

## **INDEX OF DOCUMENTATION**

Attachment 1: Supporting information

Attachment 2: Sinosteel proof of ownership for M51/869

Attachment 3: Letter of consent for M51/869

Attachment 4: Aerial photograph of proposed site layout

**ATTACHMENT 1****SUPPORTING INFORMATION**

**ATTACHMENT 2****SINOSTEEL PROOF OF OWNERSHIP FOR M51/869**

**ATTACHMENT 3****LETTER OF CONSENT FOR M51/869**

**ATTACHMENT 4****AERIAL IMAGE OF THE SITE**



# BEEBYN-W11 IRON ORE PROJECT CLEARING PERMIT APPLICATION SUPPORTING INFORMATION

Tenements: M51/869

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## TABLE OF CONTENTS

1	OVERVIEW .....	5
2	MINE ACTIVITY DETAILS.....	7
3	BASELINE ENVIRONMENTAL DATA.....	10
3.1	IBRA 7 Biogeographic subregions .....	10
3.2	Landscape .....	10
3.3	Biological surveys.....	10
3.4	Native flora .....	12
3.4.1	Vegetation.....	17
3.5	Significant vegetation and ecological systems .....	23
3.6	Introduced flora .....	23
3.7	Fauna and habitat.....	24
3.8	Introduced fauna.....	31
3.9	Short-range endemics and subterranean fauna.....	35
3.10	Hydrology .....	36
3.10.1	Surface water .....	36
3.10.2	Groundwater.....	41
3.10.3	Groundwater Dependent Ecosystems.....	42
3.10.4	Pit lake formation.....	42
4	IMPACTS AND MANAGEMENT .....	44
4.1	Impact to conservation significant flora .....	44
4.1.1	Management actions.....	44
4.2	Impact to conservation significant vegetation and ecological systems.....	44
4.2.1	Management actions.....	45
4.3	Introduced flora species .....	45
4.3.1	Management actions.....	45
4.4	Impact to conservation significant fauna or their habitat.....	45
4.4.1	Management actions.....	46
5	ASSESSMENT AGAINST THE 10 CLEARING PRINCIPLES .....	47
6.0	REFERENCES.....	50

## TABLES

Table 2.1: Current and proposed mine activity and areas of disturbance. ....	7
Table 3.1: Flora and fauna surveys in and around Weld Range. ....	11
Table 3.2: Floristic communities of the Weld Range, as identified by DEC in 2005. ....	12
Table 3.3: Conservation significant flora recorded and potentially occurring in the project area.....	13
Table 3.4: Priority species records within proposed infrastructure envelope. ....	17
Table 3.5: Vegetation types identified in the project area. ....	18
Table 3.6: Proportion of project area in PEC (excluding existing disturbance). ....	23
Table 3.7: Weed species recorded and potentially occurring in the project area.....	24
Table 3.8: Conservation significant fauna likelihood of occurrence. ....	27
Table 3.9: Fauna habitat recorded in the study area.....	31
Table 3.10: Adopted design flows from HECRAS modelling. ....	36
Table 3.11: Laboratory analysis of water samples from the project area. ....	41
Table 3.12: Pit recharge water balance. ....	43
Table 4.1: Impact to PEC vegetation. ....	44

## FIGURES

Figure 1.1: Beebyn-W11 Iron Ore Project regional location and transport route.....	6
Figure 2.1: Beebyn-W11 Project Disturbance Envelope.....	8
Figure 2.2: Proposed site layout. ....	9
Figure 3.1: Priority flora records within 30 km of the project area. ....	14
Figure 3.2: Priority flora within the proposed Beebyn-W11 area. ....	15
Figure 3.3: Priority flora within the proposed Beebyn-W11 infrastructure area. ....	16
Figure 3.4: Vegetation types associated with the project area – map 1 of 3. ....	20
Figure 3.5: Vegetation types associated with the project area – map 2 of 3. ....	21
Figure 3.6: Vegetation types associated with the project area – map 3 of 3. ....	22
Figure 3.7: Database search records of conservation significant fauna within 30 km of the project area. ....	28
Figure 3.8: Possible extinct malleefowl mounds recorded in the project area. ....	29
Figure 3.9: Recorded <i>Idiosoma clypeatum</i> locations in the Beebyn-W11 project area. ....	30
Figure 3.10: Fauna habitat in the project area – map 1 of 3. ....	32
Figure 3.11: Fauna habitat in the project area – map 2 of 3. ....	33
Figure 3.12: Fauna habitat in the project area – map 3 of 3. ....	34
Figure 3.13: Surface water catchments of the infrastructure area. ....	38
Figure 3.14: Beebyn-W11 project flood risk (infrastructure area) for a 1 in 100-year AEP.....	39
Figure 3.15: Surface water catchments of the haul road area. ....	40



**APPENDICES** (Provided as a separate document)**Appendix 1:** Flora and Fauna Reports

1a: Weld Range Flora and Vegetation Assessment - *ecologia* Environment 2010

1b: Beebyn Flora, Vegetation and Fauna Assessment – APM 2024

1c: Iron Ridge Biological Survey 2019 – *ecologia* Environment 2020

1d: Status review of *Idiosoma clypeatum* – Biologic Environmental Survey 2019

1e: Weld Range *Idiosoma nigrum* Survey – Biologic Environmental Survey 2012

1f: W11 Targeted Biological Survey – Ecotec 2024

1g: Review of *Cethegus* species limits and SRE status – Invertebrate Solutions 2024

**Appendix 2:** Iron Ridge Stygofauna Assessment - *ecologia* Environment 2020

**Appendix 3:** Hydrogeology and Hydrology Assessment - Pentium Water 2024

## 1 OVERVIEW

Fenix Resources Ltd is proposing to develop the Beebyn-W11 Iron Ore Project (the Project), approximately 600 km north-east of Perth and 85 km south-west of Meekatharra in the Mid-West Region of Western Australia (Figure 1.1). Fenix Beebyn Pty Ltd (Fenix Beebyn) is a wholly owned subsidiary of Fenix Resources Pty Ltd.

Fenix Beebyn has signed a binding agreement with Sinosteel Midwest Corporation (SMC) securing the exclusive right to mine and export up to 10 million dry metric tonnes of iron ore from the high-grade Beebyn-W11 iron ore deposit in the Weld Range (refer ASX announcement dated 3 October 2023).

Fenix already owns and operates the Iron Ridge Project, approximately 20 km to the west of the Beebyn-W11 deposit. The project is located on an existing mining lease – M51/869 – held by Sinosteel Midwest Corporation Ltd (SMC). Development of the Project will be undertaken by Fenix under an agreement with SMC. Miscellaneous Licence L20/92 (assessment pending), to be held by Fenix Beebyn Pty Ltd, will connect the Beebyn-W11 project to the Iron Ridge Project. It should be noted that baseline environmental data for the project includes details of L20/92 for project context, however, the Clearing Permit application only relates to the disturbance on M51/869.

The project is expected to produce approximately 3.9 million tonnes (Mt) of high-grade iron ore over a four year mine life, with ore being crushed on site using a semi-mobile crushing plant, then trucked to Geraldton for export to overseas customers.

An expected 13.7 Mt of waste rock will be produced over the life of the operation, with some being used for construction of pads and road surfaces, and the remainder deposited into a waste dump adjacent to the pit on M51/869.

The workforce will operate on a fly-in, fly-out (FIFO) roster and will be accommodated at Fenix's existing Iron Ridge facility, approximately 20 km to the west of the proposed Beebyn-W11 mine site.

Fenix Beebyn lodged a Mining Proposal and Mine Closure Plan in May 2024 detailing the proposed project. The Mining Proposal and Mine Closure is currently under assessment by DEMIRS.

A Works Approval application was lodged in May 2024 for the prescribed activities Category 5 (crushing and screening) and Category 6 (mine dewatering) and is currently under assessment by DWER.

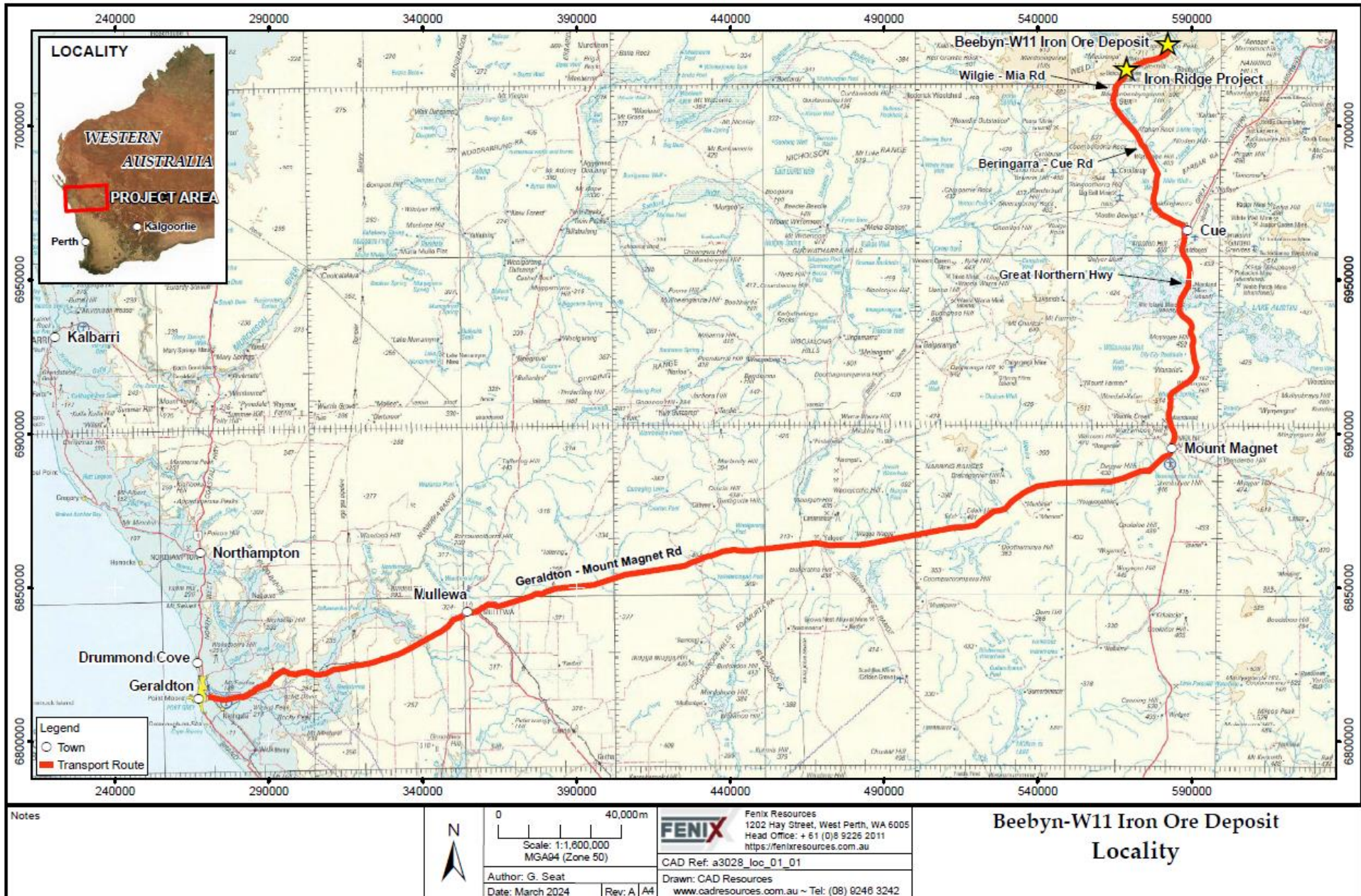


Figure 1.1: Beebyn-W11 Iron Ore Project regional location and transport route.

## 2 MINE ACTIVITY DETAILS

Clearing will be undertaken for a variety of Key Mining Activities and Other Mine Activities, as defined by DEMIRS (2023). Table 2.1, from the project Mining Proposal submitted in May 2024, provides details of the current and proposed mine activity types at the Beebyn-W11 Project.

Figure 2.1 provides the Disturbance Envelope for the project and all disturbance will occur within the defined Disturbance Envelope. Figure 2.2 provides the proposed site layout.

**Table 2.1: Current and proposed mine activity and areas of disturbance.**

Tenement: M51/869				
Activity Category	Activity Reference	Proposed area (Ha)	Current Approved Area (Ha)	Total Area (Ha) (proposed + current approved)
<b>Key Mine Activities</b>				
Waste dump or overburden stockpile (class 1)	Waste dump	68.0	0	68.0
Mining void (depth greater than 5m – below groundwater)	Open pit	15.0	0	15.0
Plant site	Crushing and screening	2.8	0	2.8
Run of mine pad	ROM	6.5	0	6.5
<b>Key Mine Activity Total Area</b>		<b>92.3</b>	<b>0</b>	<b>92.3</b>
<b>Other Mine Activities</b>				
Diversion channel or drain	Diversion channel or drain	<i>Footprints not required</i>		
Low-grade ore stockpile (class 2)	Low grade stockpile			
Dam - fresh water	Water storage dam			
Workshop	Magazine			
Borrow pit or shallow surface excavation	Borrow pit			
Laydown or hardstand area	Laydown, parking areas			
Transport or infrastructure corridor	Haul and access roads			
Topsoil stockpile	Topsoil stockpiles			
Land that is cleared of vegetation (other cleared land)	Abandonment bund			
Land that is cleared of vegetation (other cleared land)	Miscellaneous historic disturbance			
<b>Other Mine Activity Total Area</b>		<b>135.3</b>	<b>0</b>	<b>135.3</b>
<b>Total Tenement Activity Area</b>		<b>227.6</b>	<b>0</b>	<b>227.6</b>

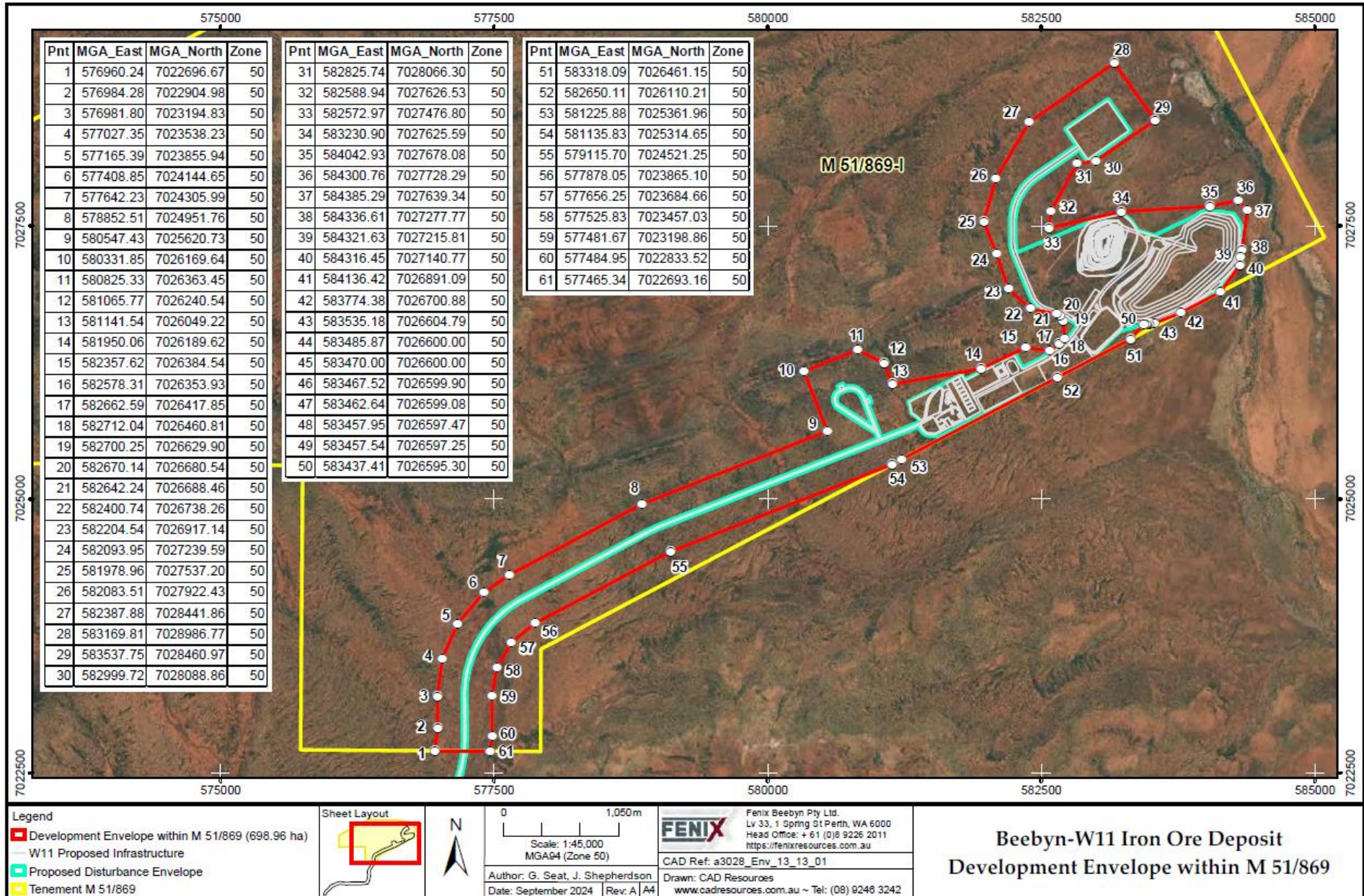


Figure 2.1: Beebyn-W11 Project Disturbance Envelope.

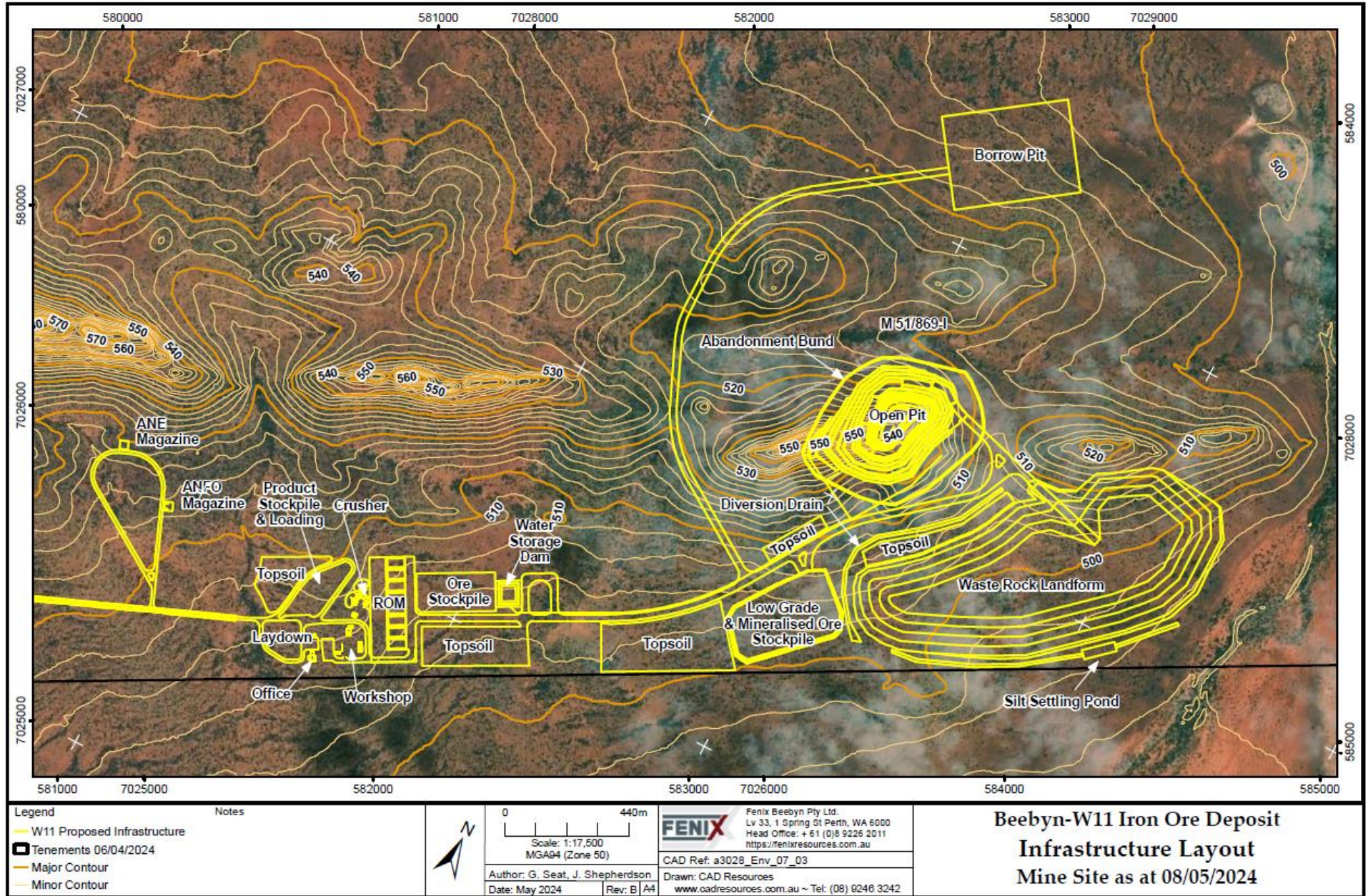


Figure 2.2: Proposed site layout.

### 3 BASELINE ENVIRONMENTAL DATA

#### 3.1 IBRA 7 Biogeographic subregions

The Interim Biogeographic Regionalisation for Australia (IBRA) classifies the Australian continent into regions or bioregions on the basis of similar geology, landform, vegetation, fauna and climate characteristics. The project area is situated within the Murchison Region according to IBRA 7, which is further divided into two subregions: Eastern Murchison and Western Murchison (DAWE 2019). The study area is situated within the Western Murchison subregion (MUR2).

The West Murchison subregion is in the northern end of the Yilgarn Craton, which experiences an arid climate with bimodal rainfall that usually falls in the winter months. The Western Murchison subregion is characterised by Mulga low woodlands on outcrop and fine textured Quaternary alluvial and eluvial surfaces mantling granitic and greenstone strata (Desmond et al. 2001). Quaternary plains contain hummock grasslands, saltbush shrublands on calcareous soils and Halosarcia low shrublands on saline alluvia.

#### 3.2 Landscape

The Beebyn-W11 Project is located within the Murchison Bioregion of the Interim Biogeographic Regionalisation of Australia (IBRA) and is situated in the Western Murchison subregion (MUR2), close to the boundary of the Eastern Murchison subregion (MUR1).

The MUR2 subregion is described by Desmond et. al. (in DAWE 2019) as follows:

*“Mulga low woodlands, often rich in ephemerals (usually with bunch grasses), on outcrop and fine textured Quaternary alluvial and eluvial surfaces (extensive hardpan wash plains that dominate and characterise the subregion) mantling granitic and greenstone strata of the northern part of the Yilgarn Craton. Surfaces associated with the occluded drainage occur throughout with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and Halosarcia low shrublands on saline alluvia. Contains the headwaters of the Murchison and Wooramel Rivers, which drain the subregion westwards to the coast. Arid climate with bimodal rainfall that usually falls in winter. The subregional area is 7,847,996 ha.”* (DAWE 2019).

Laterite or silcrete mesas are usually found at the top of the landscape in areas of granitic basement. These mesas have lateritic breakaways, kaolinised footslopes (often saline) and are surrounded by gently sloping plains. There are also some low hills, domes and tor fields of granite, gneiss and quartz found in upper parts of the landscape. The bulk of the terrain consists of gently undulating wash plains and sandplains sitting below the mesas and hills. Although wash plains are most common in the north-west, they occur throughout the province with the exception of its eastern margin. These wash plains consist of very gently inclined alluvial surfaces that carry sheet flows. Typically, an almost continuous cemented layer of red-brown hardpan has formed in these deposits. There are often small sandy banks and groves across the wash plains and gravelly mantles are sometimes present. Narrow saline drainage tracts may also be found (Tille 2006).

Soils on the plains are typically red loamy earths and red-brown hardpan shallow loams. Red sandy soils are found along the significant drainage channels. Shallow loams and sands and stony soils are found on the hills and mesas with sandy soils more common on granitic hills. Salt lake soils are found on the valley floors (Tille 2006).

#### 3.3 Biological surveys

Flora and fauna surveys have been completed in and around the project area and the wider Weld Range. The project area and surrounds have been quite extensively covered by prior biological surveys.

A summary of the surveys relevant to the project are presented in Table 3.1. More details are provided in the following sections.

**Table 3.1: Flora and fauna surveys in and around Weld Range.**

Survey type and location.	Year	Consultants
Flora and vegetation survey - Weld Range Iron Ore; Atlas Iron	2008	Woodman Environmental
Flora and Vegetation of the banded iron formations of the Yilgarn Craton: The Weld Range	2008	Department of Conservation (DEC)
Targeted Shield-backed trapdoor spider, SRE Invertebrate and vertebrate fauna survey	2009	Bamford Consulting Ecologists
Weld Range Level 1 Targeted Fauna Survey; Atlas Iron Ltd	2009	Biologic
Weld Range Vegetation and Flora Assessment Unpublished Report for Sinosteel-Midwest Corporation	2009	<i>ecologia</i>
Weld Range Vertebrate Fauna Assessment. Unpublished Report for Sinosteel-Midwest Management	2009	<i>ecologia</i>
SRE Invertebrate habitat survey; Atlas Weld Range Project	2011	Biologic
Weld Range DSO Project, Local and Regional Significant Flora Assessment 2012; Atlas Iron Ltd	2012	Woodman Environmental
Weld Range DSO Project, Flora and Vegetation Assessment; Atlas Iron Ltd	2012	Woodman Environmental
Weld Range <i>Idiosoma nigrum</i> Survey 2012; Atlas Iron Ltd	2012	Biologic
<i>Idiosoma nigrum</i> Status Review	2019	Biologic
Iron Ridge Flora and Fauna Reconnaissance Survey	2019	<i>ecologia</i>
Iron Ridge Biological Survey 2019	2019	<i>ecologia</i>
<i>Micromyrtus placoides</i> Targeted Survey	2020	<i>ecologia</i>
Beebyn 11 Weld Range Flora and Fauna Survey	2023	Animal Plant Mineral (APM)
Beebyn W11 Targeted Biological Survey	2024	Ecotec (WA) Pty Ltd

The BIF ranges of the Mid West and Goldfields regions are generally considered to have significant biodiversity value because of their unique geology, soils and relative isolation. The values of the ranges are related to the presence of endemic plant species, threatened and restricted plant species, highly restricted and distinct plant communities and ecological communities. The ranges also exhibit very distinct features in their regional landscape and in many cases possess outstanding landscape values. They also have fauna conservation values although these are less well documented than for flora. There are, however, differences between the various BIF ranges in terms of their biodiversity conservation and mineral prospectively/resource values.

The Midwest BIF ranges are considered to be under represented in the State's reserve system (Department of Environment and Conservation [DEC] 2007) however, in the report *Banded Ironstone Formation Ranges of the Midwest and Goldfields - Interim Status Report - Biodiversity Values and Conservation Requirements* by DEC (now DBCA), the Weld Range was described as being a "lower biodiversity value site, although still providing refugial habitats with localised species and vegetation communities" (DEC 2007).

The Beebyn-W11 Project partly coincides with the Priority 1 Priority Ecological Community (PEC) "Weld Range vegetation complexes (banded ironstone formation)" and the 500 m administrative buffer that surrounds it. Rather



than being defined by a specific plant community, the extent of the Weld Range PEC has been determined on the basis of its extent over the banded iron formation of the Weld Range (*ecologia* 2020a).

A survey of the flora and floristic communities of the Weld Range was undertaken by DEC in 2005 (Markey and Dillon 2008). A total of 239 taxa (species, subspecies and varieties) and five hybrids of vascular plants were collected and identified from within the survey area. Of these, 229 taxa were native and 10 species were introduced. Eight priority species were located in this survey, six of these being new records for the Weld Range.

Eight floristic community types (six types, two of these subdivided into two subtypes each) were identified and described for the Weld Range. There did not appear to be any restricted communities within the landform, but some of these communities may be geographically restricted to the Weld Range (Markey and Dillon 2008).

Table 3.2 lists the floristic communities identified during the DEC survey of Weld Range (Markey and Dillon 2008).

**Table 3.2: Floristic communities of the Weld Range, as identified by DEC in 2005.**

Reference	Description
Community 1a:	Dominated by <i>Acacia aneura</i> , <i>Acacia ramulosa</i> and/or <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994) over sparse shrub cover of <i>Eremophila</i> spp., mainly on mid-upper slopes.
Community 1b:	Open shrubland of <i>Acacia aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994) and <i>Grevillea berryana</i> over shrub cover of <i>Eremophila</i> spp. on gentle-moderate slopes.
Community 2:	Open Shrubland of <i>Acacia</i> cf. <i>aneura</i> var. <i>microcarpa</i> and/or <i>Acacia</i> cf. <i>aneura</i> var. <i>aneura</i> , over <i>Thryptomene decussata</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> and <i>Eremophila</i> spp. on BIF on moderate-steep slopes.
Community 3:	Depauperate Shrubland dominated by <i>Acacia aneura</i> on scree slopes.
Community 4:	Open Shrubland of <i>Acacia aneura</i> with <i>Acacia pruinocarpa</i> over shrublands of <i>Philotheca brucei</i> var. <i>brucei</i> and <i>Eremophila</i> spp. on steep rocky hillslopes.
Community 5a:	Open Shrubland of <i>Acacia aneura</i> and <i>Acacia ramulosa</i> with emergent <i>Acacia pruinosa</i> , mainly on lower slopes and outwash areas.
Community 5b:	Open Shrubland of <i>Acacia aneura</i> or <i>Acacia effusifolia</i> over <i>Senna</i> spp. and <i>Tribulus suberosus</i> on lower slopes.
Community 6:	Sparse Shrubland of <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia aneura</i> and <i>Acacia speckii</i> over Shrubland of <i>Eremophila macmilliana</i> , <i>Eremophila mackinleyi</i> subsp. <i>spathulate</i> and <i>Senna</i> spp. on dolerite

Knowledge of the faunal biodiversity significance of the BIF environments is incomplete, however current knowledge indicates that these isolated areas provide important refuges for fauna. Nineteen vertebrate fauna and one invertebrate species of conservation significance were identified from Threatened and Priority Fauna database searches within 100 km of the project area, predominately recorded within the Weld Range.

### 3.4 Native flora

Database searches indicated that a total of 28 conservation significant flora taxa have been recorded within a 30 km area around the project site. No Threatened flora species have been recorded in the area. Figure 3.1 provides the recorded locations of Priority listed flora within a 30 km radius of the project.

Ecologia Environment Pty Ltd (*ecologia*) were commissioned by Sinosteel to carry out a Level 2 flora and vegetation survey of the project area and surrounds over four surveys between 2006 and 2009 (*ecologia* 2010b); as well as a targeted conservation significant flora survey of a number of proposed exploration drill lines in the area. The surveys recorded 393 vascular flora taxa from 57 families and 140 genera within the Beebyn-W11 area and surrounding region; including six introduced species and 24 Priority listed flora species. No Threatened species were recorded. The *ecologia* report is included in Appendix 1.

Animal Plant Mineral Pty Ltd (APM) undertook a detailed flora and vegetation survey of the proposed Beebyn-W11 area during 2023 (APM 2024), recording 77 vascular flora taxa from 21 families and 40 genera. The reduction in taxa recorded when compared to the earlier surveys is primarily due to the region having been in drought conditions for several years and the prevalence of goats, which have had a significant impact on the vegetation.

No Threatened species were recorded; however, a single potential record of the Priority 3 listed species *Hibiscus krichauffianus* was recorded. Insufficient material was available to definitively determine the species, due to seasonal conditions. *Hibiscus krichauffianus* is common in the central parts of Australia and the Queensland mid coast. The nearest known record is approximately 250 km south west of the project area, with most records in WA from the Pilbara. The species has not previously been recorded in the Murchison Region (APM 2024).

Ecotec undertook a vegetation and targeted conservation significant flora survey of the project area in August 2024 (Ecotec 2024). No Threatened species were recorded, however five Priority listed flora species were recorded. The Ecotec report is included in Appendix 1.

Table 3.3 provides a summary of the conservation significant flora recorded during survey work, as well as those species considered to be possible inhabitants of the immediate project area. Except for *Acacia dilloniorum*, all taxa listed have distributions extending over 100 km, consistent with observations by Markey and Dillon (2008) that most species are not endemic to the Weld Ranges (*ecologia* 2010b). Species that were considered as unlikely to occur following the survey are not included in this summary table. Full discussion is included in the APM report (APM 2024), provided in Appendix 1.

The distribution of Priority species recorded in the Ecotec (2024) survey in relation to the proposed development infrastructure is shown on Figure 3.2 and Figure 3.3.

**Table 3.3: Conservation significant flora recorded and potentially occurring in the project area.**

Species	Conservation Status	Likelihood of occurrence
<i>Acacia dilloniorum</i>	P1	Possible – suitable habitat exists in the project area, no known records in immediate vicinity.
<i>Beyeria lapidicola</i>	P1	Recorded ( <i>ecologia</i> 2010b, Ecotec 2024)
<i>Euphorbia sarcostemmoides</i>	P1	Recorded (Ecotec 2024)
<i>Stenanthemum mediale</i>	P1	Recorded (Ecotec 2024)
<i>Acacia burrowsiana</i>	P3	Possible – suitable habitat exists in the project area
<i>Hemigenia virescens</i>	P3	Possible - suitable habitat exists in the project area, no known records in immediate vicinity.
<i>Hibiscus ?krichauffianus</i>	P3	Recorded (APM 2024)
<i>Homalocalyx echinulatus</i>	P3	Possible - suitable habitat exists in the project area, previous records in immediate vicinity ( <i>ecologia</i> 2010b)
<i>Micromyrtus placoides</i>	P3	Recorded (Ecotec 2024)
<i>Prostanthera petrophila</i>	P3	Recorded ( <i>ecologia</i> 2010b, Ecotec 2024)
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)	P3	Possible - suitable habitat exists in the project area, no known records in immediate vicinity
<i>Verticordia jamiesonii</i>	P3	Recorded ( <i>ecologia</i> 2010b, Ecotec 2024)
<i>Acacia speckii</i>	P4	Recorded ( <i>ecologia</i> 2010b, Ecotec 2024)
<i>Dodonaea amplisemina</i>	P4	Recorded ( <i>ecologia</i> 2010b)
<i>Grevillea inconspicua</i>	P4	Possible - suitable habitat exists in the project area, no known records in immediate vicinity.

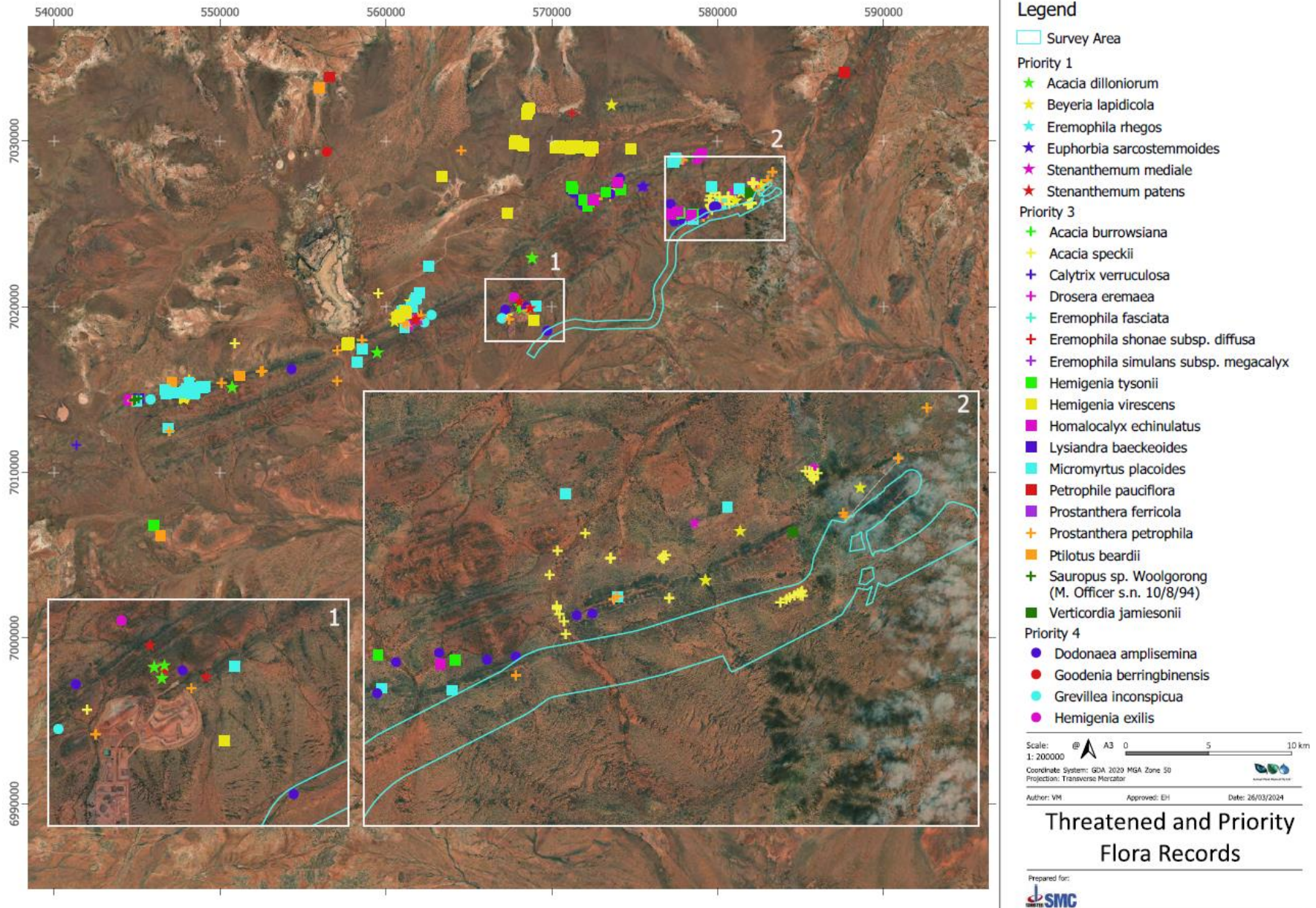


Figure 3.1: Priority flora records within 30 km of the project area.

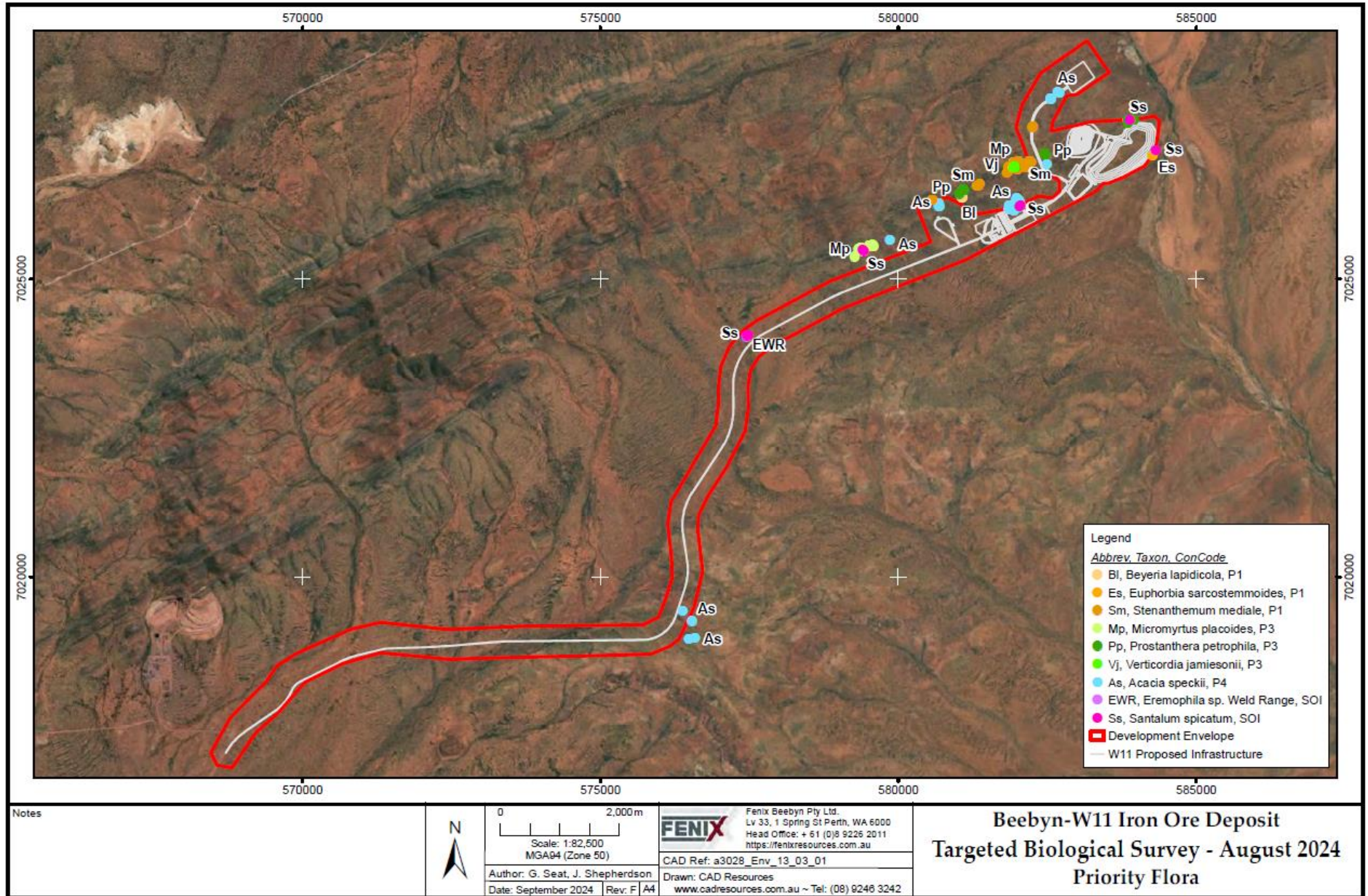


Figure 3.2: Priority flora within the proposed Beebyn-W11 area.

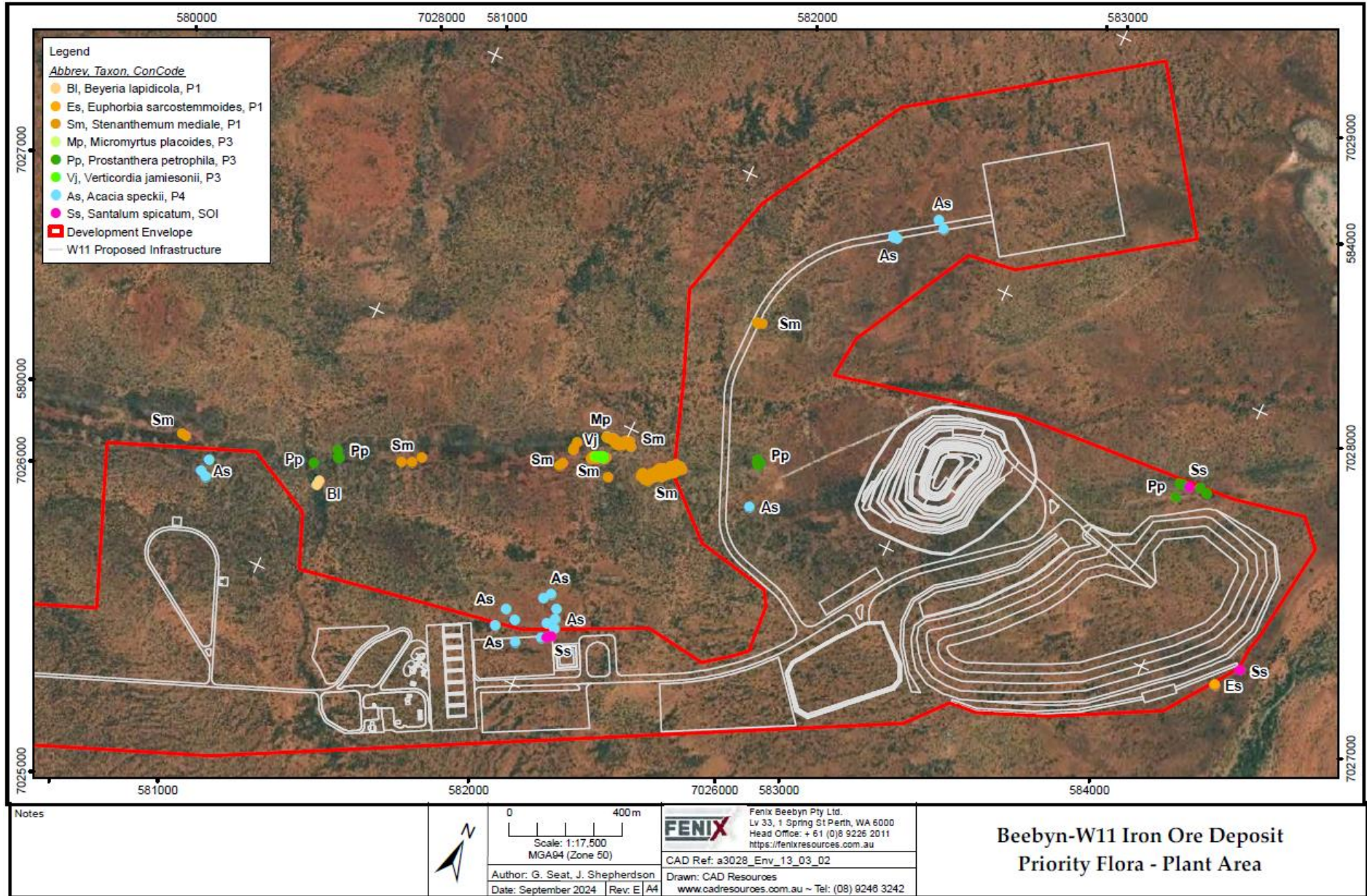


Figure 3.3: Priority flora within the proposed Beebyn-W11 infrastructure area.

Following the survey undertaken by Ecotec (2024), individuals of three of the Priority species recorded will be impacted by the proposed development (Figure 3.3). Table 3.4 lists the Priority species and the number of individuals to be impacted.

No *Hibiscus ?krichauffianus* individuals were recorded in the project area during the Ecotec (2024) survey. It is likely that the individuals of this species previously recorded by APM have since senesced or were misidentified due to lack of reproductive material present at the time of the APM survey. Prior to the Ecotec survey in August 2024, the project area had received average rainfall for the year, with the flora in good condition and many species reproductive (flowering, fruiting) and therefore more easily identifiable (Ecotec 2024).

**Table 3.4: Priority species records within proposed infrastructure envelope.**

Taxon	Known number of individuals at Weld Range	Individuals recorded within proposed disturbance footprint
<b>Priority 1</b>		
<i>Stenanthemum mediale</i>	186 ( <i>ecologia</i> 2012) 250 (Ecotec 2024)	4
<b>Priority 3</b>		
<i>Prostanthera petrophila</i>	2,184 ( <i>ecologia</i> 2012) 108 (Ecotec 2024)	17
<b>Priority 4</b>		
<i>Acacia speckii</i>	1,193 ( <i>ecologia</i> 2012) 51 (Ecotec 2024)	25

### 3.4.1 Vegetation

The 2024 Ecotec survey recorded 16 vegetation types within the project area, which generally corresponded with the floristic communities described by Markey and Dillon (2008). The vegetation types described in the Ecotec report are listed in Table 3.5 and have been recorded over the length of the Weld Range in the DEC survey (Markey and Dillon 2008). Figure 3.4 to Figure 3.6 show the distribution of vegetation types within the project area.

Vegetation condition ranged from 'Very Good' to 'Completely Degraded'. Most of the disturbance was a result of moderate to heavy grazing impact from goats and euro, and historically heavy grazing by sheep that has degraded the land and made it compacted and susceptible to sheet erosion. Historical pastoral grazing has also resulted in the loss of palatable shrubs, grasses and forbs, and a low recruitment of perennial species.

Further detail can be found in the Ecotec report, included in Appendix 1.

**Table 3.5: Vegetation types identified in the project area.**

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)
1	<i>Acacia pruinocarpa</i> open woodland or isolated trees over <i>Acacia aptaneura</i> , <i>A. caesaneura</i> , <i>A. craspedocarpa</i> tall sparse shrubland over <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Acacia tetragonophylla</i> , <i>Rhagodia eremaea</i> , <i>Teucrium teucriiflorum</i> sparse shrubland over <i>Ptilotus obovatus</i> , <i>Menkea villosula</i> , <i>Goodenia tenuiloba</i> low sparse to open shrubland; understory denser under pockets of trees. Not representative of PEC.	71.4	48.4
2	<i>Acacia pruinocarpa</i> mostly absent; <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Acacia</i> sp. Weld Range occasional <i>Acacia incurvaneura</i> , <i>A. pteraneura</i> , <i>Acacia aptaneura</i> , <i>Grevillea berryana</i> tall open shrubland over <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Ptilotus rotundifolius</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>E. glutinosa</i> , <i>E. forrestii</i> subsp. <i>forrestii</i> sparse shrubland over <i>Eragrostis eriopoda</i> , <i>Ptilotus aervoides</i> , <i>Erodium cygnorum</i> , low sparse tussock grassland. Representative of PEC – aligns with Community 3 identified by Markey & Dillion (2008)	37.1	30.0
3	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>A. rhodophloia</i> isolated tall shrubs over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Sida</i> sp. Golden calyces glabrous open shrubland over <i>Erodium cygnorum</i> , <i>Goodenia tenuiloba</i> Representative of PEC – aligns with Community 5 identified by Markey & Dillion (2008)	62.2	45.4
4	<i>Acacia pruinocarpa</i> , <i>A. incurvaneura</i> isolated trees over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Dodonaea pachyneura</i> , <i>Philothea brucei</i> subsp. <i>brucei</i> , <i>Prostanthera petrophila</i> , <i>Tribulus suberosus</i> open shrubland over <i>Ptilotus obovatus</i> , <i>Micromyrtus sulphurea</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i> , <i>Stylidium longibracteatum</i> , <i>Goodenia tenuiloba</i> , <i>Hysterobaeckea occlusa</i> low open shrubland/ low open forbland. Representative of PEC – aligns with Communities 1b and 2 identified by Markey & Dillion (2008)	8.4	5.7
5	<i>Acacia incurvaneura</i> low open woodland/ tall sparse shrubland over <i>Acacia</i> sp. Weld Range, <i>Eremophila macmillaniana</i> tall sparse shrubland over <i>Eremophila macmillaniana</i> , <i>Senna glaucifolia</i> , <i>Ptilotus rotundifolius</i> open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. macmillaniana</i> , <i>Hibiscus sturtii</i> low sparse shrubland over <i>Maireana melanocoma</i> , <i>Ptilotus aervoides</i> , <i>Goodenia tenuiloba</i> low sparse chenopod shrubland. Representative of PEC – aligns with Community 5 identified by Markey & Dillion (2008)	46.3	29.5
6	<i>Acacia incurvaneura</i> , <i>A. pruinocarpa</i> , <i>A. fuscaneura</i> low woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Psydrax latifolia</i> tall open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Rhagodia eremaea</i> , <i>Senna artemisioides</i> subsp. <i>xsturtii</i> , <i>S. glutinosa</i> subsp. <i>xluerssenii</i> shrubland over <i>Erodium cygnorum</i> , <i>Tetragonia cristata</i> , <i>Isoetopsis graminifolia</i> , <i>Menkea villosula</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> low forbland. Not representative of PEC.	60.1	24.3
7	<i>Acacia incurvaneura</i> , <i>A. sp.</i> Weld Range, <i>A. speckii</i> tall sparse shrubland over <i>Ptilotus rotundifolius</i> , <i>Eremophila fraseri</i> , <i>E. latrobei</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> sparse shrubland over <i>Sida ectogama</i> , <i>Ptilotus aervoides</i> , <i>P. schwartzii</i> , <i>Erodium cygnorum</i> low sparse shrubland. Representative of PEC – aligns with Community 6 identified by Markey & Dillion (2008)	37.5	3.7
8	<i>Acacia incurvaneura</i> , <i>A. pruinocarpa</i> tall open shrubland over <i>Acacia ramulosa</i> , <i>Eremophila latrobei</i> , <i>Scaevola spinescens</i> , <i>Senna glaucifolia</i> , sparse shrubland over <i>Eremophila latrobei</i> , <i>Stenanthemum mediale</i> , <i>Sida ectogama</i> , <i>Micromyrtus sulphurea</i> low sparse	16.7	1.8

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)
	shrubland. Representative of PEC – aligns with Community 2 identified by Markey & Dillion (2008)		
9	<i>Acacia pruinocarpa</i> low woodland/ <i>Acacia incurvaneura</i> , <i>A. ramulosa</i> tall open shrubland over <i>Eremophila simulans</i> , <i>E. georgei</i> , <i>E. forrestii</i> open shrubland patches in tall open shrubland of <i>Acacia incurvaneura</i> and <i>A. ramulosa</i> . Not representative of PEC.	231.0	66.3
10	<i>Acacia incurvaneura</i> , <i>A. caesaneura</i> , <i>A. pruinocarpa</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Grevillea berryana</i> , low open woodland/ tall open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Acacia</i> spp. open shrubland over <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>E. forrestii</i> subsp. <i>forrestii</i> , <i>E. simulans</i> subsp. <i>simulans</i> , <i>Sida ectogama</i> , <i>S. sp.</i> Golden calyces glabrous, <i>Ptilotus schwartzii</i> , <i>Eragrostis eriopoda</i> low sparse shrubland. Not representative of PEC.	129.5	9.1
11	<i>Acacia pruinocarpa</i> , <i>A. incurvaneura</i> open forest over <i>Glycine canescens</i> , <i>Santalum spicatum</i> , <i>Psydrax latifolia</i> vinedland/ <i>Acacia ramulosa</i> , <i>Glycine canescens</i> , <i>Psydrax latifolia</i> , <i>Eremophila forrestii</i> var. <i>hastieana</i> open shrubland over <i>Sida ectogama</i> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> low shrubland. Not representative of PEC.	11.3	1.6
12	<i>Acacia incurvaneura</i> , <i>A. caesaneura</i> , <i>A. pruinocarpa</i> low woodland/ <i>A. tetragonophylla</i> , <i>A. craspedocarpa</i> , <i>Psydrax latifolia</i> tall open shrubland/ <i>Eremophila forrestii</i> var. <i>forrestii</i> or var. <i>hastieana</i> , <i>A. ramulosa</i> , <i>Eremophila georgei</i> shrubland/ <i>Sida ectogama</i> , <i>Cheilanthes sieberi</i> low shrubland. Not representative of PEC.	89.2	6.6
13	<i>Acacia pruinocarpa</i> low isolated trees over <i>Acacia incurvaneura</i> , <i>A. tetragonophylla</i> tall sparse shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>A. incurvaneura</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>E. georgei</i> open shrubland over <i>Eremophila georgei</i> , <i>E. foliosissima</i> , <i>Ptilotus schwartzii</i> , <i>Stenopetalum filifolium</i> , <i>Menkea villosula</i> , <i>Isoetopsis graminifolia</i> low open forbland Not representative of PEC.	410.3	33.7
14	<i>Acacia aptaneura</i> , <i>A. grasbyi</i> low open woodland over <i>Eremophila pantonii</i> , <i>Acacia aptaneura</i> , <i>Senna glaucifolia</i> sparse shrubland over <i>Maireana thesioides</i> , <i>M. triptera</i> , <i>Senna glaucifolia</i> low open chenopod shrubland. Not representative of PEC.	9.4	0.7
15	<i>Acacia aneura</i> , <i>A. sp. Weld Range</i> tall isolated shrubs over <i>Eremophila macmillaniana</i> , <i>Acacia</i> sp. Weld Range, <i>Acacia speckii</i> sparse shrubland over <i>Cephalopterum drummondii</i> , <i>Sida ectogama</i> , <i>Aristida contorta</i> low sparse forbland. Representative of PEC – aligns with Community 6 identified by Markey & Dillion (2008)	43.5	3.5
16	<i>Acacia pteraneura</i> , <i>A. fuscaneura</i> tall open shrubland over <i>Acacia fuscaneura</i> , <i>Grevillea deflexa</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> sparse shrubland over <i>Calytrix desolata</i> , <i>Grevillea deflexa</i> low sparse shrubland over <i>Calytrix desolata</i> , <i>Grevillea deflexa</i> low sparse shrubland over <i>Cymbopogon ambiguus</i> low sparse tussock grassland. Not representative of PEC.	24.2	2.2
CL	Cleared areas	20.9	8.8
<b>Total</b>		<b>1,309.2</b>	<b>321.4</b>



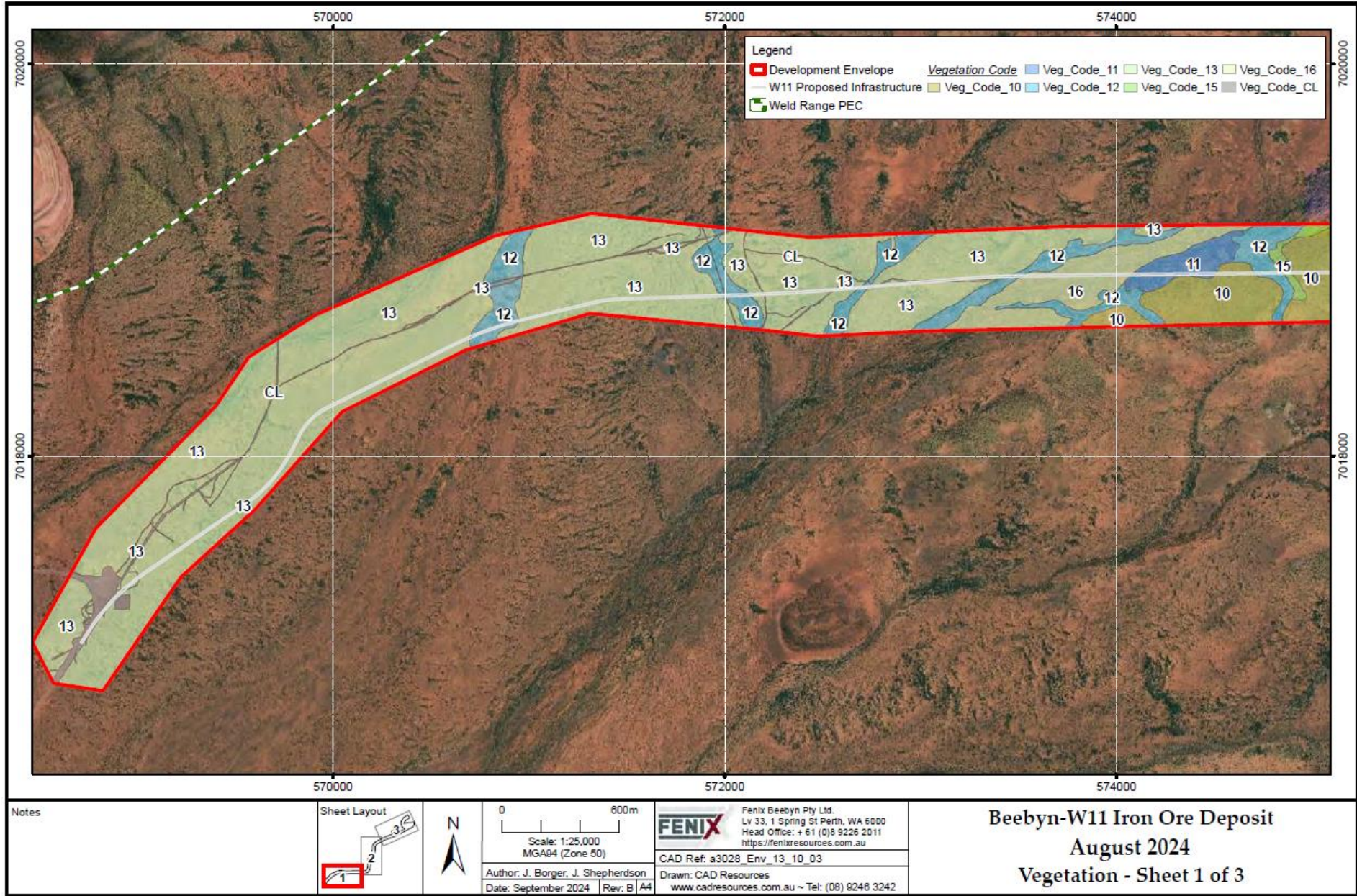


Figure 3.4: Vegetation types associated with the project area – map 1 of 3.

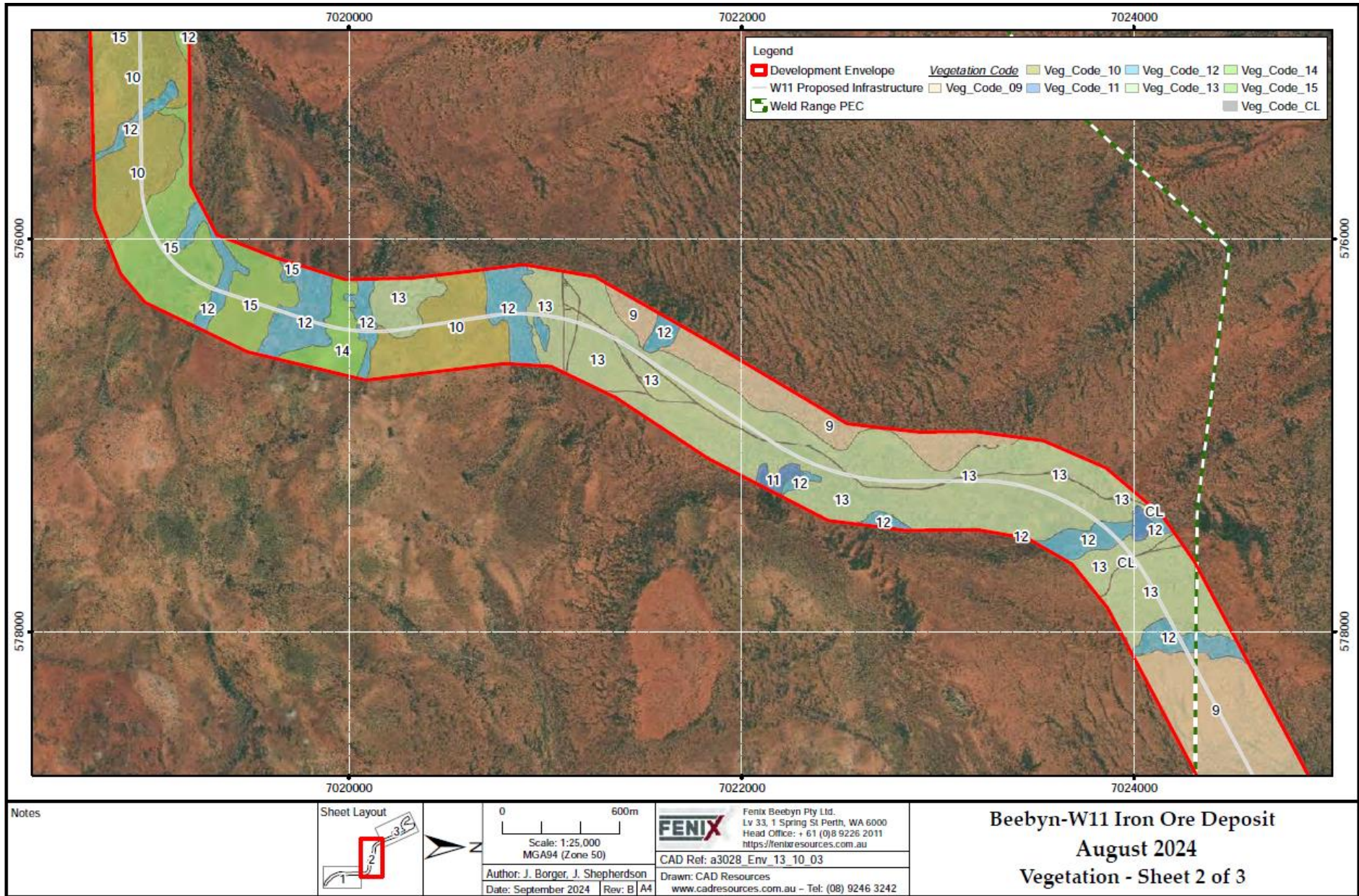


Figure 3.5: Vegetation types associated with the project area – map 2 of 3.

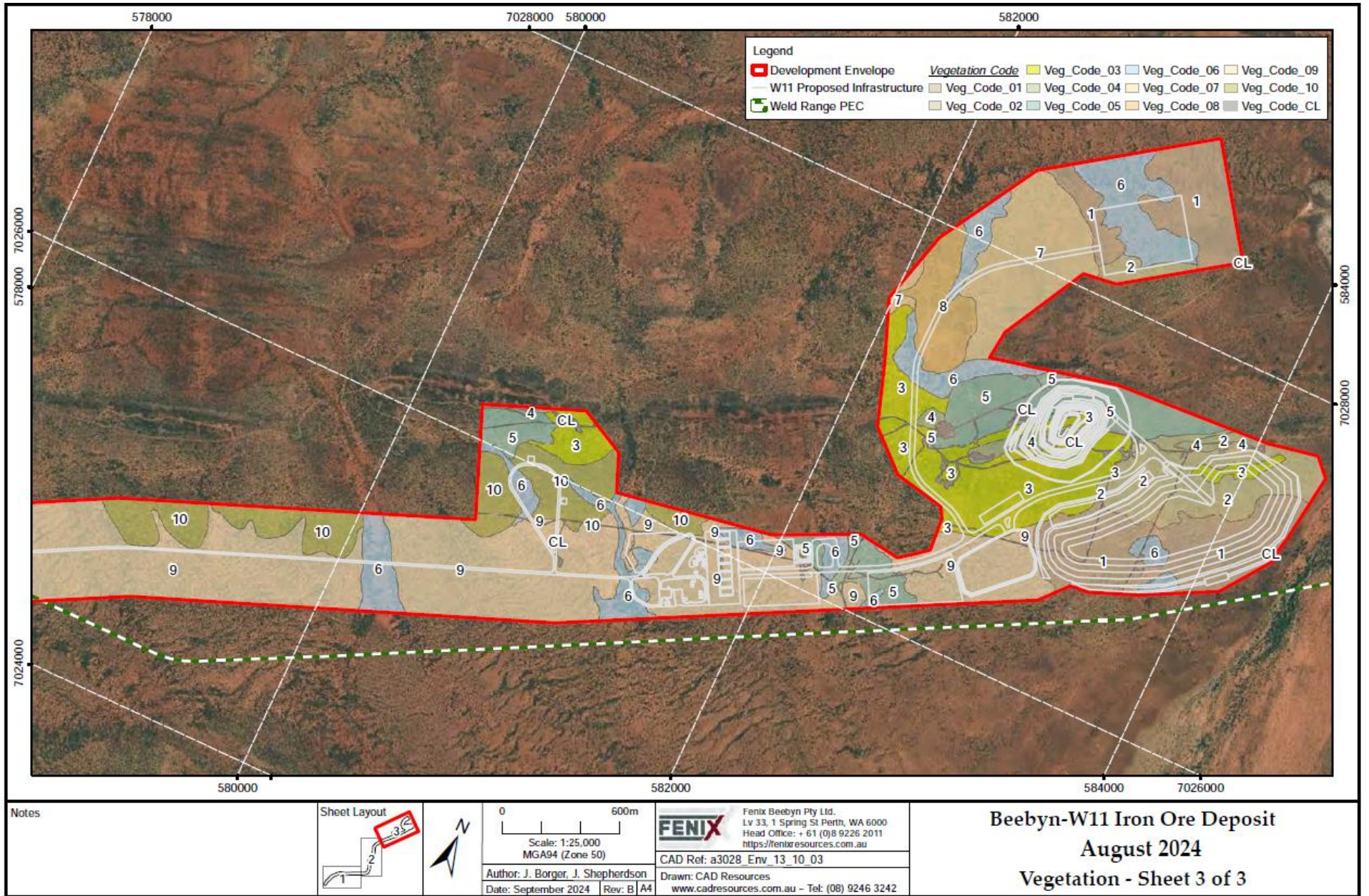


Figure 3.6: Vegetation types associated with the project area – map 3 of 3.

### 3.5 Significant vegetation and ecological systems

No State (DBCA) or Commonwealth (EPBC Act) listed Threatened Ecological Communities (TECs) occur within the project area.

The project area partly coincides with the Priority 1 Priority Ecological Community (PEC) Weld Range Vegetation Complexes (banded ironstone formation). Figure 3.4 to Figure 3.6 show the PEC boundary and vegetation in relation to the proposed project layout. The PEC boundary defined by DBCA includes a 500 m “administrative buffer”, which includes some vegetation types that do not align with the PEC description. The Weld Range PEC occupies an area of 20,073 ha, with the project area (excluding existing exploration disturbance) coinciding with less than 1.3% of this area.

Vegetation types 2, 3, 4, 5, 7, 8 and 15, as identified by Ecotec (2024) correspond to the PEC as delineated by DBCA (2019), with 116.1 ha of disturbance proposed for the project occurring within the PEC, inclusive of the buffer zone (Table 3.6).

**Table 3.6: Proportion of project area in PEC (excluding existing disturbance).**

Vegetation Code	Disturbance Envelope in PEC (ha)
2	30.0
3	45.4
4	5.7
5	29.5
7	3.7
8	1.8
15	-
<b>Total</b>	<b>116.1</b>

### 3.6 Introduced flora

The desktop survey identified nine introduced (weed) species as potentially occurring within a 30km radius of the project area. No introduced flora were recorded in the project area during the survey by APM (2024); however, Ecotec (2024) recorded one during the August survey (*Oxalis ?corniculata*). Additionally, *ecologia* (2010b) recorded five introduced (weed) species in the surrounding area and Ecotec (2021 and 2022) recorded eight weed species at the nearby Iron Ridge project. None of the weed species are listed as Weeds of National Significance. While not previously recorded in the Beebyn-W11 project area, *Rumex vesicarius* is listed as a Declared Pest on the Western Australian Organism List (Department of Primary Industries and Regional Development [DPIRD] 2024) and has been recorded at the Iron Ridge project (Ecotec 2022).

Table 3.7 lists the weed species known from the surrounding area.

**Table 3.7: Weed species recorded and potentially occurring in the project area.**

Scientific name	Common name	Known occurrence
<i>Lysimachia arvensis</i>	Pimpernel	Iron Ridge (Ecotec 2022)
<i>Brassica napus</i>	Canola	Iron Ridge (Ecotec 2022)
<i>Cenchrus ciliaris</i>	Buffel grass	Surrounding area ( <i>ecologia</i> 2010b)
<i>Centaurea melitensis</i>	Maltese cockspur	Iron Ridge (Ecotec 2022)
<i>Cuscuta epithymum</i>	Lesser Dodder	Surrounding area ( <i>ecologia</i> 2010b)
<i>Cuscuta planiflora</i>	Small seeded dodder	Iron Ridge (Ecotec 2021)
<i>Oxalis ?corniculata</i>	Yellow wood sorrel	Project area (Ecotec 2024)
<i>Portulaca oleracea</i>	Purslane	Surrounding area ( <i>ecologia</i> 2010b)
<i>Rostraria pumila</i>	Rough cats' tail	Iron Ridge (Ecotec 2021)
<i>Rumex vesicarius</i>	Ruby dock	Iron Ridge (Ecotec 2022)
<i>Solanum nigrum</i>	Black berry nightshade	Surrounding area ( <i>ecologia</i> 2010b)
<i>Sonchus asper</i>	Rough sow thistle	Iron Ridge (Ecotec 2022)
<i>Sonchus oleraceus</i>	Common sow thistle	Iron Ridge (Ecotec 2022), surrounding area ( <i>ecologia</i> 2010b)

### 3.7 Fauna and habitat

*ecologia* (2010a) undertook a Level 2 vertebrate survey of the project area and surrounds over four site visits between 2006 and 2007; recording 148 vertebrate species in and around the project area, including 80 bird species, 44 reptiles, 23 mammals (17 native and six introduced) and one amphibian.

Twenty vertebrate fauna species and two invertebrate species of conservation significance were identified from database searches of a 30 km radius from the study area including seven mammals, 11 birds and two reptiles (APM 2024). Species listed as Marine or species not known to inhabit terrestrial environments are considered very unlikely to inhabit the project area and have been excluded from further discussion. Table 3.8 provides a summary of those conservation significant species occurring or likely to occur within the Project area. Previously recorded locations of conservation significant fauna are presented in Figure 3.7.

At the Weld Range, the long-tailed dunnart has been recorded on exposed rock and stony soils with hummock grasses and shrubs, flat-topped hills, lateritic plateaus, sandstone ranges and breakaways, generally with a vegetation of sparse mulga over spinifex (*ecologia* 2009a). Within the project area, APM (2024) found suitable habitat exists in the Banded Ironstone and Drainage Line habitats.

Old, inactive malleefowl mounds have been recorded in the project area; however, mounds may last decades after abandonment and the presence of inactive mounds is not a reliable indication of current presence. The species is not expected to be a resident at Weld Range but may persist in surrounding areas of unburnt habitat (APM 2024).

The project area is on the northernmost extent of malleefowl distribution at this longitude in WA, and the closest records are over 50 km to the south. A sandy substrate and abundance of leaf litter are clear requirements for the construction of the birds' incubator-nests (Benshemesh 2007, in APM 2024). Soils in the disturbance footprint have a reasonably high clay content and litter was sparse to absent, except in the narrow Drainage Lines. The quality of the habitat for foraging and nest building are generally low, except in small patches of higher quality habitat in or

near the larger drainage features low in the plains (APM 2024). The Drainage Line habitat represents a small portion of the total project disturbance area (<15%).

Ecotec undertook a habitat and targeted conservation significant fauna survey of the project area in August 2024. Nine possible extinct (long unused and unlikely to be used again, low and flat profile without a peak or crater) malleefowl mounds were recorded during the survey (Figure 3.8). While it is considered reasonably likely that the structures observed are long-extinct mounds, it is possible that some are former rabbit warrens or even geologic formations. If they were constructed by malleefowl they have not been used for decades (Ecotec 2024).

The project area is likely to have supported malleefowl in the past but is now at the northern extent of the species' range. Suitable habitat requirements include dense vegetation with abundant leaf litter, which is used to fill the mounds to incubate the eggs as it composts. The survey area now lacks much of the understorey biomass that was once present (as a result of grazing on the pastoral station) and is therefore lacking in leaf litter, food resources and cover provided by denser vegetation. It was concluded that malleefowl are unlikely to occur in the project area (Ecotec 2024).

The project area contains some large trees that may be suitable for development of hollows by the Southern whiteface (a bird listed as Vulnerable); however, the area is previously disturbed with grazing impacts from both the Beebyn Station and feral goats, and historic clearing for mining exploration. The understory is sparse and the litter layer sparse to absent, but thicker in narrow bands around the drainage lines. Due to the poor condition of the understory, the area is unlikely to host habitat critical to the survival of the Southern whiteface (APM 2024).

Suitable foraging habitat for the grey falcon is present within the area, however no suitable nesting habitat is present and preferred nesting habitat is not available in the surrounding local area. Known records are more than 50 km away and whilst the grey falcon may occasionally visit the locality, it is unlikely to provide an important habitat for this species (APM 2024).

The Western spiny-tailed skink typically resides in family groups in coarse woody debris, such as fallen log piles (Bradley et. al 2022) or, in inland areas, burrows under boulders and exfoliated sheets of granite (ecologia 2010; Ecotec 2024). This species is generally easy to detect as the animals use a communal latrine which persists for many months even when the animals are concealed or absent. The species was not recorded in the project area during the recent fauna surveys (APM 2024; Ecotec 2024).

The West Coast mulga slider has been recorded in Weld Range including locations close to the project area; however, APM (2024) found the habitats within the project area were generally of poor quality. Leaf litter is scarce within the project area and soils are degraded and likely poor for burrowing. Higher quality microhabitats occur in the Drainage Line habitat however, soils may be too stony to be suitable.

ecologia conducted a targeted *Idiosoma nigrum* survey at Weld Range (ecologia 2009b), which included a collection of detailed data on the spider's demography, population structure and habitat preference. A total of 76 ha was surveyed for *Idiosoma nigrum*, with 1,708 burrows found, all within the boundaries of drainage lines and underneath Acacia vegetation, predominately on the southern face of hill slopes. Within the Beebyn-W11 project area, 393 burrows were recorded, with an estimated population size of  $274 \pm 197$  individuals (ecologia 2009b).

Biologic Environmental Survey Pty Ltd (Biologic) undertook a status review of the species in April 2019 and confirmed that the trapdoor spider found in the Weld Range area is now regarded as *Idiosoma clypeatum*, a Priority 3 species under the WA Biodiversity Conservation Act (Biologic 2019). The letter report provided by Biologic is included in Appendix 1.

Intensive targeted surveys have previously been conducted throughout the Weld Range when the northern shield-backed trapdoor spider was regarded as *I. nigrum* and listed as a Vulnerable species under the *WA Wildlife Conservation Act 1950*. Over 1800 trapdoor burrows have been identified from database searches, the majority of which are from within the Weld Range. Biologic (2012) estimated the population size of *I. clypeatum* across the Weld Range to be more than 14,000 individuals. The Biologic report is included in Appendix 1.

Ecotec (2024) found that shield-back trapdoor spider burrows in this region are associated with drainage lines and denser stands of Acacia where the soil has a higher moisture content. The amount and type of leaf litter present appears to be an important factor. Typically, burrows are located beneath Acacia trees and shrubs in areas where there is evidence of surface water sheet flow or in denser vegetation adjacent to ephemeral drainage.

Ecotec undertook searches of the main areas of Drainage Line habitat, which is present from the western end of the W11 infrastructure area and along the haul road route. Eleven active and five abandoned *Idiosoma clypeatum* burrows were recorded during the survey. None were located within the proposed disturbance footprint.

Several previous records (as identified by Ecologia (2009b)) within the proposed footprint and associated mainly with south-facing slopes were investigated by Ecotec during the 2024 survey. No evidence of trapdoor burrows was located at the time of the survey. Shield-back trapdoor spider burrows are very difficult to find and it is highly likely that many more burrows are present in suitable habitat across the project area. There is abundant suitable habitat in the surrounding region and *I. clypeatum* is known to be widespread across the Murchison and Yalgoo bioregions (Ecotec 2024).

The location of recorded *I. clypeatum* burrows in relation to the proposed disturbance is presented in Figure 3.9. The proposed Beebyn-W11 project avoids disturbance to all known burrows (as recorded by Ecotec 2024). The Ecotec report is included in Appendix 1.



**Table 3.8: Conservation significant fauna likelihood of occurrence.**

Common name	Scientific name	EPBC status	WA status	Comments	Likelihood of occurrence
<b>Mammals</b>					
Bilby	<i>Macrotis lagotis</i>	VU	VU	The local record has a low level of certainty and was recorded in 1984.	Unlikely
Black-flanked rock-wallaby	<i>Petrogale lateralis lateralis</i>	EN	EN	Historical local record is a fossilised specimen	Unlikely
Brush-tailed mulgara	<i>Dasymercus blythi</i>		P4	Historical local record is a fossilised specimen	Unlikely
Ghost bat	<i>Macroderma gigas</i>	VU	VU	Historical local record is a fossilised specimen	Unlikely
Gould's mouse	<i>Pseudomys gouldii</i>	VU	VU	Historical local record is a fossilised specimen	Unlikely
Greater stick-nest rat	<i>Leporillus conditor</i>	VU	CD	Historical local record is a fossilised specimen	Unlikely
Long-tailed dunnart	<i>Antechinomys longicaudata</i>		P4	Suitable habitat present in the BIF	Recorded
<b>Birds</b>					
Curlew sandpiper	<i>Calidris ferruginea</i>	CR, MI	CR	No suitable habitat present	Unlikely
Fork-tailed swift	<i>Apus pacificus</i>	MI	IA	All habitats suitable, predominantly a coastal non-breeding visitor to Australia. Project area is outside of likely habitat range.	Unlikely
Grey falcon	<i>Falco hypoleucos</i>	VU	VU	Suitable foraging habitat present. No suitable nesting habitat.	Possible
Grey wagtail	<i>Motacilla cinerea</i>	MI	MI	No suitable habitat present	Unlikely
Malleefowl	<i>Leipoa ocellata</i>	VU	VU	Inactive mounds have been recorded	Possible
Night parrot	<i>Pezoporus occidentalis</i>	EN	CR	No suitable habitat present	Unlikely
Pectoral sandpiper	<i>Calidris melanotos</i>	MI	IA	No suitable habitat present	Unlikely
Peregrine falcon	<i>Falco peregrinus</i>		OS	Foraging habitat present	Possible
Sharp-tailed sandpiper	<i>Calidris acuminata</i>	VU, MI	IA	No suitable habitat present	Unlikely
Southern whiteface	<i>Aphelocephala leucopsis</i>	VU	-	All habitats suitable, project area unlikely to host habitat critical to survival.	Possible
Yellow wagtail	<i>Motacilla flava</i>	MI	MI	No suitable habitat present	Unlikely
<b>Reptiles</b>					
West coast mulga slider	<i>Lerista eupoda</i>		P1	Suitable habitat is present in the Mulga Woodland on Hill Slope habitat.	Possible
Western spiny-tailed skink	<i>Egernia stokesii badia</i>	EN	VU	No granite outcrops are present but suitable habitat may be present in the BIF outcrops	Possible
<b>Invertebrate</b>					
Northern shield-backed trapdoor spider	<i>Idiosoma clypeatum</i>		P3	Recorded within the study area, then identified as <i>I. nigrum</i>	Recorded
Shield-backed trapdoor spider	<i>Idiosoma nigrum</i>	VU	EN	All specimens in the Murchison region determined to be <i>I. clypeatum</i>	Unlikely

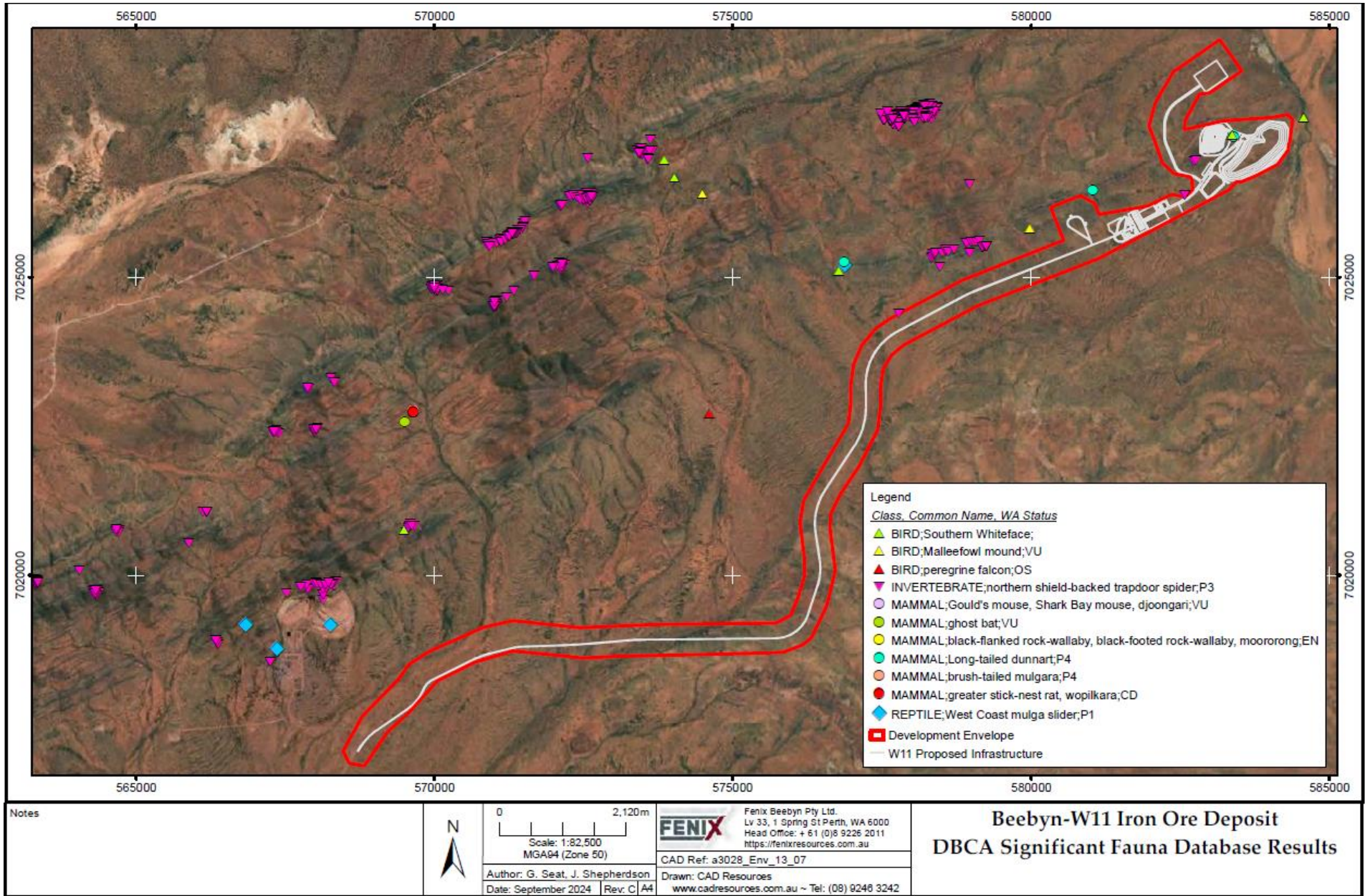


Figure 3.7: Database search records of conservation significant fauna within 30 km of the project area.

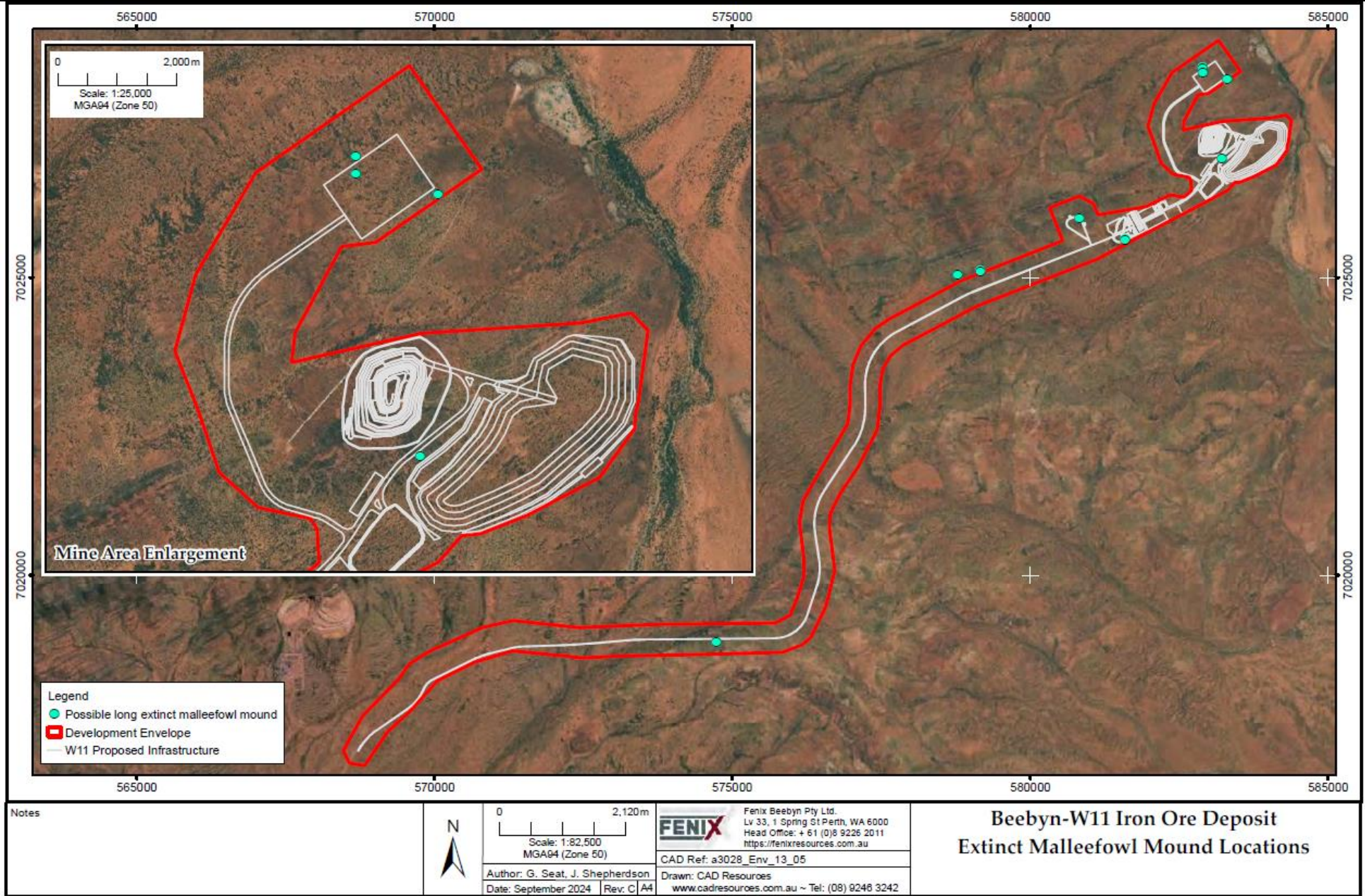


Figure 3.8: Possible extinct malleefowl mounds recorded in the project area.

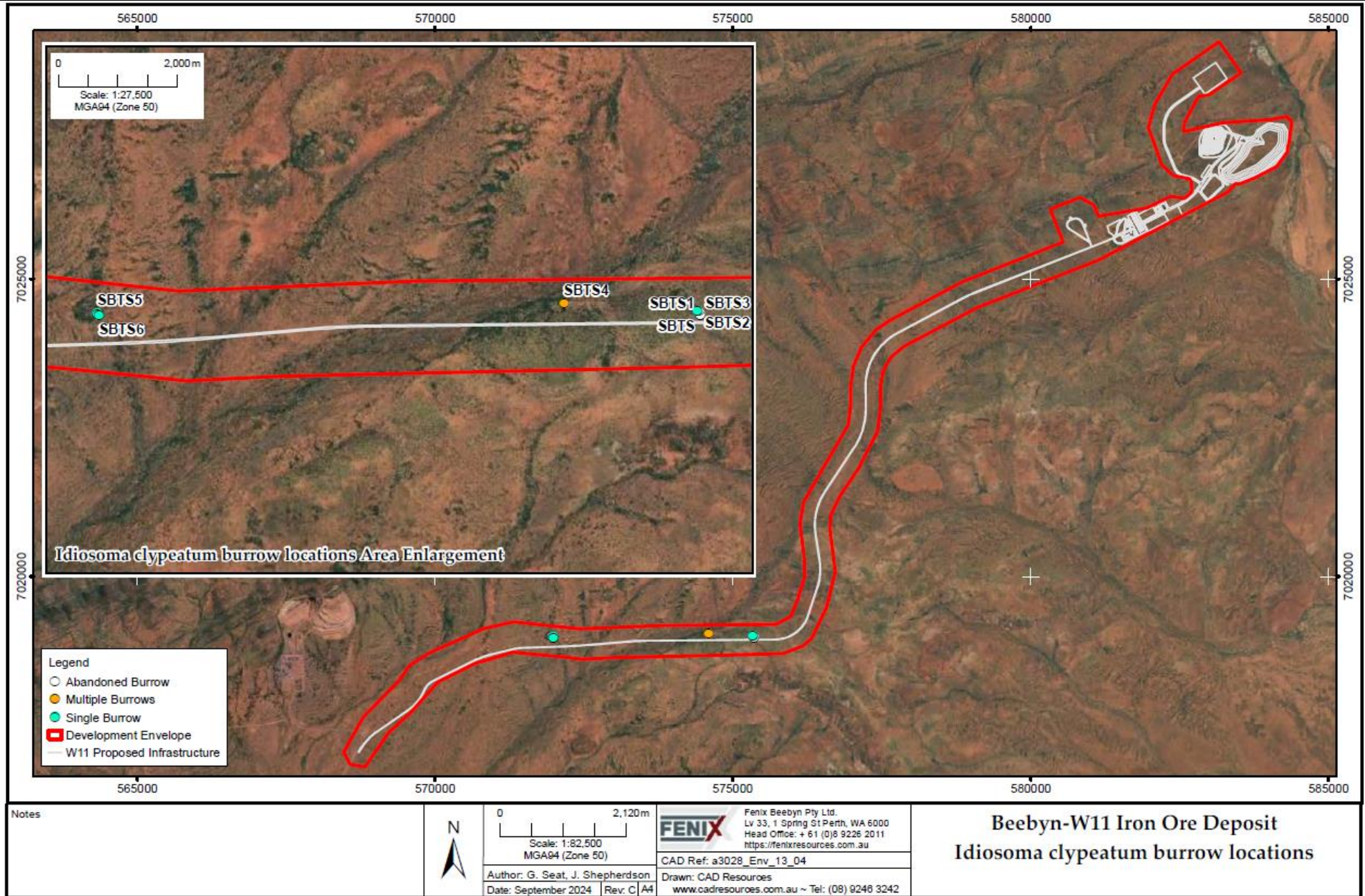


Figure 3.9: Recorded *Idiosoma clypeatum* locations in the Beebyn-W11 project area.

APM (2024) identified four main habitat types in the project area, described in described in Table 3.9 and shown on Figure 3.10. The habitat types are similar to those identified at the nearby Iron Ridge project (*ecologia* 2020a, Appendix 1). Approximately 122 ha were not covered in the survey undertaken by APM and was assessed by Ecotec in a follow-up survey (Ecotec 2024). The Ecotec survey confirmed the habitat aligned with *Mulga Woodland on Hill Slope* and *Acacia Sand Plain*.

**Table 3.9: Fauna habitat recorded in the study area.**

Habitat type	Development Envelope (ha)	Disturbance Envelope (ha)	Beebyn-W11 impact to local area (%)
Acacia Sand Plains	709.1	105.7	14.9
Rocky ridge or outcrop	118.2	41.4	35.0
Drainage Line	160.7	32.6	20.3
Acacia (Mulga) on Hill Slope	300.3	132.9	44.3
Disturbed	20.9	8.8	-
<b>Total</b>	<b>1,309.2</b>	<b>321.4</b>	-

*Acacia Sand Plains* habitat occurs predominantly on the lower slopes of the study area, where the haul road is proposed to be developed. Associated soils include sandy to lightly rocky clay loam. The project will result in localised impact to this habitat.

*Mulga Woodland on Hill Slope* habitat is dominated by *Acacia pruinocarpa* trees and *Acacia aneura* shrublands over on sandy or stony clay loam on hill slopes and is the most widespread habitat present in the area. This habitat type provides suitable substrates, vegetation and habitat to support the Priority 3 (BC Act) northern shield-backed trapdoor spider. This habitat is considered widespread in the Weld Range area. Most disturbance associated with the project will occur in this habitat type; therefore, impact to a localised area will result from the proposed development.

*Drainage Line* habitat provides suitable habitat for the west coast mulga slider. Known from the arid interior of the Midwest of WA and endemic to the Murchison bioregion, this species has previously been recorded within Weld Range in leaf litter fringing drainage lines. A limited extent of this habitat exists around the project area and the project will result in localised impact to this habitat.

*Rocky ridge or outcrop* habitat occurs in a small portion in the north of the project area and is the least widespread habitat present in the area. The long-tailed dunnart has been recorded from widely scattered localities in the arid zone where it inhabits rugged, rocky areas, such as this habitat type. It typically occurs on plateaus near breakaways and scree slopes, and on rugged boulder-strewn scree slopes. Widely separated populations occur in the Pilbara, Murchison, Gibson Desert, southern Carnarvon Basin and in the Western MacDonnell Ranges (Northern Territory). The species was once considered rare but has recently been shown to be relatively common and widespread within rocky habitats, especially banded iron formation ranges within the Midwest. A limited extent of this habitat exists around the project area and the project will result in localised impact to this habitat.

### 3.8 Introduced fauna

Seven species of introduced mammal have previously been recorded around the project area. These include the dog, European red fox, feral cat, rabbit, house mouse, goat and cow. Goats, both feral and raised as pastoral stock, are known to generate high grazing pressure on the native vegetation of parts of the Weld Range.

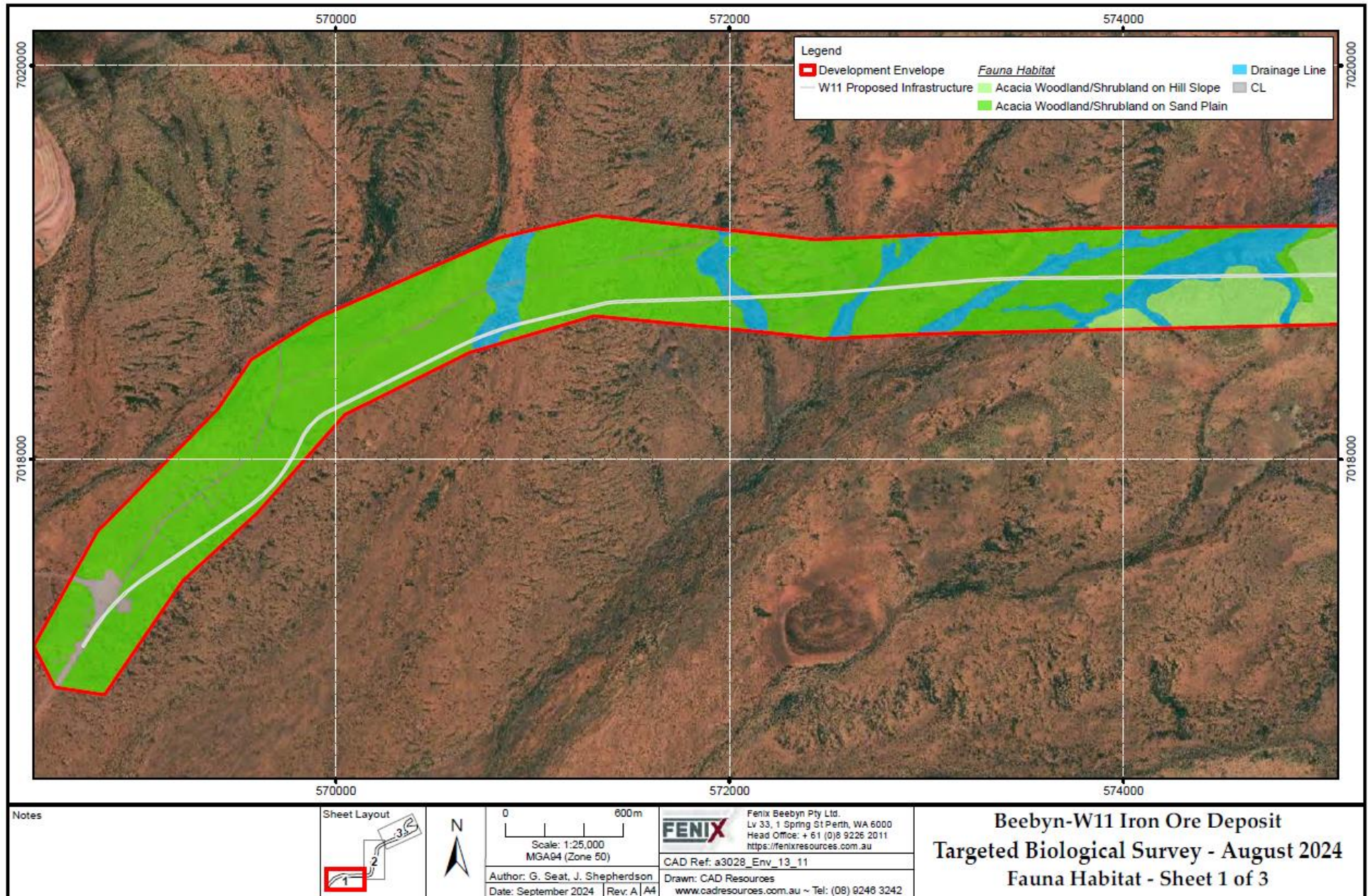


Figure 3.10: Fauna habitat in the project area – map 1 of 3.

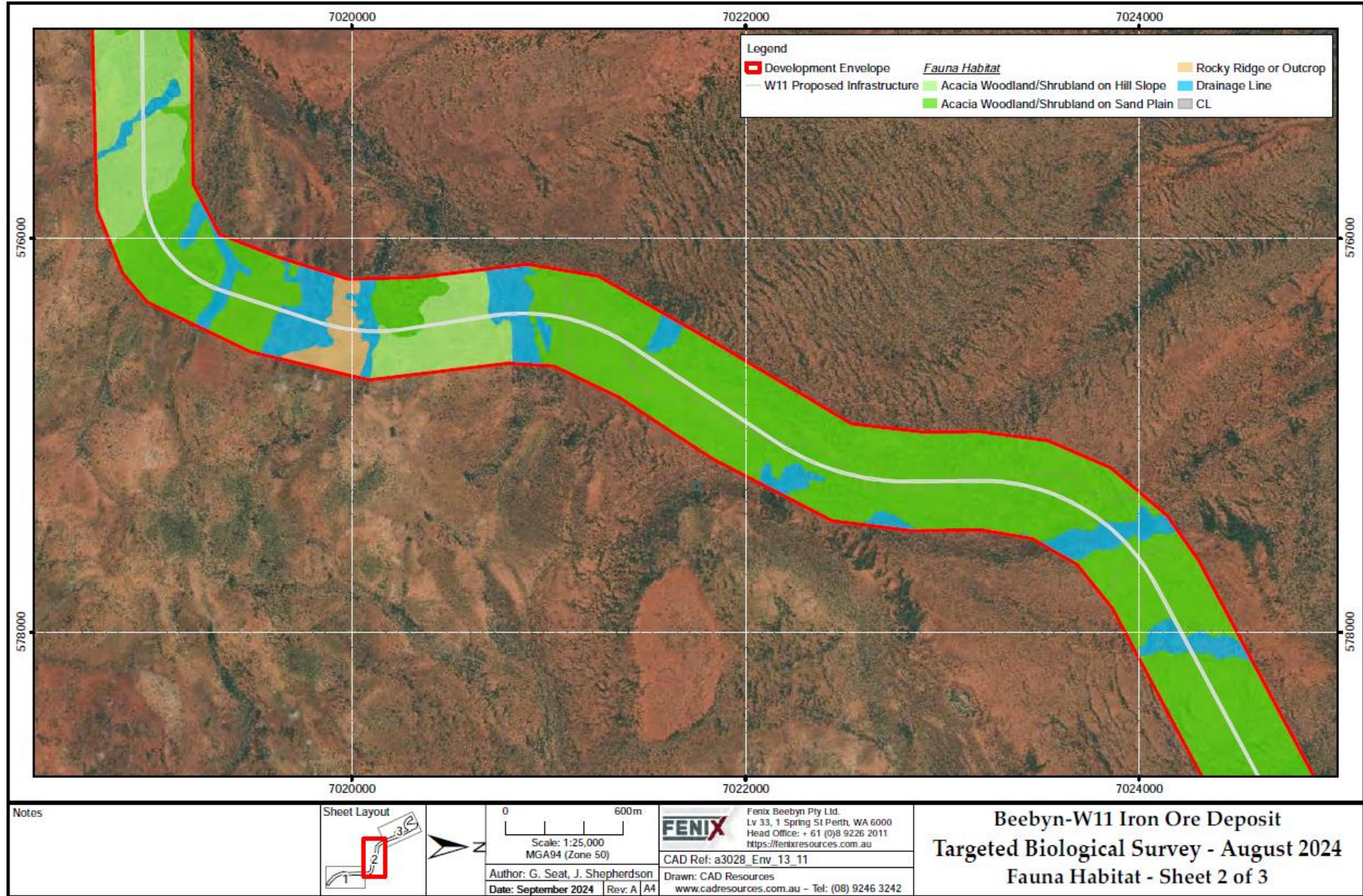


Figure 3.11: Fauna habitat in the project area – map 2 of 3.

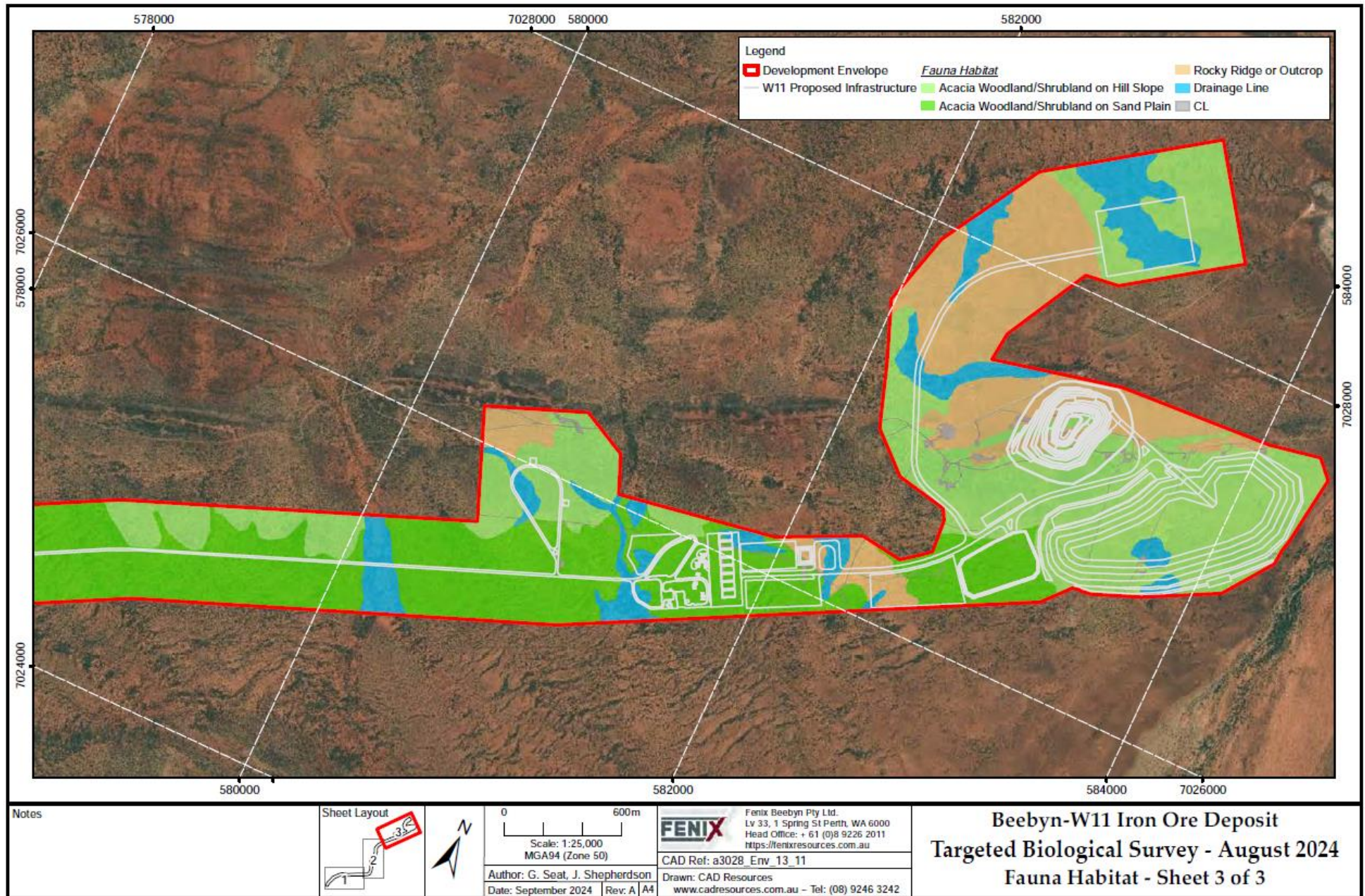


Figure 3.12: Fauna habitat in the project area – map 3 of 3.



### 3.9 Short-range endemics and subterranean fauna

Short-range endemics (SREs) are those fauna that have a naturally small range of less than 10,000 km<sup>2</sup>. In addition, these species possess similar ecological traits including poor powers of dispersal, confinement to specialised often discontinuous habitats, slow growth and low fecundity (*ecologia* 2020b).

A potential SRE from a species complex *Cethegus* 'fugax' (curtain web spider) was identified during the *ecologia* survey (2010a). The geographic distribution of *Cethegus* fugax complex extends from the sub coastal areas along the Nullabor Plain to south-western Australia and near the coast as far north as Geraldton. Both morphological and genetic studies confirmed that *Cethegus* at Weld Range belonged to a new, undescribed species. Aerial dispersal may possibly enable *Cethegus* to escape disturbance on a very local scale (i.e. < 1km) but it does not function as a long - distance vector (*ecologia* 2010a). It is found in shaded microhabitats, mostly associated with vegetated areas on southern slopes (*ecologia* 2009c).

Three records of *Cethegus* 'fugax' were recorded in the project area, to the west of the proposed laydown area and outside the disturbance footprint. An additional 33 records occur further to the west of the Beebyn-W11 project area (*ecologia* 2010a). Impact to this species as a result of project implementation is expected to be negligible.

Invertebrate Solutions (2024) undertook a desktop review of *Cethegus* fugax distribution and species limit to determine the potential for this species to be SRE. Since the *ecologia* (2010a) survey, *C. fugax* has been recorded much further north than Geraldton and are known to occur throughout the Mid-West, with populations known from both Weld Range and Robinson Range (Invertebrate Solutions 2024).

Review of genetic data and analysis found the population of Mid-West *C. 'fugax'* show some genetic structuring by geographical location; however, the assertion that these represents distinct subspecies is not supported by the data, as the analysis shows weak support for most of the clades and no morphological differences were evident. It is to be expected that some genetic structuring over the wide geographical distances between population in the Mid-West would be present, and a similar pattern of genetic structuring was found with the widespread *Idiosoma clypeatum* (Rix et al. 2018) occurring throughout the Mid-West (including Weld Range and Jack Hills) when the genus was revised. *Idiosoma clypeatum* shows similar clumped distributions around Weld Range and Jack Hills with similar levels of genetic structuring to that seen in *C. 'fugax' – Mid west* and was ultimately described as a single widespread species due to the similar morphological characters of the populations and the genetic distances being below interspecific variation (Invertebrate Solutions 2024).

Invertebrate Solutions found that the genetic and morphologic data obtained by *ecologia* support the existence of an undescribed species of *Cethegus* in the Mid-West, however the species is widespread, and based upon current records is not considered to be an SRE. The Invertebrate Solutions report is included in Appendix 1.

In 2009 *ecologia* conducted a baseline stygofauna survey at Weld Range and surrounding pastoral land, which included sampling 84 drill holes (26 at Beebyn-W11, 40 at Madoonga and 18 at the surrounding pastoral land outside the proposed area of impact), laboratory identifications and reporting, interpretation of the potential impacts and an associated risk assessment of the various project components on stygofauna communities or species (*ecologia* 2010a and 2020b).

No stygobitic species or communities were identified during the stygofauna survey within the Beebyn-W11 impact area or in the regional pastoral bores, although stygophylic representatives of two crustacean orders (Ostracoda and Copepoda) and one annelid sub-class were recorded from nine pastoral wells. One stygobitic copepod from the order Calanoida found in a troglifauna trap at Madoonga suggests that stygofauna may be present in the wider area, though this was not able to be confirmed by stygofauna sampling in nearby bores. The stygophilic copepod found in regional bores, *Mesocyclops brooksi*, is known from both surface waters and ground waters, and it is widespread in Western Australia. The ostracods, *Cypridopsis vidua* and *Sarscypridopsis oschracea* are often found in wells in arid Western Australia but are typically surface species inhabiting open freshwater bodies in southern Western Australia. The results of the 2009 survey suggest that the groundwater habitat in and around the Beebyn impact area is depauperate of true stygofauna and therefore no risk assessment or management recommendations were necessary (*ecologia* 2010a and 2020b).

The *ecologia* stygofauna report is included in Appendix 2.

*Ecologia* also conducted a two phase troglifauna study of the project area and surrounds in 2007 and 2008,

sampling 143 bore holes (50 at Beebyn-W11, 51 at Madoonga and 42 outside the then proposed area of impact).

A single centipede specimen (likely from the Cryptopidae family) was collected from a single bore within the Beebyn-W11 area. Cryptopids have been collected elsewhere in Western Australia; however, no records exist near Weld Range or other ranges in the Midwest region (*ecologia* 2011). The presence of this species was not confirmed elsewhere in the survey despite a comprehensive number of bores being sampled. Furthermore, no other troglobitic species were found in the survey area.

Examination of the bore hole with the troglofauna record showed that the hole contained at least two geological strata with voids suitable for troglofauna habitation. The most common stratum was dolerite, and this habitat has been classified as 'suitable' due to its common fractures. The other stratum was Banded Iron Formation (BIF), which showed some degree of porosity but was mostly located below the water table and thus its use for troglofauna was assessed as not suitable. The suitable troglobitic habitat (dolerite) is widespread throughout the range. Additionally, both dolerite and BIF strata are continuous to the west from the project area and also occur in the Wilgie Mia Aboriginal Reserve. Impact on the potential troglofauna habitat at Weld Range as a result of the Beebyn-W11 project is expected to be low.

### 3.10 Hydrology

#### 3.10.1 Surface water

Weld Range rises above the centre of a drainage basin that is surrounded in the north by topographically higher flat - topped breakaways. The main drainage lines converge at the southeastern part of the basin on its western path to form the Sanford River, a tributary of the Murchison River. The major drainage line (Berhing Creek) drains through the Weld Range to the west of the proposed project area (*ecologia* 2010a).

Rainwater falling in the area drains quickly off the Weld Range ridges through narrow channels which widen substantially as the water drains onto the flatter areas, in some cases forming pans. In the flatter areas the flow of water can become ambiguous with streams dividing, in some cases the divisions flow in quite different directions. The bed conditions of the main channels of all watercourses comprise of coarse sand, rocks and cobbles; whilst the banks comprise silty sand which is easily eroded.

Pentium Water Pty Ltd (Pentium) was commissioned by Fenix to undertake a surface water assessment of the potential impact of flood flows on the mining area and to determine any bunding and drainage requirements for the mining area and infrastructure (Pentium 2024).

The infrastructure area lies on the southern end of one major catchment (Beebyn Creek) with an area of approximately 225 km<sup>2</sup> (Figure 3.13). The ephemeral watercourse draining this catchment area flows south through Beebyn Gap (Pentium 2024).

Detailed flood flows using the HECRAS model found the Beebyn Creek comprised one main channel running south past the proposed Beebyn-W11 infrastructure. Critical duration for the Beebyn Creek was 36 hours (Pentium 2024). The estimated 20, 50 and 100 year average recurrence interval (ARI) design peak flows are shown in Table 3.10.

**Table 3.10: Adopted design flows from HECRAS modelling.**

ARI (years)	Adopted design flows (m <sup>3</sup> /sec)
20	150
50	235
100	312

Analysis of the impact of a 1% AEP rainfall event found that Beebyn Creek floods to about 1m deep as it flows past the Beebyn-W11 project site but does not impact mine infrastructure. The 1% AEP flood extent encroaches to within approximately 170m of the pit and waste dump (Figure 3.14).

The mine generally lies near the top of a ridge, and catchments and surface water flows impacting site infrastructure are relatively small. A standard pit bund will be sufficient to prevent surface water flows from entering the pit (Pentium 2024).

Minor flow paths run through the site and the proposed pit, waste dump and plant boundaries; therefore, these areas will require drainage management to prevent ponding. The diversion channel and bunds required are all minor. Ponding against the northern side of the waste dump may occur, depending on the development and configuration of the waste dump, and in the operational phase, will evaporate and infiltrate in situ (Pentium Water 2024). Provision has been made for a diversion channel in this area if required.

The borrow pit was included in the mine design after the surface water assessment was completed. The borrow pit lies outside any catchment flow paths and will not impact surface water flows or require surface water management infrastructure.

Several flow paths cross the proposed road route (Figure 3.15), with a 1% AEP peak flow ranging from 0.7 (CS\_08) to 28 m<sup>3</sup>/s (CS\_04). Fenix is currently undertaking a lidar survey to accurately design the road and waterway, however, due to the short life of mine and relatively small catchments, Pentium (2024) concluded that floodways (with culverts if required) would be suitable. The length of floodways may be determined by the selected design flood event and permissible water depth of road trains.

The Pentium report is included in Appendix 3.

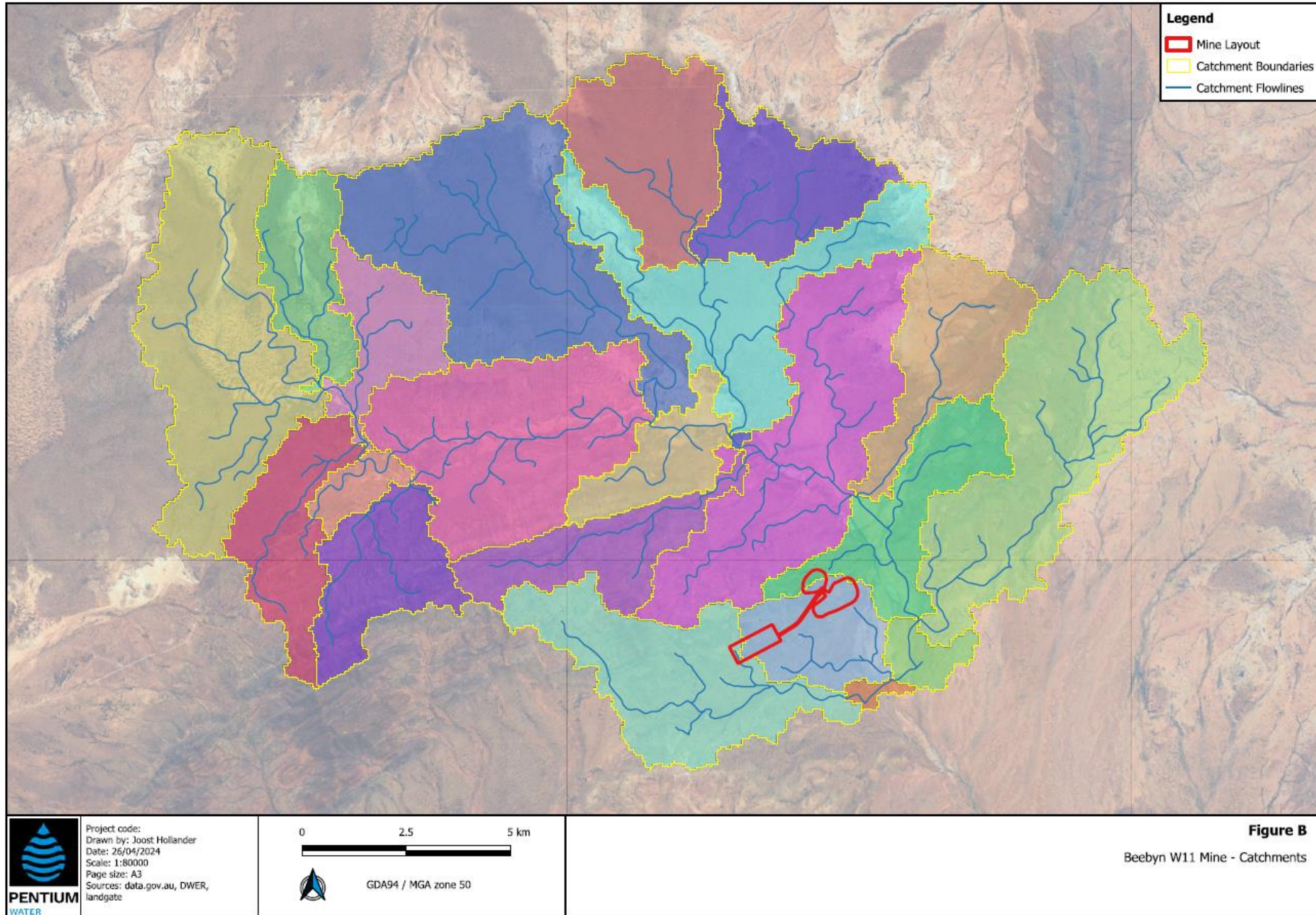


Figure 3.13: Surface water catchments of the infrastructure area.

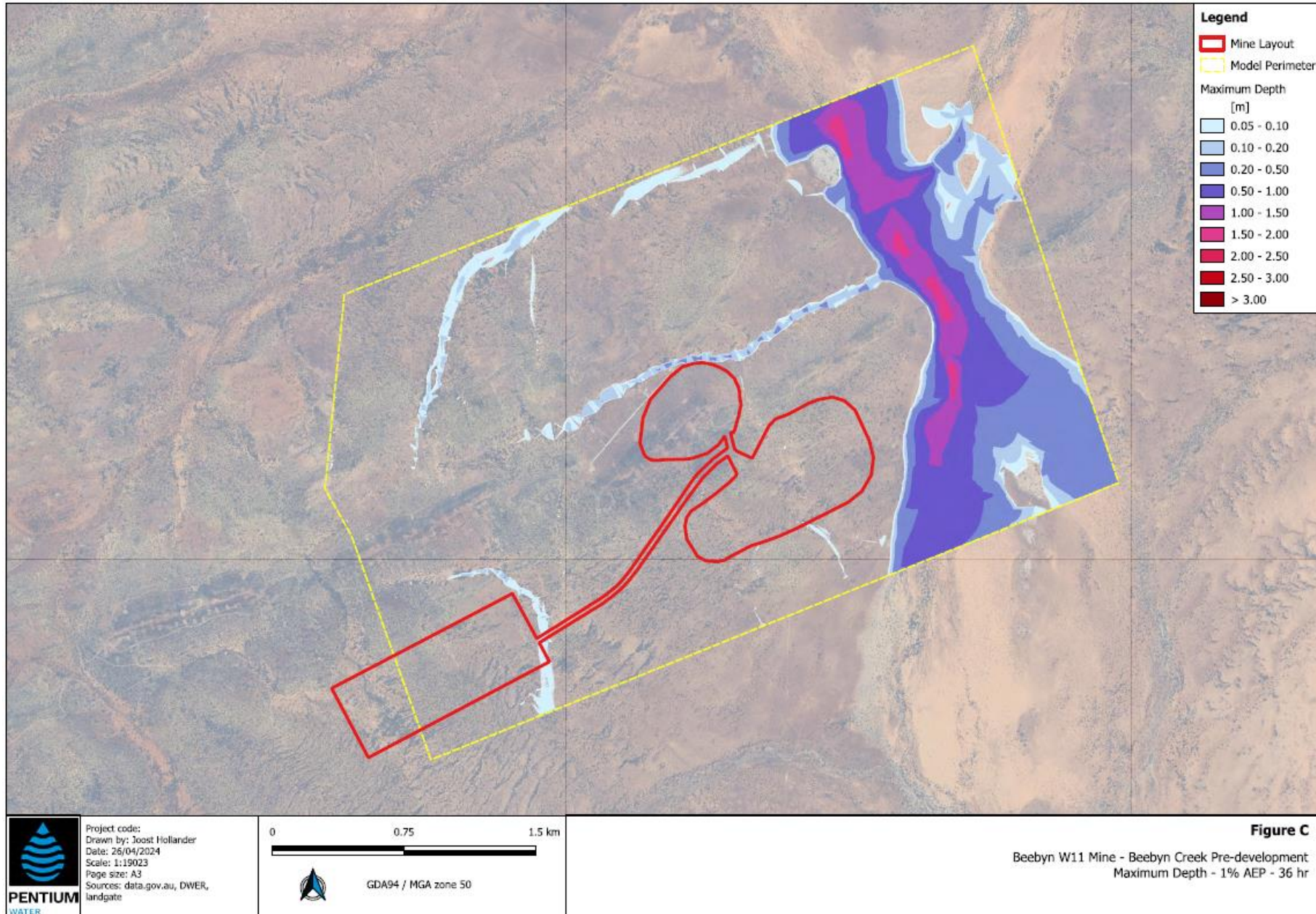


Figure 3.14: Beebyn-W11 project flood risk (infrastructure area) for a 1 in 100-year AEP.

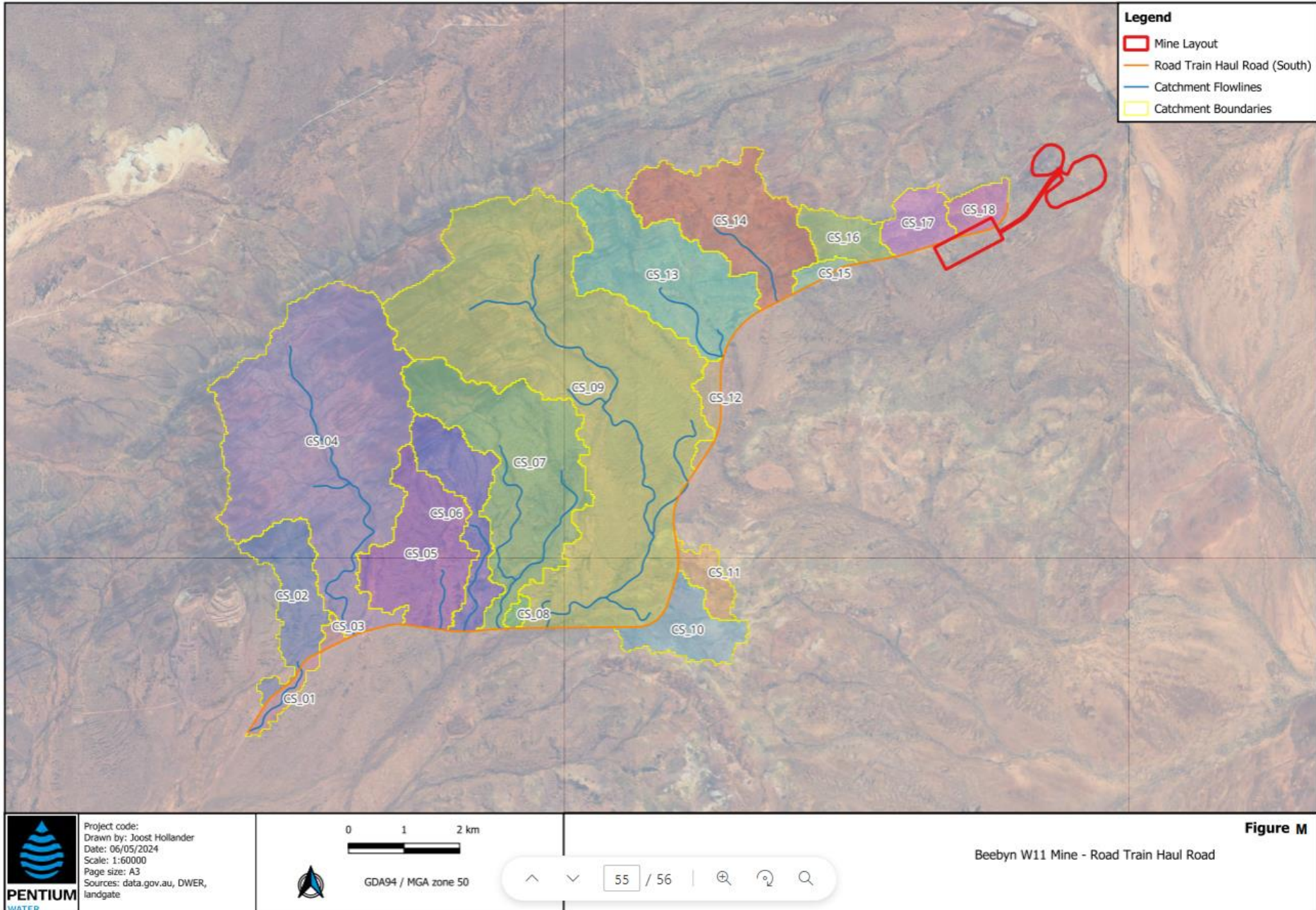


Figure 3.15: Surface water catchments of the haul road area.

### 3.10.2 Groundwater

The Weld Range is located in the East Murchison groundwater management unit. The groundwater in this area is characterised by fractured-rock and palaeochannel aquifers, alluvium and localised calcrete aquifers. Groundwater from fractured-rock aquifers can vary widely in terms of quality and quantity. At Weld Range, groundwater occurs at relatively shallow depths (typically 5 – 50 m below ground level (bgl)) beneath the alluvial plain and occurs within the bedrock sequence that forms Weld Range. The groundwater is fresh to slightly brackish in the BIF and shallow alluvial aquifers and is highly saline in alluvium and the palaeochannel aquifer west and south of the project area (*ecologia* 2010a).

The main aquifers in the region are alluvium and colluvium with a tertiary palaeochannel passing through the Weld Range. The Banded Iron Formation (BIF) strata which include the Beebyn-Beebyn-W11 deposit are commonly fractured, jointed and vuggy, and constitute aquifers of moderate to high permeability. The granitic and greenstone basement rocks (other than BIF) are generally of low permeability, including the dolerite associated with the BIF. The groundwater is recharged by the infiltration of rainfall and streamflow following high rainfall events. Groundwater flows in a north to southeast direction through the Weld Range and discharges into Lake Austin or a smaller temporary lake to the north.

Existing groundwater extraction in the area consists of water for domestic use and stock watering at homesteads and on stations, and dewatering associated with the Iron Ridge project to the west. The nearest recorded wells are Wilgie Mia and Yallon Wells, approximately 5 km to the south and south-south-east respectively.

The three bores constructed for water abstraction encountered the water table between 29.6 m (hole ID B\_WB2\_01) and 49.7 m (hole ID B\_WB2\_02). The water level in the project area was found to be around 480 m RL, with salinity of 690 – 1,400 mg/L TDS and neutral to slightly alkaline pH between 7.6 and 8.6. Table 3.11 summarises the water quality.

The Pentium report is included in Appendix 3.

**Table 3.11: Laboratory analysis of water samples from the project area.**

Analyte	Unit	B_LTM_03	B_LTM_04	B_WB2_01	B_WB2_02	Livestock drinking water trigger value
Date Sampled		15/7/2019	16/7/2019	17/7/2009	18/7/2019	
Acidity	pH	7.8	7.6	8.6	7.6	
Electrical Conductivity @ 25°C	µS/cm	1200	1400	2300	1600	
Total Dissolved Solids @180°C	mg/L	690	830	1400	950	4000
Total Hardness as CaCO <sub>3</sub>	mg/L	250	330	500	310	
Carbonate, CO <sub>3</sub>	mg/L	<1	<1	14	<1	
Bicarbonate, HCO <sub>3</sub>	mg/L	290	370	380	370	
Chloride, Cl	mg/L	180	220	450	260	
Sulphate, SO <sub>4</sub>	mg/L	88	130	190	160	1000
Nitrate, NO <sub>3</sub>	mg/L	55	28	<0.2	14	
Sodium, Na	mg/L	170	180	190	230	
Potassium, K	mg/L	11	14	180	12	
Calcium, Ca	mg/L	37	45	50	39	1000
Magnesium, Mg	mg/L	38	54	92	52	Not toxic
Soluble Iron, Fe	mg/L	<0.02	<0.02	<0.02	<0.02	
Fluoride, F	mg/L	0.4	0.3	0.5	0.3	
Free Cyanide	mg/L	<0.01	<0.01	<0.01	<0.01	

Analyte	Unit	B_LTM_03	B_LTM_04	B_WB2_01	B_WB2_02	Livestock drinking water trigger value
Aluminium, Al	mg/L	<0.02	<0.02	<0.02	<0.02	0.04
Arsenic, As	mg/L	0.005	<0.002	0.24	<0.002	
Manganese, Mn	mg/L	0.007	0.007	0.074	0.29	Not toxic
Lead, Pb	mg/L	<0.005	<0.005	<0.005	<0.005	
Cadmium, Cd	mg/L	<0.001	<0.001	<0.001	<0.001	
Copper, Cu	mg/L	<0.005	<0.005	<0.005	<0.005	
Antimony, Sb	mg/L	<0.0005	<0.0005	0.05	<0.05	
Mercury, Hg	mg/L	<0.05	<0.05			
Silver, Ag	mg/L	<0.005	<0.005	<0.005	<0.005	
Boron, B	mg/L	1	0.9	0.7	1.2	
Barium, Ba	mg/L	<0.005	<0.005	0.02	<0.01	
Beryllium, Be,	mg/L	<0.005	<0.005	<0.005	<0.005	
Cobalt, Co	mg/L	<0.01	<0.01	<0.01	<0.01	
Chromium, Cr	mg/L	<0.005	<0.005	<0.005	<0.005	
Molybdenum, Mo	mg/L	<0.01	<0.01	<0.01	<0.01	
Nickel, Ni	mg/L	0.007	0.005	0.06	0.008	

### 3.10.3 Groundwater Dependent Ecosystems

No Groundwater Dependent Ecosystems (GDE's) have been identified within the project area and no vegetation considered to be groundwater dependent has been recorded in the various surveys completed (APM 2024, *ecologia* 2010a). Phreatophytic vegetation types were recorded by *ecologia* (2010a) approximately 10 km north east and 20 km south west of the proposed project, outside the disturbance area and extent of predicted drawdown associated with the proposal.

### 3.10.4 Pit lake formation

Once mining is completed, the water level in the pit will rapidly rise for the first five years, followed by a slower recovery over time until a balance is established between the groundwater inflows plus rainfall accumulation and evaporation losses. The pit will extend down from ground levels of approximately 520 m AHD to a base elevation of 395 m AHD, 125 m below the average natural ground level.

The water recharge predicted post mining is given in Table 3.12. The water level in the pit lake will rise up to approximately 466 m RL post mining. It is predicted that a rapid recovery of the water table will occur in the first five years and then plateau after this time.

Groundwater modelling indicates that the pit will function as a sink, with groundwater flowing towards it. Therefore, there would be no flow from the pit lake to groundwater and so there is no potential for groundwater contamination.

The concentration of solutes within the pit lakes will increase over time due to high evaporation and low precipitation in the area. The salinity of the pit water would gradually increase from about 900 mg/L TDS when the pit first begins to fill with water, to about 12,000 mg/L TDS 100 years after the end of mining (Pentium 2024).

The Pentium report is included in Appendix 3.



**Table 3.12: Pit recharge water balance.**

Time post mining (yr)	Pit lake water level (m RL)
1	419
2	428
5	443
10	454
25	463
100	466

## 4 IMPACTS AND MANAGEMENT

### 4.1 Impact to conservation significant flora

Nine Priority listed flora species have been recorded in and around the project area. Based on the survey by Ecotec (2024), individuals from three of the Priority species recorded will be impacted by the proposed development. Impact to these species from the proposed development is expected to be minimal, with four individuals of *Stenanthemum mediale*, 17 individuals of *Prostanthera petrophila* and 25 individuals of *Acacia speckii* occurring within the proposed disturbance footprint.

Impact to each species is minimal and most records of conservation significant flora occur to the west of the project area. All species are widespread and well represented in the Weld Range and surrounding area.

#### 4.1.1 Management actions

To minimise potential impacts to Priority flora species, Fenix will:

- implement a Site Disturbance Permit system with strict survey controls and requiring sign off by the Registered Manager prior to clearing commencing.
- clearly delineate areas to be cleared using survey pegs and coloured flagging tape and record (“pick up”) cleared areas on completion.
- maintain records of clearing undertaken.
- provide information to site personnel by way of an induction and specific training where necessary to identify conservation significant species and highlight the importance of clearing protocols.

### 4.2 Impact to conservation significant vegetation and ecological systems

No State (BC Act) or Commonwealth (EPBC Act) listed Threatened Ecological Communities (TECs) occur within the project area. A portion of the Beebyn-W11 Project area coincides with the Priority 1 PEC Weld Range Vegetation Complexes (banded ironstone formation) (*ecologia* 2020a). Ecotec (2024) determined that vegetation units 2, 3, 4, 5, 7, 8 and 15 correspond to the PEC as delineated by DBCA (2019) (refer to Section 3.5).

The Priority 1 PEC Weld Range Vegetation Complexes (banded ironstone formation) occupies an area of 20,318 ha.

Table 4.1 summarises the significance of each of the vegetation types in the project area that are associated with the PEC and the planned area of disturbance to each. The area of project disturbance (excluding existing disturbance in the area) to vegetation associated with the Weld Range PEC equates to less than 0.6% of the PEC (20,318 ha) and is therefore not considered to be a significant impact.

**Table 4.1: Impact to PEC vegetation.**

Vegetation Code	Disturbance Envelope in PEC (ha)
2	30.0
3	45.4
4	5.7
5	29.5
7	3.7
8	1.8
15	-

Vegetation Code	Disturbance Envelope in PEC (ha)
<b>Total</b>	<b>116.1</b>

#### 4.2.1 Management actions

To minimise further impact to vegetation associated with the Weld Range PEC, Fenix will:

- implement a Site Disturbance Permit system with strict survey controls and requiring sign off by the Registered Manager prior to clearing commencing.
- clearly delineate areas to be cleared using survey pegs and coloured flagging tape and record (“pick up”) cleared areas on completion.
- maintain records of clearing undertaken.
- provide information to site personnel by way of an induction and specific training where necessary to identify conservation significant vegetation and highlight the importance of clearing protocols.
- a targeted survey will be undertaken in late July 2024 to confirm the location and numbers of conservation significant flora.

#### 4.3 Introduced flora species

The vegetation in the vicinity of the Beebyn-W11 Project is in good condition. Minor occurrences of existing weed species have been recorded in the area (refer to 3.6).

Weed seeds can be transported in soil and vegetative material attached to the machinery and equipment. Weeds can be introduced to site via machinery and equipment that has come from weed infested areas without being cleaned.

##### 4.3.1 Management actions

To minimise the potential for new (and potentially invasive) weed species to be introduced to the site, Fenix will require that:

- machinery and equipment is thoroughly cleaned prior to being mobilised to site.
- contractors provide a weed hygiene certificate for each item of machinery brought to site.
- machinery and equipment that arrives on site will be inspected. Machinery that does not meet the hygiene requirements will require removal and additional cleaning in an appropriate location.

The potential spread of weed species and establishment of new weed populations will be minimised by:

- regular monitoring of disturbed areas and road verges to identify weeds
- identifying weeds species, abundance and cover during rehabilitation monitoring
- control of weed outbreaks using herbicide or manual removal
- preventing stock access to rehabilitated areas
- educating site personnel by way of the site induction.

#### 4.4 Impact to conservation significant fauna or their habitat

Clearing of vegetation for development of project infrastructure will remove a portion of habitat types suitable for a number of Priority fauna species.

The proposed site layout avoids impact to known locations of *Idiosoma clypeatum* (P3). The species is widespread in the surrounding region.

Disturbance to some suitable habitat in the project area for *Lerista eupoda* (P1) will occur where creek crossings are constructed for access roads. There is a limited extent of habitat (Drainage line) within the project area suitable for *Lerista eupoda* (P1) (refer to Figure 3.10 - Figure 3.12).

A limited extent of habitat (Rocky ridge or outcrop) potentially suitable for *Antechinomys longicaudata* (P4) exists around the project area and additional habitat occurs across the Weld Range.

There is no suitable habitat (granite outcropping) in the project area for the western spiny-tailed skink.

#### **4.4.1 Management actions**

To minimise further impact to fauna habitat, Fenix will:

- ensure clearing is undertaken in accordance with the approved Clearing Permit
- implement a Site Disturbance Permit system with strict survey controls and requiring sign off by the Registered Manager prior to clearing commencing
- undertake clearing in a progressive manner and kept to the minimum required for the project
- clearly delineate areas to be cleared using survey pegs and coloured flagging tape and record (“pick up”) cleared areas on completion
- maintain records of clearing undertaken
- provide information to site personnel by way of an induction and specific training where necessary to identify conservation significant fauna and highlight the importance of clearing protocols.

## 5 ASSESSMENT AGAINST THE 10 CLEARING PRINCIPLES

### (1) Native vegetation should not be cleared if it comprises a high level of biological diversity.

The survey of the project area by APM (2024) recorded 77 vascular plant taxa from 21 families and 40 genera. The survey prior (*ecologia* 2010b) recorded 393 vascular flora taxa from 57 families and 140 genera within the Beebyn-W11 area and surrounding region; including six introduced species and 24 Priority listed flora species.

The 2024 Ecotec survey recorded 16 vegetation types within the project area, which generally corresponded with the floristic communities described by Markey and Dillon (2008) and have been recorded over the length of the Weld Range in the DEC survey (Markey and Dillon 2008).

The Priority 1 Weld Range PEC occurs within the area.

While BIF ranges in general are considered to have significant biodiversity value because of their unique geology, soils and relative isolation, the Weld Range was described as being a “lower biodiversity value site, although still providing refugial habitats with localised species and vegetation communities” (DEC 2007).

Less than 0.6% of vegetation associated with the Weld Range PEC will be impacted by the development.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

### (2) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Although areas of suitable habitat for several species of conservation-significant fauna occurs within the project area, the area is not considered to provide habitat necessary for the survival of these species. The fauna habitat to be impacted by the project is represented in the surrounding area and accounts for a very small proportion of available habitat.

The proposed site layout avoids impact to known locations of *Idiosoma clypeatum* (P3). The species is widespread in the surrounding region (refer to Figure 3.8).

There is a limited extent of habitat (Drainage line) outside the project area suitable for *Lerista eupoda* (P1) (refer to Figure 3.10) and disturbance will occur where creek crossings are constructed for access roads.

A limited extent of habitat (Rocky ridge or outcrop) potentially suitable for *Antechinomys longicaudata* (P4) exists around the project area and additional habitat occurs across the Weld Range.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

### (3) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

The area does not coincide with any previously recorded Rare flora taxa, and no Rare flora species are listed as potentially occurring in the area. Accordingly, the area is not considered necessary for the continued existence of Rare flora.

Nine Priority listed flora species have been recorded in and around the project area. Based on the survey by Ecotec (2024), individuals from three of the Priority species recorded will be impacted by the proposed development. Impact to these species from the proposed development is expected to be minimal, with four individuals of *Stenanthemum mediale*, 17 individuals of *Prostanthera petrophila* and 25 individuals of *Acacia speckii* occurring within the proposed disturbance footprint. Impact to each species is minimal and most records of conservation significant flora occur to the west of the project area (Figure 3.2). All species are widespread and well represented in the Weld Range and surrounding area.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

**(4) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.**

The project area does not coincide with any Threatened Ecological Communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (C'th). Accordingly, the area is not considered necessary for the maintenance of a Threatened Ecological Community.

Development of the project will result in impact to less than 0.6% of vegetation associated with the Priority 1 Priority Ecological Community "Weld Range vegetation complexes (banded ironstone formation)".

Clearing of native vegetation within the area is not considered to be at variance to this principle.

**(5) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.**

The project area supports 16 distinct vegetation types, none of which have been extensively cleared nor can be considered remnant vegetation.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

**(6) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.**

The project area does not contain native vegetation that is within or associated with any significant watercourse or wetland. The nearest significant surface water feature is Lake Austin, more than 50 km from the site.

Several minor ephemeral drainage lines pass through the area. The project has been designed to avoid these in the majority. Road crossings will be required at several locations but disturbance to vegetation will be minimal.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

**(7) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.**

None of the vegetation in the area is associated with land that is recognised as being particularly susceptible to land degradation. Appropriate surface water drainage and containment around cleared areas will minimise the potential for surface water erosion. Land degradation resulting from clearing of vegetation is considered unlikely.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

**(8) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.**

The project area partly coincides with Priority 1 PEC "Weld Range vegetation complexes (banded ironstone formation)". Approximately 116.1 ha (excluding existing disturbance in the area) of disturbance proposed for the project will occur within the PEC, inclusive of the buffer zone. This equates to less than 0.6% of the buffered Weld Range PEC (20,318 ha).

Clearing of native vegetation within the area is not considered to be at variance to this principle.

**(9) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.**

The project has been designed to minimise impact to a number of small ephemeral drainage lines. Drainage and containment structures incorporated into the development areas will ensure surface water runoff is controlled and

minimise the potential for contaminants and sediment to enter the surface water system.

Clearing of vegetation is not anticipated to have any impact on the groundwater system. Clearing of native vegetation within the area is not considered to be at variance to this principle.

**(10) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.**

The project area is elevated with surface water runoff flowing generally in a southerly direction. Runoff from cleared areas will be directed toward the perimeter where appropriate drainage and containment structures will be in place. Flooding of the area is considered very unlikely.

Clearing of native vegetation within the area is not considered to be at variance to this principle.

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BEEBYN-W11 PROJECT

# CLEARING PERMIT APPLICATION SUPPORTING INFORMATION

## APPENDICES

Date: September 2024



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# Appendix 1

## Flora and Fauna Reports

1a: Flora and Vegetation Assessment – ecologia 2010

1b: Flora, Vegetation and Fauna Assessment – APM 2024

1c: Iron Ridge Biological Survey– ecologia Environment 2020

1d: Status review of *Idiosoma clypeatum* – Biologic Environmental Survey 2019

1e: Weld Range *Idiosoma nigrum* Survey – Biologic Environmental Survey 2012

1f: W11 Targeted Biological Survey – Ecotec 2024

1g: Review of *Cethegus* species limits and SRE status – Invertebrate Solutions 2024

JULY 2010



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**SINOSTEEL MIDWEST CORPORATION LTD.  
WELD RANGE FLORA AND VEGETATION ASSESSMENT**

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**WELD RANGE  
VEGETATION AND FLORA  
ASSESSMENT**

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## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	PROJECT BACKGROUND .....	1
1.2	LEGISLATIVE FRAMEWORK .....	5
1.3	SURVEY OBJECTIVES .....	6
<b>2</b>	<b>EXISTING ENVIRONMENT .....</b>	<b>7</b>
2.1	CLIMATE .....	7
2.2	GEOLOGY AND LAND SYSTEMS .....	9
2.3	HYDROGEOLOGY .....	17
2.4	GROUNDWATER DEPENDENT ECOSYSTEMS .....	17
2.5	BIOGEOGRAPHIC REGION .....	19
2.6	PREVIOUS BIOLOGICAL SURVEYS .....	19
2.7	LANDUSE HISTORY .....	20
<b>3</b>	<b>METHODOLOGY .....</b>	<b>21</b>
3.1	GUIDING PRINCIPLES .....	21
3.2	SURVEY METHODS .....	21
3.3	DETAILED FLORISTIC SURVEY METHODS .....	22
<b>4</b>	<b>VEGETATION .....</b>	<b>33</b>
4.1	REGIONAL VEGETATION .....	33
4.2	PREVIOUS DOCUMENTATION OF THE VEGETATION OF THE WELD RANGE .....	33
4.3	VEGETATION COMMUNITIES IDENTIFIED WITHIN STUDY AREA DURING THE CURRENT SURVEY .....	38
4.4	VEGETATION CONDITION .....	38
4.5	ECOLOGICAL COMMUNITIES OF CONSERVATION SIGNIFICANCE WITHIN THE STUDY AREA .....	53
<b>5</b>	<b>FLORA .....</b>	<b>57</b>
5.1	FLORISTIC INVENTORY .....	57
5.2	FLORISTIC DIVERSITY RELATIVE TO OTHER SURVEYS WITHIN THE MURCHISON BIOREGION .....	57
5.3	SAMPLING ADEQUACY .....	58

5.4	FLORA OF CONSERVATION SIGNIFICANCE .....	59
5.5	RANGE EXTENSIONS.....	74
5.6	INTRODUCED FLORA SPECIES.....	75
<b>6</b>	<b>CONSERVATION SIGNIFICANCE .....</b>	<b>77</b>
6.1	CONSERVATION SIGNIFICANCE OF VEGETATION WITHIN THE STUDY AREA.....	77
6.2	CONSERVATION SIGNIFICANCE OF FLORA WITHIN THE STUDY AREA .....	87
<b>7</b>	<b>ENVIRONMENTAL IMPACTS OF THE PROJECT .....</b>	<b>91</b>
7.1	DIRECT LOSS OF VEGETATION AND FLORA .....	91
7.2	INDIRECT IMPACTS TO VEGETATION AND FLORA.....	165
<b>8</b>	<b>RECOMMENDATIONS .....</b>	<b>169</b>
8.1	DESIGN LEVEL.....	169
8.2	MANAGEMENT LEVEL .....	170
<b>9</b>	<b>STUDY TEAM.....</b>	<b>173</b>
<b>10</b>	<b>REFERENCES.....</b>	<b>175</b>

## TABLES

Table 2-1 – Climatic Averages for Meekatharra Airport Weather Station.....	8
Table 2-2 – Climatic Averages for Meekatharra Airport Weather Station (BOM, 2009) .....	8
Table 2-3 – Summary of Land Systems Occurring within the Weld Range Project Area (From Curry et al. 1994).....	13
Table 3-1 – Vegetation Condition Scale (BushForever, 2000 after Trudgen,1991) .....	24
Table 3-2 – Limitations of the Flora and Vegetation Survey .....	31
Table 4-1 – Summary of Beard’s Vegetation Units Located Within the Study Area. ....	33
Table 4-2 – Weld Range Vegetation Communities Described by the DEC (Markey & Dillon, 2008). ....	37
Table 4-3 – Assessment of Vegetation Condition of Quadrats .....	38
Table 4-4 – Vegetation Communities of the Study Area.....	41
Table 5-1 – Taxonomic Composition of the Weld Range Flora .....	57
Table 5-2 – Comparison of Florisitic Diversity from Surveys Conducted at Weld Range and Jack Hills .	58
Table 5-3 – Taxa of Conservation Significance Recorded in the Study Area.....	61

Table 5-4 – Characteristics of Priority Taxa Recorded at Weld Range .....	62
Table 5-5 – Characteristics of Taxa of Potential Conservation Significance Recorded at Weld Range...	73
Table 5-6 – Taxa for which the Weld Range Records Represent an Extension of Known Distribution. .	74
Table 6-1 – Proportion Of Each Vegetation Type Mapped By Ecologia Within The Study Area.....	78
Table 6-2 -- Land Systems of the Weld Range Study Area. ....	79
Table 6-3 -- Beard Vegetation Units Within the Weld Range Study Area. ....	81
Table 6-4 – Comparison of Vegetation Communities Described by DEC at BIF Ranges North of Mt. Magnet. ....	83
Table 6-5 – Area of Community Types Mapped in the Study Area .....	85
Table 6-6 – Number of Plants Assumed for Records Where Only Descriptions or % Cover Available ...	87
Table 6-7 – Conservation Significant Flora Recorded Within the Study Area (All Data Sources) .....	88
Table 7-1 – Proposed Infrastructure Clearance Areas .....	91
Table 7-2 Estimated Impacts of Clearing to Land Systems within the Study Area .....	95
Table 7-3 Estimated Impacts to Beard Vegetation Communities of Infrastructure Footprint Options within the Study Area .....	96
Table 7-4 Estimated Impacts to ecologia Community Types within the Study Area of Infrastructure Footprint Options. ....	97
Table 7-5 – Overall Impact to the Vegetation of the PEC .....	99
Table 7-6 – Estimated Impact from the Three Infrastructure Options to Vegetations Communities of the Weld Range PEC. ....	101
Table 7-7 – Estimated Impacts to Priority Flora within the Study Area of Infrastructure Footprint Options .....	104

## FIGURES

Figure 1-1 – Location of the SMC Weld Range Iron Ore Project .....	2
Figure 1-2 – Three Potential Infrastructure Footprint Options .....	3
Figure 2-1 – Summary of Climatic Data for Meekatharra Airport (Source, BOM, 2009). ....	7
Figure 2-2 – The Three Major Landscape Units Comprising the Weld Land System (source: Curry et al., 1994). ....	10
Figure 2-3 – Land Systems of the Weld Range Project Area and Surrounds.....	11
Figure 2-4 – The Interim Biogeographic Regionalisation for Western Australia (IBRA). ....	19
Figure 3-1 – Distribution of Quadrats Surveyed within the Study Area .....	27
Figure 3-2 – Location of Transects Surveyed within the Study Area .....	29

Figure 4-1 – Beard’s Vegetation Units in the Weld Range Study Area.....	35
Figure 4-2 – Vegetation Communities Mapped within the Study Area. ....	39
Figure 4-3 – Location of the Weld Range PEC relative to the Study Area .....	55
Figure 5-1 –Species Accumulation Curve for the Weld Range Survey (Average Randomised, 258 quadrats).....	59
Figure 7-1 – Distribution of <i>Beyeria lapidicola</i> within the Infrastructure Options.....	107
Figure 7-2 – Distribution of <i>Eremophila rhegos</i> within the Infrastructure Options .....	109
Figure 7-3 – Distribution of <i>Euphorbia sarcostemoides</i> within the Infrastructure Options .....	111
Figure 7-4 – Distribution of <i>Goodenia lyrata</i> within the Infrastructure Options .....	113
Figure 7-5 – Distribution of <i>Sauropus</i> sp. Woogorong (M. Officer sn.n. 10/8/94) within the Infrastructure Options .....	115
Figure 7-6 – Distribution of <i>Stenanthemum patens</i> within the Infrastructure Options.....	117
Figure 7-7 – Distribution of <i>Acacia ?burrowsiana</i> within the Infrastructure Options.....	119
Figure 7-8 – Distribution of <i>Acacia speckii</i> within the Infrastructure Options .....	121
Figure 7-9 – Distribution of <i>Calytrix erosipetala</i> within the Infrastructure Options .....	123
Figure 7-10 – Distribution of <i>Dodonaea amplisemina</i> within the Infrastructure Options .....	125
Figure 7-11 – Distribution of <i>Eremophila arachnoides</i> subsp. <i>arachnoides</i> within the Infrastructure Options.....	127
Figure 7-12 – Distribution of <i>Grevillea stenostachya</i> within the Infrastructure Options .....	129
Figure 7-13 – Distribution of <i>Hemigenia tysonii</i> within the Infrastructure Options .....	131
Figure 7-14 – Distribution of <i>Homocalyx echinulatus</i> within the Infrastructure Options .....	133
Figure 7-15 – Distribution of <i>Indigofera gilesii</i> subsp. <i>gilesii</i> within the Infrastructure Options .....	135
Figure 7-16 – Distribution of <i>Micromyrtus placoides</i> within the Infrastructure Options.....	137
Figure 7-17 – Distribution of <i>Mirbelia ?stipitata</i> within the Infrastructure Options.....	139
Figure 7-18 – Distribution of <i>Phyllanthus baectenoides</i> within the Infrastructure Options.....	141
Figure 7-19 – Distribution of <i>Prostanthera ferricola</i> within the Infrastructure Options.....	143
Figure 7-20 – Distribution of <i>Prostanthera petrophila</i> within the Infrastructure Options.....	145
Figure 7-21 – Distribution of <i>Ptilotus beardii</i> within the Infrastructure Options .....	147
Figure 7-22 – Distribution of <i>Ptilotus luteolus</i> within the Infrastructure Options .....	149
Figure 7-23 – Distribution of <i>Tecticornia cymbiformis</i> within the Infrastructure Options.....	151
Figure 7-24 – Distribution of <i>Verticordia jamesii</i> within the Infrastructure Options .....	153

Figure 7-25 – Distribution of *Baeckea* sp. Melita Station (H. Pringle 2738) within the Infrastructure Options..... 155

Figure 7-26 – Distribution of *Goodenia berringbinensis* within the Infrastructure Options ..... 157

Figure 7-27 – Distribution of *Grevillea inconspicua* within the Infrastructure Options ..... 159

Figure 7-28 – Distribution of *Acacis* sp. nov. (aff. *Kochii*) within the Infrastructure Options..... 161

Figure 7-27 – Distribution of *Hemigenia* sp. nov. (aff. *exilis*) within the Infrastructure Options ..... 163

## APPENDICES

Appendix A summary of targeted flora Surveys by ecologia at Weld Range ..... 181

Appendix B 2010 DEC database search..... 189

Appendix C coordinates and vegetation condition assessment of quadrats..... 195

Appendix D National Vegetation Inventory System (NVIS) Vegetation Classifications..... 205

Appendix E Site descriptions for phases 1,2 and 3 ..... 207

Appendix F Dendrogram of multivariate analysis..... 209

Appendix G Species by site matrix ..... 213

Appendix H Vegetation maps at higher resolution ..... 215

Appendix I Explanation of Conservation Codes ..... 227

Appendix J Species List ..... 231

Appendix K Priority Flora and Species of Interest Locations ..... 245

Appendix L Voucher Specimens lodged with the WA herbarium..... 259

Appendix M Explanation of Declared Plant Codes..... 261

Appendix N DEC Vegetation Communities Described for Selected BIF Ranges Lying North of Mount Magnet..... 263

## ACRONYMS

List all acronyms used in the report here. Format alphabetically as follows:

**DEC** Department of Environment and Conservation

**EPA** Environmental Protection Authority

**EPBC** *Environment Protection and Biodiversity Conservation Act 1950*

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## EXECUTIVE SUMMARY

### Background

Sinosteel Midwest Corporation Ltd (SMC) is currently assessing the viability of the Weld Range Mining Proposal.

The Weld Range is located approximately 70 km south-west of Meekatharra and 80 km north-west of Cue. It is part of a series of greenstone ridges that forms the northerly extent of the Yilgarn Craton.

As part of the project feasibility studies, and to facilitate the environmental legal approvals processes, an assessment of the vegetation and flora of the Weld Range was undertaken. The purpose of this assessment was to provide information on the conservation significance of the vegetation and flora of the project area as part of the public environmental review (PER) process for the project. An assessment of the vegetation and flora of the Weld Range is presented in this report.

### Methods

The main fieldwork component of the vegetation and flora survey was conducted in November 2006 (spring), April 2007 (autumn) and May 2008 (winter). These field surveys involved both quadrat-based and opportunistic floristic sampling. Targeted threatened flora surveys were undertaken in addition to the quadrat-based surveys.

The data matrix detailing the presence / absence of species and their abundance in the quadrats surveyed was analyzed using multivariate statistics. The analysis resulted in a classification of the vegetation communities present at Weld Range; these vegetation communities were mapped at a scale of 1: 15,000. Voucher specimens of each vascular flora species were collected and identified using current literature, with reference to the WA Herbarium collection. Documented voucher specimens of all flora of conservation significance will be lodged with the WA Herbarium.

Flora surveys undertaken as part of the environmental impact assessment (EIA) process are required to address the Environmental Protection Agency's (EPA) Position Statement No. 3: *Terrestrial Biological Surveys as an Element of Biodiversity Protection* and Guidance Statement No. 51: *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia*. Table S.1 below lists requirements detailed in these statements and outlines the compliance of this survey to these guidelines.



• Table S. 1 - Conformance of Project to Relevant EPA Statements

Requirement	EPA Statement	Relevance to Project	Project Compliance
Impact on Biodiversity	Position Statement No. 3	Where impact on biodiversity cannot be avoided, the proponent must demonstrate that the impact will not result in unacceptable loss.	<p>The Study Area of 51,557 ha encompasses sections of Madoonga, Beebyn and Glen Stations, all of which have been stocked with sheep or cattle for many years. Feral goat numbers have also increased over the past decade. The vegetation of the much of the area, particularly on the plains and lower slopes has been affected by grazing. A number of small mines (including the oldest known ochre mine) have been worked in the area in the past, and small scale exploration activities have been undertaken at Weld Range (particularly on the western section) for approximately 10 – 20 years. For the past three years SMC has been carrying out exploration activities on its tenements at Weld Range.</p> <p>Based on the three infrastructure options indicated in the report (and the area of each vegetation community mapped within SMC's project area) the reduction of area of vegetation communities mapped at Weld Range will be:</p> <ul style="list-style-type: none"> <li>• 14 % to Community types 1 and 2 (mapped as a single unit) and considered of conservation significance due to their apparent restricted distribution regionally, with 12.5% impact to the area of this unit within the PEC;</li> <li>• 77% and 39% to Community sub-types 5b and 7b respectively, both of which are encompass small areas in the Study Area;</li> <li>• 29% to Community 6a;</li> <li>• Less than 20% for all other community types mapped.</li> </ul> <p>Twenty-seven priority flora species have been recorded in the study area (25 during the current survey) including six P1 taxa. Potential impacts to these species have been calculated based on the information collected during these surveys and data previously available from the DEC. Estimates of impact are likely to overestimate the proportion of locations and plants insidet the Study Area and areas of impact due the much greater intensity of survey. The taxon which would be most affected by Option 1, the preferred option, is <i>Micromyrtus placoides</i>(P3), followed by <i>Beyeria lapidicola</i>(P1) which will have 44.4% and 41.7% respectively of all locations impacted. <i>Eremophila rhegos</i> (P1) and <i>Goodenia lyrata</i>(P1) will also be impacted by 33% and 30% respectively. The impacts of Option 2 are identical for these species, as all of the impacted locations lie within the pits and dumps which are common to both. The Base Case option would have significantly more</p>

Requirement	EPA Statement	Relevance to Project	Project Compliance
			impact, with 80% of all known locations of <i>Homalocalyx echinulatus</i> impacted, and <i>Beyeria lapidicola</i> , <i>Eremophila rhegos</i> , <i>Goodenia lyrata</i> , <i>Sauropus</i> sp. <i>Woolgorong</i> (M. Officer s.n. 10/8/94), <i>Hemigenia tysonii</i> and <i>Micromyrtus placoides</i> also impacted by between 30 and 41%.
State, National and International Agreements, Legislation and Policy on Biodiversity	Position Statement No. 3	Information gathered for environmental impact assessment in Western Australia is to address State, national and international agreements, legislation and policy in regard to biodiversity conservation.	Impacts to species and communities listed under relevant legislature and to the general vegetation of the project area are addressed in Section 6 of this report. Relevance of the information gathered to the <i>Environmental Protection Act 1986</i> , <i>Wildlife Conservation Act 1950</i> and <i>Environment Protection and Biodiversity Conservation Act 1999</i> is discussed in Sections 1.2, 1.3 and 5.
EPA Standards, Requirements and Protocols	Position Statement No. 3	The quality of information and scope of field surveys is to meet the standards, requirements and protocols as determined and published by the EPA.	The current survey conforms to a Level 2 vegetation and flora survey, comprising a reconnaissance survey, a comprehensive three phase botanical survey and mapping of the vegetation of the area, as per EPA Guidance Statement 51.
Biodiversity Conservation and Ecological Function Values	Position Statement No. 3	Sufficient information is to be provided to address biodiversity conservation and ecological function values.	The value of the vegetation communities and conservation significant flora taxa occurring in the project area is discussed in a bioregional context in Section 6. Impacts to biodiversity and ecological function are discussed in Section 7.
State Biological Databases	Position Statement No. 3	Terrestrial biological surveys will be made publicly available and will contribute to the bank of data available for the region.	Voucher specimens for all priority flora species collected during the survey will be lodged at the WA Herbarium. Information collated from this survey will be included in public documents available for use by others.
Sampling Design and Intensity at Two Levels – Regional and Area Specific	Guidance Statement No. 51	Sites to be assessed at an appropriate level.	Data was collected on an area specific level. Sites were established mostly on SMC's lease at Weld Range and were concentrated on habitats to be impacted by the project footprint.  Regional data is available from the DEC surveys carried out on a number of BIF ranges of the Yilgarn Craton.
Landform – Scale, Rarity, Heterogeneity	Guidance Statement No. 51	Sites are to be established in representative landforms of the project area.	Vegetation communities occurring on the different landforms of the area were ground truthed in the field, and sites were assessed based on their representation on those landforms. Multiple sites were assessed on these landforms.
Habitat – Scale, Rarity, Heterogeneity	Guidance Statement No. 51	Sites are to be established in representative habitats of the project area.	Sites were selected from aerial photography before going to the field while ground-truthing of the vegetation communities occurring in the different habitats of the project area took place during the survey. Multiple sites were assessed in

Requirement	EPA Statement	Relevance to Project	Project Compliance
			each habitat.
Vegetation Structure, Diversity and Seasonality	Guidance Statement No. 51	Sufficient information is to be provided in the report on vegetation structure, diversity and seasonality.	<p>The report details the results of a vegetation mapping exercise carried out over the Weld Range. Multivariate analysis was carried out on the data collected from 239 quadrats assessed at Weld Range. Following analysis the structure of the vegetation communities occurring at Weld Range was described and the main communities were mapped.</p> <p>The vegetation was surveyed over three phases – each phase at a different time of year (spring, autumn and winter). Diversity and seasonality of the vegetation are reflected in the species lists produced for each phase of the survey. Additional information was available from sites assessed in June 2009 within a potential rail corridor at Weld Range.</p>
Potential for Conservation Significant Flora to occur, Based on Habitat Analysis	Guidance Statement No. 51	Sufficient information is to be provided to indicate the potential for significant flora to occur based on habitats in the area.	A list of the 27 conservation significant taxa recorded (to date) at Weld Range is provided in 5.4.3. Since July 2006 <i>ecologia</i> has carried out in excess of 20 surveys associated with SMC's exploration programme at Weld Range (Appendix A). Twenty-five priority flora taxa have been recorded during these surveys. Database searches produced a list of conservation significant taxa that could potentially occur at Weld Range. A list of these taxa is included in Appendix B, and the table includes a comment on the likelihood of each species occurring in the habitats of the Weld Range.
Results Including Species/Area Curves, Species and Ecosystem diversity and Heterogeneity	Guidance Statement No. 51	Adequate information is to be provided in the report to comply with this requirement.	Species / area curves are included in Section 5.3. Details on the flora of the project area are included in this report and comparisons with the flora of other ranges in the region are also included in Section 6.1.2.4. A vegetation map and detailed vegetation descriptions are provided for the project area.
Information on Adjacent Areas – Previous Surveys and Herbarium Records	Guidance Statement No. 51	Information is to be included in the report on the results of other surveys in the area and region.	<p>Information was requested from relevant government databases and was collated from reports available on other vegetation surveys undertaken in the vicinity of Weld Range.</p> <p>A review of data collected by the DEC on selected BIF ranges in the region is included in this report.</p>

## Vegetation

Seven main vegetation communities, incorporating 17 sub-communities were identified:

- 1a *Acacia aneura* low open woodland over *Acacia* sp. Weld Range, *A. ramulosa* var. *linophylla* and *Thryptomene decussata* open mid shrubland over mixed *Eremophila* spp. low shrubland.
- 1b *Acacia aneura* low open woodland over *Acacia cockertoniana* open mid shrubland over mixed mid shrubland over *Ptilotus obovatus* low shrubland.
- 2a Scattered *Acacia pruinocarpa* trees over *A. aneura* mid sparse shrubland / scattered shrubs over *Ptilotus obovatus* low shrubland with *Cymbopogon ambiguus* tussock grasses.
- 2b *Acacia aneura* sparse shrubland over mixed sparse mid shrubland over *Micromyrtus sulphurea* and *Ptilotus obovatus* low open shrubland.
- 3a +/- *Corymbia lenziana* scattered medium trees over *Acacia ramulosa* var. *linophylla* and *A. aneura* sparse tall shrubland over mixed *Eremophila* spp. open mid shrubland over scattered low shrubs of *Ptilotus obovatus* over mixed open tussock grassland.
- 3b +/- *Acacia pruinocarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* spp. closed shrubland over *Ptilotus obovatus* open low shrubland.
- 3c Scattered *Eucalyptus mallees* / trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Rhagodia eremaea*, *Eremophila forrestii* subsp. *forrestii* shrubland over *Ptilotus obovatus* open low shrubland.
- 3d *Acacia aneura* and *A. cockertoniana* open moderate shrubland over *Eremophila simulans* subsp. *simulans* and *Aluta aspera* subsp. *hesperia* low open shrubland.
- 4a *Acacia* sp. Weld Range and *A. aneura* var. *microcarpa* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* open low shrubland.
- 4b *Acacia* sp. Weld Range and *Acacia speckii* (Priority 3) shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* (Priority 4) and *Dodonaea amplisemina* (Priority 3) open shrubland over *Cymbopogon ambiguus* sparse tussock grassland.
- 5a *Acacia craspedocarpa* open tall shrubland over *Solanum ashbyae* / *lasiophyllum* and *Ptilotus obovatus* low shrubland over mixed low tussock grassland.
- 5b +/- *Grevillea striata* low isolated trees over *Acacia craspedocarpa* and *A. aneura* tall open shrubland over *Scaevola spinescens* sparse mid shrubland over *Austrostipa elegantissima* and *Eriachne flaccida* low open tussock grassland.
- 6a Scattered *Acacia* spp. shrubs over mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* sparse shrubland over mixed *Maireana* spp. chenopod shrubland.

- 6b Scattered mixed *Acacia* spp. over *Rhagodia eremaea* and *Scaevola spinescens* sparse mid to low shrubland over *Ptilotus obovatus*, *Maireana georgei* and *Sclerolaena diacantha* low chenopod shrubland.
- 6c *Eremophila maculata* subsp. *brevifolia* low open shrubland over *Sclerolaena diacantha* low chenopod shrubland over *Enneapogon cylindricus* low tussock grassland.
- 7a *Melaleuca stereophloia* and *Cratystylis subspinescens* low shrubland over *Tecticornia* spp. low samphire shrubland over *Frankenia laxiflora* low shrubland.
- 7b *Eucalyptus carnei* and *Eucalyptus trivalva* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland over mixed low tussock grasses.

Units 1 and 2 were combined for the purposes of mapping their distribution, as the distinctions in vegetation composition visible at ground level could not be reliably discriminated on the aerial photography.

### Vegetation of Conservation Significance

Searches of government databases indicate that no threatened ecological communities occur at Weld Range. However, the Priority 1 priority ecological community (PEC) "Weld Range vegetation complexes (banded ironstone formation)" has been listed and incorporates much of the vegetation within the Study Area.

### Flora

A total of 393 taxa resulted from the combined records of all surveys within the Study Area, including species, subspecies, varieties, forms and affinities. Of this total, six were naturalised alien flora.

### Flora of Conservation Significance

One nationally-listed threatened flora species have been recorded within the Murchison bioregion; *Conospermum toddii* but was not recorded within the Study Area.

Two State-listed DRF species occur in the Murchison; *Conospermum toddii* and *Eremophila rostrata* subsp. *rostrata* but were not recorded within the Study Area.

One hundred and fifty declared rare or priority flora species are listed by the DEC as occurring in the Murchison botanical region.

To date, 27 priority taxa have been recorded within the Study Area, twenty-five of which were recorded during the surveys detailed in this report. In addition two potentially new, undescribed taxa were recorded during the survey.

Seventeen taxa, seven of which have Priority status, have range extensions of greater than 150 kilometres from the previously lodged records. The relatively large number of Priority taxa and range extensions is considered a product of two factors:

- the sporadic history of collection in the vicinity of the Study Area, resulting in an incomplete knowledge of the distributions of many taxa; and in at some instances; and
- specific requirements of some taxa for habitats which are genuinely restricted in the bioregion, resulting in restricted or disjunct distribution.

### **Naturalised Alien Taxa (Weeds)**

Six alien taxa were recorded during the Weld Range survey; *\*Anagallis arvensis*, *\*Cenchrus ciliaris*, *\*Cuscuta epithymum*, *\*Portulaca oleracea*, *\*Solanum nigrum* and *\*Sonchus oleraceus*. None of these species are classified as Weeds of National Significance (WONS) or Declared Weeds under State listings. *\*Cenchrus ciliaris* is rated as a weed of high impact, whilst *\*Anagallis arvensis*, *\*Solanum nigrum* and *\*Sonchus oleraceus* have been rated as of moderate impact by the Environmental Weed Strategy of WA.

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# 1 INTRODUCTION

## 1.1 PROJECT BACKGROUND

Sinosteel Midwest Corporation (SMC) is proposing to develop a new iron ore mine (the Project) at Weld Range, located approximately 600 km north-north-east of Perth and 85 km southwest of Meekatharra. The tenements that form the basis for the Project cover a series of hills that rise approximately 250 m above the surrounding plains. The range is some 3 km wide, extends for up to 60 km in length from southwest to the northeast, and consists of a series of parallel ridges with deep incised valleys.

To facilitate the environmental legal approvals process, an assessment of the vegetation and flora of the proposed project area was required. SMC commissioned ecologia Environment (ecologia) to undertake a baseline survey of the vegetation and flora of its tenements at Weld Range. The results of this assessment are presented in this report, the purpose of which is to provide botanical information as part of the public environmental review (PER) process for the project.

Sites were surveyed within the following tenements, covering an area of 26,784 ha at Weld Range:

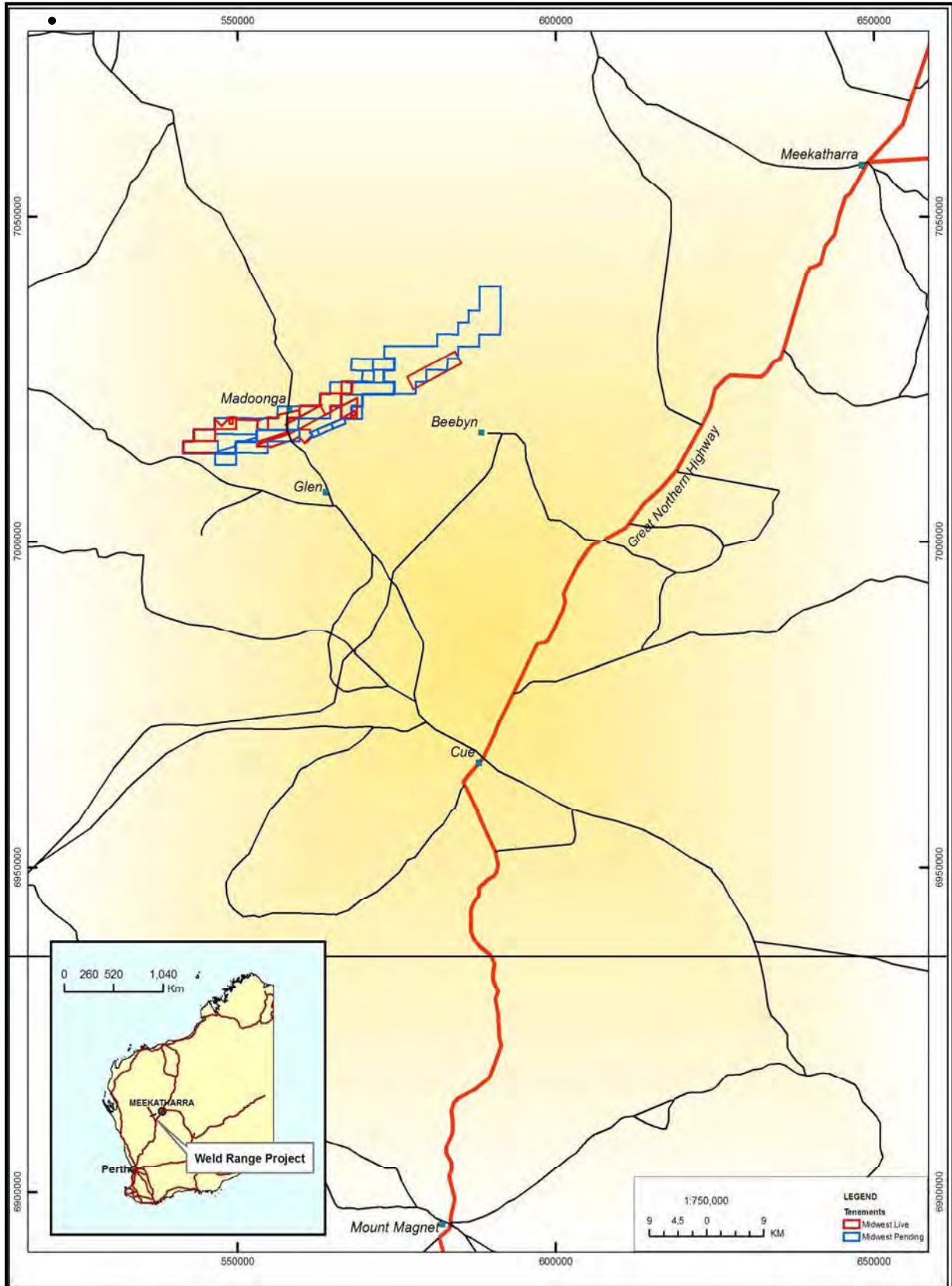
E20/0450, E20/0459, E20/0457, E20/0208, E20/0595, E20/0402, E20/0474, E20/0476, E20/0633, E51/0981, E51/0907, M20/0403, M20/0311 and TR70/3902.

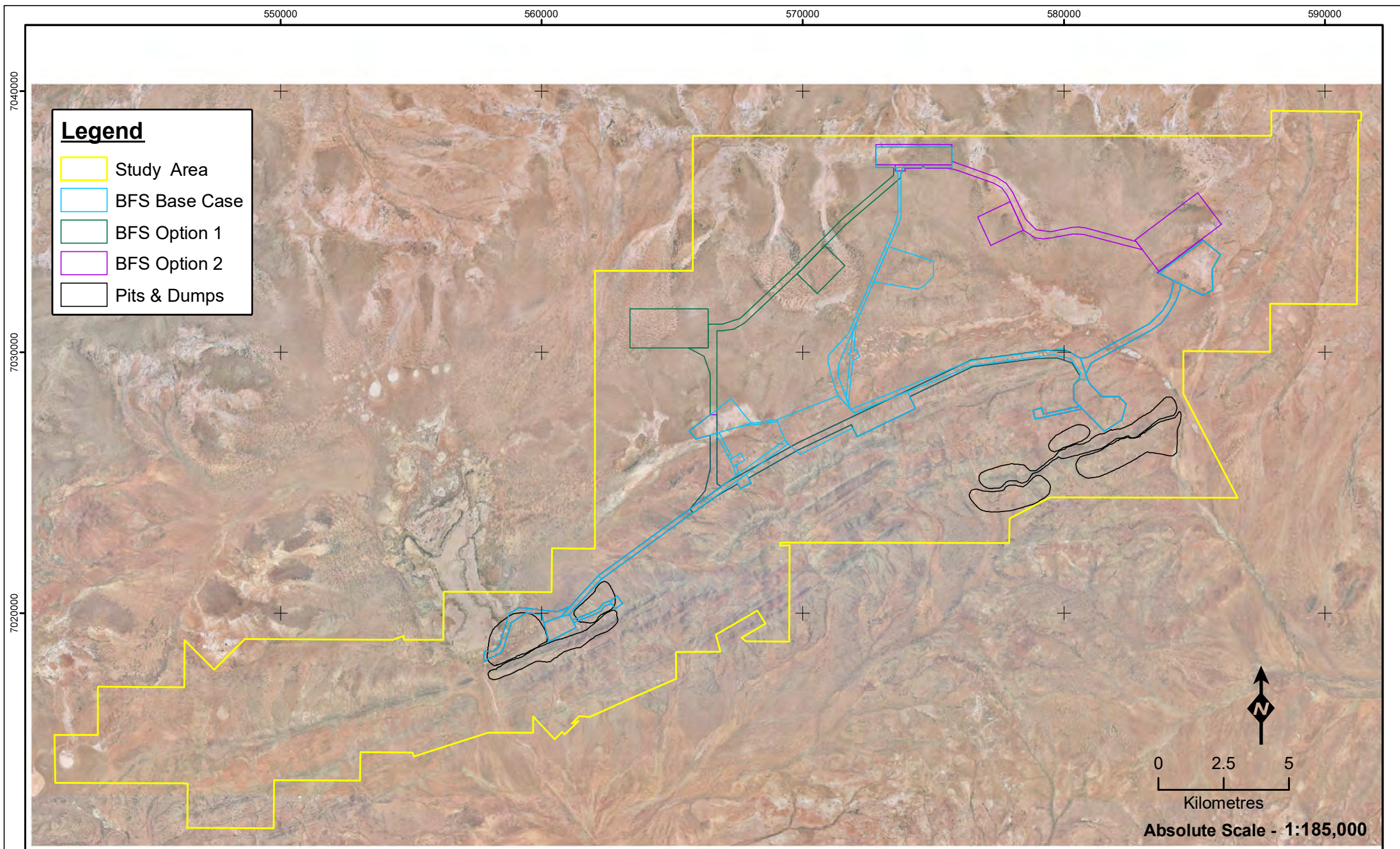
Sites were concentrated in those areas to be directly impacted by the Project. However the vegetation of a larger area (the Study Area) of 51,557 ha encompassing the above leases and some portions of surrounding leases was mapped (Figure 1.1).

SMC has considered three potential infrastructure footprint options; BFS Base Case option, BFS Option 1 and BFS Option 2, with Option 1 being the preferred option (Figure 1.2).




**Figure 1.1 – Location of the SMC Weld Range Iron Ore Project**





**Legend**

- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps

  
 0      2.5      5  
 Kilometres  
**Absolute Scale - 1:185,000**



**Infrastructure options of the project**

**Figure: 1.2**  
**Project ID: 722**  
 Coordinate System  
 Name: GDA 1994 MGA Zone 50  
 Projection: Transverse Mercator  
 Datum: GDA 1994

**Drawn: SV**  
**Date: 24/06/10**  
 Unique Map ID: S142  
**A4**

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## 1.2 LEGISLATIVE FRAMEWORK

Federal and State legislation applicable to the conservation of native flora and fauna includes, but is not limited to, the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, the *Wildlife Conservation Act 1950 (WC Act)*, and the *Environmental Protection Act 1986 (EP Act)*. Section 4a of the *EP Act 1986* requires that developments take into account the following principles applicable to native flora and fauna.

### The Precautionary Principle

Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

### The Principles of Intergenerational Equity

The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

### The Principle of Conservation of Biological Diversity and Ecological Integrity

Conservation of biological diversity and ecological integrity should be a fundamental consideration.

Furthermore, biological surveys undertaken as part of the environmental impact assessment (EIA) process are required to address the Environmental Protection Authority's (EPA's) 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, 2004a), and Guidance Statement No. 56: *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004b).

Native flora and fauna in Western Australia are protected at a federal level under the *EPBC Act* and at a State level under the *WC Act*.

The *EPBC Act* was developed to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance, to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources, and to promote the conservation of biodiversity. The *EPBC Act* includes provisions to protect native species (and in particular to prevent the extinction and promote the recovery of threatened species) and to ensure the conservation of migratory species. In addition to the principles outlined in Section 4a of the *EP Act*, Section 3a of the *EPBC Act* includes a principle of ecologically sustainable development dictating that decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.

The *WC Act* was developed to provide for the conservation and protection of wildlife in Western Australia. Under Section 14 of this Act, all fauna and flora within Western Australia are protected; however the Minister may, via a notice published in the Government Gazette, declare a list of flora taxa identified as likely to become extinct, or as rare, or otherwise in need of special protection. The current listing was gazetted on the 23<sup>rd</sup> February 2010.

### 1.3 SURVEY OBJECTIVES

The EPA's objectives with regards to the management of native flora and vegetation are to:

- Avoid adverse impacts on biological diversity comprising the different plants and animals and the ecosystems they form, at the levels of genetic, species and ecosystem diversity.
- Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.
- Protect declared rare flora consistent with the provisions of the WC Act 1950.
- Protect other flora species of conservation significance.

The primary objective of this survey was to provide sufficient information to the EPA to assess the impact of the project on the vegetation and flora of the area, thereby ensuring that these objectives will be upheld.

Specifically, this survey was to satisfy the requirements documented in EPA's Guidance Statement 51 and Position Statement No. 3, thus providing:

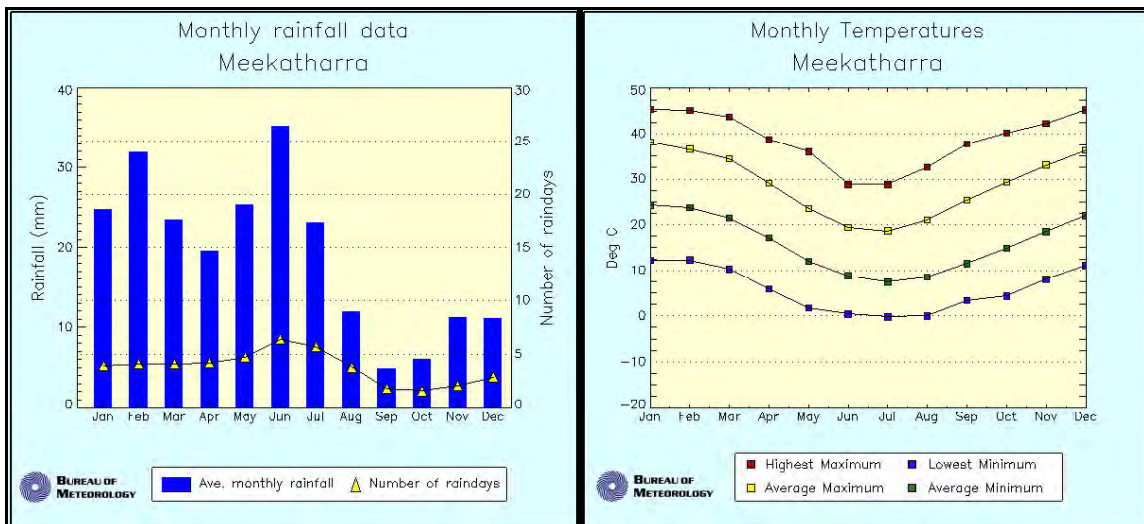
- a review of background information (including literature and database searches);
- an inventory of vegetation types and flora species occurring in the Study Area, incorporating recent published and unpublished records;
- an inventory of species of biological and conservation significance recorded or likely to occur within the project area and surrounds;
- a map and detailed description of vegetation types occurring in the Study Area;
- a description of the characteristics of the vegetation types;
- an appraisal of the current knowledge base for the area, including a review of previous surveys conducted in the area relevant to the current study;
- a review of regional and biogeographical significance, including the conservation status of species recorded in the project area; and
- a risk assessment to determine likely impacts of threatening processes on vegetation and flora within the Study Area.

## 2 EXISTING ENVIRONMENT

### 2.1 CLIMATE

The closest Bureau of Meteorology (BOM) weather reading station is at Meekatharra Airport approximately 70 km north-east of Weld Range. The local climate is dry with hot summers and mild winters and is strongly influenced by a band of high pressure known as the sub tropical ridge. The ridge is located to the south-east for most of the year, occasionally moving close enough to allow cold fronts to pass over the area, bringing little, if any rain. The reliable rainfall periods are associated with the tropical cloud bands during May to July (BOM, May 2009) (Figure 2.1).

Annual rainfall at Meekatharra is variable and an average of 237 mm falls over an average of 46 days. According to the BOM rainfall map of Western Australia, the Weld Range falls between the 200 mm and 175 mm rainfall isohyets and, as a result falls within the desert bioclimatic region that receives both summer and winter rainfall (Beard, 1976).



**Figure 2.1 – Summary of Climatic Data for Meekatharra Airport (Source, BOM, 2009).**

The most reliable rainfall period occurs during winter from May to July. June is the wettest winter month, with an average of 31 mm falling on six rainfall days. A second period of rainfall period occurs from January to March, associated with thunderstorms that infrequently produce heavy, localised falls during these hotter months. February is the wettest summer month, with an average of 36 mm of rain falling over four rain days.

The hottest month is January with an average maximum temperature of 38.3°C (Table 2-1); hot, dry north-east to north-west winds often result in temperatures above 41°C. July temperatures range from an average maximum of 19°C to an average minimum of 7.4°C; overnight, the temperature may drop below 5°C (BOM, May 2009).

Humidity in this area is low, with the average morning relative humidity reaching 63% in June and the average afternoon relative humidity dropping below 17% in November and December. Evaporation greatly exceeds precipitation, with the average daily evaporation rate as high as 16.2 mm per day in January, and dropping to 3.8 mm per day in June.

**Table 2-1 – Climatic Averages for Meekatharra Airport Weather Station.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
<b>Mean maximum temperature (°C)</b>													
38.3	36.6	34.3	29.1	23.7	19.6	19	21.3	25.6	29.5	33.2	36.4	28.9	1950 - 2009
<b>Mean minimum temperature (°C)</b>													
24.3	23.7	21.3	17	12.1	8.7	7.4	8.5	11.5	15	18.6	22	15.8	1950 - 2009
<b>Mean 9 am relative humidity (%)</b>													
30	37	38	45	52	63	61	51	40	33	29	28	42	1950 - 2009
<b>Mean 3 pm relative humidity (%)</b>													
18	24	23	28	34	41	38	30	22	17	16	16	25	1950 - 2009
<b>Mean rainfall (mm)</b>													
27.5	35.9	28.6	20.9	23.9	31	22.1	11.4	4.6	6.4	11.6	12.2	236.2	1944 - 2009
<b>Highest monthly rainfall (mm)</b>													
135.4	174.2	259	159.2	96	186.6	165.7	56.2	40.8	61.8	113.2	91.4	573.2	1944 - 2009
<b>Mean number of rain days</b>													
4.2	4.5	4.2	4.3	4.5	5.8	5.6	3.6	1.9	1.7	2.4	3	45.7	1944 - 2009
<b>Mean number of days of rain ≥ 1 mm</b>													
2.7	3.2	2.7	2.6	2.8	3.6	3.7	2.1	0.8	1	1.5	1.9	28.6	1944 - 2009
<b>Mean evaporation (mm)</b>													
16.2	14.2	11.9	8.2	5.5	3.8	3.9	5.4	8.1	11.1	13.5	15.1	9.7	1967 - 2009

BOM Station - 'Meekatharra Airport' [007045], accessed 19 May 2009. Location: 26.61 °S 118.54 °E, elevation: 517 m.

Rainfall in the four months preceding the first phase (November 2006) of the Weld Range survey was 49.6 mm, 5.1 mm above the long-term average for those months (Table 2.2). During 2006, 80% more rain than the long-term average was recorded. Rainfall in the four months preceding the second phase survey (April 2007) was 66.2 mm, 38.4 mm less than the long-term average for those same four months (104.2 mm). Rainfall in the four months preceding the third phase survey (July 2008) was 84 mm, 20.4 mm less than the long-term average for those same four months (104.4 mm). Rainfall in the four months preceding the rail corridor survey (June 2009) was 26.4 mm, 82.5 mm below the long-term average for those four months.

**Table 2-2 – Climatic Averages for Meekatharra Airport Weather Station (BOM, 2009)**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
<b>2006</b>	86.8	85.8	138	26.4	1.8	0.8	3.6	0.8	8.4	36.8	7.2	28.6	425
<b>2007</b>	23.8	13.8	0	24.8	9.2	2.6	21.6	0.8	1.2	1.2	1	19	119
<b>2008</b>	5.4	128	57.2	13.8	2.2	10.8	16.8	17.6	0	6.2	29.8	14.8	302.2
<b>2009</b>	28.8	11.8	2.6	10.0	2.0	18.6	18.2	4.2	3.0	3.4	12.4	4.0	119.0

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
<b>Average Annual Rainfall (mm)**</b>	<b>27.1</b>	<b>35.3</b>	<b>28.1</b>	<b>20.7</b>	<b>23.2</b>	<b>30.8</b>	<b>22.0</b>	<b>11.3</b>	<b>4.6</b>	<b>6.3</b>	<b>11.6</b>	<b>12.1</b>	<b>236.9</b>

BOM Station - 'Meekatharra Airport' [007045], June 2010 Location: 26.61 °S 118.54 °E, elevation: 517m. \*\*Average annual rainfall records from 1944 to 2009.

## 2.2 GEOLOGY AND LAND SYSTEMS

### 2.2.1 Geology

The Weld Range is located at the northern extent of the Yilgarn Craton, the sediments of which are derived from either the erosion of the Archaean bedrock, or the reworking of the older pre-existing sediments. They are highly variable in origin, composition and thickness, predominantly characterised by shallow, sandy and infertile soils underlain by a red-brown siliceous hardpan (Anand & Paine, 2002).

The landscape is gently undulating, composed of Archaean rocks, predominantly granite with north to north-west trending belts of greenstone rocks. These greenstone rocks form hill ranges that are separated widely by the very flat plains derived from colluvium and alluvium. The topography of this area results from a complex history of extensive weathering, affecting most of the geological provinces across it. The depth of weathering on the mantle is highly variable, and it can be up to approximately 150 m in depth (Anand & Paine, 2002).

The greenstone belts of the Weld Range exhibit banded ironstone formations (BIF) over strike lengths of 40 – 50 km. BIF and related rocks are comprised of silica, hematite, magnetite and iron silicates, with the majority of BIF in the Weld Range being of the jaspilite type. Jaspilite consists of red chert bands in conjunction with white and/or black bands; fine hematite dust gives the red colouration. The informally named Madoonga, Lulworth and Wilgie Mia beds represent the three laterally persistent units of jaspilite at the Weld Range (from north to south). The Weld Range jaspilite has a grain size of 10 – 30 µm and contains 20 – 60% magnetite (Elias, 1982).

Dolerite intrudes into the BIF with minimal disruption to bedding, and exists as multiple sheets which range from less than 50 m to exceeding 150 m in outcrop width. Approximately 90% of the thickness of the sequence at Weld Range is attributed to dolerite.

Large amounts of iron ore occur at Weld Range, formed by supergene enrichment of BIF during the Tertiary lateritization period. Ochre also exists in the jaspilites of the range (Elias, 1982).

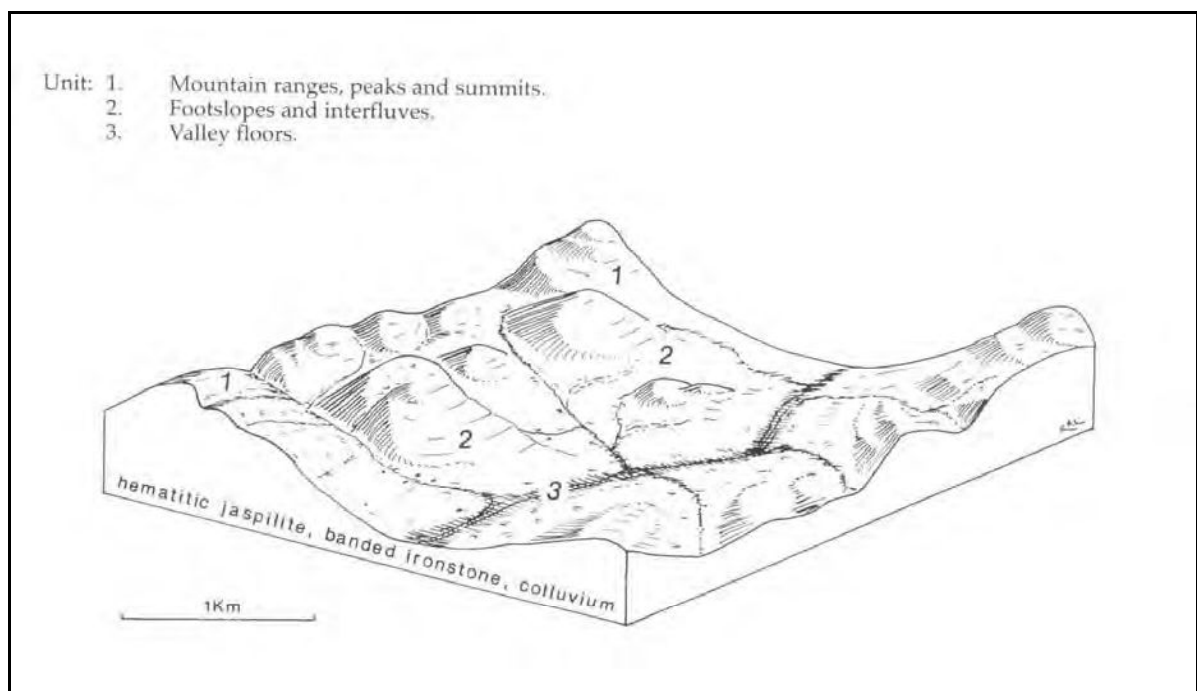
### 2.2.2 Land Systems

Curry et al. (1994) undertook a regional inventory of the Murchison River catchment and surrounds to document the land systems present in the area and the condition of each. The survey area covered 88,360 km<sup>2</sup>, and spanned between Meekatharra and Mount Magnet in the east, to the catchments of the Greenough and Wooramel Rivers in the west.

The Weld Range Project is primarily located on the Weld land system (350 km<sup>2</sup>), described as rugged ranges and ridges of mainly Archaean metamorphosed sedimentary rocks supporting Acacia species shrublands (Curry et al., 1994). It is composed of three major landscape units (Figure 2.2):

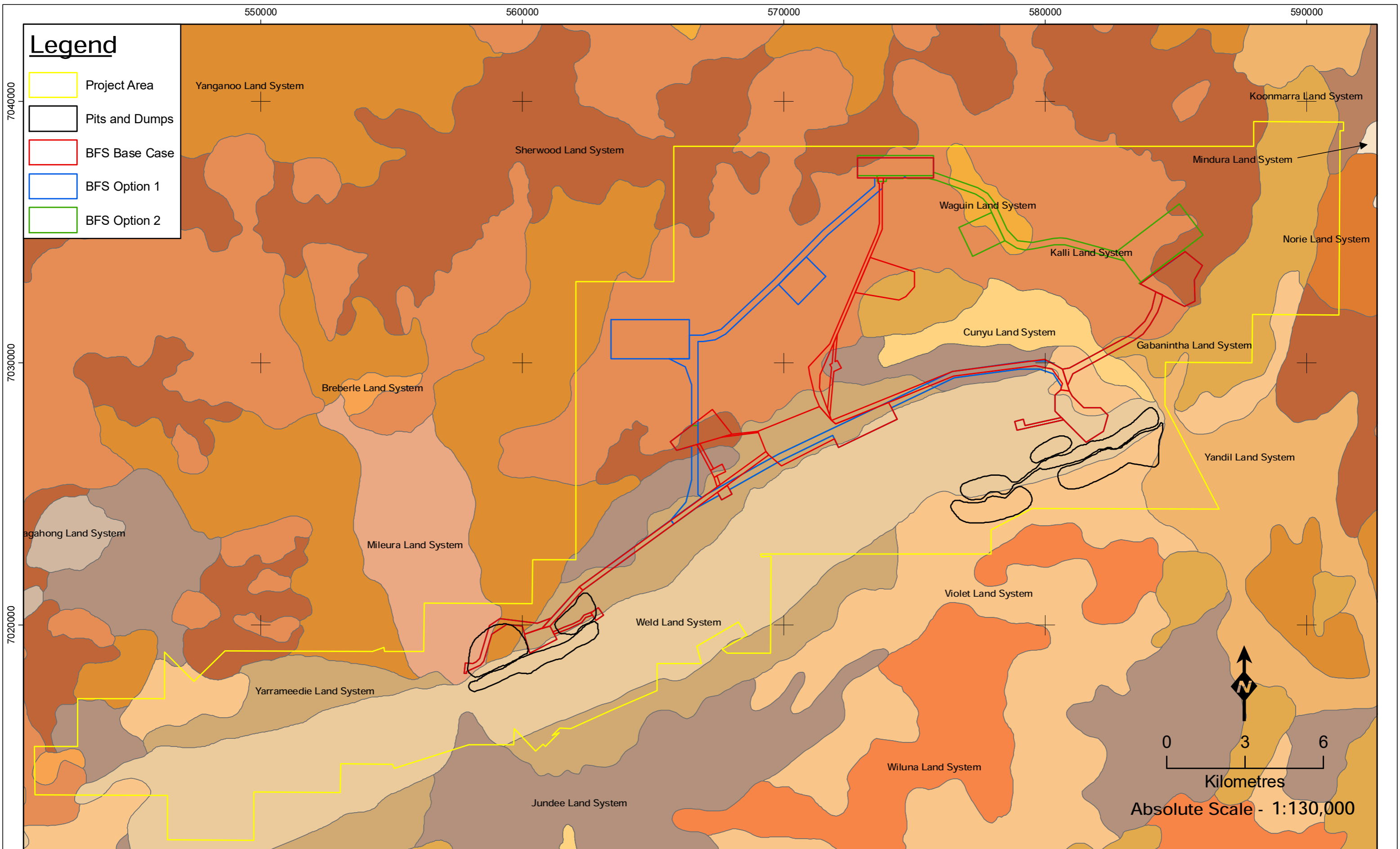


1. *Mountain ranges, peaks and summits* – characterised by ridges forming steep rocky outcrops of ironstone and jaspilite. These have soils described as skeletal lithosols confined to pockets of dark red loamy or clayey sands, with infrequent clay subsoils less than 50 cm deep, overlying parent material.
2. *Footslopes and interfluves* – characterised by broad concave inclines generally covered by dense quartz or ironstone mantles. The soils are described as reddish-brown or dark red shallow earths less than 50 cm deep.
3. *Valley floors* – occurring between ridges with creek channels dissecting into the bedrock with soils described as red earthy sands overlying metamorphic rock fragments less than 50 cm deep (Curry *et al.*, 1994).



**Figure 2.2 – The Three Major Landscape Units Comprising the Weld Land System (source: Curry *et al.*, 1994).**

Most of the surrounding area within the Project lies within the Yarrameedie, Violet and Jundee land systems, with smaller areas of the Sherwood, Mileura, Norie, Cunyu, Kalli, Gabanintha, Breberle, Koonmarra, Waguin, Wiluna, Yandil and Yanganoo land systems (Figure 2.3) also present. These land systems and their associated land types are described in Table 2-3.



**Legend**

- Project Area
- Pits and Dumps
- BFS Base Case
- BFS Option 1
- BFS Option 2



## Landsystems of the Weld Range Project Area

Figure: 2.3  
Project ID: 722

Drawn: SG  
Date: 01/07/10

*Coordinate System*  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Unique Map ID: S144

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**Table 2-3 – Summary of Land Systems Occurring within the Weld Range Project Area (From Curry et al. 1994).**

Land System (Total Area in Murchison)	Land Type	Description
Weld (350 km <sup>2</sup> )	1: Rough Hills with <i>Acacia</i> spp. shrublands	Rugged ranges and ridges of mainly Archaean metamorphosed sedimentary rocks; supports <i>Acacia</i> species shrublands; major system of Weld Range and Jack Hills.
Norie (1321 km <sup>2</sup> )		Granite hills with exfoliating domes and extensive tor fields, supporting <i>Acacia</i> species shrublands.
Gabanintha (962 km <sup>2</sup> )		Ridges, hills and footslopes of various metamorphosed volcanic rocks (greenstones), supporting sparse <i>Acacia</i> species and other mainly non-halophytic shrublands.
Wiluna (1294 km <sup>2</sup> )	2: Hills and plains with mulga, snakewood-halophytic shrublands	Low greenstone hills with occasional lateritic breakaways and broad stony slopes, lower saline stony plains and broad drainage tracts; supports sparse mulga shrublands with patches of halophytic shrubs.
Yarrameedie (519 km <sup>2</sup> )	3: Low hills and quartz strewn plains with mulga shrublands	Undulating stony interfluves, drainage floors and pediment (foothill) plains below major ranges of crystalline rocks (mainly Weld Land System) supporting sparse mulga shrublands.
Sherwood (4839 km <sup>2</sup> )	4: Breakaways, stony plains and sandy surfaced plains on granite with mulga and halophytic shrublands	Extensive, gently sloping stony and sandy plains on granite and gneiss below saline footslopes of lateritised breakaway and outcrops of weathered rock; mainly supports scattered mulga shrublands with understorey of non-halophytic shrubs.
Violet (1078 km <sup>2</sup> )	7: Irregular plains on laterite and parent rock with mulga and halophytic shrublands	Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supports mulga and bowgada-dominated shrublands, with dense mulga groves and patchy halophytic shrublands.
Kalli (6097 km <sup>2</sup> )	10: Sandplains and drainage floors with grassy and halophytic shrublands	Elevated, gently undulating red sandplains edged by stripped surfaces on laterite and granite; tall <i>Acacia</i> species shrublands and understorey of wanderrie grasses.

Land System (Total Area in Murchison)	Land Type	Description
Jundee (1346 km <sup>2</sup> )	14: Wash plains on hardpan with mulga shrublands	Hardpan wash plains with variable dark gravely mantling and weakly groved vegetation; minor sandy banks; supports scattered mulga shrublands.
Yanganoo (12,433 km <sup>2</sup> )		Almost flat hardpan wash, with or without small wanderrie banks and showing variable development of weak groving; supports mulga shrublands.
Yandil (3402 km <sup>2</sup> )		Flat hardpan wash plains, with occasional wanderrie banks and groves; supports mulga shrublands.
Cunyu (1083 km <sup>2</sup> )	15: Calcreted river plains with grassy shrublands.	Calcreted drainage on hardpan, alluvial plains with raised calcrete platforms dissected by major flow zones and channels, supporting variable non-halophytic shrublands and shrubby grasslands.
Mileura (1007 km <sup>2</sup> )		Saline and non-saline calcreted river plains, with clayey flood plains interrupted by raised calcrete platforms supporting diverse and very variable tall shrublands, mixed halophytic shrublands and shrubby grasslands.
Breberle (115 km <sup>2</sup> )	16: Sandplains and drainage floors with acacia and halophytic shrublands	Level saline drainage plains adjacent to ephemeral lakes, claypans and swampy drainage foci with sandy margins and occasional sand dunes; supports tall acacia shrublands and other fringing shrublands with zonations of perennial grasses and halophytes.
Koonmarra (5335 km <sup>2</sup> )	17: Stony plains with <i>Acacia</i> spp. shrublands	Quartz-strewn stony plains and low rises with outcropping granite, gneiss and schists; supports scattered mulga and other mainly non-saline shrubs.

Land System (Total Area in Murchison)	Land Type	Description
Waguin (748 km <sup>2</sup> )	7: Mesas, breakaways and stony plains with acacia or eucalypt woodlands and halophytic shrubs.	Sandplains and stripped granite or laterite surfaces with low fringing breakaways and lower plains; supports bowgada and mulga shrublands with wanderrie grasses and minor mixed halophytes.

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### 2.3 HYDROGEOLOGY

Drainage in the project area occurs within the upper Murchison River Catchment, part of the drainage basin of the Murchison River. Water flows northwards and is ephemeral. Most of the drainage runs towards the Indian Ocean, with a small part draining inland towards the salt lakes of the area.

As the rainfall and associated surface water have erratic seasonal distributions the dominant land uses, mining and pastoralism, are dependent on the extensive shallow aquifers found in the area. The area contains a variety of Precambrian bedrock aquifers ranging from granite to metamorphic and sedimentary rocks, overlain by alluvium and calcrete.

Groundwater salinity decreases northwards towards the Gascoyne area and ranges from hypersaline in the upper parts of the Yarra Yarra and Murchison catchments, to fresh – brackish conditions in the Gascoyne catchment (Department of Fisheries, 2004).

The following aquifer types are found within the Murchison:

- Alluvium aquifer; alluvial sediments lie along the main river valleys of the Yilgarn Craton, overlying calcrete, palaeochannels and fractured rock. It is not known as a major aquifer source, but is utilised by wells and bores for stock and mining. Groundwater salinity ranges from fresh on the valley sides and increases towards the centre.
- Calcrete aquifer; calcrete is a chemically precipitated limestone contained by the alluvium, close to the centres of the valleys. Calcrete aquifers have the most potential for shallow, large supplies of brackish to saline groundwater in the Murchison catchment.
- Palaeochannel aquifer; palaeochannels are the basal infilling of ancient river valleys. One major palaeochannel aquifer occurs at Windimurra in the Murchison, and it is used for mining. The groundwater salinity is generally high.
- Fractured rock aquifer; this includes a variety of metamorphic and igneous rocks. Fractured rock aquifers are the main source of water for mining in the Murchison, with groundwater salinity ranging from brackish to hypersaline.

### 2.4 GROUNDWATER DEPENDENT ECOSYSTEMS

Groundwater dependent ecosystems (GDEs) are defined as “ecosystems that must have access to groundwater to maintain their ecological structure and function” (Murray et al., 2006) or “ecosystems that are dependent on groundwater for their existence and health” (National Water Commission, 2006).

The extent to which ecosystems are dependent on groundwater is classified into five categories: ecosystems entirely dependent on groundwater; ecosystems highly dependent on groundwater; ecosystems with proportional dependence on groundwater; ecosystems which may only use groundwater opportunistically or to a very limited extent; and ecosystems with no apparent dependence on groundwater (Hatton and Evans, 1998). The dependency of ecosystems on groundwater is based on groundwater flow or flux, level, pressure and quality. The ecosystem response to alterations in these groundwater parameters is variable (Sinclair Knight Merz Pty Ltd, 2001).



Less than 1% of the land area of Australia is represented by ecosystems that are entirely dependent on groundwater, and similarly for ecosystems highly dependent on groundwater. Less than 5% of the land area is associated with ecosystems that are proportionally dependent on groundwater (Hatton and Evans, 1998). These ecosystems represent a small but unique and important part of the Australian environment (Hatton and Evans, 1998; Sinclair Knight Merz Pty Ltd, 2001).

Examples of Australian GDEs that are entirely dependent on groundwater include riparian (streamside) vegetation in the central Australian arid zone and arid zone calcrete aquifer ecosystems of central Western Australia (Sinclair Knight Merz Pty Ltd, 2001).

There is a range of wetland and riparian ecosystems in Australia that initially appear to be groundwater dependent, but prove not to be. Examples of this include intermittent and episodic wetlands and lakes of the arid zone and of the Western Australian sandplain and Yilgarn Plateau (Sinclair Knight Merz Pty Ltd, 2001).

Currently, six distinct types of GDEs are recognized in Australia: terrestrial vegetation, river base flow systems; aquifer and cave ecosystems; wetlands; terrestrial fauna; and estuarine and near-shore marine ecosystems (Sinclair Knight Merz Pty Ltd, 2001).

Terrestrial vegetation GDEs do not rely on surface water to survive, but depend seasonally or episodically on groundwater that would be locally recharged in the wet season. These terrestrial vegetation GDEs are influenced by groundwater level, flux and quality (Sinclair Knight Merz Pty Ltd, 2001).

The determination of environmental water requirements of GDEs is associated with the following factors: the nature of ecosystem dependency on groundwater; the water requirements of the ecosystem; the groundwater regime that will meet the requirements of the ecosystem; and impacts of change in groundwater regime on ecological processes (Sinclair Knight Merz Pty Ltd, 2001). Sustainable borefield developments require an understanding of the use of ecosystem groundwater requirements and adaptability (Eamus and Froend, 2006).

Phreatophytes (deep-rooted plants that can access the water table) show seasonal variability in both the quantity of groundwater used and the relative importance of groundwater as a water source. Phreatophytes utilise groundwater the most during the driest season of the year, when alternative sources of water become exhausted and transpiration is highest (Eamus and Froend, 2006). With regard to borefield operations, the timing and modification of abstraction and the magnitude and rate of drawdown affects the risk to GDEs. For example, the risk to GDEs may be lowered considerably by avoiding periods of peak environmental demand and allowing adaptation of dependent biota to a lower water table. Information concerning the process of adaptation to changes in groundwater availability is limited (Eamus and Froend, 2006).

The maintenance of GDEs is directly related to the maintenance of specific ecosystem processes such as: flowering, seed set and germination; growth and persistence; seedling establishment and recruitment to reproductive age; mortality; and nutrient cycling (Eamus *et al.*, 2006). A GDE may experience a decline in the functioning of the ecosystem following the extraction of groundwater, as opposed to a total collapse of the ecosystem (Murray *et al.*, 2006).

In March 2009, the National Water Commission (2009) initiated a project that seeks to identify major GDEs across Australia, in order to produce a national comprehensive geographic database inventory (an "atlas") of GDEs.

## 2.5 BIOGEOGRAPHIC REGION

The Interim Biogeographic Regionalisation for Australia (IBRA) categorises the Australian continent into regions of similar geology, landform, vegetation, fauna and climate. The Weld Range lies within the Western Murchison sub-region (MUR2) (Figure 2.4) in the Eremaean botanical province of the arid zone of Western Australia (Environment Australia, 2007). The MUR2 is described as:

“ Mulga low woodlands, rich in ephemerals (usually with bunched grasses), on outcrop and fine-textured Quaternary alluvial and eluvial surfaces. Quaternary alluvial and eluvial surfaces (extensive hardpan wash plains dominate and characterise the subregion) mantling granitic and greenstone rocks outcrops in the northern part of the Yilgarn Craton. Surfaces associated with the occluded drainage systems occur throughout with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and Halosarcia low shrublands on saline alluvia.” (Desmond *et al.*, 2001).



Figure 2.4 – The Interim Biogeographic Regionalisation for Western Australia (IBRA).

## 2.6 PREVIOUS BIOLOGICAL SURVEYS

Vegetation communities and land systems of the Weld Range were described by Speck and Mabbut *et al* (1963) respectively as part of a regional survey of the Wiluna to Meekatharra area.

The vegetation communities of the area were mapped by Beard (1976) in his regional survey of the Murchison at a scale of 1: 1 000 000, describing the region as providing optimum conditions for the presence of mulga (*Acacia aneura*) woodlands.

A finer-scale survey of the vegetation was undertaken by Curry *et al.* (1994), using the land systems of Mabbut *et al.* as part of their regional survey of rangelands within the Murchison River Catchment. The vegetation communities of the greenstone ranges of Weld Range (the Weld land system) were surveyed between 1985 and 1988 and were reported to be dominated by *Acacia* species and rocky hill mixed shrublands, stony mulga mixed shrublands, and creekline shrublands.

A survey of the vegetation communities and flora of the Weld Range was conducted by the DEC in late August 2005 (Markey & Dillon, 2008). The aim of the survey was to resolve floristic communities within the Weld Range at a finer scale than had been attained by the regional surveys. Fifty-two quadrats were established at the Range, and 239 taxa were collected. Of these taxa, eight were identified as priority flora and six were new records for the Weld Range.

From July 2006 to July 2009 *ecologia* conducted 26 flora surveys at Weld Range for various programme of works applications. The results of these surveys are summarised in Appendix A.

## 2.7 LANDUSE HISTORY

Much of the Murchison area was vacant crown land until the 1900s. A rapid expansion of pastoral leases occurred over the following three decades (Curry *et al.* 1994). The Murchison pastoral areas are still active and primarily run sheep and cattle. Large numbers of feral goats are also caught and exported to supplement station incomes. Meekatharra is a major service centre for the pastoral industry and mining exploration in the Murchison region of Western Australia.

The first discovery of gold in the Murchison occurred in July, 1890 (Edwards, 1994). Gold was found at Nannine in 1891 and soon afterwards at Garden Gully and Meekatharra, leading to the establishment of thriving mining centres (Elias, 1982). Meekatharra was first settled in 1894. The 'Meekatharra' 90N gold mine gave the name to the town, when gold was found in 1896. This early success was short-lived and it wasn't until a second gold discovery was made in 1899 that the town's survival was ensured. The Meekatharra State Battery commenced operations in 1901, and closed down in 1987. Meekatharra became a railhead in 1910, forming an important part of the pastoral industry. Cattle arrived at the stockyards from the Pilbara and Kimberley regions, and the shipment of wool was facilitated by the rail line, which subsequently closed down in 1978 (Edwards, 1994).

Gold and iron ore mining became established at Weld Range in the early 20<sup>th</sup> century. The potential for iron ore mining at Weld Range has been recognised for over 100 years and modern exploration efforts started in 1959. The resources region in the Midwest has developed into a major contributor in this area, and in 2004 provided 7% (or \$1.9 billion) of the state revenue (The Chambers of Minerals and Energy, 2006).

A deposit of red ochre at Wilgie Mia, an ochre mine on the Weld Range, has been used by Aboriginals for over 1000 years while Europeans started red ochre production from the area in 1945 (Elias, 1982).

### 3 METHODOLOGY

#### 3.1 GUIDING PRINCIPLES

The survey methods adopted by *ecologia* were formulated using:

- The Western Australian EPA's position paper on terrestrial biological surveys as an element of biodiversity protection (EPA, 2002);
- The EPA's guidance statement on terrestrial flora and vegetation surveys for environmental impact assessment (EPA, 2004a); and
- Consultation with regional Department of Environment and Conservation (DEC) and other relevant government officers.

The Weld Range and other Banded Iron Formation Ranges are important landforms in the Murchison region. Although representing a very small proportion of the total area of the Murchison bioregion, their unique geology, soils and relative isolation has produced distinctive vegetation communities, many of which have restricted distributions in the region. Many of the BIF ranges support threatened, and in some instances locally endemic, species. As a consequence they are considered to have very significant biodiversity values and a multiphase Level 2 floristic survey consistent was considered appropriate within the current Project area. The survey combined the following methodological approaches:

- *Background research*: to gather background information on the footprint or target area (i.e. search of literature, data and map-based information).
- *Reconnaissance*: to verify the accuracy of the background information, further delineate and characterise the flora and range of vegetation units present in the footprint and to identify potential impacts.
- *Detailed survey*: to enhance the level of knowledge of the flora and vegetation at the local scale and its local context or significance (if the broader scale is well known).

Level 2 surveys require one or more visits to the target area in the main flowering season and visits in other seasons. Replication of plots in each vegetation unit is required to thoroughly sample the flora and all the vegetation units over their full extent in the target area, to enable maps of these vegetation units to be produced at an appropriate scale. An assessment of vegetation condition are also required.

#### 3.2 SURVEY METHODS

##### 3.2.1 Database Searches

A search of the following databases were undertaken in July 2006 prior to commencing the first survey and again in June 2010, to determine species of conservation significance previously recorded in the vicinity of the Project area:

- DEC Threatened (Declared Rare) Flora Database (DEFL);
- DEC Declared Rare and Priority Flora List;

- DEC Western Australian Herbarium Specimen Database (WAHERB);
- DEC Threatened Ecological Community Database; and
- the Department of the Environment and Water Resources Protected Matters Database.

Details of the 2010 search are included in Table B.1, Appendix B.

### 3.2.2 Survey Timing and Objectives

The vegetation and flora of the Weld Range project area were surveyed over fifty three person days over three phases:

- 3<sup>rd</sup> to the 12<sup>th</sup> of November, 2006 (spring phase);
- 14<sup>th</sup> to the 21<sup>st</sup> of April 2007 (autumn phase); and
- 3<sup>rd</sup> to the 10<sup>th</sup> of July 2008 (winter phase).

In addition a linear rail corridor survey at Weld Range was conducted in June 2009, a portion of which occurred within the current Study Area. The species collected during this survey were also added to the overall species list for the Project. An additional three person survey days were spent within the Study Area during this survey.

The objectives of these surveys were to provide:

- an inventory of vascular plant species;
- a description and mapping of plant communities;
- a review of plant species considered to be rare and endangered, or geographically restricted, which are known to, or may occur, within the project area;
- an inventory of exotic plants, including declared weeds; and
- a review of the significance of the plant communities within a local, regional, and state context.

### 3.3 DETAILED FLORISTIC SURVEY METHODS

The three-phase survey involved a combination of sampling within bounded quadrats and a series of linked field traverses. Linked traverses are more time efficient than bounded quadrats to maximise the sampling of the entire area and thus the probability of locating flora of potential significance. However quadrats were utilized to characterise the vegetation units and to facilitate multivariate analysis of the vegetation. Both methods contributed to the delineation of small scale vegetation units and to a comprehensive floristic inventory of the survey area.

#### 3.3.1 Quadrat based surveys

To ensure that all floristic communities and habitats present within the survey area were represented in the data collected, sampling sites were selected using aerial photography, topographical features and field observations. The number of sites established was determined by the size and the heterogeneity of the study area. Two-hundred and thirty-nine quadrats were

established during the three phase survey over the project area. One hundred and three quadrats were assessed during Phase 1, with 72 additional quadrats assessed and 37 Phase 1 quadrats re-assessed during Phase 2, and a further 64 quadrats during Phase 3. Information from an additional 19 sites within the project area assessed during a rail corridor survey was also used to further refine vegetation boundaries; however data collected during this survey were not included within the statistical analysis. The location of quadrats is detailed in Figure 3.1. The coordinates of quadrats are listed in listed in Appendix C.

Quadrats measured 20 m x 20 m (400 m<sup>2</sup>) or an equivalent area when sites were located in drainage lines or irregularly shaped patches of vegetation. The following parameters were recorded at each quadrat:

- location details, including GPS co-ordinates;
- site parameters such as topography, soils, and surface lithology;
- structural information describing the vegetation unit, including the height, cover, form and dominant species within each stratum;
- maximum height and foliage projective cover for each species within the site, including introduced species;
- vegetation condition; and
- the estimated time since the last fire at each site.

Plant specimens were collected for later identification and verification. Nomenclature and taxonomy follow the conventions currently adopted by the Western Australian Herbarium (2010).

Vegetation type, life-form strata and percentage cover for each stratum were recorded using the National Vegetation Information System (NVIS) vegetation classifications (Appendix D). Site descriptions are included as Appendix E.

### **3.3.2 Transect based surveys**

Surveys targeting taxa of conservation significance previously recorded during the quadrat-based surveys were conducted between May 2008 and August 2009. In total 1053 transects over 94 person days were conducted inside and outside proposed areas of infrastructure. Because the proposed infrastructure areas are large (approximately 4500 ha including buffer zones) they could not be systematically grid searched and therefore sub-plots of each area were surveyed.

Transects surveying a 10 m width were walked and the locations and abundance of all Priority taxa observed were recorded using a handheld GPS. The spacing between transects varied to some degree but the majority of transects were separated by 100 m. Transect length was determined by the dimensions of each habitat occurring in a particular search polygon. The number of transects walked in each habitat depended on the total area of that habitat and on the typical densities of Priority taxa occurring within them.

Individual coordinates and the exact number of plants present were recorded for isolated or small clusters of plants. Boundary waypoints were recorded for large populations and of the number of plants present within those boundaries was estimated. The vegetation community, habitat and orientation relative to the ranges at which each cluster was located were noted. Any plants observed between transects or outside the boundaries of grids searched were recorded as opportunistic collections, and the number of plants and locations similarly recorded.

The transects were located such that the range of topography and vegetation types present within the proposed infrastructure areas were represented and is illustrated relative to the land systems present in Figure 3.2.

An additional 34 transects were surveyed within the Wilgie Mia Reserve in September 2008 subsequent to permission being granted by the Wajarri Community. Priority flora locations and vegetation structure were recorded, and collections were made of any taxa not previously recorded during surveys within the Study Area. Specimens of known and suspected conservation significant flora species recorded during the threatened flora surveys were collected for verification by an experienced taxonomist.

### 3.3.3 Vegetation Condition

Vegetation condition was assessed at all quadrats using the rankings based on criteria described in Table 3-1.

**Table 3-1 – Vegetation Condition Scale (BushForever, 2000 after Trudgen,1991)**

Vegetation condition	Criteria
Excellent	Pristine or nearly so, no obvious sign of damage caused by European man
Very good	Some relatively slight signs of damage caused by the activities of European man. E.g. damage to tree trunks by repeated fires, the presence of some relatively non-aggressive weeds or occasional vehicle tracks.
Good	More obvious signs of damage caused by the activities of European man, including some obvious impact to vegetation structure such as caused by low levels of grazing or by selective logging. Weeds as above, possibly plus some more aggressive ones
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of European man such as grazing or partial clearing or very frequent fires. Presence of some more aggressive weeds.
Very poor	Severely impacted by grazing, fire, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weeds species including aggressive species.
Completely Degraded	Areas that are completely or almost completely without native vegetation e.g. areas that are cleared or parkland cleared with their flora comprising weed or crop species with isolated native trees or shrubs.

### 3.3.4 Vegetation Mapping

Vegetation mapping is the delineation of plant communities based on distinctive characteristics that these communities share such as the vegetation structure, dominant species and species composition. A combination of multivariate analysis of species composition of quadrats and ground truthing was employed to define communities. This method provides an objective means of defining vegetation communities and provides insight into the hierarchical relationship between communities based on the degree of similarity in species composition and abundance. The boundaries of communities were then extrapolated to the entire Study Area based on their appearance in 1:15,000 aerial imagery.

The species by site matrix utilized in the statistical analysis included perennial taxa identified to species level. Annuals and singletons (species occurring at only one quadrat) were removed from the species list. All *Acacia aneura* varieties were grouped as *Acacia aneura* and *Solanum ashbyae* and *S. lasiophyllum* were combined into a single entity, *Solanum ashbyae / lasiophyllum* given the

difficulty in reliably discriminating non-reproductive specimens of these taxa. This treatment follows that utilized by Markey and Dillon (2008) in their analysis of DEC quadrats located on Weld Range.

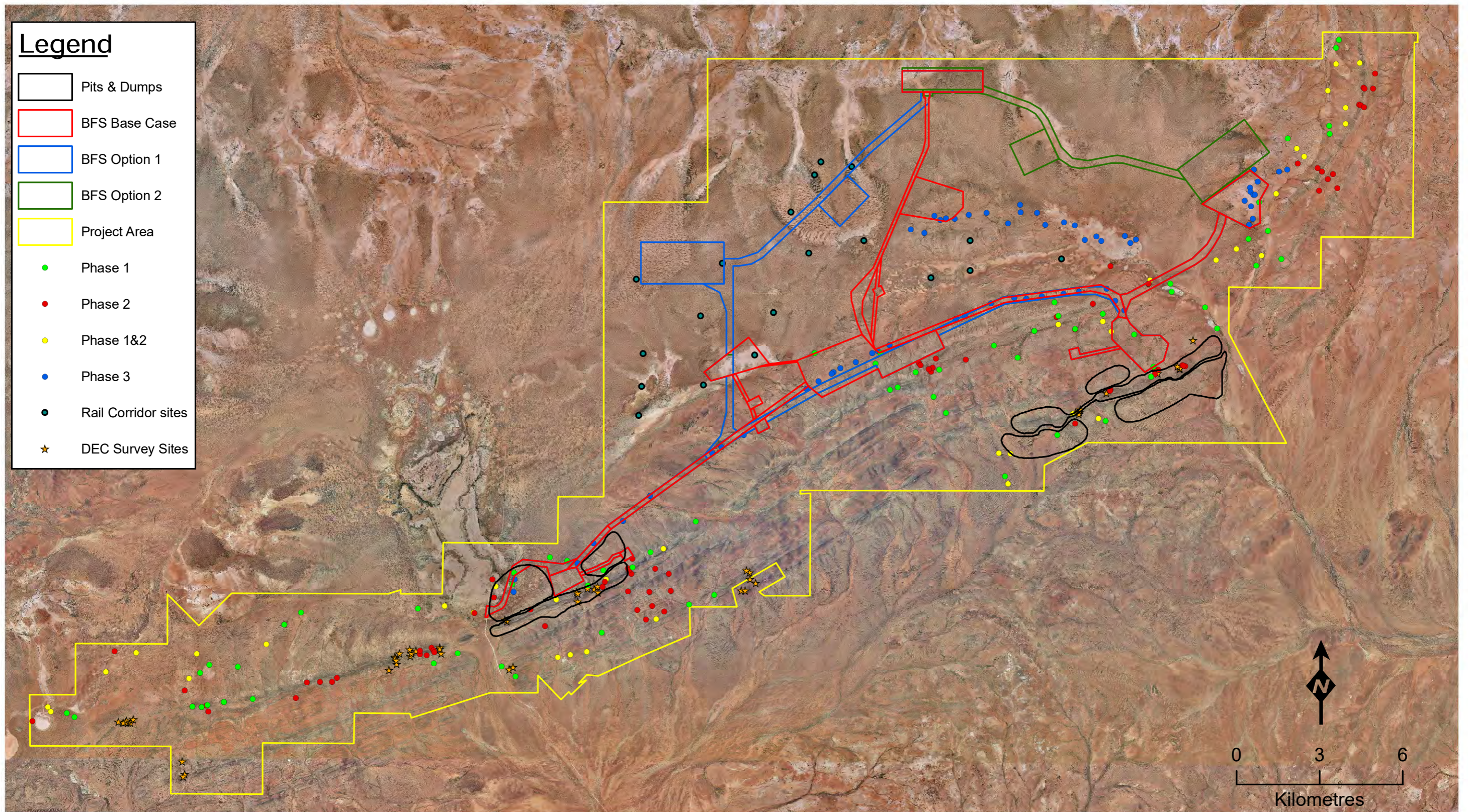
Multivariate analysis of the site by species matrix (present/absent data) was performed using the complete linkage algorithms in PATN<sup>TM</sup>. The data from quadrats surveyed by the DEC in 2005 survey at Weld Range were compared with that collected by ecologia. This analysis was useful in providing a means of objectively comparing patterns observed in the data collected by the DEC and ecologia.

Multivariate analysis of the species matrix data collected at quadrats during ecologia's three-phase survey were also analysed using the multivariate programme SYSTAT<sup>TM</sup>. Both present/absent and cover-weighted matrices were analysed using Pearson complete linkage algorithms. to produce dendrograms showing similarities between sites. The DEC data was omitted from this analysis as cover-weighted rankings were not available.

A combination of aerial photography and topographic maps was used to interpret the vegetation patterns of the Study Area. Due to the size of the Study Area, the mapping was constrained by the number of quadrats surveyed and was supplemented by habitat and vegetation descriptions collected during the transect-based surveys and during the survey of the rail corridor.



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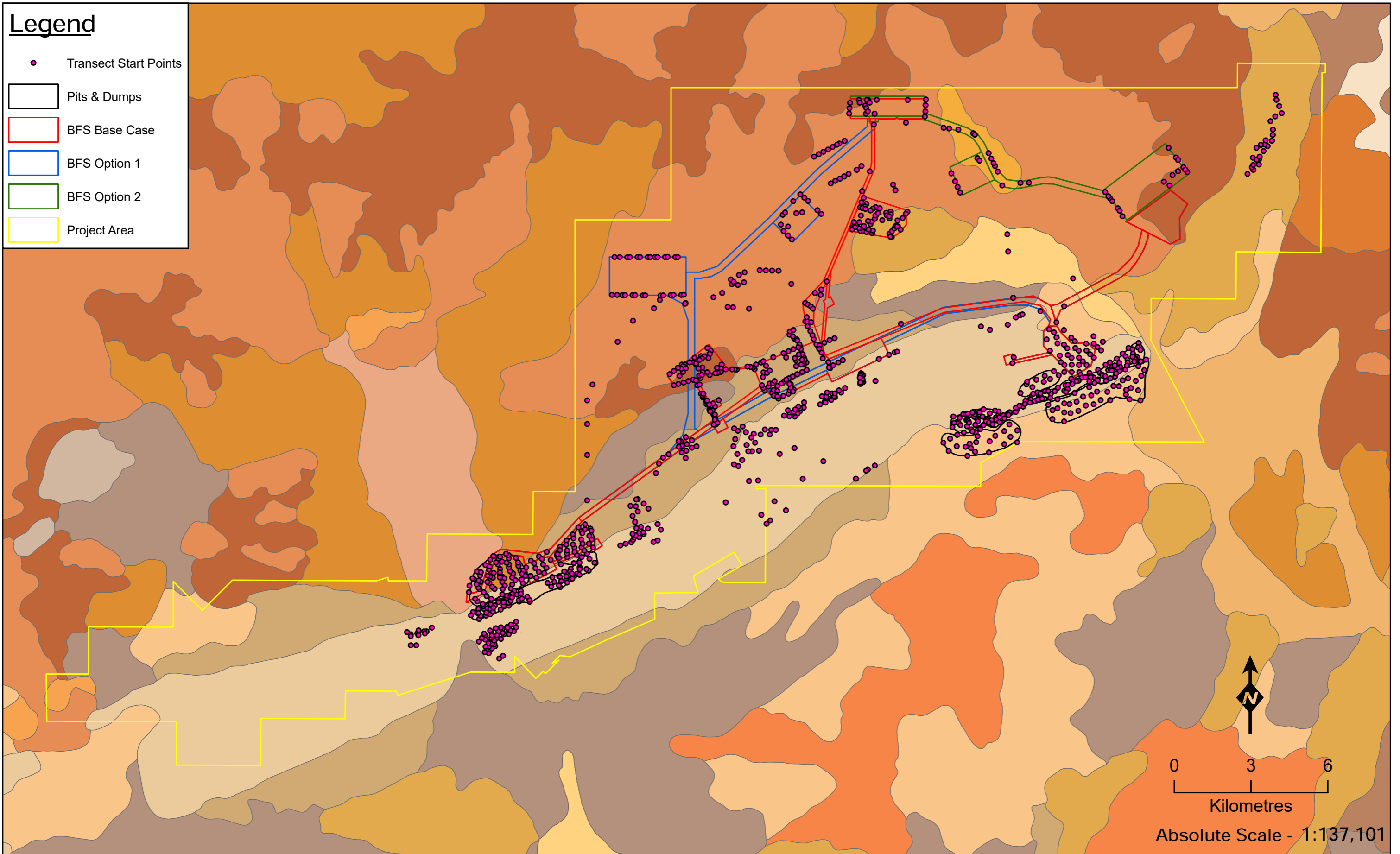


Absolute Scale - 1:137,101

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# Legend

- Transect Start Points
- Pits & Dumps
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Project Area



Absolute Scale - 1:137,101



## Locations of Threatened Flora Transects Across the Land Systems of the Weld Range Project Area

Figure: 3.2  
Project ID: 722

Drawn: SH  
Date: 06/11/2009

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Unique Map ID: S061

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### 3.3.5 Survey Limitations and Constraints

According to the EPA Guidance Statement for Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA, 2004a), flora and vegetation surveys may be limited by a number of factors. These factors and their relevance to the current survey are detailed in Table 3.1.

**Table 3-2 – Limitations of the Flora and Vegetation Survey**

Limitation	Relevance to current survey
Sources of information and availability of contextual information (i.e. pre-existing background versus new material)	<p>A number of other botanical surveys associated with mining activities have been completed in the surrounding area and in the Western Murchison region generally which were accessible. In particular:</p> <ul style="list-style-type: none"> <li>The DEC surveyed 52 bounded quadrats at Weld Range in August 2005. The DEC has described the floristic communities at the Weld Range and at other BIF ranges of the Yilgarn Craton.</li> <li>More than 20 targeted flora surveys have been carried out by <i>ecologia</i> within the Study Area and some nearby leases.</li> <li>In June 2009 the Weld Range section of a linear rail corridor was surveyed for OPR (<i>ecologia</i> 2010i). SMC and OPR agreed to share relevant data in this area hence data collected has been used to verify the vegetation mapping and to supplement the species inventory.</li> </ul>
The scope (i.e. what life forms were sampled)	The vascular flora and vegetation of the Study Area was sampled during spring, autumn and winter.
Proportion of flora collected and identified (based on sampling, timing and intensity)	<p>Over the three phases of the survey (and including the additional rail corridor sites) approximately 3,500 plant specimens were collected within the Study Area, and 393 taxa (including species, subspecies, varieties, forms and affinities) were identified. Based on species accumulation analysis it is estimated that 93% of the species potentially present were recorded. 4 taxa were identified to genus level only</p> <p>Forty-four annual or weakly perennial species were recorded during Phase 1 of the survey, 12 during Phase 2, 27 during Phase 3 and 7 during the rail corridor survey.</p>
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed)	The Study Area encompassed 51,557 ha, approximately twice the area within the SMC Project, allowing the vegetation mapped to be viewed in a broader local context. Survey intensity was greatest in areas of proposed infrastructure, however as the locations of some structures were unknown at the time of survey, supplementary surveys will be required to identify and mark populations of priority flora in some areas.
Mapping reliability	Aerial imagery at a scale of 1:15,000 was used to select sites to be sampled during the survey and to produce a digitised map of the vegetation associations occurring in the study area. The distribution of quadrats within the Study Area was concentrated in the areas of proposed infrastructure and along the BIF range, therefore a greater degree of extrapolation was required at the boundaries of the survey area. However the number of quadrats (239 plus an additional 19 from the OPR rail corridor) is considered to have provided adequate data for this purpose.
Timing/weather/season/cycle	<p>Rainfall in the four months preceding each phase relative to the long term average (LTA) for these months was as follows:</p> <p>Phase 1, Nov. 2006: 49.6 mm, 5.1 mm &gt; LTA          Phase 2, Apr. 2007: 66.2 mm, 38.4 mm &lt; LTA          Phase 3, Jul. 2008 (Table 2.2). 84.0 mm, 20.4 mm &lt; LTA.</p>

Limitation	Relevance to current survey
	<p>Rail Corridor, Jun. 2009: 26.4 mm, 82.5 mm &lt; LTA.</p> <p>Annual rainfall during 2006 was 56.4% greater than the LTA annual rainfall.</p> <p>It is considered that, although rainfall was significantly below the LTA during the 2007 Autumn survey, the survey timing was adequate given the higher than average rainfall during 2006.</p>
Disturbances (e.g. fire, flood, accidental human intervention)	<p>Isolated, small pockets of burnt vegetation are present across the Study Area. Due to their small size and broad distribution, they did not impact survey adequacy.</p>
Intensity (in retrospect, was the intensity adequate?)	<p>In total 56 person days (53 during Phases 1 to 3 and a further 3 during the rail corridor) have been expended on the quadrat based survey. A further 94 days were expended during transect based surveys.</p> <p>The survey is considered adequate in intensity and will add significantly to the existing knowledge on the vegetation and flora of the project area.</p>
Resources	<p>The number of personnel employed and the physical resources available to facilitate the survey were adequate. The survey effort was not impeded by a lack of resources.</p>
Access problems	<p>Access was reasonable to most of the survey area. A relatively small area toward the centre of the range proved difficult to access during each phase of the survey as higher than average rainfall in 2006 had washed out many of the pastoral and old exploration tracks providing access to this area. However this area was surveyed by within the transect based surveys and the data collected used to supplement the vegetation mapping.</p>
Experience levels (e.g. degree of expertise in plant identification to taxon level)	<p>The field botanists have conducted numerous surveys in the Murchison biogeographic region. Plant specimens were collected from all quadrat assessed to ensure taxonomic accuracy. The two taxonomists responsible for identifying the specimens collected during the three phases and additional rail corridor surveys each have more than 10 years of experience in plant taxonomy. <i>ecologia's</i> Principal Botanist has more than 19 years of experience in vegetation mapping and supervised data analysis and interpretation prior to production of the vegetation map.</p>

## 4 VEGETATION

### 4.1 REGIONAL VEGETATION

The Weld Range project area is situated within the Murchison botanical district of the Eremaean botanical province. The boundaries of this province approximate the geological boundaries of the Yilgarn Block, which forms the nucleus of the West Australian Shield (Beard, 1976). The region is well known for the dominance of mulga (*Acacia aneura*) woodlands, and the extensive flats and plains provide optimum conditions for the occurrence of these woodlands (Beard, 1976). The Murchison botanical district is divided into two subregions, and the Weld Range falls within the boundaries of the upper or Western Murchison subregion (MUR2). Data recorded from flora surveys and opportunistic collections in the region indicate that the Murchison bioregion encompasses a rich flora with at least 2,210 known species (Western Australian Herbarium, 2010).

Mulga shrublands make up the vast majority of vegetation types encountered in the Murchison region. On the more favorable soils (plains and valleys) *Acacia aneura* generally grows in the form of a tree with a single erect trunk and forms low woodlands. On less favorable soils, such as those present on hill slopes and ridges, it takes the form of a shrub producing shrublands/scrublands (Beard, 1976). As a result, the bulk of landscapes are dominated by mixed shrubland/scrubland, with few or no trees or perennial grasses, randomly scattered or loosely aggregated shrubs, with large areas of bare ground with exposed shallow red soils between them (Curry et al., 1994).

### 4.2 PREVIOUS DOCUMENTATION OF THE VEGETATION OF THE WELD RANGE

The vegetation of the Weld Range has been mapped on a broad scale (1:1,000 000) by Speck (1963) and Beard (1976). Beard classified the vegetation of the Study Area into seven main types as described in Table 4.1 below and shown in Figure 4.1.

**Table 4-1 – Summary of Beard’s Vegetation Units Located Within the Study Area.**

Vegetation Code	Vegetation Description
a <sub>1</sub> Si	<i>Acacia aneura</i> (mulga) scrub.
a <sup>1</sup> <sub>14</sub> Si	<i>Acacia aneura</i> and <i>Acacia quadrimarginea</i> scrub.
a <sub>1</sub> Li	<i>Acacia aneura</i> low woodland.
a <sup>1</sup> <sub>9</sub> Li	<i>Acacia aneura</i> , <i>Acacia ramulosa</i> and <i>Acacia linophylla</i> (now <i>Acacia ramulosa</i> var. <i>linophylla</i> ) low woodland.
a <sup>1</sup> <sub>17</sub> Li	<i>Acacia aneura</i> and <i>Acacia grasbyi</i> low woodland.
a <sub>9</sub> Si	<i>Acacia ramulosa</i> and <i>Acacia linophylla</i> (now <i>Acacia ramulosa</i> var. <i>linophylla</i> ) scrub.



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**Legend**

- Pits & Dumps
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Project Area

0                      4                      8
   
 Kilometres
   
**Absolute Scale - 1:135,775**



**Beard's Vegetation Units of the Weld Range Project Area**

Figure: 4.1  
Project ID: 722  
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: SH  
Date: 19/10/09  
Unique Map ID: M048  
**A3**

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More recently the DEC (Markey & Dillon, 2008) surveyed the Weld Range and documented six main vegetation communities and four sub-communities occurring on the hills, footslopes and outwash plains (Table 4.4)

**Table 4-2 – Weld Range Vegetation Communities Described by the DEC (Markey & Dillon, 2008).**

Community Type	Landform Description	Vegetation Description	Characteristic Species
1a	Moderate hill slopes, very rocky terrain and outcrops of BIF.	<i>Acacia aneura</i> , <i>A. ramulosa</i> and / or <i>Acacia</i> sp. Weld Range (A. Markey and S. Dillon 2994), over sparse <i>Eremophila</i> species.	<i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Santalum spicatum</i> .
1b	Rocky, gentle to moderate inclines.	Open to sparse shrubland of <i>Acacia aneura</i> (var. <i>microphylla</i> , <i>aneura</i> and <i>argentea</i> ), <i>Acacia</i> sp. Weld Range and <i>Grevillea berryana</i> , over <i>Eremophila</i> spp. low shrubs.	<i>Prostanthera petrophila</i> & <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> .
2	Massive rocky outcrops of BIF, moderate to steep hill slopes.	Sparse to open shrubland of <i>Acacia aneura</i> var. <i>microcarpa</i> and / or <i>A. aneura</i> var. <i>aneura</i> , over mid stratum shrub layer of <i>Thryptomene decussata</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , and <i>Eremophila</i> species.	<i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Micromyrtus sulphurea</i> , <i>Dodonaea pachyneura</i> and <i>Stylidium longibracteatum</i> .
3	Mid and low to moderate hillslopes. Loose ironstone gravel and scree.	Open shrubland of <i>Acacia aneura</i> over isolated <i>Solanum ashbyae</i> and <i>Tribulus suberosus</i> low shrubs.	<i>Cheilanthes sieberi</i> subsp. <i>pseudovellea</i> .
4	Steep rocky hillslopes with relatively high levels of exposed bedrock.	Open shrubs of <i>Acacia aneura</i> and emergent trees of <i>Acacia pruinocarpa</i> , over <i>Philotheca brucei</i> subsp. <i>brucei</i> and <i>Eremophila</i> species.	<i>Abutilon oxycarpum</i> , <i>Dodonaea pachyneura</i> and <i>Enneapogon caerulescens</i> – all characteristic of fractured rocky substrates.
5a	Moderately inclined lower hillslopes and outwash plains.	Isolated emergent trees of <i>Acacia pruinocarpa</i> over <i>Acacia aneura</i> / <i>Acacia ramulosa</i> , over an open mid-stratum of shrubs.	No significant indicator species. Distinguished from community type 5B by <i>Acacia aneura</i> var. <i>major</i> , <i>Sida excedentifolia</i> and <i>Acacia pruinocarpa</i> .
5b	Moderately inclined lower hillslopes and outwash plains.	Sparse to open <i>Acacia</i> shrubland ( <i>A. aneura</i> cf. var. <i>tenuis</i> or <i>aneura</i> and / or <i>Acacia effusifolia</i> ), over sparse <i>Senna</i> species and <i>Tribulus suberosus</i> low shrubs.	<i>Acacia aneura</i> var. <i>tenuis</i> , <i>Senna glaucifolia</i> and <i>Hibiscus sturtii</i> .
6	Associated with dolerite substrates.	Open shrubland of <i>Acacia</i> sp. Weld Range (A. Markey and S. Dillon 2994), <i>Acacia aneura</i> and <i>Acacia speckii</i> , over sparse mid stratum of <i>Eremophila macmilliana</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> and <i>Heliotropium ovalifolium</i> .	<i>Senna</i> spp. and <i>Eremophila macmilliana</i> .

### 4.3 VEGETATION COMMUNITIES IDENTIFIED WITHIN THE STUDY AREA DURING THE CURRENT SURVEY

The vegetation within the study area was mapped at a scale of 1:15,000 using aerial photography, ground truthing and multivariate analysis of the floristic composition and vegetation structure of quadrats (Figure 4.2). Not all vegetation communities visible at ground level and evident within the multivariate analysis could be reliably discriminated using aerial photography. In particular vegetation communities 1a and 1b, and 2a and 2b could not be distinguished and have been mapped as a single unit, 1 and 2.

Seven major vegetation communities, and 16 sub-communities, as identified by the multivariate analysis are described in Table 4.5. The dendrogram resulting from this analysis is shown in Appendix F and the site by species matrix used to conduct the analysis is included as Appendix G.

Higher resolution vegetation maps of the whole area are included as Appendix H (Figures H.1 to H.5).

### 4.4 VEGETATION CONDITION

As detailed in Table 4-3, the condition of vegetation within bounded quadrats ranged from very good to poor, with the majority of quadrats assessed as in good condition.

**Table 4-3 – Assessment of Vegetation Condition of Quadrats**

Vegetation Condition	Proportion of Quadrats (%)
Excellent	0
Very Good	14
Good	77
Poor	9
Very Poor	0
Degraded	

Vegetation condition at sites on the flat sand plains of the survey area ranged from good to poor, with most damage due to extensive grazing by feral goats and livestock across these areas of the pastoral lease. There was no evidence of cattle grazing at sites located higher in the landscape, but some evidence of grazing by goats.

Vegetation across the Study Area, particularly on the rocky ironstone ridges, had been disturbed by tracks and clearing for exploration activities.

Weed abundance is generally low across the lease. Most weeds are recorded on sites lower in the landscape where most grazing is more prevalent.

530000

540000

550000

560000

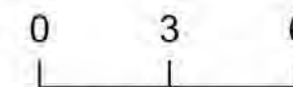
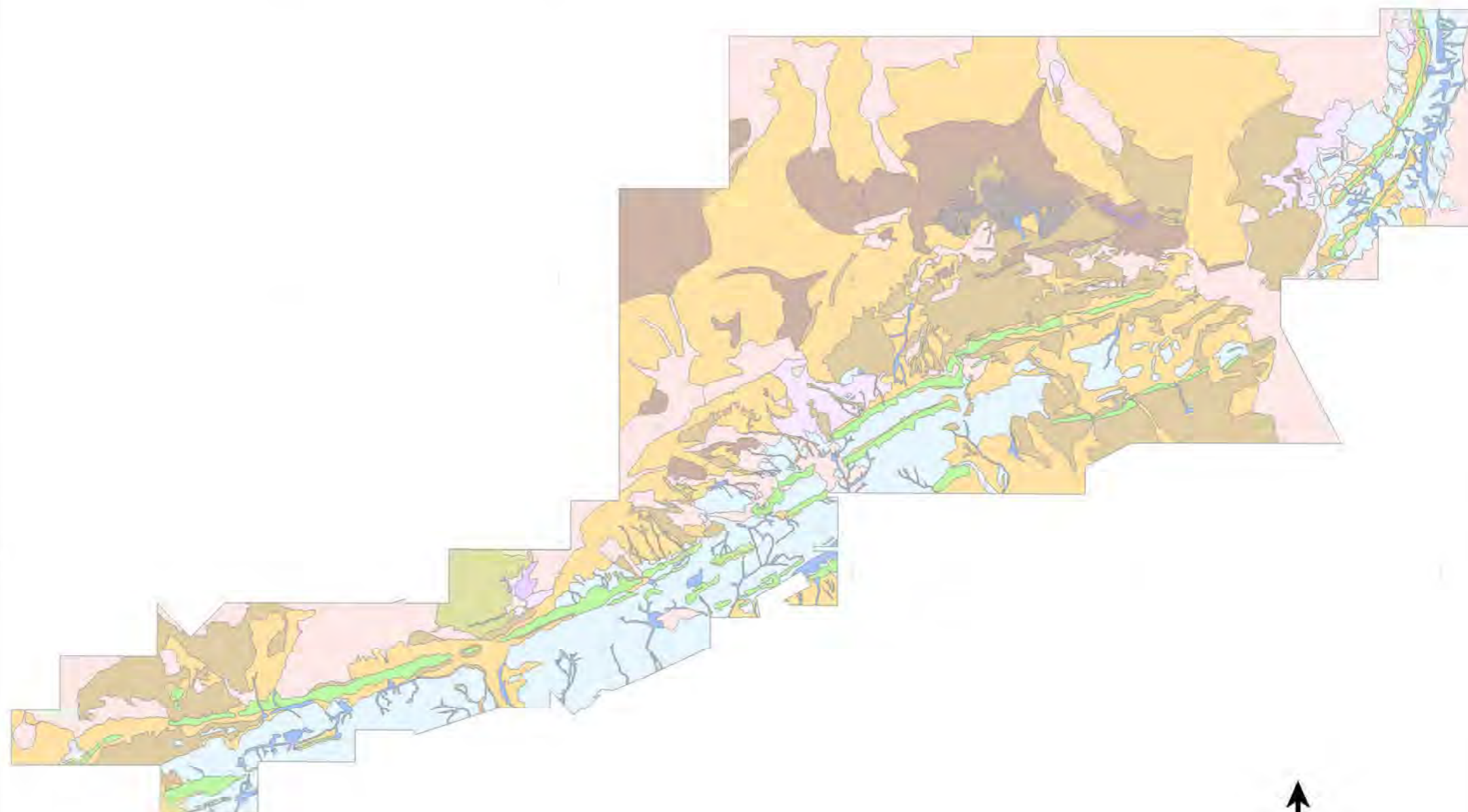
570000

580000

590000

### Legend

- 1a *Acacia aneura* low woodland over mixed open shrubs.
- 3a +/- *Corymbia lenziana* scattered medium trees over *Acacia ramulosa* var. *linophylla* and *Acacia aneura* sparse shrubland over mixed *Eremophila* open shrubland over scattered low shrubs of *Ptilotus obovatus* var. *obovatus* over open tussock grasses.
- 3b +/- *Acacia pruinoscarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* closed shrubland over *Ptilotus obovatus* var. *obovatus* open low shrubland.
- 3c Scattered *Eucalyptus mallees* / trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Rhagodia eremaea*, *Eremophila forrestii* subsp. *forrestii* shrubland over *Ptilotus obovatus* var. *obovatus* open low shrubland.
- 4a *Acacia aneura* and *Acacia cockertoniana* open tall shrubland over *Eremophila simulans* subsp. *simulans* and *Aluta aspera* subsp. *hesperia* low open shrubland.
- 4a *Acacia* sp. Weld Range and *A. aneura* var. *microcarpa* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* var. *obovatus* open low shrubland.
- 4b *Acacia* sp. Weld Range and *Acacia speckii* shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* and *Dodonaea amplisemina* open shrubland over *Cymbopogon ambiguus* sparse tussock grassland.
- 5 *Acacia craspedocarpa* tall shrubland over *Solanum ashbyae* / *lasiophyllum* and *Ptilotus obovatus* var. *obovatus* low shrubland over mixed low tussock grassland.
- 6a Scattered *Acacia* shrubs over mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* var. *obovatus* sparse shrubland over mixed *Maireana* spp. chenopod shrubland.
- 6b Scattered mixed *Acacia* spp. over *Rhagodia eremaea* and *Scaevola spinescens* sparse mid to low shrubland over *Ptilotus obovatus* var. *obovatus* *Maireana georgeii* and *Sclerolaena diacantha* low chenopod shrubland.
- 6c *Eremophila maculata* subsp. *brevifolia* low open shrubland over *Sclerolaena diacantha* low chenopod shrubland over *Enneapogon cylindricus* low tussock grassland.
- 6d *Grevillea striata* low isolated trees over *Acacia craspedocarpa* and *A. aneura* tall open shrubland over *Scaevola spinescens* sparse mid shrubland over *Austrostipa elegantissima* and *Eriachne flaccida* low open tussock grassland.
- 7a *Melaleuca stereophloia* and *Cratystylis subspinescens* low shrubland over *Tecticornia* spp. low samphire shrubland over *Frankenia laxiflora* low shrubland.
- 7b *Eucalyptus carnei* and *Eucalyptus trivalva* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland over mixed low tussock grasses.



**Absolute Scale - 1:175,000**



## Weld Range Vegetation Overview Map

Figure: 4.2  
Project ID: 722


Drawn: SG  
Date: 04/11/09

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994


Unique Map ID: S145



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**Table 4-4 – Vegetation Communities of the Study Area.**



Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
<p><b>1      <i>Acacia aneura</i> low woodland over mixed open shrubs</b></p>				
<p>These woodlands are widely distributed across the banded ironstone formation (BIF) ranges of the survey area, generally covering the mid and upper slopes. The overstorey is dominated by an open to moderately dense stratum of mixed <i>Acacia aneura</i> varieties. The mid stratum consists of open to moderately dense mixed shrub species with the Priority 3 taxon <i>Prostanthera petrophila</i> occasionally occurring as a co-dominant. <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> was recorded at three locations within this community type. It occurred as a dominant overstorey shrub to the west of the range and also around the centre of the range on higher, steep relief hills. Ground cover is often dominated by annual herbs and <i>Cheilanthes</i> spp. in favourable seasons and scattered <i>Eriachne pulchella</i> subsp. <i>pulchella</i> tussock grasses.</p> <p>Two sub-communities resulted from the statistical analysis, however, their boundaries could not be consistently differentiated on the aerial photography and they were not mapped separately.</p>				
<p><b>1a</b>      <i>Acacia aneura</i> low open woodland over <i>A. sp.</i> Weld Range, <i>A. ramulosa</i> var. <i>linophylla</i> and <i>Thryptomene decussata</i> open mid shrubland over mixed <i>Eremophila</i> spp. low shrubland.</p> <p><i>Micromyrtus placoides</i>, <i>Prostanthera petrophila</i> (<b>Priority 3</b>) and <i>Beyeria lapidicola</i> (<b>Priority 2</b>) were recorded mostly in this community, on prominent BIF outcroppings.</p> <p>Mean species richness = <math>13 \pm 3.52</math> (n = 20).</p>	<p><i>Acacia aneura</i> var. <i>aneura</i>, <i>A. aneura</i> var. <i>microcarpa</i>, <i>A. sp.</i> Weld Range, <i>A. ramulosa</i> var. <i>linophylla</i>, <i>Thryptomene decussata</i>, <i>Eremophila latrobei</i> subsp. <i>latrobei</i>, <i>E. glutinosa</i>, <i>E. georgei</i>.</p>	<p>BIF mid to upper slopes and outcropping.</p>	<p>10a, 11, 12, 23, 30, 69, 71, 89, 108, 117, 151, 153, 156, 158, 165, 171, 175, 177, 183 and BPW09.</p>	






Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
<p><b>1b</b> <i>Acacia aneura</i> low open woodland over <i>A. cockertoniana</i> open mid shrubland over mixed mid shrubland over <i>Ptilotus obovatus</i> low shrubland.</p> <p><i>Goodenia lyrata</i> (<b>Priority 1</b>) and <i>Hemigenia tysonii</i> (<b>Priority 3</b>) occurred within this community on the rocky BIF slopes to the west of the lease.</p> <p>Mean species richness = <math>14 \pm 2.89</math> (n = 16).</p>	<p><i>Acacia aneura</i> var. <i>aneura</i>, <i>A. aneura</i> var. <i>microcarpa</i>, <i>A. cockertoniana</i>, <i>Thryptomene decussata</i>, <i>Eremophila glutinosa</i>, <i>E. latrobei</i> subsp. <i>latrobei</i>, <i>E. georgei</i>, <i>Ptilotus obovatus</i>.</p>	<p>BIF upper slopes and outcropping.</p>	<p>7, 27, 52, 97, 128, 132, 133, 150, 152, BPW01, BPW03, BPW04, BPW05, BPW06, BPW13 and HR05.</p>	
<p><b>2</b> <i>Acacia aneura</i> sparse shrubland over <i>Ptilotus obovatus</i> low shrubland</p>				
<p>This community is predominantly restricted to ridge tops and the upper slopes of higher elevation BIF ridges. Scattered <i>Acacia pruinocarpa</i> trees occasionally occurred in the overstorey. The upper stratum is dominated by sparse <i>Acacia aneura</i> shrubs with mixed mid stratum shrubs. The lower stratum was dominated by open to moderately dense <i>Ptilotus obovatus</i> over sparse mixed tussock grasses. Two sub-communities resulted from the statistical analysis, however as their boundaries could not be consistently differentiated on the aerial imagery they could not be mapped separately.</p>				


Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
<p><b>2a</b> Scattered <i>Acacia pruinocarpa</i> trees over <i>A. aneura</i> mid sparse shrubland / scattered shrubs over <i>Ptilotus obovatus</i> low shrubland with <i>Cymbopogon ambiguus</i> tussock grasses.</p> <p><i>Sauropus</i> sp. Woolgorong (<b>Priority 1</b>) and <i>Prostanthera petrophila</i> (<b>Priority 3</b>) were both recorded within this community.</p> <p>Mean species richness = <math>11 \pm 3.30</math> (n = 18).</p>	<p><i>Acacia aneura</i> var. <i>microcarpa</i>, <i>A. pruinocarpa</i>, <i>A. aneura</i> var. <i>aneura</i>, <i>A. aneura</i> var. <i>tenuis</i>, <i>Solanum ashbyae</i> / <i>lasiophyllum</i>, <i>Ptilotus obovatus</i>, <i>Thryptomene decussata</i>, <i>Sida</i> sp. Golden calyces glabrous (H.N. Foote 32), <i>Cymbopogon ambiguus</i>.</p>	<p>Ridge tops of BIF ranges.</p>	<p>37, 51, 67, 118, 124, 126, 127, 139, 140, 143, 146, 154, 157, 159, 163, 176, 178 and 179.</p>	
<p><b>2b</b> <i>Acacia aneura</i> sparse shrubland over mixed sparse mid shrubland over <i>Micromyrtus sulphurea</i> and <i>Ptilotus obovatus</i> low open shrubland.</p> <p><i>Prostanthera petrophila</i> (<b>Priority 3</b>) and <i>Baeckea</i> sp. Melita Station (<b>Priority 4</b>) were commonly recorded within this community.</p> <p>Mean species richness = <math>17 \pm 3.86</math> (n = 14).</p>	<p><i>Acacia aneura</i> var. <i>aneura</i>, <i>A. aneura</i> var. <i>microcarpa</i>, <i>Dodonaea pachyneura</i>, <i>Eremophila glutinosa</i>, <i>E. latrobei</i> subsp. <i>latrobei</i>, <i>Thryptomene decussata</i>, <i>Solanum ashbyae</i> / <i>lasiophyllum</i>, <i>Ptilotus schwartzii</i>, <i>P. obovatus</i> var. <i>obovatus</i>, <i>Philothea brucei</i> subsp. <i>brucei</i>, <i>Micromyrtus sulphurea</i>.</p>	<p>Mid to upper slopes and broad ridge tops of BIF ranges and ridge tops of breakaways.</p>	<p>4a, 8, 10, 26, 48, 68, 70, 109, 110, 111, 144, 168, 180 and BPE03.</p>	


Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
<b>3 Acacia spp. shrubland over open mixed shrub species and tussock grasses</b>				
<p>This was the most widespread community occurring across sand plains and minor drainage areas associated with outwash plains and on the footslopes of hills. The upper stratum is characterised by moderately tall <i>Acacia</i> spp. shrubs occasionally with scattered <i>A. pruinoarpa</i> or <i>Corymbia lenziana</i> trees. The mid stratum is dominated by a diverse array of <i>Eremophila</i> species. The lower stratum consists predominantly of sparse to open shrubs with mixed tussock grasses. An isolated patch of Community 3a was recorded to the north of the ranges with <i>Triodia shinzii</i> occurring as a dominant in the lower stratum. This was not recorded at any other location and appeared to be restricted to an isolated area of yellow sand plain. Four sub-communities were differentiated by the statistical analysis and these are described below. Sub-communities 3a and 3b, have similar floristic assemblages, however, plant densities differ significantly.</p>				
<p><b>3a</b> +/- <i>Corymbia lenziana</i> scattered medium trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> sparse tall shrubland over mixed <i>Eremophila</i> spp. open mid shrubland over scattered low shrubs of <i>Ptilotus obovatus</i> over mixed open tussock grassland.</p> <p>No priority species were recorded within this community.</p> <p>Mean species richness = <math>16 \pm 3.42</math> (n = 8).</p>	<p><i>Acacia ramulosa</i> var. <i>linophylla</i>, <i>A. aneura</i> var. <i>aneura</i>, <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>E. granitica</i>, <i>E. foliosissima</i>, <i>E. simulans</i> subsp. <i>simulans</i>, <i>Solanum ashbyae</i> / <i>lasiophyllum</i>, <i>Ptilotus obovatus</i>, <i>Monachather paradoxus</i>, <i>Eragrostis eriopoda</i>.</p>	<p>Sandy outwash and gravelly plains and footslopes of BIF ranges.</p>	<p>1, 17, 55, 56, 98, 147, BPE06 and HR13.</p>	

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
<p><b>3b</b> +/- <i>Acacia pruinoarpa</i> scattered trees over <i>A. aneura</i> woodland over <i>A. ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> shrubland over mixed <i>Eremophila</i> spp. closed shrubland over <i>Ptilotus obovatus</i> open low shrubland.</p> <p>Isolated individuals of <i>Grevillea stenostachya</i> (<b>Priority 3</b>) were commonly recorded within this community.</p> <p>Mean species richness = <math>17 \pm 5.26</math> (n = 59).</p>	<p><i>Acacia aneura</i> var. <i>aneura</i>, <i>A. aneura</i> var. <i>microcarpa</i>, <i>A. ramulosa</i> var. <i>linophylla</i>, <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>E. spectabilis</i> subsp. <i>brevis</i>, <i>Ptilotus obovatus</i>, <i>Eragrostis eriopoda</i>.</p>	<p>Drainage lines and low lying areas on sandy and outwash plains.</p>	<p>3, 4, 5, 6, 13, 14, 15, 16, 18, 22, 28, 32, 34, 35, 36, 38, 39, 40, 41, 42, 49, 50, 53, 54, 59, 60, 66, 72, 77, 82, 83, 84, 86, 102, 141, 142, 145, 156a, 172, BPC03, BPC07, BPE02, BPE12, BPE14a, HR01, HR02, HR09, HR11, HR14, HR15, HR16, HR18, HR19, HR21 HR23a, HR23b, HR25, HR26 and HR27.</p>	
<p><b>3c</b> Scattered <i>Eucalyptus mallees</i> / trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Rhagodia eremaea</i>, <i>Eremophila forrestii</i> subsp. <i>forrestii</i> shrubland over <i>Ptilotus obovatus</i> open low shrubland.</p> <p>No priority flora taxa were associated in this community.</p> <p>Mean species richness = <math>19 \pm 1.26</math> (n = 4).</p>	<p><i>Corymbia lenziana</i>, <i>Eucalyptus striatocalyx</i> subsp. <i>striatocalyx</i>, <i>Enchylaena tomentosa</i>, <i>Solanum ashbyae</i> / <i>lasiophyllum</i>, <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>E. spectabilis</i> subsp. <i>brevis</i>, <i>Rhagodia eremaea</i>, <i>Ptilotus obovatus</i>, <i>Monachather paradoxus</i>.</p>	<p>Sandy plains.</p>	<p>33, 85, BPW02, and HR10.</p>	



Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
<p><b>3d</b> <i>Acacia aneura</i> and <i>A. cockertoniana</i> open moderate shrubland over <i>Eremophila simulans</i> subsp. <i>simulans</i> and <i>Aluta aspera</i> subsp. <i>hesperia</i> low open shrubland.</p> <p><i>Hemigenia tysonii</i> (<b>Priority 3</b>) commonly occurred within this community, often as a co-dominant within the lower stratum.</p> <p>Mean species richness = <math>9 \pm 2.65</math> (n = 5).</p>	<p><i>Acacia aneura</i> var. <i>aneura</i>, <i>A. cockertoniana</i>, <i>Eremophila simulans</i> subsp. <i>simulans</i>, <i>Aluta aspera</i> subsp. <i>hesperia</i>.</p>	<p>Gravelly plains and low hills.</p>	<p>BPW07, BPW08, BPW10, HR03 and HR07.</p>	
<p><b>4</b> <i>Acacia</i> sp. Weld Range shrubland over mixed open shrubs</p>				
<p>This community was widely distributed across the lease occurring predominantly on scree slopes of granite and dolerite and along minor and major drainage lines. <i>Acacia</i> sp. Weld Range is the dominant overstorey shrub with a mixed mid shrub layer of <i>Eremophila</i> and <i>Senna</i> spp. over a lower stratum of a diverse range of shrubs. Two sub-communities resulted from the statistical analysis and these are described below.</p>				



Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
<p><b>4a</b> <i>Acacia</i> sp. Weld Range and <i>A. aneura</i> var. <i>microcarpa</i> open tall shrubland over <i>Eremophila macmillaniana</i> and mixed <i>Senna</i> spp. open mid shrubland over <i>Ptilotus obovatus</i> open low shrubland.</p> <p><i>Acacia speckii</i> (<b>Priority 3</b>) was commonly recorded within this community, as was <i>Dodonaea amplisemina</i> (<b>Priority 3</b>) <i>Ptilotus astrolasius</i> var. <i>luteolus</i> (<b>Priority 1</b>) within the north- eastern extent of the lease. The currently undescribed species, <i>Acacia</i> sp. nov. (aff. <i>kochii</i>) and <i>Hemigenia</i> sp. nov. (aff. <i>exilis</i>), were recorded within this community both inside the lease, and within Wilgie Mia during the threatened flora surveys.</p> <p>Mean species richness = <math>15 \pm 3.75</math> (n = 23).</p>	<p><i>Acacia</i> sp. Weld Range, <i>A. aneura</i> var. <i>microcarpa</i>, <i>A. speckii</i>, <i>Eremophila macmillaniana</i>, <i>E. mackinlayi</i> subsp. <i>spathulata</i>, <i>Senna artemisioides</i> subsp. <i>helmsii</i>, <i>S. glaucifolia</i>, <i>Ptilotus obovatus</i>.</p>	<p>Undulating scree plains and mid to low slopes of granite and dolerite.</p>	<p>29, 75, 76, 78, 79, 80, 81, 94, 95, 101, 104, 129, 130, 134, 135, 137, 160, 161, 166, 170, 174, 182 and HR29.</p>	
<p><b>4b</b> <i>Acacia</i> sp. Weld Range and <i>Acacia speckii</i> (<b>Priority 3</b>) shrubland over mixed <i>Senna</i> spp. sparse shrubland over <i>Grevillea inconspicua</i> (<b>Priority 4</b>) and <i>Dodonaea amplisemina</i> (<b>Priority 3</b>) open shrubland over <i>Cymbopogon ambiguus</i> sparse tussock grassland.</p> <p>The priority species <i>Acacia speckii</i> (<b>Priority 3</b>), <i>Grevillea inconspicua</i> (<b>Priority 4</b>), and <i>Dodonaea amplisemina</i> (<b>Priority 3</b>) were recorded consistently within this community. <i>Stenanthemum patens</i> (<b>Priority 1</b>) was recorded at two sites within this community.</p> <p>Mean species richness = <math>17 \pm 5.77</math> (n = 10).</p>	<p><i>Acacia</i> sp. Weld Range, <i>A. speckii</i>, <i>A. tetragonophylla</i>, <i>Senna</i> sp. Meekatharra, <i>S. artemisioides</i> subsp. <i>helmsii</i>, <i>S. glaucifolia</i>, <i>Eremophila macmillaniana</i>, <i>E. exilifolia</i>, <i>Grevillea inconspicua</i>, <i>Dodonaea amplisemina</i>, <i>Cymbopogon ambiguus</i>.</p>	<p>Minor drainage areas, creek lines and midslope of low dolerite and granite hills.</p>	<p>125, 136, 162, 167, 169, 181, BPE01, BPE07, HR04 and HR28.</p>	


Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
<b>5</b> <i>Acacia craspedocarpa</i> open shrubland over open low shrubs				
<p>This association occurred predominantly on and around salt affected, low lying and riparian areas. The upper stratum is dominated by <i>Acacia craspedocarpa</i> and <i>A. tetragonophylla</i> tall shrubs. The lower stratum is dominated by mixed low shrubs. Open to moderately dense tussock grasses dominate the ground cover with scattered mixed herb species. This community was often heavily grazed by cattle. Two sub-communities were differentiated within this community.</p>				
<p><b>5a</b> <i>Acacia craspedocarpa</i> open tall shrubland over <i>Solanum ashbyae</i> / <i>lasiophyllum</i> and <i>Ptilotus obovatus</i> low shrubland over mixed low tussock grassland.</p> <p>The priority species <i>Acacia speckii</i> (<b>Priority 3</b>) and <i>Grevillea inconspicua</i> (<b>Priority 4</b>) were recorded within this community.</p> <p>Mean species richness = 16 ± 5.56 (n = 33).</p>	<p><i>Acacia aneura</i> var. <i>aneura</i>, <i>A. tetragonophylla</i>, <i>A. craspedocarpa</i>, <i>Eremophila foliosissima</i>, <i>Solanum ashbyae</i> / <i>lasiophyllum</i>, <i>Ptilotus obovatus</i>, <i>Cymbopogon ambiguus</i>, <i>Aristida contorta</i>, <i>Eragrostis dielsii</i> subsp. <i>dielsii</i>.</p>	<p>Ridge tops and upper slopes of BIF ridges, low lying semi-saline flats, riparian areas and ironstone scree flat plains.</p>	<p>2, 19, 24, 25, 43, 44, 45, 46, 47, 57, 65, 87, 88, 88a, 90, 92, 96, 100, 114, 115, 116, 122, 123, 131, 138, 148, 149, 164, 173, BPE14b, BPE16, HR06 and HR12.</p>	

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
<p><b>5b</b> +/- <i>Grevillea striata</i> low isolated trees over <i>Acacia craspedocarpa</i> and <i>A. aneura</i> tall open shrubland over <i>Scaevola spinescens</i> sparse mid shrubland over <i>Austrostipa elegantissima</i> and <i>Eriachne flaccida</i> low open tussock grassland.</p> <p>The priority species <i>Goodenia lyrata</i> (<b>priority 1</b>) and <i>G. berringbinensis</i> (<b>Priority 3</b>) were recorded within this community.</p> <p>Mean species richness = <math>16 \pm 3.61</math> (n = 3).</p>	<p><i>Grevillea striata</i>, <i>Acacia craspedocarpa</i>, <i>Scaevola spinescens</i>, <i>Austrostipa elegantissima</i>, <i>Acacia tetragonophylla</i>, <i>Grevillea nematophylla</i> subsp. <i>supralunar</i>.</p>	<p>Flat plain adjoining seasonally inundated wetland.</p>	<p>63, 64 and MWD01.</p>	
<p><b>6 Mixed open chenopod shrubland</b></p>				
<p>This association occurs predominantly adjacent to seasonally inundated salt lakes and saline affected drainage lines as well as on undulating plains with a surface layer of gypsum or calcrete stones and pebbles. The upper stratum is dominated by <i>Acacia</i> spp. shrubs with the mid stratum dominated by mixed <i>Senna</i> spp. shrubs over sparse low shrubs. Low chenopods often dominate the ground layer. Three sub-communities were differentiated within this community.</p>				



Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
<p><b>6a</b> Scattered <i>Acacia</i> spp. shrubs over mixed <i>Senna</i> spp. open mid shrubland over <i>Ptilotus obovatus</i> sparse shrubland over mixed <i>Maireana</i> spp. chenopod shrubland.</p> <p>The priority species <i>Ptilotus beardii</i> (<b>Priority 3</b>) was commonly recorded within this community.</p> <p>Mean species richness = <math>20 \pm 4.43</math> (n = 8).</p>	<p><i>Acacia aneura</i> var. <i>microcarpa</i>, <i>A. craspedocarpa</i>, <i>A. tetragonophylla</i>, <i>Senna artemisioides</i> subsp. <i>helmsii</i>, <i>S. artemisioides</i> subsp. <i>filifolia</i>, <i>S. glaucifolia</i>, <i>Eremophila latrobei</i> subsp. <i>latrobei</i>, <i>Ptilotus obovatus</i>, <i>Maireana georgei</i>, <i>Solanum ashbyae</i> / <i>lasiophyllum</i>.</p>	<p>Mainly occurring in and around seasonally inundated areas and salt affected drainage lines</p>	<p>91, 93, 99, 103, BPE05, HR17, HR30 and MWD02.</p>	
<p><b>6b</b> Scattered mixed <i>Acacia</i> spp. over <i>Rhagodia eremaea</i> and <i>Scaevola spinescens</i> sparse mid to low shrubland over <i>Ptilotus obovatus</i>, <i>Maireana georgei</i> and <i>Sclerolaena diacantha</i> low chenopod shrubland.</p> <p>No priority species were recorded within this community type.</p> <p>Mean species richness = <math>13 \pm 3.12</math> (n = 8).</p>	<p><i>Acacia aneura</i> var. <i>tenuis</i>, <i>A. burkittii</i>, <i>Scaevola spinescens</i>, <i>Ptilotus obovatus</i>, <i>Ptilotus exaltatus</i>, <i>Maireana georgei</i>.</p>	<p>Undulating plains with a surface layer of gypsum and calcrete.</p>	<p>BPC01, BPC02, BPC04, BPC08, BPC09, BPC10, BPE08 and BPE09.</p>	

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
<p><b>6c</b> <i>Eremophila maculata</i> subsp. <i>brevifolia</i> low open shrubland over <i>Sclerolaena diacantha</i> low chenopod shrubland over <i>Enneapogon cylindricus</i> low tussock grassland.</p> <p>No priority species were recorded within this community.</p> <p>Mean species richness = 6.0 ± 1.0 (n = 3).</p>	<p><i>Eremophila maculata</i> subsp. <i>brevifolia</i>, <i>Sclerolaena diacantha</i>, <i>Enneapogon cylindricus</i>.</p>	<p>Seasonally inundated salt pan.</p>	<p>BPC05, BPC06 and BPE15.</p>	
<p><b>7 Halophytic shrubland</b></p>				
<p>This community is the most distinctive in the data analysis and separated at the highest level in the dendrogram. It occurred in and around saline claypans and seasonally inundated wetlands. It was characterised by halophytic shrubs over mixed tussock grasses. A subset of this community is dominated by <i>Eucalyptus</i> spp. over shrub species. Two sub-units occur within this community.</p>				
<p><b>7a</b> <i>Melaleuca stereophloia</i> and <i>Cratystylis subspinescens</i> low shrubland over <i>Tecticornia</i> spp. low samphire shrubland over <i>Frankenia laxiflora</i> low shrubland.</p> <p>The priority species <i>Goodenia lyrata</i> (<b>Priority 1</b>) and <i>Tecticornia cymbiformis</i> (<b>Priority 3</b>) were recorded within this community.</p> <p>Mean species richness = 18 ± 2.08 (n = 3).</p>	<p><i>Melaleuca stereophloia</i>, <i>Cratystylis subspinescens</i>, <i>Eremophila glabra</i> subsp. <i>glabra</i>, <i>Frankenia laxiflora</i>, <i>Scaevola spinescens</i>, <i>Leptomeria preissiana</i>, <i>Senna artemisioides</i> subsp. <i>filifolia</i>, <i>Tecticornia doleiformis</i>, <i>Tecticornia indica</i> subsp. <i>leiostachya</i>, <i>Atriplex vesicaria</i>.</p>	<p>Seasonally inundated claypan.</p>	<p>62, 120 and 121.</p>	

Vegetation Community and Description	Associated Species	Habitat	Quadrats Surveyed in Vegetation Community	Photograph
<p><b>7b</b> <i>Eucalyptus carnei</i> and <i>Eucalyptus trivalva</i> woodland over <i>Cratystylis subspinescens</i> and <i>Muehlenbeckia florulenta</i> low sparse shrubland over mixed low tussock grasses.</p> <p>No priority species were recorded within this community.</p> <p>Mean species richness = <math>19 \pm 2.89</math> (n = 3).</p>	<p><i>Eucalyptus trivalva</i>, <i>E. carnei</i>, <i>Cratystylis subspinescens</i>, <i>Muehlenbeckia florulenta</i>, <i>Eremophila glabra</i> subsp. <i>glabra</i>, <i>Scaevola spinescens</i>, <i>Leptomeria preissiana</i>, <i>Senna artemisioides</i> subsp. <i>filifolia</i>, <i>Tecticornia doleiformis</i>, <i>Tecticornia indica</i> subsp. <i>leiostachya</i>.</p>	<p>Occurring as a band across a seasonally inundated wetland.</p>	<p>58, 61 and 119.</p>	
<p>Notes: Mean species richness expressed <math>\pm</math> standard deviation</p> <p>HR = haul road; BPW = borrow pit west; BPE = borrow pit east, BPC = borrow pit centre; MWD = Madoonga waste dump.</p>				

#### 4.5 ECOLOGICAL COMMUNITIES OF CONSERVATION SIGNIFICANCE WITHIN THE STUDY AREA

Ecological communities are naturally occurring biological assemblages found in a particular type of habitat. At a national level, flora and threatened ecological communities (TECs) are protected under the EPBC Act. TECs are listed as Critically Endangered, Endangered or Vulnerable (refer to Table I.1, Appendix I for category definitions). The Department of the Environment and Water Resources does not currently list any TECs as occurring within the Weld Range survey area.

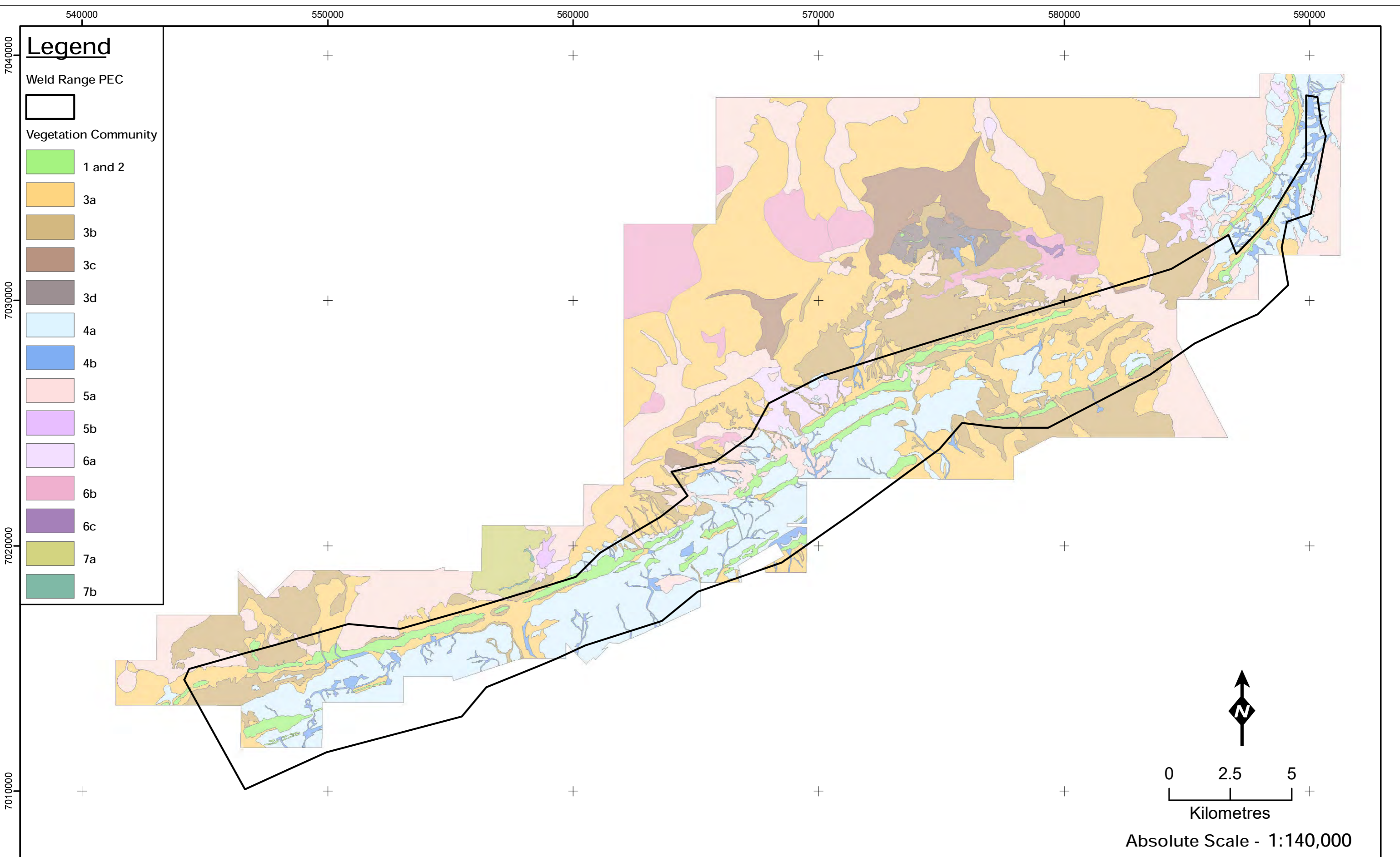
The Western Australian DEC maintains a list of TECs that are Presumed Totally Destroyed, Critically Endangered, Endangered or Vulnerable. No State-listed TECs occur within or near to the project area.

Potential TECs that do not meet survey criteria, or that are not adequately defined, are added to a list of priority ecological communities (PECs). Communities are placed in this category while consideration can be given to their declaration as TECs. PECs are classified into one of five possible priority ranks based on frequency of ecological community occurrence and known threatening processes (refer to Table I.2, Appendix I for category definitions).

One Priority 1 PEC occurs in the vicinity of the Study Area; “Weld Range vegetation complexes (Banded Ironstone Formation) (BIF)”. A significant proportion of the Study Areas lies within the currently defined boundaries of this PEC (Figure 4.3). The Priority 1 PEC ranking at Weld Range has been assigned on the basis that it represents a rare vegetation complex that is considered currently under threat of mining (DEC, 2008).

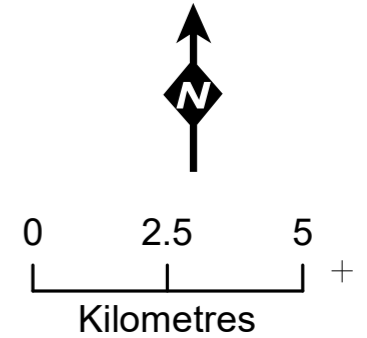
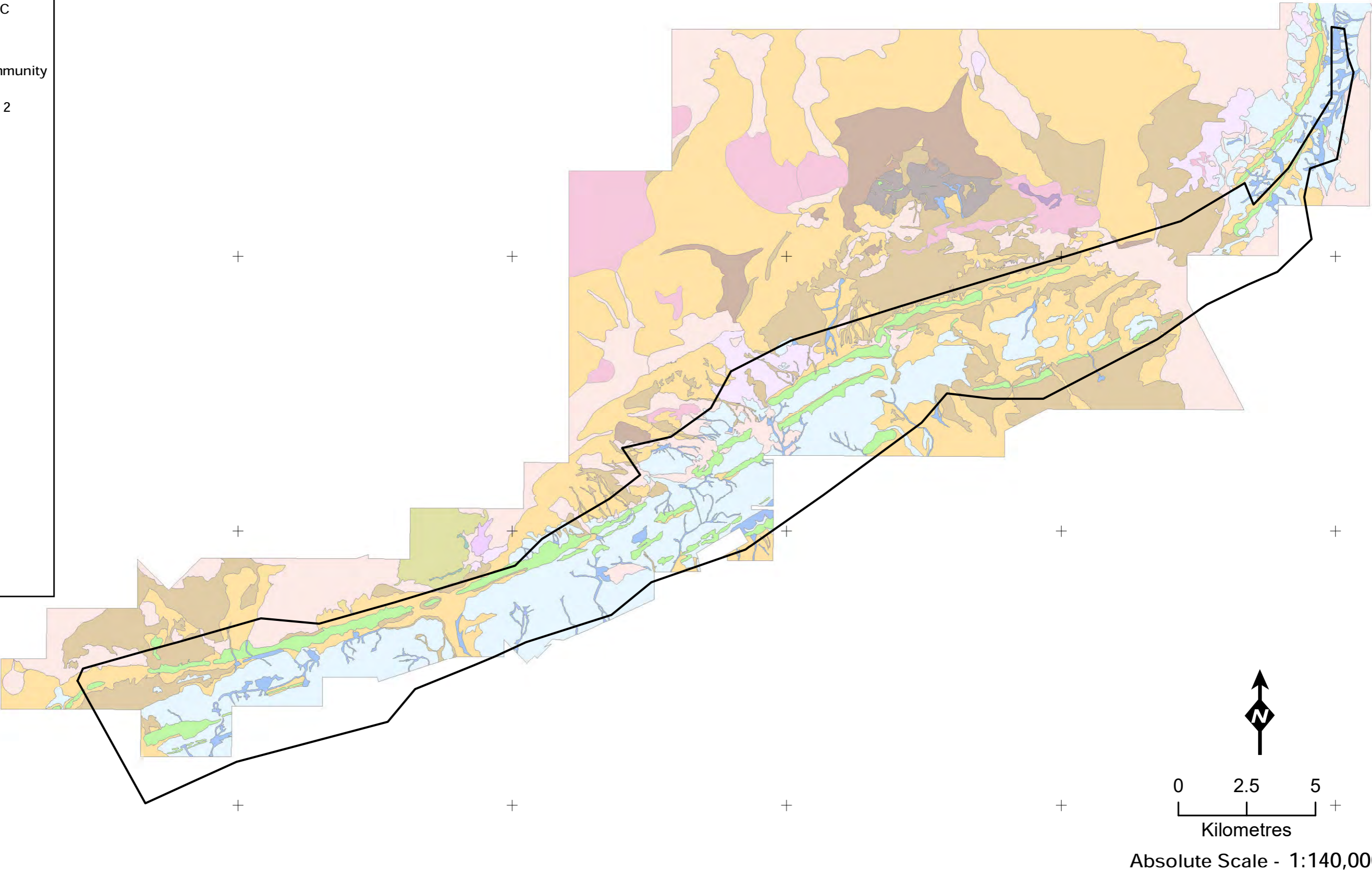
The current PEC boundary is based on information that was available at the time the Weld Range vegetation complexes (BIF) PEC was listed and is approximate, based on geology and vegetation layers available in GIS databases. It is possible the boundary will be reviewed as more data in relation to the vegetation of the BIF Ranges and surrounding plains becomes available.

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**Legend**

- Weld Range PEC
- Vegetation Community
- 1 and 2
  - 3a
  - 3b
  - 3c
  - 3d
  - 4a
  - 4b
  - 5a
  - 5b
  - 6a
  - 6b
  - 6c
  - 7a
  - 7b



Absolute Scale - 1:140,000



**Current Weld Range PEC Boundary  
(as supplied 25/05/09) over  
Mapped Vegetation Communities**

Figure: 4.3  
Project ID: 722  
  
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: SG  
Date: 23/10/09

Unique Map ID: S047

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## 5 FLORA

### 5.1 FLORISTIC INVENTORY

A total of 393 taxa (including species, subspecies, varieties, forms and affinities) were recorded within the Study Area. Four taxa were could not be beyond genus level only due to insufficient reproductive material. Six naturalised alien flora taxa were located during the survey. A complete list of the flora recorded is included as Table J.1, Appendix J.

The taxonomic composition of the flora is summarised in Table 5-1.

**Table 5-1 – Taxonomic Composition of the Weld Range Flora.**

	Phase 1	Phase 2	Phase 3	Rail Corridor	Combined
Date surveyed	Nov-06	Apr-07	Jul-08	Jun-09	
Number quadrats surveyed	103	109 (including 37 RPT)	64	19	258
Number taxa recorded	260	188	195	74	393
Number families	43	38	41	17	57
Number genera	107	72	82	28	140
Number annual taxa (%)	44 (16.9)	12 (6.4)	27 (13.9)	7 (9.6)	77 (19.6)
Number perennial taxa (%)	216 (83.1)	176 (93.6)	167 (86.1)	67 (90.5)	315 (80.4)

It can be seen that the highest proportion of annual taxa was recorded during the Phase 1 survey, in which rainfall in the four months was significantly higher than the long term average.

The families represented by the greatest number of taxa in the combined species list were Mimosaceae (43 taxa), Myoporaceae (41 taxa), Chenopodiaceae (38 taxa), Poaceae (31 taxa), and Asteraceae (26 taxa). Genera represented by the greatest number of taxa were *Acacia* (43 taxa), *Eremophila* (41 taxa), *Senna* (17 taxa), *Ptilotus* and *Maireana* (15 taxa each). This pattern of dominance is consistent to that described by Beard (1976) within the Murchison botanical district, reflecting the dominance of shrublands dominated and *Acacia* and *Eremophila* species, and the abundance of saline loams on the plains which support many species of Chenopodiaceae.

Species richness per unit area was observed to be greatest at quadrats located in areas of higher water availability: creek beds and banks, gentle slopes; and was lowest on steeper slopes, rocky crests or midslopes, and saline pans and associated drainage lines.

### 5.2 FLORISTIC DIVERSITY RELATIVE TO OTHER SURVEYS WITHIN THE MURCHISON BIOREGION

The number of species, families and dominant families / genera recorded during this survey can be compared with information recorded during other surveys conducted at Weld Range and Jack Hills Table 5-2.



Although the density of quadrats/unit area and land systems present vary between surveys, broad comparisons of floristic composition are possible.

**Table 5-2 – Comparison of Floristic Diversity from Surveys Conducted at Weld Range and Jack Hills**

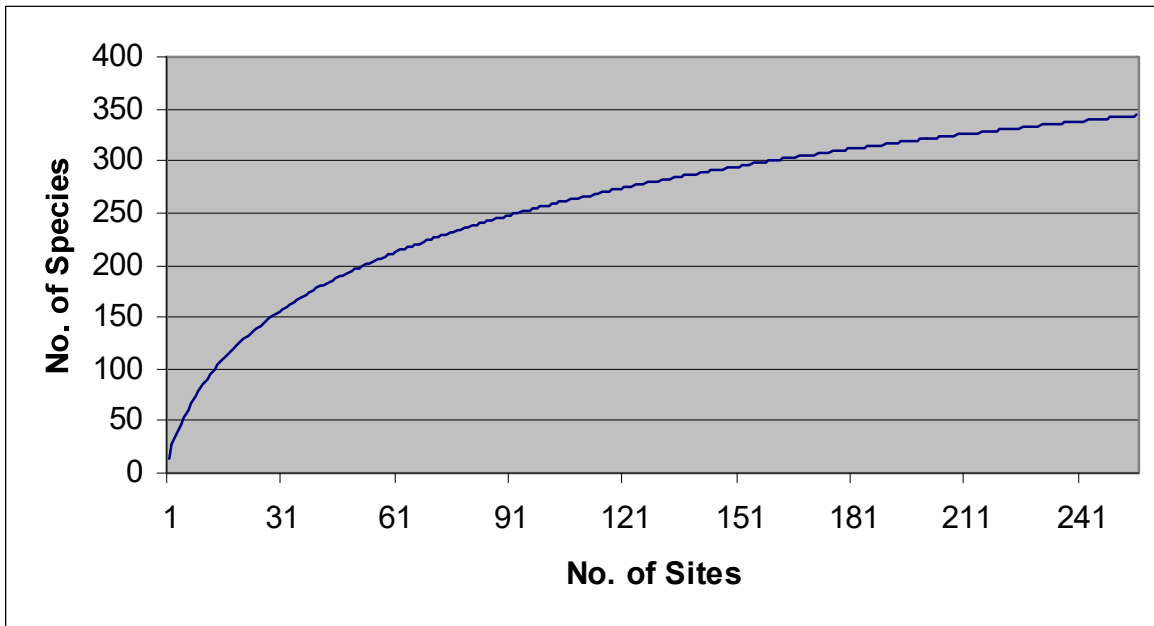
Survey	<i>ecologia</i> Weld Range	DEC Weld Range	DEC Jack Hills	Mattiske Jack Hills
Date of survey	November 2006 April 2007 July 2008 June 2009	August 2005	August 2005	October 2004 June 2005 October 2005
Survey intensity	258 x 400 m <sup>2</sup> quadrats Includes 19 quadrats within the Study Area from the OPR rail corridor survey	52 x 400 m <sup>2</sup> quadrats surveyed	50 x 400 m <sup>2</sup> quadrats surveyed	122 x 400 m <sup>2</sup> quadrats Includes 4 quadrats established on Mount Gould / Robinson Ranges.
Total number taxa recorded	393	244	209	211
Total number families recorded	57	50	43	36
Dominant families (no taxa recorded)	Mimosaceae (43) Myoporaceae (41) Chenopodiaceae (38) Poaceae (31) Asteraceae (26)	Asteraceae (46) Poaceae (22 ) Mimosaceae (13 ) Myoporaceae(12) Amaranthaceae (11) Chenopodiaceae (11)	Asteraceae (41) Poaceae (17) Mimosaceae (16) Malvaceae (12) Myoporaceae (12)	Mimosaceae (35) Myoporaceae (22) Poaceae (18) Chenopodiaceae (16) Asteraceae (15 )
Dominant genera (no taxa recorded)	<i>Acacia</i> (43) <i>Eremophila</i> (41) <i>Senna</i> (17) <i>Ptilotus</i> (15) <i>Maireana</i> (15)	<i>Acacia</i> (13) <i>Eremophila</i> (12) <i>Ptilotus</i> (10) <i>Rhodanthe</i> (8) <i>Senna</i> (7)	Not specified in report	Not specified in report
Source	Current report	(Markey & Dillon, 2008)	(Meissner & Caruso, DRAFT 2008)	(Mattiske, 2005)

It can be seen that the pattern of dominance of the families Mimosaceae, Myoporaceae, Chenopodiaceae, Poaceae and Asteraceae is common to all the surveys. Asteraceae (primarily ephemeral daisies) was the most speciosa family in both DEC surveys, reflecting the high rainfall in 2005 which preceded these surveys. Fifty two percent of the total number of taxa recorded during the DEC survey of Weld range were classified as annuals, compared with 16.8% in the current survey.

### 5.3 SAMPLING ADEQUACY

Species accumulation curves provide a theoretical basis for understanding the relationship between sampling effort and the accumulation of species, and hence provide a means of estimating species richness and assessing survey adequacy. As sampling effort increases (i.e. the number of quadrats surveyed increases), the rate at which new species are recorded decreases and ultimately becomes asymptotic. This asymptote provides an estimate of the total number of species that might be expected from a particular survey area.

Flora sampling adequacy was estimated using species accumulation curve analysis (Colwell, 2006) and extrapolation of the curve to the asymptote using Michaelis-Menten modelling (Figure 5.1).



**Figure 5.1 –Species Accumulation Curve for the Weld Range Survey (Average Randomised, 258 quadrats)**

Using this analysis, the incidence-based coverage estimator of species richness (ICE Mean, Chao 2 Mean) was determined as 424. With a total of 344 taxa recorded from the 258 quadrats surveyed (three phases plus rail corridor), this suggests that approximately 81% of the flora species potentially present within the study area were recorded during the quadrat-based component of the survey. A further 48 species were recorded opportunistically during transects, or 92% of the total number of species estimated to be present.

#### **5.4 FLORA OF CONSERVATION SIGNIFICANCE**

##### **5.4.1 Flora Species Protected by Commonwealth and State Acts**

###### **5.4.1.1 Environment Protection and Biodiversity Conservation Act 1999**

Flora species are protected at a national level under the Commonwealth *EPBC Act*. This Act protects species that are considered Critically Endangered, Endangered, Vulnerable, Conservation Dependent, Extinct or Extinct in the Wild (refer to Table I.3, Appendix I for category definitions). One species listed under this Act as Endangered, *Conospermum toddii* (Approved Conservation Advice for *Conospermum toddii*, 2008), is known from two collections in the Murchison region.

*Conospermum toddii* was not recorded during the current survey.

###### **5.4.1.2 Wildlife Conservation Act 1950**

Under the Western Australian Wildlife Conservation (Rare Flora) Notice of the *WC Act*, the Minister for the Environment may declare species of protected flora to be declared rare flora (DRF) if they are

considered to be in danger of extinction, rare or otherwise in need of special protection. These taxa are legally protected and removal or impact to their surroundings cannot be conducted without ministerial approval obtained specifically on each occasion for each population.

Currently, two DRF taxa are protected by the *WC Act* and are listed as occurring in the Murchison, *Conospermum toddii* and *Eremophila rostrata* subsp. *rostrata* (Wildlife Conservation (Rare Flora) Notice 2008(2)).

Neither *Eremophila rostrata* subsp. *rostrata* nor *Conospermum toddii* were recorded during the current survey

#### **5.4.2 Priority Flora**

The DEC maintains a list of priority flora species, which may be rare or threatened but for which there are insufficient records to accurately determine the status, or which are regarded as rare but not currently threatened. These species are assigned to one of four priority categories (Atkins, 2010), as defined in Table I.4, Appendix I. Currently, 150 rare and priority flora taxa are listed as occurring in the Murchison (Western Australian Herbarium, June 2010).

To date, 27 flora taxa of conservation significance have been recorded during surveys carried out at the Weld Range by the DEC and *ecologia*, 25 of which were recorded during the current survey. Table 5-3 summarises the distribution of these taxa. Their morphology, habitat preferences and distribution at Weld Range are summarised in Table 5-4, their locations in Appendix K and details of Voucher specimens and Declared Rare Forms in Appendix L

Populations are defined as disjunct in Table 5-3 if separated by at least 100 km from all other known occurrences. A disjunct record may simply reflect a lack of available data, due to a low level of investigation in the region or a low number of lodgements at the WA Herbarium. However it may also indicate a population that is genuinely isolated as a result of habitat specificity for the BIF landform that is isolated within the landscape. On the basis of current records, eight of the Weld Range Priority taxa populations appear to be disjunct.

All Priority taxa currently recorded at Weld Range have distributions extending over at least 100 km, consistent with the observation by Markey and Dillon (2008) that there do not appear to be any species that are endemic to the Weld Ranges.



#### **5.4.3 Taxa of Potential Conservation Significance**



Two previously undescribed taxa were also recorded during the current survey. Given their status as undescribed taxa, there is insufficient information available to determine their conservation status. These taxa may be listed as Priority species in the future. Their morphology, habitat preferences and distribution at Weld Range are summarised in Table 5-5.



**Table 5-3 – Taxa of Conservation Significance Recorded in the Study Area**




Taxon	Conserv. Status	Origin of record(s) at Weld Range		Distribution	
		ecologia	DEC Database	Weld Range disjunct	range >100 km
<i>Beyeria lapidicola</i> (formerly sp. Murchison)	P1	✓	✓	✓	✓
<i>Eremophila rhexos</i>	P1		✓	✓	✓
<i>Euphorbia sarcostemmoides</i>	P1	✓		✓	✓
<i>Goodenia lyrata</i>	P1	✓		✓	✓
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)	P1	✓	✓	✓	✓
<i>Stenanthemum patens</i>	P1	✓	✓	✓	✓
<i>Acacia ?burrowsiana</i>	P3	✓	✓		✓
<i>Acacia speckii</i>	P3	✓	✓		✓
<i>Calytrix erosipetala</i>	P3	✓			✓
<i>Dodonaea amplisemina</i>	P3	✓	✓		✓
<i>Eremophila arachnoides</i> subsp. <i>arachnoides</i>	P3	✓			✓
<i>Grevillea stenostachya</i>	P3	✓	✓		✓
<i>Hemigenia tysonii</i>	P3	✓			✓
<i>Homalocalyx echinulatus</i>	P3	✓	✓		✓
<i>Indigofera gilesii</i> subsp. <i>gilesii</i> Peter G.Wilson & Rowe	P3	✓		✓	✓
<i>Micromyrtus placoides</i>	P3	✓	✓		✓
<i>Mirbelia ?stipitata</i>	P3	✓		✓	✓
<i>Phyllanthus baeckeoides</i>	P3		✓	✓	✓
<i>Prostanthera ferricola</i>	P3	✓	✓		✓
<i>Prostanthera petrophila</i>	P3	✓	✓		✓
<i>Ptilotus beardii</i>	P3	✓	✓		✓
<i>Ptilotus luteolus</i>	P3	✓			✓
<i>Tecticornia cymbiformis</i>	P3	✓		✓	✓
<i>Verticordia jamiesonii</i>	P3	✓	✓		✓
<i>Baeckea</i> sp. Melita Station (H. Pringle 2738)	P4	✓	✓		✓
<i>Goodenia berringbinensis</i>	P4	✓			✓
<i>Grevillea inconspicua</i>	P4	✓	✓		✓

**Table 5-4 – Characteristics of Priority Taxa Recorded at Weld Range**

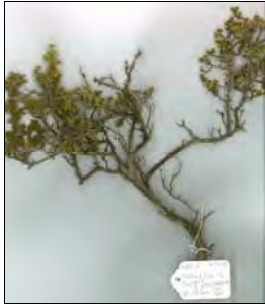


Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
<i>Beyeria lapidicola</i> (EUPHORBIACEAE)	P1	Much branched shrub to 1.6 m. Stems and leaves resinous and sticky, branches pale, yellow-green becoming grey or black. Leaves narrow oblong, 5-20 mm x 1-3 mm, three ribs on under surface, hairy between the ribs, and a tip that is a blunt callus. Flowers are small and green.	Banded ironstone ridges and slopes	1&2, 3a, 3b, 3d, 4a	Scattered distribution bounded by Meekatharra, Wiluna, Menzies.	Ida Valley - Mt Forrest Cons. Park	2	
<i>Eremophila rhexos</i> (MYOPORACEAE)	P1	Erect shrub 1.5 m tall. Flowers deep lilac, tube white, purple spotted in tube below the upper and lower lips.	Skeletal brown stony loams over granite, dolerite	1&2	Three locations Weld Range, Coombarra, Waldburg Stn.	No	0	 <p><i>Eremophila rhexos</i> <span style="float: right;">Photos: J.D. Start</span></p>




Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
<i>Euphorbia sarcostemmoides</i> (EUPHORBIACEAE)	P1	Upright, often leafless, semi-succulent herb 0.4 - 1 m (2). Stems light green, with blue-grey waxy light coating. Stems exude white sap. Rarely present leaves narrow, lanceolate, opposite, held horizontally. Flowers terminal, green.	Sandstone ridges, quartzite hills	5b	Robinson Ranges, Mt Augustus Station.	No	1	
<i>Goodenia lyrata</i>	P1	Prostrate herb to 0.5 m length. Basal leaves lyrate (triangular with one or two points at right angles to the leaf stalk), to 2.5 cm long; stem leaves always smaller than the basal leaves and similarly shaped. Yellow flowers occurring in August.	Mulga woodlands, red sandy loam	1&2, 3a, 3b, 5a, 5b, 7a	Newman, Laverton, West Angelas.	No	4	




Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94) <b>(EUPHORBIACEAE)</b>	P1	Low shrub 0.3 - 1 m high. Leaves obovate with a notched tip, light to medium green in colour, approx. 0.5-2 cm long and 0.2-0.8 cm wide. Tiny yellow flowers June	Slopes of Banded Ironstone outcrop	1&2, 4a, 4b	Weld Range, Woolgorong Hstd., Pinegrove Hstd.	No		
<i>Stenanthemum patens</i> <b>(RHAMNACEAE)</b>	P1	Small, widely spreading shrub with spiny branchlets to 0.6 m. Leaves small, round to heart-shaped, hairs both surfaces. Flowers small, hairy tubular flowers primarily Aug. - Sept. Easily confused with the more common <i>S. petraeum</i> , which has hairs only on the under surface of the leaf.	Rocky hillsides	1&2, 4a, 4b	Weld Range, Marshall Pool, Mt. Clifford, Leinster			



Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
<i>Acacia ?burrowsiana</i> <b>(MIMOSACEAE)</b>	P3	Spreading shrub or tree to 5 m, main trunks and branches often slightly contorted. Phyllodes narrowly linear - linear oblanceolate - linear elliptic, narrowing towards base, 7-13 cm long, often held erect on the plant. Inflorescences simple, spikes interrupted 10 – 20 mm.	Red-brown loams, calcrete, laterite, quartz. Flats adj. to drainage, crests of low rises, breakaways.	3b, 5a	Lorna Glen Cons. Park, Cue, Sandstone, Mt. Magnet	Lorna Glen Cons. Park,	1	
<i>Acacia speckii</i> <b>(MIMOSACEAE)</b>	P3	Bushy, rounded shrub or gnarled tree, 1.5 m- 3.0 m. Bark grey and fissured on the main branches. Phyllodes light green, rigid and erect, circular in cross-section, with a hardened, brown tip. Pod light brown, narrow and compressed between each seed.	Rocky soils over granite, basalt or dolerite. Rocky hills or rises	1&2, 3a, 3b, 4a, 5a	Weld Range, Mt. Magnet, Meekatharra, Yalgoo		26	 









Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
<i>Calytrix erosipetala</i> (MYRTACEAE)	P3	Low shrub 0.3 m - 0.7 m. Leaves erect to spreading, obovate in outline, club shaped). White or pink flowers Sept. - Oct.	Rocky sandstone or granite breakaways	6a, 6b	Yakabindie Station, Mt Mason, Booylgoo Range, Windimurra Hstd..	*	1	
<i>Dodonaea amplisemina</i> (SAPINDACEAE)	P3	Multi-stemmed open shrub, branchlets sometimes spiny. Leaves linear or narrow spear shaped, blunt tips, often clumped together. Flowers inconspicuous. Mature fruits pink-brown with four incurving horns, Aug. – Oct.	Red-brown sandy clay soils over basalt or banded ironstone	1&2, 3a, 3b, 4a, 4b, 5a, 7a, 7b	Scattered populations Robinson Ranges -south Paynes Find. Mt Magnet, Weld Range, Cue, Buddadoo Range.		17	
<i>Eremophila arachnoides</i> subsp. <i>Arachnoides</i> (MYOPORACEAE)	P3	Open shrub to 3.5 m. Stems and leaves whiteish-green appearance (due to a covering of microscopic white scales), stems pustulate. Leaves linear, upright with hooked tip. Flowers white to mauve, the inside of the corolla yellow or purple spotted.	Shallow loams over limestone	1&2, 3a, 3b, 4a	Jilyili Hills, Yarrabubba Hstd., Lake Mason Hstd.		2	


Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
<i>Grevillea stenostachya</i> (PROTEACEAE)	P3	Dense, spiky shrub 0.6 m to 1.5 m. Leaves dissected into a number of segments, each segment terminating in a sharp tip. Flowers greenish/creamy yellow colour on a cylindrical inflorescence, July – Sept.	Red sand, sandy loam	3a, 3b, 3c, 4b, 6b	Toolonga N. R., Woolgorong Station, Carnarvon, Belele Station	Toolonga N. R.,	5	
<i>Hemigenia tysonii</i> (LAMIACEAE)	P3	Dense, finely-branched bush to 0.6 m. Leaves grey-green in colour, stiff, 4-7 mm long and 1-3 mm wide, arranged opposite one another or occasionally grouped on the stem. Flowers purple/light pink, with white spots inside, May to Dec.	Red sand, sandy clay and lateritic sand on flats, sand dunes and hills	1&2, 3a, 3b, 3d, 4a, 5, 6a	Mi Hale, Noonie Hills, Muggon Station, between Murchison Roadhouse and Meekatharra		8	
<i>Homalocalyx echinulatus</i> (MYRTACEAE)	P3	Shrub 0.45 - 1.0 m. Bark old branches stringy, fibrous. Leaves closely spaced, covering surface branchlets, oblong - spoon shaped, 1-2.5 mm long, two rows of dark glands on the under surface. Flowers pink, terminal, surrounded by small papery bracts. Jun - Sept.	Laterite. Breakaways, sandstone hills	3a, 3b, 4b, 5a	Weld Range, Wiluna West BIF Range, Jack Hills, Mt. Hale		2	

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
<i>Indigofera gilesii</i> subsp. <i>gilesii</i> (FABACEAE)	P3	Upright erect single stemmed shrub 1.5 m high. Bark dull, grey, fairly smooth. Leaflets grey-green above and below. Flowers purple/pink. Keel dull light red with white base and brown hairy tip. May-Aug.	Pebbly loams and hill slopes amongst boulders & outcrops	4a	Jinayri, Fortescue Botanical District, Hamersley Ranges, Mooloogool Homestead, Ophthalmia Range	Karinjini N. P., *	1	
<i>Micromyrtus placoides</i> (MYRTACEAE)	P3	Rounded shrub 0.5 m - 2.5 m. Leaves broad obovate to almost circular, usually concentrated at the tips of branches. Flowers white, often reflexed on stalks July-Sept.	Brown loam, dolerite, ironstone or granite, outcrops above breakaways and steep slopes	1&2, 3a, 3b, 4b, 5a, 7b	Weld Range, Tallering Peak, Mt. Narryer and Cue		7	
<i>Mirbelia ?stipitata</i> (FABACEAE)	P3	Spiny shrub 0.5 - 1 m. Leafless, small brown bracts at the bases of the spinescent branchlets. Pink pea flowers borne along these spiny branchlets Aug..	Red sandy loam	3b, 4a, 4b, 5a	Sandstone, Cue-Sandstone Road, Bandya Hstd.		5	


Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
<i>Phyllanthus baeckeoides</i> (EUPHORBIACEAE)	P3	Shrub 1-1.7 m high. Flowers small, white to cream. March Fruit green	Red lateritic & sandy clay soils. Granite outcrops	DEC record	Sandstone, Laverton, Leinster, Windimurra Station		0	Not available
<i>Prostanthera ferricola</i> (LAMIACEAE)	P3	Erect, openly branched shrub 0.3 - 1 m in. Densely hairy branches, leaves flat, green to pale green, often whorled around stem, strongly aromatic when crushed. Flowers purple/mauve, hairy July - Sept.	Red-brown skeletal sandy loam on BIF, laterite, basalt or quartz.	4a	Jack Hills, Wiluna West Range, Moolagool Stn.	*	1	
<i>Prostanthera petrophila</i> (LAMIACEAE)	P3	Spreading shrub 0.6 - 2 m. Young stems covered in white-grey hairs. Leaves opposite and elliptic. Flowers white with purple to violet striations August.	Lateritic soils.	1&2, 3a, 3b, 4a, 4b, 5a, 5b, 7a, 7b	Weld Range, Woolgorong Hstd., Mt. Barloweerie, Cue		21	

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
<i>Ptilotus beardii</i> (AMARANTHACEAE)	P3	Many-branched, rigid shrub 0.15- 0.5 m . Leaves often clustered along the stem, small, linear, acute. Flowers pale pink/red. Inflorescences terminal, open,spherical to cylindrical. Aug. – Oc.	Clayey soils. Saline flats, low breakaways	1&2, 3a, 3b, 4b, 5a, 6a	Weld Range, Muggon Stn., Crystal Hill, Mt Narryer Hstd.		5	
<i>Ptilotus luteolus</i> (AMARANTHACEAE)	P3	Low, spreading shrub 0.15 - 0.7 m. Stems yellow, leaves grey-yellow, oblong. Flowers lemon to greenish-yellow, bract bases often purplish; Inflorescence ovate - shortly cylindrical, Mar. -Oct.	Gravelly slopes down from Banded Ironstone outcrop	1&2, 3a, 4a, 4b	Thomas River, Neds Creek, Wiluna, Wiluna Murchison Roadhouse Mt. Magnet, Meekatharra		5	
<i>Tecticornia cymbiformis</i> (CHENOPODIACEAE)	P3	Low, erect shrub to 0.5 m. Fleshy stem is cylindrical, oval or circular in cross-section, dull green, or dull to bright red. Terminal, fertile tips have broad, boat shaped bracts with tips that flare outwards.	Saline areas along floodplains or creeklines	5a, 5b, 7a	Lake Aneen, Yuin Hstd., Polelle Stn..		2	

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
<i>Verticordia jamiesonii</i> (MYRTACEAE)	P3	Small, irregularly branched, rounded shrub to 60 cm more commonly to 20 cm. Leaves very small, crowded on short, lateral branchlets. Flowers creamish-white turning to pink with maturity. Flower buds are shiny, pale to bright red. Sept- Oct.	Sandy clay soils. Lateritic breakaways	3b	Mt Hale, Noonie Hills, Cue, Yalgoo, Sth Warburton	* Class A Reserve 40787	1	
<i>Baeckea</i> sp. Melita Station (H. Pringle 2738) (MYRTACEAE)	P4	Upright shrub 2 - 2.5 m. Leaves terete, 3-5 mm, hooked at tip. Older stems retain persistent leaf bases creating a white corky-like scar. Flowers white/pale pink terminal; Sept. to Oct.	Dark red rocky soil over ironstone. Mulga shrubland	1&2, 3a, 3b, 4a, 4b	Scattered distribution bounded by Weld Range, Robinson Range, Wiluna and Leonora	Wanjarri N. R., Ida Valley – Mt Forrest Cons. Pk	6	
<i>Goodenia berrinbinensis</i> (GOODENIACEAE)	P4	Prostrate to ascending herb to 0.3 m. Basal leaves spoon-shaped to 6 cm, stem leaves to 3 cm long. Flowers yellow; Oct.	Red sandy loam. Along watercourses	5b	Noonie Hills, Killara Stn., Nallan Lake and Belele Stn.		2	

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Locations During Current Survey	Photograph
<i>Grevillea inconspicua</i> (PROTEAE)	P4	Intricately branched, untidy, spreading shrub 0.6 - 2 m. Leaves linear, deflexed, flat, silvery green with hardened tip. Flowers white to pink June- Aug.	Greenstone loam gravel drainage lines, rocky outcrops, creeklines	3a, 3b, 4a, 5a	Weld Range, Sandstone, Cue, Wanjarie, Mt Magnet, Booylgoo Range	Wanjarri N. R.	9	

**Table 5-5 – Characteristics of Taxa of Potential Conservation Significance Recorded at Weld Range**

Taxon	Cons. Status	Characteristics	Habitat Preference (FloraBase)	Ecologia Vegetation Units in which Recorded	Distribution	Records in Cons. Estate	Number Location During Current Survey	Photograph
<i>Hemigenia sp. nov. (aff. exilis)</i> <b>(LAMIACEAE)</b>	-	Open spreading shrub to 1m. Branches divaricate, leaves mainly at tips of branchlets. Leaves opposite, linear-elliptic. Flowers pale mauve/white with pale purple markings, singly below the current season's leaves; Sept.	Mid - lower slopes, surface layer of stones, small boulders & gravel. Granite and dolerite.		Weld Range. Related to <i>Hemigenia exilis</i> which occurs Agnew - Sandstone - Leonora		3	Not available.
<i>Acacia sp. nov. (aff. kochii)</i> <b>(MIMOSACEAE)</b>	-	Low, multi-stemmed shrub to 1.25 m, often >1 m wide. Main branches smooth, charcoal grey, branchlets red ending with a spine. Phyllodes elliptic, 1-6 mm long, usually steely blue with needle sharp apex offset from the mid vein. Inflorescence globular, bright yellow; Sept. Pod sausage shaped, red-brown, faint waxy blue glaze.	Foot slopes of dolerite hills, undulating plains.		Sth Madoonga Hstd., Wilgie Mia Reserve.	Wilgie Mia Reserve	2	

\* = Indicates species with records at the DEC owned Doolgunna, Mooloogool or Woolgorong Stations.



## 5.5 RANGE EXTENSIONS

Based on records lodged at the Western Australian Herbarium (2010), there are a seventeen range extensions of greater than 150 km of common and Priority taxa occurring within the Study Area, as detailed in Table 5-6. These range extensions are likely to be a reflection of two factors:

- the sporadic history of collection in the vicinity of the Study Area, resulting in an incomplete knowledge of the distributions of many taxa; and in at some instances; and
- specific requirements of some taxa for habitats which are genuinely restricted in the bioregion, resulting in restricted or disjunct distribution.

**Table 5-6 –Taxa for which the Weld Range Records Represent an Extension of Known Distribution.**

Taxon	Conserv. Status	Extent of Range Extension
<i>Indigofera gilesii</i> subsp. <i>gilesii</i>	P3	Approximately 150 km south west of the closest collection record at Glengarry Range ( 5 miles SE of Mooloogool Homestead).
<i>Phyllanthus baeckeoides</i>	P3	Approximately 170 km from the closest collection record to northwest at Windimurra Station and more than 400 km to the southeast at Laverton, Leinster.
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)	P1	Approximately 200 km east of the closest collection record at Woolgorong Station.
<i>Beyeria lapidicola</i>	P1	Approximately 200 km west of the closest collection record at Lakeway Station (30 km southwest of Wiluna)
<i>Euphorbia sarcostemmoides</i>	P1	Approximately 150 km south west from the closest collection record at Mt. Padbury Station, Robinson Range
<i>Goodenia lyrata</i>	P1	More than 400 km from the closest collections to northeast near Newman and to southeast near Laverton.
<i>Stenanthemum patens</i>	P1	Approximately 230 km from the closest collections to southeast at Windimurra Homestead. 80.7 km SE of Mount Magnet
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)	P1	Approximately 200 km from the closest collection record at Woolgorong
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	None	Approximately 300 km north-east from the closest collection record at Jeffries Rocks (east of Galena) (Geraldton Sandplains region).
<i>Amyema maidenii</i>	None	Approximately 210 km south-east from the closest collection record at Gascoyne River (Gascoyne region).
<i>Sclerolaena uniflora</i>	None	Approximately 350 km north-east from the closest collection record at Three Springs (Avon Wheatbelt region).
<i>Eucalyptus socialis</i> subsp. <i>eucentrica</i>	None	Approximately 260 km south-west from the closest collection record at Gascoyne River (Gascoyne region).
<i>Eriachne lanata</i>	None	Approximately 430 km south-west from the closest collection record at Hamersley Ranges (Pilbara region).
<i>Triodia schinzii</i>	None	Approximately 170 km north north-west from the closest collection record at Cashmere Downs Station (Murchison region).

Taxon	Conserv. Status	Extent of Range Extension
<i>Micromyrtus racemosa</i> var. <i>racemosa</i>	None	Approximately 280 km from the closest collection record at White Well (Murchison region).
<i>Drosera macrantha</i> subsp. <i>eremaea</i>	None	Approximately 155 km north from the closest collection record at Mount Magnet (Murchison region).
<i>Abutilon leucopetalum</i>	None	Approximately 280 km south-west from the closest collection record at the Hamersley Ranges (Pilbara region).

## 5.6 INTRODUCED FLORA SPECIES

The Australian Weed Strategy (2007) defines a weed as “a plant which has, or has the potential to have, a detrimental effect on economic, social or conservation values”. Weeds that have proliferated in bushland without direct human intervention or assistance are also referred to as naturalized alien species.

### 5.6.1 Weeds of National Significance

At a national level there are twenty weed species listed as Weeds of National Significance (WONS). *The Commonwealth National Weeds Strategy: A Strategic Approach to Weed Problems of National Significance* describes broad goals and objectives to manage these species. There were no weed species listed as WONS recorded within the Study Area

### 5.6.2 Declared Plants

Weeds that are, or have the potential to become, a threat to agriculture may be formally declared under the *Agriculture and Related Resources Protection Act 1976 (ARRP Act)*. Declared Plants under this Act are listed with Standard Control Codes that outline the requirements for control. Five Priority groupings exist (P1, P2, P3, P4 or P5), and more than one Priority may be placed on a weed species. Weeds may also be prioritised differently in different agricultural regions. Eighty three Declared Plants are listed as occurring in the Murchison region of Western Australia under the ARRP Act. Landholders having declared weeds on their property are obliged to control them at their own expense, and are encouraged to follow the Standard Control Codes. Details of these codes are included in Appendix M. Information regarding the current status of Declared Plants is listed at the Department of Agriculture and Food website:

[http://agspsrv95.agric.wa.gov.au/dps/version02/01\\_plantsearch.asp](http://agspsrv95.agric.wa.gov.au/dps/version02/01_plantsearch.asp).

No Declared Plants (weeds) were recorded during the Weld Range survey.

### 5.6.3 Environmental Weeds within the Study Area

Currently, 106 weed species are known to occur in the Murchison region of Western Australia (Western Australian Herbarium, October 2009). Six environmental weed species were recorded during the Weld Range survey: *\*Anagallis arvensis*; *\*Cenchrus ciliaris*; *\*Cuscuta epithymum*; *\*Portulaca oleracea*; *\*Solanum nigrum*; and *\*Sonchus oleraceus*.

These weed species have a scattered distribution on the plains within the Study Area, generally at low abundance, recorded either as “less than 10 plants” or as percentage cover of 2-10%. Brief descriptions of each weed species are provided below.

\**Anagallis arvensis* (PRIMULACEAE) (Pimpernell) is a decumbent annual herb growing to 40 cm in height. Flower colour varies from cream to scarlet and they are produced between February and December. This species is commonly recorded on disturbed areas from the Shark Bay to Esperance and inland areas between (Hussey et al, 2007; Western Australian Herbarium, 2009).

\**Cenchrus ciliaris* (POACEAE) (Buffel grass) is a tufted, perennial grass growing to 1 m in height. It was widely planted in pastoral regions as a pasture grass, and has since become a widespread weed of roadsides, creeklines, river edges and most vegetation types from Shark Bay to the Pilbara and adjacent desert (Hussey et al, 2007; Western Australian Herbarium, 2009).

\**Cuscuta epithymum* (CUSCUTACEAE) (Lesser Dodder) is a twining, annual, parasitic herb or climber (no image available). White flowers occur in small clusters and are produced from August to December. This species often occurs in sandy soils over limestone or granite, from Kalbarri to Busselton (Hussey et al., 2007; Western Australian Herbarium, 2009).

\**Portulaca oleracea* (PORTULACACEAE) (Pigweed or Purslane) is a prostrate, succulent annual herb that grows up to 0.2 m in height. The leaves are shiny and spoon-shaped, and yellow flowers are produced from April to May. The entire plant becomes reddish in colour when subjected to water stress. This common and widespread species grows in clay loam and sand, often inhabiting disturbed sites. It is considered a native in the majority of Western Australia, however is probably introduced to the south-west (Hussey et al., 2007; Western Australian Herbarium, 2009).

\**Solanum nigrum* (SOLANACEAE) (Black berry nightshade) is an erect perennial/annual herb or shrub reaching 1 m in height. It has broad, alternate concolorous leaves. It produces white flowers between April and October and dull black to purple globular berries. This species is thought to be native to central and southern Europe. It is recorded in all Australian states in disturbed woodlands, drainage areas and regions of high rainfall (Hussey et al., 2007; Western Australian Herbarium, 2009).

\**Sonchus oleraceus* (ASTERACEAE) (Common Sowthistle) is an erect annual or short-lived perennial herb that grows up to 1.5 m in height. The generally flaccid leaves are slightly prickly or not prickly at all. Yellow flowers are produced from January to December. This species is native to Eurasia and North Africa, and is widespread on roadsides, gardens, market gardens and wasteland in all parts of Western Australia (Hussey et al., 2007; Western Australian Herbarium, 2009).

## 6 CONSERVATION SIGNIFICANCE

The significance of the flora of the project area has been assessed at four spatial scales; national, State, regional and local.

National significance refers to those features of the environment which are recognised under legislation as being of importance to the Australian community. Flora species and TECs listed under the *EPBC Act* are regarded as nationally significant.

State significance refers to those features of the environment that are recognised under State legislation as being of importance to the Western Australian community, in particular, species scheduled / listed as rare flora under the *WC Act*.

Regional significance addresses the representation of species and habitats at a biogeographic regional level. Species or habitat types that are endemic to the Murchison bioregion and whose distributions are limited or unknown are considered regionally significant.

Vegetation and flora species are of local significance when their presence is confined to a specialised habitat that is uncommon in the local area and whose disturbance or removal may lead to localised extinction.

### 6.1 CONSERVATION SIGNIFICANCE OF VEGETATION WITHIN THE STUDY AREA

#### 6.1.1 Vegetation of National Significance

No vegetation communities recognised under the *EPBC Act* were recorded in the Study Area

#### 6.1.2 Vegetation of State Significance

The Priority 1 State-listed PEC “Weld Range vegetation complexes (Banded Ironstone Formations)” occurs in the Study Area. Although not protected by current State legislation, the vegetation within these boundaries is potentially of State significance. The criteria for a Priority 1 listing is;

“Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.”

The total area of each community type mapped by ecologia which lies within the PEC is detailed in Table 6.1. As not all of the area within the PEC lies within the study area, the total area of each community type within the PEC could not be accurately determined. An estimate of the area has been made, based on the assumption that the proportion of each community type that occurs in the areas mapped by ecologia is identical in those areas outside the study area. This assumption is likely to be less correct for types more typical of the surrounding plains, since the majority of the PEC occurs on the BIF ridgeline. Eighty percent of the area within the Study Area of Community types 1 and 2 lies within the PEC and on this basis these community types are considered of conservation significance.

Some of the communities occurring within the PEC, particularly on the lower slopes and adjacent plains, are not uncommon within the broader area and hence may not meet the Priority 1 criteria.

Integration of vegetation mapping of the BIF ranges and surrounding plains throughout the Murchison region is required to further define and evaluate the regional significance of the ecological communities present within the PEC.

**Table 6.1 – Proportion Of Each Vegetation Type Mapped By Ecologia Within The Study Area**

Mapped Vegetation Community	Total Area Within Study Area (ha)	Area Study Area Within PEC (ha)	Proportion of Study Area Within PEC (%)	*Estimated Area Within PEC (ha)
<b>1 and 2:</b> <i>Acacia aneura</i> low woodland over mixed open shrubs	1695	1360	<b>80.2</b>	1821
<b>3a:</b> +/- <i>Corymbia lenziana</i> scattered medium trees over <i>Acacia. ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> sparse tall shrubland over mixed <i>Eremophila</i> spp. open mid shrubland over scattered low shrubs of <i>Ptilotus obovatus</i> over mixed open tussock grassland.	16779	462	2.8	4042
<b>3b:</b> +/- <i>Acacia pruinoarpa</i> scattered trees over <i>A. aneura</i> woodland over <i>A. ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> shrubland over mixed <i>Eremophila</i> spp. closed shrubland over <i>Ptilotus obovatus</i> open low shrubland.	8085	666	8.2	2947
<b>3c:</b> Scattered <i>Eucalyptus</i> mallees / trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Rhagodia eremaea</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> shrubland over <i>Ptilotus obovatus</i> open low shrubland.	1624	0	0.0	24
<b>3d:</b> <i>Acacia aneura</i> and <i>A. cockertoniana</i> open moderate shrubland over <i>Eremophila simulans</i> subsp. <i>simulans</i> and <i>Aluta aspera</i> subsp. <i>hesperia</i> low open shrubland.	476	0	0.0	0
<b>4a:</b> <i>Acacia</i> sp. Weld Range and <i>A. aneura</i> var. <i>microcarpa</i> open tall shrubland over <i>Eremophila macmillaniana</i> and mixed <i>Senna</i> spp. open mid shrubland over <i>Ptilotus obovatus</i> open low shrubland.	8412	3225	38.3	8260
<b>4b:</b> <i>Acacia</i> sp. Weld Range and <i>A. speckii</i> (P3) shrubland over mixed <i>Senna</i> spp. sparse shrubland over <i>Grevillea inconspicua</i> (P4) and <i>Dodonaea amplisemina</i> (P3) open shrubland over <i>Cymbopogon ambiguus</i> sparse tussock grassland.	952	473	49.7	879
<b>5a:</b> <i>Acacia crapedocarpa</i> open tall shrubland over <i>Solanum ashbyae</i> / <i>lasiophyllum</i> and <i>Ptilotus obovatus</i> low shrubland over mixed low tussock grassland.	9324	461	4.9	1894
<b>5b:</b> +/- <i>Grevillea striata</i> low isolated trees over <i>Acacia crapedocarpa</i> and <i>A. aneura</i> tall open shrubland over <i>Scaevola spinescens</i> sparse mid shrubland over <i>Austrostipa elegantissima</i> and <i>Eriachne flaccida</i> low open tussock grassland.	56	0	0.0	0
<b>6a:</b> Scattered <i>Acacia</i> spp. shrubs over mixed <i>Senna</i> spp. open mid shrubland over <i>Ptilotus obovatus</i> sparse shrubland over mixed <i>Maireana</i> spp. chenopod shrubland.	1014	24	2.3	440
<b>6b:</b> Scattered mixed <i>Acacia</i> spp. over <i>Rhagodia eremaea</i> and <i>Scaevola spinescens</i> sparse mid to low shrubland over <i>Ptilotus obovatus</i> , <i>Maireana georgei</i> and <i>Sclerolaena diacantha</i> low chenopod shrubland.	2430	1	0.0	1
<b>6c:</b> <i>Eremophila maculata</i> subsp. <i>brevifolia</i> low open shrubland over <i>Sclerolaena diacantha</i> low chenopod shrubland over <i>Enneapogon cylindricus</i> low tussock grassland.	37	0	0.0	0
<b>7a:</b> <i>Melaleuca stereophloia</i> and <i>Cratystylis subspinescens</i> low shrubland over <i>Tecticornia</i> spp. low samphire shrubland over <i>Frankenia laxiflora</i> low shrubland.	635	0	0.0	1
<b>7b:</b> <i>Eucalyptus carnei</i> and <i>E. trivalva</i> woodland over <i>Cratystylis subspinescens</i> and <i>Muehlenbeckia florulenta</i> low sparse shrubland over mixed low tussock grasses.	14	0	0.0	0

### 6.1.2.1 Vegetation of Regional Significance

Regional conservation significance of the vegetation of the Weld Range has been assessed based upon three sources of information: land systems of the survey area, Beard's vegetation mapping of the Murchison and the DEC's surveys of BIF ranges of the Yilgarn Craton.

### 6.1.2.2 Land Systems Mapping Analysis

Sixteen land systems are represented within the Weld Range Study Area (Curry *et al*, 1994). The area of each land system in WA and the Murchison River Catchment Area are detailed (the Murchison) in Table 6-2. Eleven of the 16 land systems occur within two of SMC's infrastructure footprint options and 12 in the third.

Two land systems occurring within the Study Area are considered of potential conservation significance on the basis of being highly restricted in absolute area (<1% of the total Murchison) and either wholly or largely confined to the Murchison: the Breberle and Weld.

The Breberle land system (11,482 ha) is almost completely confined to the Murchison (97%) with a scattered distribution, the majority of which occurs much further to the west. It occurs in level saline drainage plains adjacent to ephemeral lakes, claypans and areas of swampy drainage with sandy margins. It supports tall acacia chrublands and other fringing shrublands gradating to perennial grasses and halophytes with increasing salinity. Only 4% of transects assessed in the Murchison Catchment Area Rangeland survey were in good condition, with 55% assessed as in poor condition.

This unit is not present within the footprint options for the Project.

The Weld land system (37,235 ha) is wholly confined to the Murchison, almost exclusively at Jack Hills and Weld Range. It occurs on rugged ranges and ridges and supports acacia shrublands. The majority of areas assessing the Murchison Rangeland survey were in good (59%) or fair (36%) condition, attributed to the lack of accessibility of the vegetation to stock.


Approximately 3% of the entire occurrence of the Weld land system occurs within the footprint options for the Project.

**Table 6-2: Land Systems of the Weld Range Study Area.**

Land System	Total Area in WA (ha)	Total Area in the Murchison* (ha)	% Total Area in WA Within Murchison*	% Total Area of Murchison*	% in Good Condition
<b>Breberle</b>	<b>11,482</b>	<b>11,188</b>	<b>97</b>	<b>0.13</b>	<b>4</b>
Cunyu	329,933	290,394	88	1.26	12
Gabanintha	251,455	165,109	66	1.12	22
Jundee	660,224	585,378	89	1.57	16
Kalli	1,115,901	853,590	76	7.10	40
Koonmarra	569,874	543,173	95	6.21	10
Mileura	261,223	206,496	79	1.17	31
Norie	211,177	157,182	74	1.54	31
Sherwood	1,579,691	1,505,851	95	5.63	25

Land System	Total Area in WA (ha)	Total Area in the Murchison* (ha)	% Total Area in WA Within Murchison*	% Total Area of Murchison*	% in Good Condition
Violet	584,096	546,126	93	1.26	25
Waguin	317,146	245,497	77	6	22
<b>Weld</b>	<b>37,235</b>	<b>37,235</b>	<b>100</b>	<b>0.41</b>	<b>59</b>
Wiluna	258,978	252,598	98	1.51	25
Yandil	494,525	465,955	94	3.96	8
Yanganoo	2,019,907	1,967,111	97	14.48	20
Yarrameedie	68,324	44,169	65	0.60	22

\* Murchison defined as the Murchison River Catchment, and area of 88,360 km<sup>2</sup> extending from the Innouendy and Mt Gould stations in the north, to Bullardoo and Wondinong in the south and to Pollele and Muggon in the east and west respectively (Curry *et al*, 1994)

 Indicates land systems which occur with the proposed footprint options of the Project.

### 6.1.2.3 Beard Mapping Analysis

The survey area lies within the Austin Botanical District of Beard's Murchison Region. At a scale of 1:1000000 Beard (1976) mapped seven communities within the Weld Range project area (Figure 4.1). The total area of these units mapped in WA and within the Murchison bioregions is detailed in Table 6-3. Their level of significance based on total extent and degree of regional endemism is as follows:

- Unit; a<sub>1</sub><sup>17</sup> Li, *Acacia aneura* and *Acacia grasbyi* low woodland, is both highly restricted, with a total area in WA of only 3,255 ha, and wholly confined to the Murchison bioregion. It is considered of high regional conservation significance due to its restricted area and regional endemism. A single polygon of this unit has been mapped at the eastern boundary of the Study Area (Figure 4.1), outside the proposed areas of any of the proposed footprints.

During the current survey, this area was mapped as Community 4; *Acacia* sp. Weld Range shrubland over mixed open shrubs. *Acacia grasbyi* did not occur as a dominant species in any community types described in the current survey however *Acacia aneura* is a dominant species in the upper strata of Community 4.

- Unit; a<sub>1</sub><sup>9</sup>Li, *Acacia aneura*, *Acacia ramulosa* and *Acacia linophylla* (now *Acacia ramulosa* var. *linophylla*) low woodland is also relatively restricted (total area of occurrence 94,031 ha) but is not confined to the Murchison bioregion (54%). Due to the relatively small area, both within WA and the Murchison, this unit is regarded as of moderate regional significance. A single polygon of this unit occurs within the Study Area to the north of the Weld Range and portions of it are encompassed in each of the footprint options.

Within the current survey Community 3: *Acacia* spp. shrubland over open mixed shrub species and tussock grasses was mapped in areas corresponding to this unit, predominantly as sub-communities 3a and 3b, both of which have *Acacia aneura* and *A. ramulosa* var. *linophylla* as dominants in the upper strata.

Two other Beard units present within the Study Area are largely confined to the Murchison bioregion but occur across larger areas. These units are considered of some regional significance given their high degree of endemism, but are likely to be less threatened given their broader occurrence:

- Unit  $a_1^8 \text{Sr}k_1^2 \text{Ci}$ , *Acacia aneura* and *Acacia sclerosperma* lightly wooded succulent steppe, with *Atriplex* (saltbush) and *Maireana* (bluebush) species. A total of 199,534 ha is mapped across WA, 93% of which is broadly distributed across the Murchison bioregion. Two polygons of this unit are mapped within the Study Area however only a small proportion lies within the footprint options.

The areas in which this unit occurs within the Study Area were primarily mapped as Community 6, Mixed open chenopod shrubland; and Community 7, Halophytic shrubland. *Acacia sclerosperma* was not dominant in either of these communities in the current survey, but is a widely distributed species in the Study Area. T

- Unit  $a_1^{14} \text{Si}$ , *Acacia aneura* and *Acacia quadrimarginea* scrub. A total of 448,700 ha is mapped across WA, 78% of which is widely distributed within the Murchison bioregion. The tendency of this unit to occur on stony ridges means that it is more likely to occur in area of mineral exploration. Two polygons of this unit occur along the stony ridges and footslopes to the south of the ridgeline, partially overlapping with areas of proposed pits and dumps.

The areas in which this unit occurs within the Study Area were primarily mapped as Community 1, *Acacia aneura* low woodland over mixed open shrubs; and Community 4, *Acacia* sp. Weld Range shrubland over mixed open shrubs. *Acacia quadrimarginea* was not identified from any of the specimens collected during the surveys. However, *Acacia* sp. Weld Range, a recently identified taxon that is morphologically similar to *A. quadrimarginea* is dominant within Community 4.

No other Beard units mapped within the Study Area are considered of regional conservation significance given the much larger areas they encompass and their broader distribution across multiple bioregions.

**Table 6-3: Beard Vegetation Units Within the Weld Range Study Area.**

Vegetation Unit Code	Vegetation Description	Total Area of Unit in WA (ha)	Area of Unit in the Murchison (ha)	% Within Murchison
$a_1^{17} \text{Li}$	<i>Acacia aneura</i> and <i>Acacia grasbyi</i> low woodland.	3255	3255	100
$a_1^9 \text{Li}$	<i>Acacia aneura</i> , <i>Acacia ramulosa</i> and <i>Acacia linophylla</i> (now <i>Acacia ramulosa</i> var. <i>linophylla</i> ) low woodland.	94,031	50,965	54
$a_1^8 \text{Sr}k_1^2 \text{Ci}$	<i>Acacia aneura</i> and <i>Acacia sclerosperma</i> lightly wooded succulent steppe, with <i>Atriplex</i> (saltbush) and <i>Maireana</i> (bluebush) species.	199,534	185,622	93
$a_1^{14} \text{Si}$	<i>Acacia aneura</i> and <i>Acacia quadrimarginea</i> scrub.	448,700	339,907	76
$a_1 \text{Li}$	<i>Acacia aneura</i> low woodland.	24,751,239	12,452,151	50
$a_1 \text{Si}$	<i>Acacia aneura</i> (mulga) scrub.	6,666,951	1,149,610	17



a <sub>9</sub> Si	<i>Acacia ramulosa</i> and <i>Acacia linophylla</i> (now <i>Acacia ramulosa</i> var. <i>linophylla</i> ) scrub.	1,331,779	390,207	29

#### 6.1.2.4 Vegetation of the BIF Ranges of the Yilgarn Craton

Since 2005 the DEC has conducted more than 20 botanical surveys of the BIF ranges of the Yilgarn Craton. The characteristics of vegetation described at 11 of the BIF ranges surveyed by the DEC are summarised in Table 6-4. These 11 ranges are located to the north of Mount Magnet. The vegetation described at ranges south of Mount Magnet tends to diverge increasingly and has been excluded from these comparisons.

When comparing the characteristics of communities, it is important to remember that the studies by the DEC were restricted to the BIF ranges themselves and unlike the current survey did not include significant areas of adjacent plains. Combined multivariate analysis of the 52 DEC Weld quadrats and the 259 ecologia Weld quadrats (the latter including surrounding plains) resulted in a shift in community groupings for the DEC data. Nevertheless the DEC data provides a means of comparing the composition of the BIF Range vegetation communities at a much finer scale regionally. The vegetation descriptions present at each point on the Ranges (e.g. crest, midslope, rocky outcrop, lower slope) are summarised in Appendix N. There are some limitations to this classification, as there is variation between the landforms present at each range, and some variation in the methods of describing vegetation communities in different surveys.

The DEC reported that the *Triodia melvillei* communities present at Jack Hills, Robinson Range and Mount Gould are restricted and of conservation significance. Communities including *T. melvillei* also occur at Joyners Find Hills (Community 2) and Lee Steere Range (Community 4) but have not been described as restricted communities. Isolated populations of *T. melvillei* have been located by ecologia at Weld Range – a very small population on a low hill of the Range and a few populations on the sandy flats to the north of the Range. There has been anecdotal evidence that more populations of this spinifex occur in the northern areas, however, ecologia has also collected *Triodia schinzii* from the flats to the north of the Range.

It appears that *T. melvillei* is at the southern boundary of its distribution on these more northern BIF ranges of the Yilgarn Craton. FloraBase records (October, 2009) indicate that *T. melvillei* has been recorded further south of these four ranges and further survey work might reveal more populations on other high ranges to the south of Weld Range. During a recent survey of SMC's tenements at Jack Hills (ecologia, 2010j) many large populations of *T. melvillei* were located in areas away from Mounts Hale and Matthew and on non-BIF hills. Small, isolated populations of *T. melvillei* were also located at Robinson Range in lower lying areas than the populations recorded on Mount Fraser. In summary it appears that there is further regional comparison of these communities necessary to determine the regional significance of the *T. melvillei* communities.

Three of the 11 ranges listed in the table (Weld Range, Jack Hills and Robinson Ranges with Mount Gould), are thought to have communities endemic to the range (Table 6-4). Two of these ranges; Jack Hills and Robinson Ranges / Mount Gould, have communities thought to be restricted within that range (Government of Western Australia, 2007).

**Table 6-4 – Comparison of Vegetation Communities Described by DEC at BIF Ranges North of Mt. Magnet.**

Banded Ironstone Formation (BIF)	Number of Communities	Community Endemic to Range?	Restricted Distribution within Range?	Source
Weld Range	8	Yes	No	Markey & Dillon, 2008
Jack Hills	6	Yes	Yes	Meissner & Caruso, DRAFT 2008
Robinson Ranges and Mount Gould	7	Yes	Yes	Meissner <i>et al.</i> , DRAFT 2007
Western Narryer Terrane	4	No	No	Meissner & Owen, Draft 2008
Barloweerie and Twin Peaks Greenstone Belts	3	No?	No	Meissner & Wright, DRAFT 2008a
Montague Range Zone of Gum Creek Greenstone Belt	6	No	No	Thompson & Sheehy, Draft 2009a
Lake Mason Zone of Gum Creek Greenstone Belt	6	No	No	Thompson & Sheehy, Draft 2009b
Joyner's Find Hills	6	No	No	Markey & Dillon, Draft 2007a
Lee Steere Range	5	No	No	Thompson & Sheehy, Draft 2009c
Perseverance Greenstone Belt	4	No	No	Meissner & Wright, Draft 2009b
Booylgoo Range	6	Possibly	No	Markey & Dillon, Draft 2007b

Jack Hills is approximately 100 km north, Robinson Range approximately 150 km north-east and Mount Gould approximately 130 km north-west of Weld Range. The vegetation communities described by the DEC at these ranges have some structural similarities with those described at Weld Range but tend to differ in species composition, as described below.

*ecologia* mapped the flat plains of Weld Range as dominated by Community 3, broadly described as *Acacia* spp. shrubland over mixed shrub species and tussock grasses. The dominant *Acacia* species was *Acacia ramulosa* var. *linophylla* and the dominant shrub species was *Eremophila forrestii* subsp. *forrestii*. At Jack Hills the DEC described a fairly species poor community of open woodlands of *A. aneura* cf. var. *aneura* over shrublands of *Eremophila* species dominated by *Eremophila macmillaniana* is described as occurring on outwash plains. No similar community is described by the DEC at Robinson Range/Mount Gould.

*ecologia's* Community 4 appears to be unique to Weld Range when compared with the vegetation of Jack Hills and Robinson Ranges and Mount Gould. The dominant species in this community are *Acacia* sp. Weld Range and *Acacia speckii* (Priority 3) over *Eremophila macmillaniana* shrubs. No similar community has been described on any other range surveyed. Community 4 was recorded predominantly on dolerite substrates across the Weld Range.

The communities occurring on the BIF ridges at Weld Range were dominated by *Acacia aneura* species woodlands and shrublands, along with *Acacia ramulosa* var. *linophylla*, *A. cockertoniana* and

*Acacia* sp. Weld Range tall shrubs and *Eremophila* spp. lower shrubs (Communities 1 and 2 and associated sub-communities). Similar ridges at Jack Hills were dominated by *Acacia* species not recorded at Weld Range such as *Acacia citrinoviridis* and *A. sp. Jack Hills* with *Eremophila margarethae* as the dominant lower shrub species.

The communities recorded by DEC on BIF ridges at Robinson Range and Mount Gould were also dominated by *Acacia aneura* varieties with *A. citrinoviridis* and resemble the vegetation communities recorded by the DEC at Jack Hills rather than those at Weld Range.

Those communities located on the flat saline plains of Weld Range (Communities 5, 6 and 7) were not recorded at Jack Hills or Robinson Range and Mount Gould. However, the majority of the DEC's survey sites at Jack Hills, Robinson Range and Mount Gould were located on BIF ridges and associated landforms. Similar communities may exist in these habitats at these ranges beyond the area of survey.

In summary the regional comparison suggests that Community Types 1, 2 and 4 described in the current survey, although locally widespread, may be endemic to the Weld Range and hence of regional significance.

### 6.1.3 Vegetation of Local Significance.

Table 6-5 details the total area of each community type mapped by *ecologia* within the Study Area. Several community types; 3d, 5b, 6c and 7b, each account for less than 1% of the total area. Community 1 and 2 is a composite of four subtypes which could not be discriminated in aerial photography and hence could not be individually mapped despite segregating as distinct subtypes during multivariate analysis. Since the total area of the composite is 3.29%, it is likely that at least some of the subtypes also encompass less than 1% of the Study Area. These community subtypes are potentially of local significance if species are confined to them and hence are likely to become locally scarce if they are destroyed. Communities 1 and 2, 4b, 6a, 7a and 7b are all locally restricted and support species that appear largely or wholly locally restricted in distribution. Communities 1 and 2 and 4b in particular support Priority taxa that are restricted to this habitat.

**Table 6-5 – Area of Community Types Mapped in the Study Area**

Vegetation Community	Area Mapped in Study Area (ha)	% of Study Area	Species with > 80% Records Locally Restricted To Community Type
1 and 2: <i>Acacia aneura</i> low woodland over mixed open shrubs	1695	3.29	<i>Acacia coolgardiensis</i> subsp. <i>effuse</i> , <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> , <i>Dodonaea pachyneura</i> , <i>Eremophila compacta</i> subsp. <i>fecunda</i> , <i>Hakea recurva</i> subsp. <i>arida</i> , <b><i>Micromyrtus placoides</i></b> , <i>Micromyrtus sulphurea</i> , <i>Olearia plucheacea</i> , <i>Olearia stuartii</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Stenanthemum petraeum</i> , <i>Thryptomene decussata</i>
<b>3a:</b> +/- <i>Corymbia lenziana</i> scattered medium trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> sparse tall shrubland over mixed <i>Eremophila</i> spp. open mid shrubland over scattered low shrubs of <i>Ptilotus obovatus</i> over mixed open tussock grassland.	16779	32.56	No species
<b>3b:</b> +/- <i>Acacia pruinocarpa</i> scattered trees over <i>A. aneura</i> woodland over <i>A. ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> shrubland over mixed <i>Eremophila</i> spp. closed shrubland over <i>Ptilotus obovatus</i> open low shrubland.	8085	15.69	<i>Acacia cuthbertsonii</i> subsp. <i>cuthbertsonii</i> , <i>Sida fibulifera</i> , <i>Sida</i> sp. <i>Golden calyces pubescent</i> (G.J. Leach 1966)
<b>3c:</b> Scattered <i>Eucalyptus mallees</i> / trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Rhagodia eremaea</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> shrubland over <i>Ptilotus obovatus</i> open low shrubland.	1624	3.15	<i>Corymbia lenziana</i> , <i>Eucalyptus socialis</i> subsp. <i>eucentrica</i>
<b>3d:</b> <i>Acacia aneura</i> and <i>A. cockertoniana</i> open moderate shrubland over <i>Eremophila simulans</i> subsp. <i>simulans</i> and <i>Aluta aspera</i> subsp. <i>hesperia</i> low open shrubland.	476	0.92	No species
<b>4a:</b> <i>Acacia</i> sp. Weld Range and <i>A. aneura</i> var. <i>microcarpa</i> open tall shrubland over <i>Eremophila macmillaniana</i> and mixed <i>Senna</i> spp. open mid shrubland over <i>Ptilotus obovatus</i> open low shrubland.	8412	16.32	<b><i>Ptilotus luteolus</i></b>
<b>4b:</b> <i>Acacia</i> sp. Weld Range and <i>A. speckii</i> (P3) shrubland over mixed <i>Senna</i> spp. sparse shrubland over <i>Grevillea inconspicua</i> (P4) and <i>Dodonaea amphisemina</i> (P3) open shrubland over <i>Cymbopogon ambiguus</i> sparse tussock grassland.	952	1.85	<i>Chorizema genistoides</i> , <b><i>Stenanthemum patens</i></b>
<b>5a:</b> <i>Acacia craspedocarpa</i> open tall shrubland over <i>Solanum ashbyae</i> / <i>lasiophyllum</i> and <i>Ptilotus obovatus</i> low shrubland over mixed low tussock grassland.	9324	18.09	<i>Eragrostis australasica</i> , <i>Eucalyptus lucasii</i> , <i>Eremophila latrobei</i> subsp. <i>filiformis</i> , <i>Eremophila galeata</i>

Vegetation Community	Area Mapped in Study Area (ha)	% of Study Area	Species with > 80% Records Locally Restricted To Community Type
<b>5b:</b> +/- <i>Grevillea striata</i> low isolated trees over <i>Acacia craspedocarpa</i> and <i>A. aneura</i> tall open shrubland over <i>Scaevola spinescens</i> sparse mid shrubland over <i>Austrostipa elegantissima</i> and <i>Eriachne flaccida</i> low open tussock grassland.	56	0.11	No species
<b>6a:</b> Scattered <i>Acacia</i> spp. shrubs over mixed <i>Senna</i> spp. open mid shrubland over <i>Ptilotus obovatus</i> sparse shrubland over mixed <i>Maireana</i> spp. chenopod shrubland.	1014	1.97	<i>Maireana carnos</i> , <i>Maireana thesioides</i>
<b>6b:</b> Scattered mixed <i>Acacia</i> spp. over <i>Rhagodia eremaea</i> and <i>Scaevola spinescens</i> sparse mid to low shrubland over <i>Ptilotus obovatus</i> , <i>Maireana georgei</i> and <i>Sclerolaena diacantha</i> low chenopod shrubland.	2430	4.72	<i>Eucalyptus striatocalyx</i> subsp. <i>striatocalyx</i> , <i>Exocarpos aphyllus</i>
<b>6c:</b> <i>Eremophila maculata</i> subsp. <i>brevifolia</i> low open shrubland over <i>Sclerolaena diacantha</i> low chenopod shrubland over <i>Enneapogon cylindricus</i> low tussock grassland.	37	0.07	No species
<b>7a:</b> <i>Melaleuca stereophloia</i> and <i>Cratystylis subspinescens</i> low shrubland over <i>Tecticornia</i> spp. low samphire shrubland over <i>Frankenia laxiflora</i> low shrubland.	635	1.23	<i>Atriplex bunburyana</i> , <i>Atriplex nummularia</i> , <i>Atriplex vesicaria</i> , <i>Eremophila glabra</i> subsp. <i>glabra</i> , <i>Eremophila pantonii</i> , <i>Frankenia laxiflora</i> , <i>Halosarcia doleiformis</i> , <i>Halosarcia indica</i> subsp. <i>leiostachya</i> , <i>Muehlenbeckia florulenta</i>
<b>7b:</b> <i>Eucalyptus carnei</i> and <i>E. trivalva</i> woodland over <i>Cratystylis subspinescens</i> and <i>Muehlenbeckia florulenta</i> low sparse shrubland over mixed low tussock grasses.	14	0.03	<i>Halosarcia indica</i> subsp. <i>leiostachya</i>
<b>Total</b>	<b>51533</b>	<b>100.0</b>	

Species in **bold** are Priority listed.

## 6.2 CONSERVATION SIGNIFICANCE OF FLORA WITHIN THE STUDY AREA

### 6.2.1 Flora of National Significance.

No taxa listed under the *EPBC Act* and hence of national significance have been recorded within the Study Area.

### 6.2.2 Flora of State Significance.

No taxa listed under the as Declared Rare Flora have been recorded within the Study Area. Twenty five Priority Flora taxa were recorded by *ecologia* during the current survey within the Study Area. An additional two Priority taxa were recorded in the Study Area by other sources as detailed in Table 5-3, making a total of 27 conservation significant flora taxa recorded in the Study Area.

The total abundance of each species was estimated by examining the collections notes of records from the DEC, combined with the data from surveys by *ecologia* for which accurate plant counts were available. DEC records vary considerably in the amount of detail available, ranging from accurate counts; to broad abundance descriptions; to no detail. Where multiple records at the same location were available, the highest numeric estimate was applied. Where descriptions of abundance only were available, numbers were inferred according to the assumptions detailed in Table 6-6. Where no estimate of abundance was available, it was assumed only one plant was present. The latter assumption is likely to be an underestimate in many instances, and hence the final estimates of total abundance of each species are likely to be very conservative.

The number of plants present at each location was counted during the *ecologia* transect-based surveys, however in most instances estimates of percentage cover only were available for collections from quadrats. The number of plants assumed from these cover estimates is detailed below.

**Table 6-6 – Number of Plants Assumed for Records Where Only Descriptions or % Cover Available**

Abundance Description or Percentage Cover	No. of Plants Assumed
no indication	1
very rare	1
several	3
infrequent, uncommon, scarce, one small group, a few scattered	5
occasional, moderately common, locally frequent, very localised	10
common here, locally common, locally frequent, locally abundant	20
frequent, common, plentiful, abundant, dominant	50
>2% cover	5
2-10% cover	10
10-30% cover	20

Table 6-7 summarises the known distribution and abundance of these species from all sources, including DEC records. The numbers of loci (clusters of plants separated by more than 500m from each other) are detailed. It can be seen that that the records within the Study Area represent more than 50% of all locations recorded to date for 8 species, and more than 50% of all known plants for 12 species. However it is likely that proportion of both locations and abundance within the Study Area is likely to have been significantly overestimated due to the much greater intensity of searching for these taxa which has occurred during threatened flora transects. The numbers of plants outside the survey area is also likely to have been underestimated because many previous records lack any detail of abundance, and hence a single plant has been recorded at these locations.

**Table 6-7 – Conservation Significant Flora Recorded Within the Study Area (All Data Sources)**

Rank	Species	Total No. ♦Loci	Estimate of Total No. Plants	No. ♦Loci Recorded Within the Study Area	% All ♦Loci Within Study Area	No Plants Recorded Within Study Area	% All Estimated Plants Within Study Area
P1	<i>Beyeria lapidicola</i>	12	80	8	66.7	53	66.3
P1	<i>Eremophila rhexos</i>	3	58	1	33.3	3	5.2
P1	<i>Euphorbia sarcostemmoides</i>	4	12	1	25.0	1	8.3
P1	<i>Goodenia lyrata</i>	10	35	3	30.0	20	57.1
P1	<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)	10	61	8	80.0	50	82.0
P1	<i>Stenanthemum patens</i>	8	186	3	37.5	34	18.3
P3	<i>Acacia burrowsiana</i>	14	4354	1	7.1	9	0.2
P3	<i>Acacia speckii</i>	97	1098	81	83.5	853	77.7
P3	<i>Calytrix erosipetala</i>	35	2053	1	2.9	20	1.0
P3	<i>Dodonaea amplisemina</i>	67	790	47	70.1	603	76.3
P3	<i>Eremophila arachnoides</i> <i>Chinnock subsp. arachnoides</i>	11	205	2	18.2	30	14.6
P3	<i>Grevillea stenostachya</i>	91	971	66	72.5	918	94.5
P3	<i>Hemigenia tysonii</i>	80	6616	67	83.8	6374	96.3
P3	<i>Homalocalyx echinulatus</i>	30	1050	12	40.0	845	80.5
P3	<i>Micromyrtus placoides</i>	45	2160	43	95.6	2126	98.4
P3	<i>Mirbelia ?stipitata</i>	4	7	1	25.0	5	71.4
P3	<i>Phyllanthus baeckeoides</i>	15	1309	1	6.7	5	0.4
P3	<i>Prostanthera ferricola</i>	14	672	1	7.1	14	2.1
P3	<i>Prostanthera petrophila</i>	95	2141	83	87.4	2084	97.3
P3	<i>Ptilotus beardii</i>	38	2804	11	28.9	1906	68.0

Rank	Species	Total No. ♦Loci	Estimate of Total No. Plants	No. ♦Loci Recorded Within the Study Area	% All ♦Loci Within Study Area	No Plants Recorded Within Study Area	% All Estimated Plants Within Study Area
P3	<i>Ptilotus luteolus</i>	15	533	5	33.3	68	12.8
P3	<i>Tecticornia cymbiformis</i>	7	69	1	14.3	14	20.3
P3	<i>Verticordia jamiesonii</i>	22	483	1	4.5	1	0.2
P4	<i>Baeckea sp. Melita Station</i>	57	2626	14	24.6	666	25.4
P4	<i>Goodenia berringbinensis</i>	18	33546	1	5.6	30	0.1
P4	<i>Grevillea inconspicua</i>	62	2320	16	25.8	264	11.4



Taxa with greater than 50% of loci within the study area

Taxa with greater than 50% of estimated plants within the study area



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## 7 ENVIRONMENTAL IMPACTS OF THE PROJECT

Impacts associated with construction may include:

- Clearing of vegetation leading to loss or fragmentation of habitats;
- Increased weed propagation;
- Direct loss of populations of plant taxa of conservation significance resulting in reduced viability of taxa regionally;
- Impact to the Weld Range PEC;
- Erosion;
- Changes to surface water flows with resultant deleterious effect on vegetation particularly adapted to surface water harvesting such as Mulga;
- Increased potential for fires;
- Alteration to groundwater levels, with resultant damage to phreatophytic vegetation;
- Increased dust levels, with resultant plant deaths;
- Increased salinity of soils if saline water is used for dust suppression.

### 7.1 DIRECT LOSS OF VEGETATION AND FLORA

The most substantial environmental impacts arising from the proposed works at Weld Range will result from the clearing of native vegetation. Approximately 3,533 ha, including a 100 m buffer will be cleared or disturbed during construction, as detailed in Table 7.1.

**Table 7.1 – Proposed Infrastructure Clearance Areas**

<b>Weld Range Project</b>	<b>Approximate Area (ha)</b>
Beebyn Pit and Waste Dumps	1097
Madoonga Pit and Waste Dumps	714.5
Central Processing Facility – Plant and Infrastructure	351
Evaporation Pond	600
Tailings Dam	46.5
Accommodation Village	20
Airstrip	55
Access Tracks and Haul Roads	549
<b>Total</b>	<b>3,533 ha</b>

Clearing of significant areas of vegetation is an unavoidable impact from the development of a mine and associated infrastructure. However the impact can be minimised by considering the distribution

of vegetation and flora species of conservation significance during the design stage and locating infrastructure to avoid areas of higher significance whenever possible.

### 7.1.1 Impact to Vegetation from Clearing

Tables 7.2, 7.3 and 7.4 show the areas of vegetation within each land system, Beard vegetation unit and ecologia community type respectively that would be cleared under each of three proposed infrastructure options.

At the land system level, the greatest impact, irrespective of the infrastructure option selected, is to the Weld land system (3.1%) and the next greatest impact is to the Yarrameedie land system (Table 7-2), with 2.4%, 1.0% and 1.6% of the total area within the Murchison from Base Case, Option 1 and 2 respectively. Impacts to the remaining land system are less than 0.5%. At this scale the impacts of clearing are not considered significant.

At the level of resolution (1:1,000,000) of Beard's vegetation mapping the greatest impact is to Beard's *Acacia aneura*, *Acacia ramulosa* and *Acacia linophylla* (now *Acacia ramulosa* var. *linophylla*) low woodland ( $a_1^9$  Li) community (Table 7-3). This community is mapped over a relatively small area in Western Australia (94,031 ha), 54% of which is within the Murchison region, and hence could be considered relatively vulnerable. However the potential impacts predicted from each option are low. A loss of 1.4%, 1.1% or 1.7% of the total occurrence within the Murchison would result from the Base Case, Option 1 and Option 2 infrastructure options respectively.

With the exception of Unit  $a_1^{17}$  Li, which is not directly impacted by any of the infrastructure options, the remaining Beard units occurring in the project area occur over large areas of the Murchison and in some instances Western Australia, hence the impact from the proposed infrastructure clearing is minimal (less than 0.2%) irrespective of the footprint option selected.

At the finer scale of resolution of vegetation communities of the current survey, the greatest estimated potential impact to the vegetation communities is to Community 5b (77% by each option). The impact is results from clearing of the Madoonga waste dump which is common to all. Only one small area (56 ha) of this community type was identified elsewhere, close to Madoonga homestead. Much of this area is degraded sue to historical use as a dump for station refuse and grazing.

The estimated impact to the locally restricted Sub-community (7b) of the halophytic shrubland community 7 is also relatively high (39%) for all infrastructure footprint options. This community is considered locally significant, as it occurs on a seasonally inundated salt pan which provides a refuge to threatened fauna species. This community will be impacted by the proposed Madoonga waste dump. This community extends to the north beyond the boundaries of the Study Area however even allowing for this larger area, it remains locally restricted.

Potential impacts to Community 6a, which encompasses 1014 ha on the saline flats and drainage areas of the Study Area, are 34.2%, 30.3% and 28.9% from Option 2, Base Case and footprint Option 1 respectively. The Priority three species *Ptilotus beardii* was commonly within this community.

Communities 1 and 2 have been identified as of state conservation significance due to their restricted occurrence outside the area identified as a PEC and of local significance due to the high number of taxa which were locally restricted to them. These communities predominantly occur on BIF ridges and outcrops and cover approximately 1, 695 ha of the area mapped. The Priority 3 species *Prostanthera petrophila* commonly occurred in this community as did the geographically restricted

taxon *Acacia* sp. Weld Range. Approximately 13.8% would be impacted by all three of the potential infrastructure footprint options. This community will be impacted by the proposed Madoonga and Beebyn pits and associated infrastructure such as tracks and crushing facilities and by the central processing plant under the Base Case.

The impacts to Community 4, which is also considered to be locally and possibly regionally significant, due to the high numbers of conservation significant flora recorded within it, is low. Community 4a was mapped over a large area of the lease (8,412 ha) and the calculated impacts to the community from the three footprint options are 3.5% from the Base Case footprint and 3.3% from footprint Options 1 and 2. The Priority 3 taxa *Acacia speckii* and *Dodonaea amplisemina* along with the Priority 1 taxon *Ptilotus astrolasius* var. *luteolus* were commonly recorded within this sub-community. The undescribed taxa *Acacia* sp. nov. (aff. *Kochii*) and *Hemigenia* sp. nov. (aff. *exilis*) were also recorded within this sub-community. Community 4b was mapped over a smaller area (952 ha) of which 3.1% will be impacted by the Base Case Option and 2.0% by footprint Options 1 and 2.

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**Table 7-2 Estimated Impacts of Clearing to Land Systems within the Study Area**

Land System	Total Area of Land System in WA (ha)	Total area in Murchison (ha)	BFS Base Case			BFS Option 1			BFS Option 2		
			Area (ha)	Potential Impact to Area Within WA (%)	Potential Impact to Area Within Murchison (%)	Area (ha)	Potential Impact to Area Within WA (%)	Potential Impact to Area Within Murchison (%)	Area (ha)	Potential Impact to Area Within WA (%)	Potential Impact to Area Within Murchison (%)
Breberle	11,482	11,188	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000
Cunyu	329,933	290,394	16	0.005	0.006	16	0.005	0.005	16	0.005	0.005
Gabanintha	251,455	165,109	165	0.066	0.100	29	0.012	0.018	29	0.012	0.018
Jundee	660,224	585,378	153	0.023	0.026	185	0.028	0.032	185	0.028	0.032
Kalli	1,115,901	853,590	605	0.054	0.071	1298	0.116	0.152	891	0.080	0.104
Koonmarra	569,874	543,173	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000
Mileura	261,223	206,496	141	0.054	0.068	141	0.054	0.068	141	0.054	0.068
Norie	211,177	157,182	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000
Sherwood	1,579,691	1,505,851	367	0.023	0.024	280	0.018	0.019	432	0.027	0.029
Violet	584,096	546,126	669	0.115	0.123	671	0.115	0.123	671	0.115	0.123
Waguin	317,146	245,497	0	0.000	0.000	0	0.000	0.000	163	0.052	0.067
Weld	37,235	37,235	1153	3.098	3.098	1160	3.116	3.116	1160	3.116	3.116
Wiluna	258,978	252,598	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000
Yandil	494,525	465,955	7	0.001	0.001	7	0.001	0.001	7	0.001	0.001
Yanganoo	2,019,907	1,967,111	165	0.008	0.008	165	0.008	0.008	165	0.008	0.008
Yarrameedie	68,324	44,169	1078	1.577	2.440	714	1.046	1.617	714	1.046	1.617

**Table 7-3 Estimated Impacts to Beard Vegetation Communities of Infrastructure Footprint Options within the Study Area**

Beard Unit	Vegetation Description	Area in WA (ha)	Area in Murchison Bioregion (ha)	BFS Base Case			BFS Option 1			BFS Option 2		
				Area in BFS Base Case (ha)	Impact to Area Within WA (%)	Impact to Area Within Murch. (%)	Area in BFS Opt 1 (ha)	Impact to Area Within WA (%)	Impact to Area Within Murch. (%)	Area in BFS Opt 2 (ha)	Impact to Area Within WA (%)	Impact to Area Within Murch. (%)
a <sub>1</sub> <sup>14</sup> Si	<i>Acacia aneura</i> and <i>Acacia quadrimarginea</i> scrub.	448,700	339,907	553	0.123	0.163	564	0.126	0.166	564	0.126	0.166
a <sub>1</sub> <sup>8</sup> Srk <sub>1</sub> <sup>2</sup> Ci	<i>Acacia aneura</i> and <i>Acacia sclerosperma</i> lightly wooded succulent steppe, with <i>Atriplex</i> (saltbush) and <i>Maireana</i> (bluebush) species.	199,534	185,622	229	0.115	0.123	167	0.084	0.090	167	0.084	0.090
a <sub>1</sub> <sup>9</sup> Li	<i>Acacia aneura</i> , <i>Acacia ramulosa</i> and <i>Acacia linophylla</i> (now <i>Acacia ramulosa</i> var. <i>linophylla</i> ) low woodland.	94,031	50,965	729	0.775	1.430	582	0.619	1.141	881	0.937	1.729
a <sub>1</sub> Li	<i>Acacia aneura</i> low woodland.	24,751,239	12,452,151	2837	0.011	0.023	2856	0.012	0.023	2882	0.012	0.023
a <sub>1</sub> Si	<i>Acacia aneura</i> (mulga) scrub.	6,666,951	1,149,610	153	0.002	0.013	1	0.000	0.000	82	0.001	0.007
a <sub>9</sub> Si	<i>Acacia ramulosa</i> and <i>Acacia linophylla</i> (now <i>Acacia ramulosa</i> var. <i>linophylla</i> ) scrub.	1,331,779	390,207	19	0.001	0.005	498	0.037	0.128	0	0	0
a <sub>1</sub> <sup>17</sup> Li	<i>Acacia aneura</i> and <i>Acacia grasbyi</i> low woodland.	3255	3255	0	0.000	0.000	0	0.000	0.000	0	0.000	0.000

**Table 7-4 Estimated Impacts to ecologia Community Types within the Study Area of Infrastructure Footprint Options.**

Mapped Vegetation Community	Total Area Within Study Area (ha)	BFS Base Case		BFS Option 1		BFS Option 2	
		Area Impacted (ha)	% Within Study Area	Area Impacted (ha)	% Within Study Area	Area Impacted (ha)	% Within Study Area
1 and 2: <i>Acacia aneura</i> low woodland over mixed open shrubs	1695	236	13.93	234	13.82	234	13.82
<b>3a:</b> +/- <i>Corymbia lenziana</i> scattered medium trees over <i>Acacia. ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> sparse tall shrubland over mixed <i>Eremophila</i> spp. open mid shrubland over scattered low shrubs of <i>Ptilotus obovatus</i> over mixed open tussock grassland.	16779	1278	7.62	1626	9.69	1362	8.12
<b>3b:</b> +/- <i>Acacia pruinocarpa</i> scattered trees over <i>A. aneura</i> woodland over <i>A. ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> shrubland over mixed <i>Eremophila</i> spp. closed shrubland over <i>Ptilotus obovatus</i> open low shrubland.	8085	1465	18.12	1185	14.66	1597	19.75
<b>3c:</b> Scattered <i>Eucalyptus</i> mallees / trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Rhagodia eremaea</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> shrubland over <i>Ptilotus obovatus</i> open low shrubland.	1624	175	10.78	35	2.17	17	1.03
<b>3d:</b> <i>Acacia aneura</i> and <i>A. cockertoniana</i> open moderate shrubland over <i>Eremophila simulans</i> subsp. <i>simulans</i> and <i>Aluta aspera</i> subsp. <i>hesperia</i> low open shrubland.	476	91	19.14	0	0.00	0	0.00
<b>4a:</b> <i>Acacia</i> sp. Weld Range and <i>A. aneura</i> var. <i>microcarpa</i> open tall shrubland over <i>Eremophila macmillaniana</i> and mixed <i>Senna</i> spp. open mid shrubland over <i>Ptilotus obovatus</i> open low shrubland.	8412	297	3.53	277	3.29	277	3.29
<b>4b:</b> <i>Acacia</i> sp. Weld Range and <i>A. speckii</i> (P3) shrubland over mixed <i>Senna</i> spp. sparse shrubland over <i>Grevillea inconspicua</i> (P4) and <i>Dodonaea amplisemina</i> (P3) open shrubland over <i>Cymbopogon ambiguus</i> sparse tussock grassland.	952	32	3.33	19	1.99	19	1.99



Mapped Vegetation Community	Total Area Within Study Area (ha)	BFS Base Case		BFS Option 1		BFS Option 2	
		Area Impacted (ha)	% Within Study Area	Area Impacted (ha)	% Within Study Area	Area Impacted (ha)	% Within Study Area
<b>5a:</b> <i>Acacia craspedocarpa</i> open tall shrubland over <i>Solanum ashbyae</i> / <i>lasiophyllum</i> and <i>Ptilotus obovatus</i> low shrubland over mixed low tussock grassland.	9324	478	5.12	406	4.35	551	5.91
<b>5b:</b> +/- <i>Grevillea striata</i> low isolated trees over <i>Acacia craspedocarpa</i> and <i>A. aneura</i> tall open shrubland over <i>Scaevola spinescens</i> sparse mid shrubland over <i>Austrostipa elegantissima</i> and <i>Eriachne flaccida</i> low open tussock grassland.	56	43	76.66	43	76.66	43	76.66
<b>6a:</b> Scattered <i>Acacia</i> spp. shrubs over mixed <i>Senna</i> spp. open mid shrubland over <i>Ptilotus obovatus</i> sparse shrubland over mixed <i>Maireana</i> spp. chenopod shrubland.	1014	307	30.30	293	28.93	347	34.21
<b>6b:</b> Scattered mixed <i>Acacia</i> spp. over <i>Rhagodia eremaea</i> and <i>Scaevola spinescens</i> sparse mid to low shrubland over <i>Ptilotus obovatus</i> , <i>Maireana georgei</i> and <i>Sclerolaena diacantha</i> low chenopod shrubland.	2430	35	1.42	466	19.20	45	1.85
<b>6c:</b> <i>Eremophila maculata</i> subsp. <i>brevifolia</i> low open shrubland over <i>Sclerolaena diacantha</i> low chenopod shrubland over <i>Enneapogon cylindricus</i> low tussock grassland.	37	0	0.00	0	0.00	0	0.00
<b>7a:</b> <i>Melaleuca stereophloia</i> and <i>Cratystylis subspinescens</i> low shrubland over <i>Tecticornia</i> spp. low samphire shrubland over <i>Frankenia laxiflora</i> low shrubland.	635	41	6.41	41	6.41	41	6.41
<b>7b:</b> <i>Eucalyptus carnei</i> and <i>E. trivalva</i> woodland over <i>Cratystylis subspinescens</i> and <i>Muehlenbeckia florulenta</i> low sparse shrubland over mixed low tussock grasses.	14	5	38.82	5	38.82	5	38.82

### 7.1.2 Clearing Impacts to the PEC

Using the DEC's currently defined PEC boundary the overall impact to the vegetation of the PEC (from each of the infrastructure options) has been estimated (Table 7.5).

**Table 7.5 – Overall Impact to the Vegetation of the PEC**

Area of PEC (ha)	Infrastructure Option	Area of PEC to be Impacted (ha)	Impact to PEC (%)
20,311	Base Case	1,660	8.17
	Option 1	1,623	7.99
	Option 2	1,623	7.99

The impact to the vegetation of the PEC as a whole is relatively low (less than 10%), as much of the proposed infrastructure occurs outside the PEC boundary (*ecologia*, 2009d).

The area of each community type mapped by *ecologia* within the PEC within each of the proposed infrastructure options is detailed in Table 7.6. Impact to Communities 1 and 2, identified as of conservation significance due to their restricted occurrence outside the Study Area, is 12.5% irrespective of which option is considered. This impact is considered the most significant by virtue of this restricted distribution.

A relatively high proportion (45%) of the area of Community sub-type 3c within the PEC will be impacted by all options. However this sub-type is much more abundant within the study area outside the PEC boundaries and is therefore not considered significant.

The second highest impact would be to Sub-community 6a where 20.5% would be affected by the Base Case option and 19.2% by Options 1 and 2. This community occurs on the seasonally inundated washout plains and saline drainage systems of the PEC. Again this percentage impact reflects the relatively small area of this community occurs within the current PEC boundary and a larger area has been mapped in the greater Project area.

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**Table 7.6 – Estimated Impact from the Three Infrastructure Options to Vegetations Communities of the Weld Range PEC.**

Mapped Vegetation Community	Total Area Within Study Area (ha)	*Estimated Area Within PEC (ha)	Area Within Base Case Footprint (ha)	% Area within PEC	Area within Option 1 Footprint (ha)	% Area within PEC	Area Within Option 2 Footprint (ha)	% Area within PEC
<b>1 and 2:</b> <i>Acacia aneura</i> low woodland over mixed open shrubs	1695	1821	227	12.5	228	12.5	228	12.5
<b>3a:</b> +/- <i>Corymbia lenziana</i> scattered medium trees over <i>Acacia. ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> sparse tall shrubland over mixed <i>Eremophila</i> spp. open mid shrubland over scattered low shrubs of <i>Ptilotus obovatus</i> over mixed open tussock grassland.	16779	4042	512	12.7	507	12.5	507	12.5
<b>3b:</b> +/- <i>Acacia pruinoscarpa</i> scattered trees over <i>A. aneura</i> woodland over <i>A. ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> shrubland over mixed <i>Eremophila</i> spp. closed shrubland over <i>Ptilotus obovatus</i> open low shrubland.	8085	2947	538	18.3	530	18.0	530	18.0
<b>3c:</b> Scattered <i>Eucalyptus mallees</i> / trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Rhagodia eremaea</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> shrubland over <i>Ptilotus obovatus</i> open low shrubland.	1624	24	11	45.8	11	45.8	11	45.8
<b>3d:</b> <i>Acacia aneura</i> and <i>A. cockertoniana</i> open moderate shrubland over <i>Eremophila simulans</i> subsp. <i>simulans</i> and <i>Aluta aspera</i> subsp. <i>hesperia</i> low open shrubland.	476	0	0	0.0	0	0.0	0	0.0
<b>4a:</b> <i>Acacia</i> sp. Weld Range and <i>A. aneura</i> var. <i>microcarpa</i> open tall shrubland over <i>Eremophila macmillaniana</i> and mixed <i>Senna</i> spp. open mid shrubland over <i>Ptilotus obovatus</i> open low shrubland.	8412	8260	194	2.3	182	2.2	182	2.2
<b>4b:</b> <i>Acacia</i> sp. Weld Range and <i>A. speckii</i> (P3) shrubland over mixed <i>Senna</i> spp. sparse shrubland over <i>Grevillea inconspicua</i> (P4) and <i>Dodonaea amplisemina</i> (P3) open shrubland over <i>Cymbopogon ambiguus</i> sparse tussock grassland.	952	879	16	1.8	11	1.3	11	1.3
<b>5a:</b> <i>Acacia craspedocarpa</i> open tall shrubland over <i>Solanum ashbyae</i> / <i>lasiophyllum</i> and <i>Ptilotus obovatus</i> low shrubland over mixed low tussock grassland.	9324	1894	71	3.7	71	3.7	71	3.7
<b>5b:</b> +/- <i>Grevillea striata</i> low isolated trees over <i>Acacia craspedocarpa</i> and <i>A. aneura</i> tall open shrubland over <i>Scaevola spinescens</i> sparse mid shrubland over <i>Austrostipa elegantissima</i> and <i>Eriachne flaccida</i> low open tussock grassland.	56	0	0	0.0	0	0.0	0	0.0

Mapped Vegetation Community	Total Area Within Study Area (ha)	*Estimated Area Within PEC (ha)	Area Within Base Case Footprint (ha)	% Area within PEC	Area within Option 1 Footprint (ha)	% Area within PEC	Area Within Option 2 Footprint (ha)	% Area within PEC
<b>6a:</b> Scattered <i>Acacia</i> spp. shrubs over mixed <i>Senna</i> spp. open mid shrubland over <i>Ptilotus obovatus</i> sparse shrubland over mixed <i>Maireana</i> spp. chenopod shrubland.	1014	440	90	20.5	85	19.3	85	19.3
<b>6b:</b> Scattered mixed <i>Acacia</i> spp. over <i>Rhagodia eremaea</i> and <i>Scaevola spinescens</i> sparse mid to low shrubland over <i>Ptilotus obovatus</i> , <i>Maireana georgei</i> and <i>Sclerolaena diacantha</i> low chenopod shrubland.	2430	1	0	0.0	0	0.0	0	0.0
<b>6c:</b> <i>Eremophila maculata</i> subsp. <i>brevifolia</i> low open shrubland over <i>Sclerolaena diacantha</i> low chenopod shrubland over <i>Enneapogon cylindricus</i> low tussock grassland.	37	0	0	0.0	0	0.0	0	0.0
<b>7a:</b> <i>Melaleuca stereophloia</i> and <i>Cratystylis subspinescens</i> low shrubland over <i>Tecticornia</i> spp. low samphire shrubland over <i>Frankenia laxiflora</i> low shrubland.	635	1	0	0.0	0	0.0	0	0.0
<b>7b:</b> <i>Eucalyptus carnei</i> and <i>E. trivalva</i> woodland over <i>Cratystylis subspinescens</i> and <i>Muehlenbeckia florulenta</i> low sparse shrubland over mixed low tussock grasses.	14	0	0	0.0	0	0.0	0	0.0

Area mapped in PEC = area of each vegetation community mapped within the boundary of the PEC plus a fractional sum for the unmapped areas. The fractional sum equals the proportion of each mapped vegetation community in the mapped area multiplied by the area of the PEC that has not been mapped.

### 7.1.3 Impact to Priority Flora from Clearing

The estimated numbers of Priority taxa and the number of loci (defined to be the number of records of a taxon at least 500 metres distant from all other records) which are located within the clearance footprint for each option are detailed in Table 7.7. The distribution of each Priority and Species of Interest taxon relative to the infrastructure option is illustrated in Figures 7.1 to 7.29. Although a relatively high proportion of all records lie within the study area, the impact to most taxa due to the Option 1, the preferred option, is relatively low.

The taxon which would be most affected by Option 1, the preferred option, is *Micromyrtus placoides*, followed by *Beyeria lapidicola* which will have 44.4% and 41.7% respectively of all locations impacted. *Eremophila rhegos* and *Goodenia lyrata* will also be impacted by 33% and 30% respectively. The impacts of Option 2 are identical for these species, as all impacted locations lie within the pits and dumps which are common to both. The Base Case option would have significantly more impact, with 80% of all known locations of *Homalocalyx echinulatus* impacted, and *Beyeria lapidicola*, *Eremophila rhegos*, *Goodenia lyrata*, *Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94), *Hemigenia tysonii* and *Micromyrtus placoides* also impacted by between 30 and 41%.

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**Table 7.7 – Estimated Impacts to Priority Flora within the Study Area of Infrastructure Footprint Options**

Taxon	Total No Locations separated by >500 m	Estimated Total No. Plants	BFS Base Case				BFS Option 1				BFS Option 2			
			Total No Loci separated by >500 m	% Total	Estimated Total No. Plants	% Total	Total No Loci separated by >500 m	% Total	Estimated Total No. Plants	% Total	Total No Loci separated by >500 m	% Total	Estimated Total No. Plants	% Total
<i>Beyeria lapidicola</i> (P1)	12	80	5	41.7	19	23.8	5	41.7	19	23.8	5	41.7	19	23.8
<i>Eremophila rhegos</i> (P1)	3	58	1	33.3	3	5.2	1	33.3	3	5.2	1	33.3	3	5.2
<i>Euphorbia sarcostemmoides</i> (P1)	4	12	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
<i>Goodenia lyrata</i> (P1)	10	35	3	30.0	25	71.4	3	30.0	25	71.4	3	30.0	25	71.4
<i>Sauropus sp. Woolgorong (M. Officer s.n. 10/8/94)</i> (P1)	10	61	4	40.0	30	49.2	1	10.0	1	1.6	1	10.0	1	1.6
<i>Stenanthemum patens</i> (P1)	8	186	1	12.5	20	10.8	1	12.5	20	10.8	1	12.5	20	10.8
<i>Acacia burrowsiana</i> (P3)	14	4354	0	0.0	0	0.0	1	7.1	9	0.2	1	7.1	9	0.2
<i>Acacia speckii</i> (P3)	97	1098	25	25.8	326	29.7	18	18.6	200	18.2	18	18.6	200	18.2
<i>Calytrix erosipetala</i> (P3)	35	2053	1	2.9	20	1.0	1	2.9	20	1.0	1	2.9	20	1.0
<i>Dodonaea amplisemina</i>	67	790	11	16.4	323	40.9	12	17.9	183	23.2	12	17.9	183	23.2
<i>Eremophila arachnoides</i> Chinnock subsp. <i>Arachnoids</i> (P3)	11	205	1	9.1	20	9.8	1	9.1	20	9.8	1	9.1	20	9.8
<i>Grevillea stenostachya</i> (P3)	91	971	2	2.2	510	52.5	6	6.6	205	21.1	7	7.7	396	40.8
<i>Hemigenia tysonii</i> (P3)	80	6616	32	40.0	2074	31.3	9	11.3	410	6.2	10	12.5	2783	42.1
<i>Homalocalyx echinulatus</i> (P3)	30	1050	24	80.0	438	41.7	6	20.0	438	41.7	6	20.0	438	41.7
<i>Micromyrtus placoides</i> (P3)	45	2160	16	35.6	545	25.2	20	44.4	532	24.6	20	44.4	532	24.6
<i>Mirbelia stipitata</i> (P3)	4	7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
<i>Phyllanthus baeckeoides</i> (P3)	15	1309	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
<i>Prostanthera ferricola</i> (P3)	14	672	1	7.1	14	2.1	1	7.1	14	2.1	1	7.1	14	2.1
<i>Prostanthera petrophila</i> (P3)	95	2141	25	26.3	556	26.0	25	26.3	435	20.3	25	26.3	491	22.9
<i>Ptilotus beardii</i> (P3)	38	2804	9	23.7	1669	59.5	3	7.9	836	29.8	4	10.5	960	34.2
<i>Ptilotus luteolus</i> (P3)	15	533	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
<i>Tecticornia cymbiformis</i> (P3)	7	69	0	0.0	14	20.3	1	14.3	14	20.3	1	14.3	14	20.3
<i>Verticordia jamiesonii</i> (P3)	22	483	1	4.5	1	0.2	1	4.5	1	0.2	1	4.5	1	0.2



Taxon	Total No Locations separated by >500 m	Estimated Total No. Plants	BFS Base Case				BFS Option 1				BFS Option 2			
			Total No Loci separated by >500 m	% Total	Estimated Total No. Plants	% Total	Total No Loci separated by >500 m	% Total	Estimated Total No. Plants	% Total	Total No Loci separated by >500 m	% Total	Estimated Total No. Plants	% Total
<i>Baeckea sp. Melita Station</i> (P4)	57	2626	4	7.0	100	3.8	4	7.0	100	3.8	4	7.0	100	3.8
<i>Goodenia berringbinensis</i> (P4)	18	33546	5	27.8	40	0.1	2	11.1	40	0.1	2	11.1	40	0.1
<i>Grevillea inconspicua</i> (P4)	62	2320	6	9.7	110	4.7	6	9.7	82	3.5	6	9.7	82	3.5

**Taxa** for which > 50% total no of loci or plants are impacted by one or more options

**Taxa** for which > 30% total number of loci or plants are impacted by one or more options

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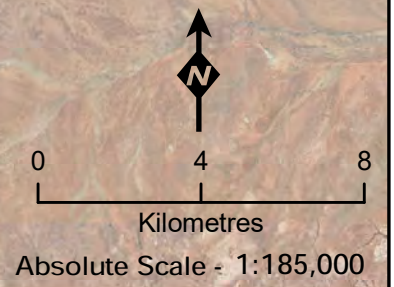
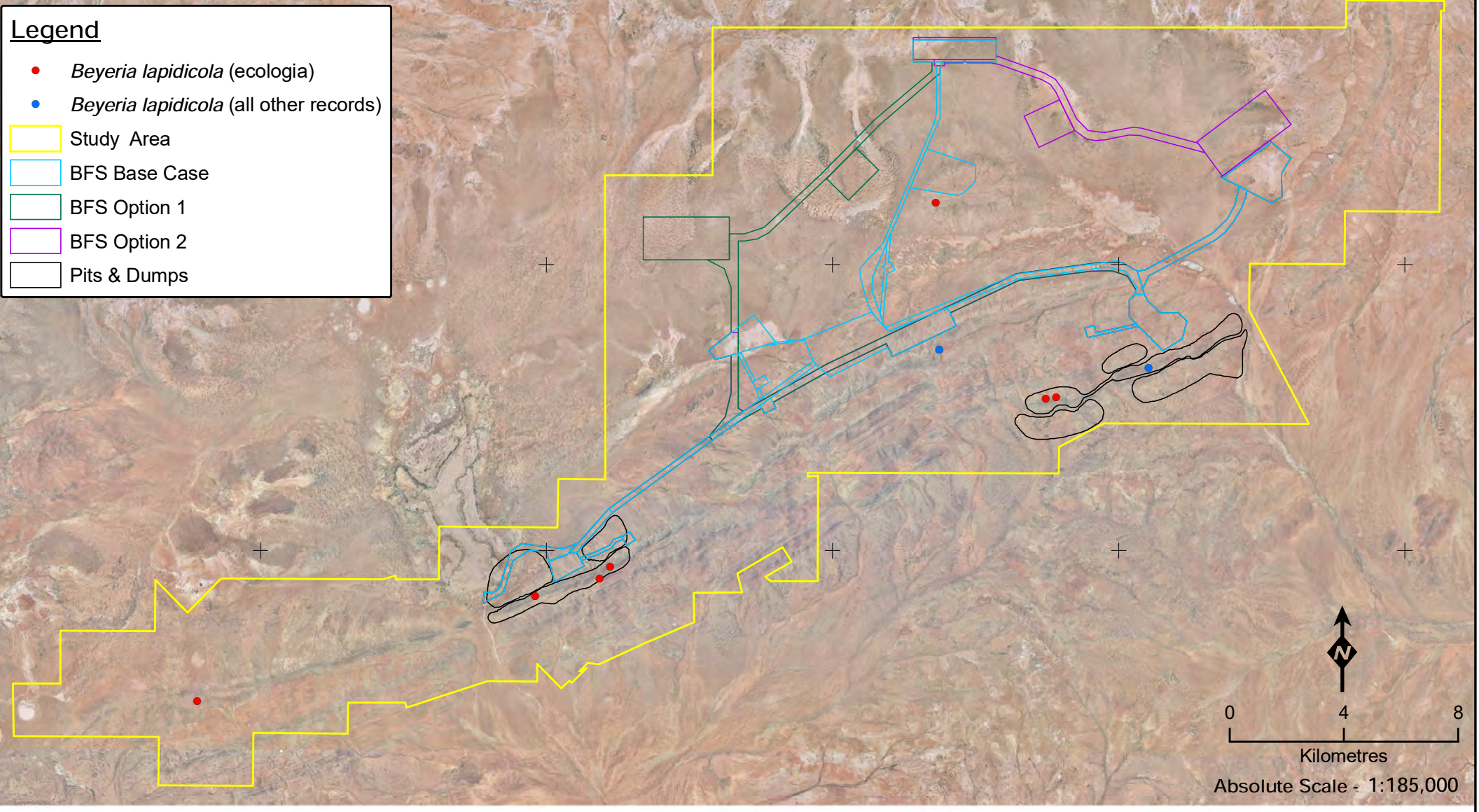
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**Legend**

- *Beyeria lapidicola* (ecologia)
- *Beyeria lapidicola* (all other records)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of *Beyeria lapidicola* (P1)  
within the Study Area

Figure: 7.1  
Project ID: 722

Drawn: CJM  
Date: 19/06/10

Unique Map ID: S142

Coordinate System  
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Projection: Transverse Mercator  
Datum: GDA 1994

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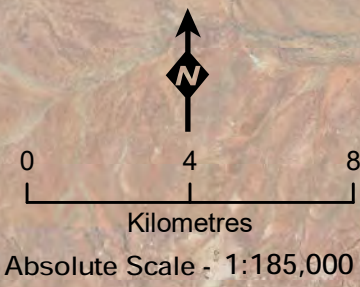
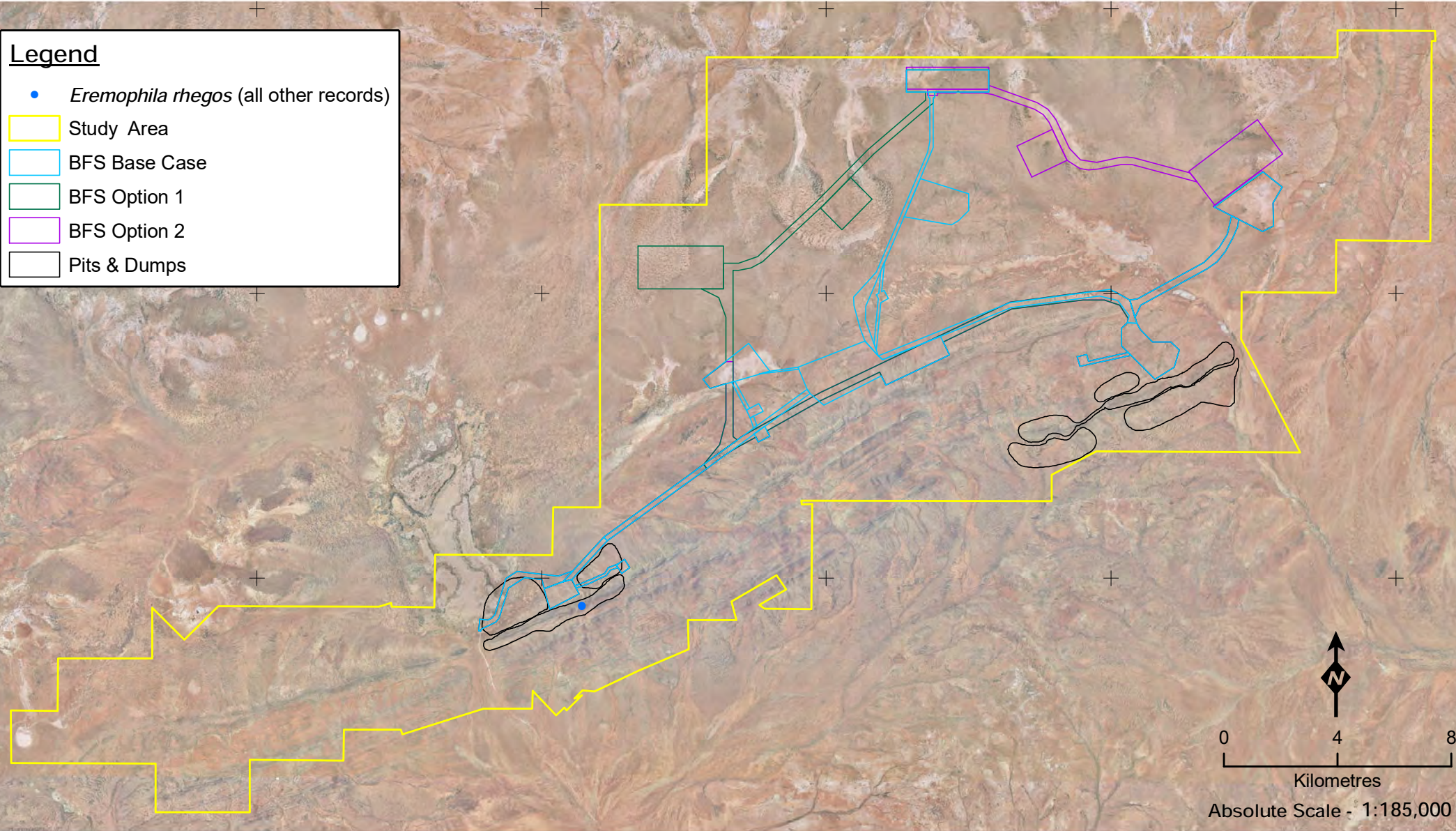
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**Legend**

- *Eremophila rhexos* (all other records)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of *Eremophila rhexos* (P1) within the Study Area

Figure: 7.2  
Project ID: 722  
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10

Unique Map ID: S142

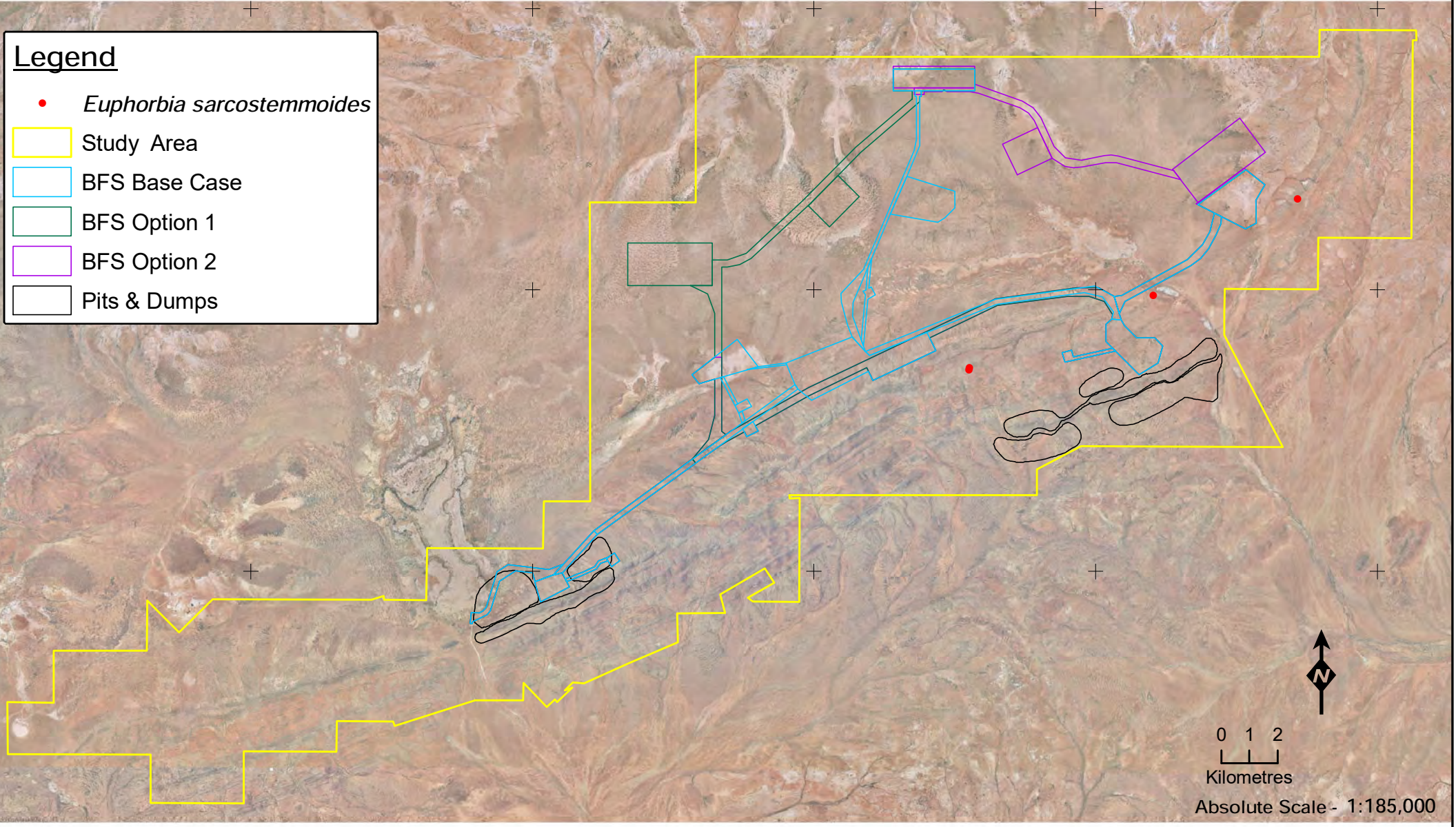
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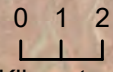
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**Legend**

- *Euphorbia sarcostemmoides*
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



  
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 Kilometres  
 Absolute Scale - 1:185,000




**中钢澳洲中西矿业公司**  
SINO STEEL MIDWEST CORPORATION LIMITED

**Location of**  
*Euphorbia sarcostemmoides* (P1)  
**within the Study Area**

Figure: 7.3  
 Project ID: 722  
 Coordinate System  
 Name: GDA 1994 MGA Zone 50  
 Projection: Transverse Mercator  
 Datum: GDA 1994

Drawn: CJM  
 Date: 19/06/10  
 Unique Map ID: S142  
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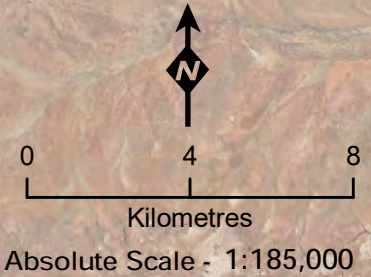
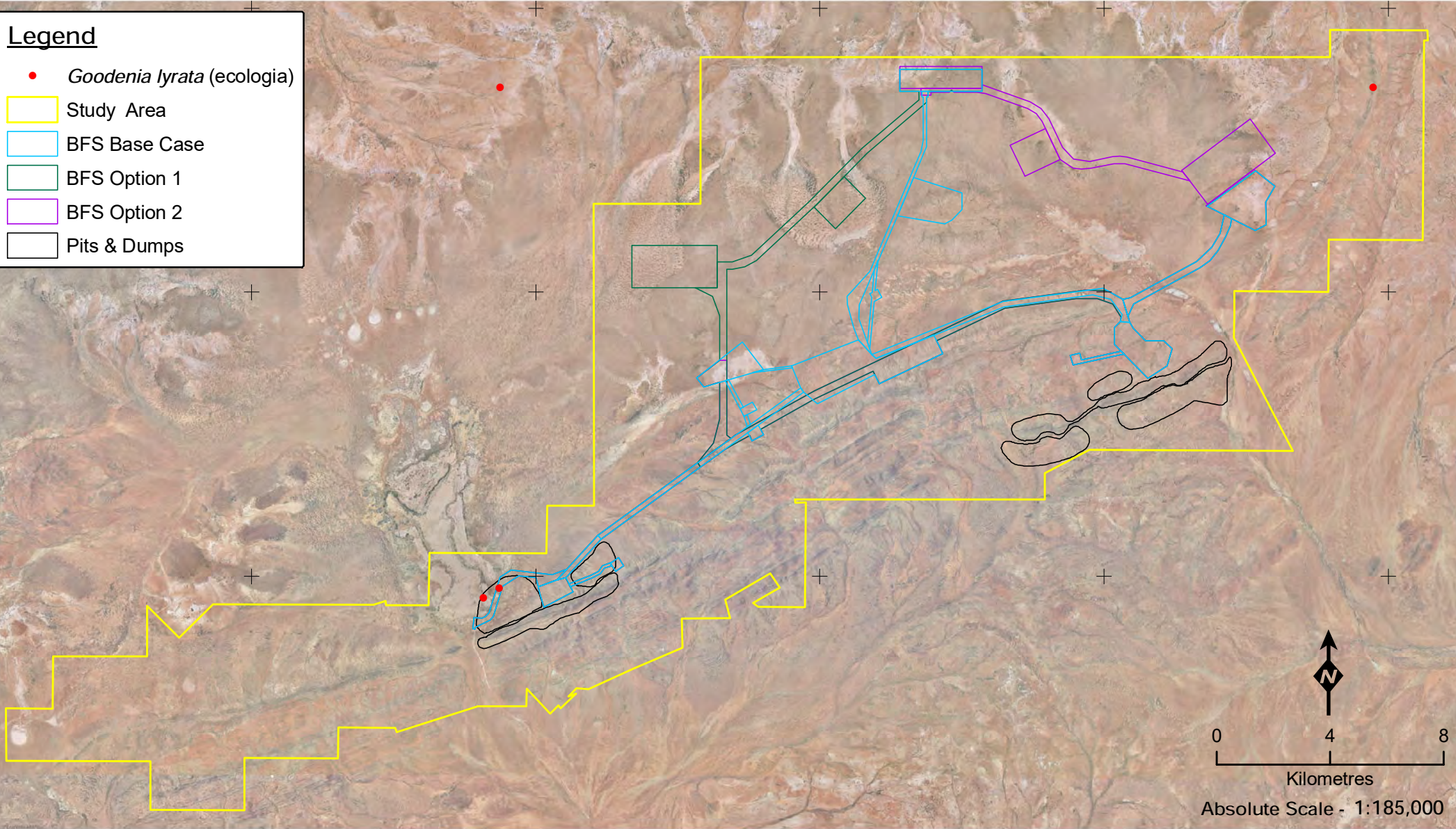
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### Legend

- *Goodenia lyrata* (ecologia)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Goodenia lyrata* (P1)  
within the Study Area

Figure: 7.4  
Project ID: 722

Drawn: CJM  
Date: 19/06/10

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Unique Map ID: S142



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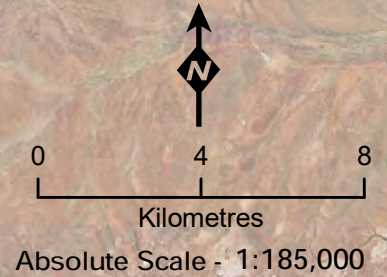
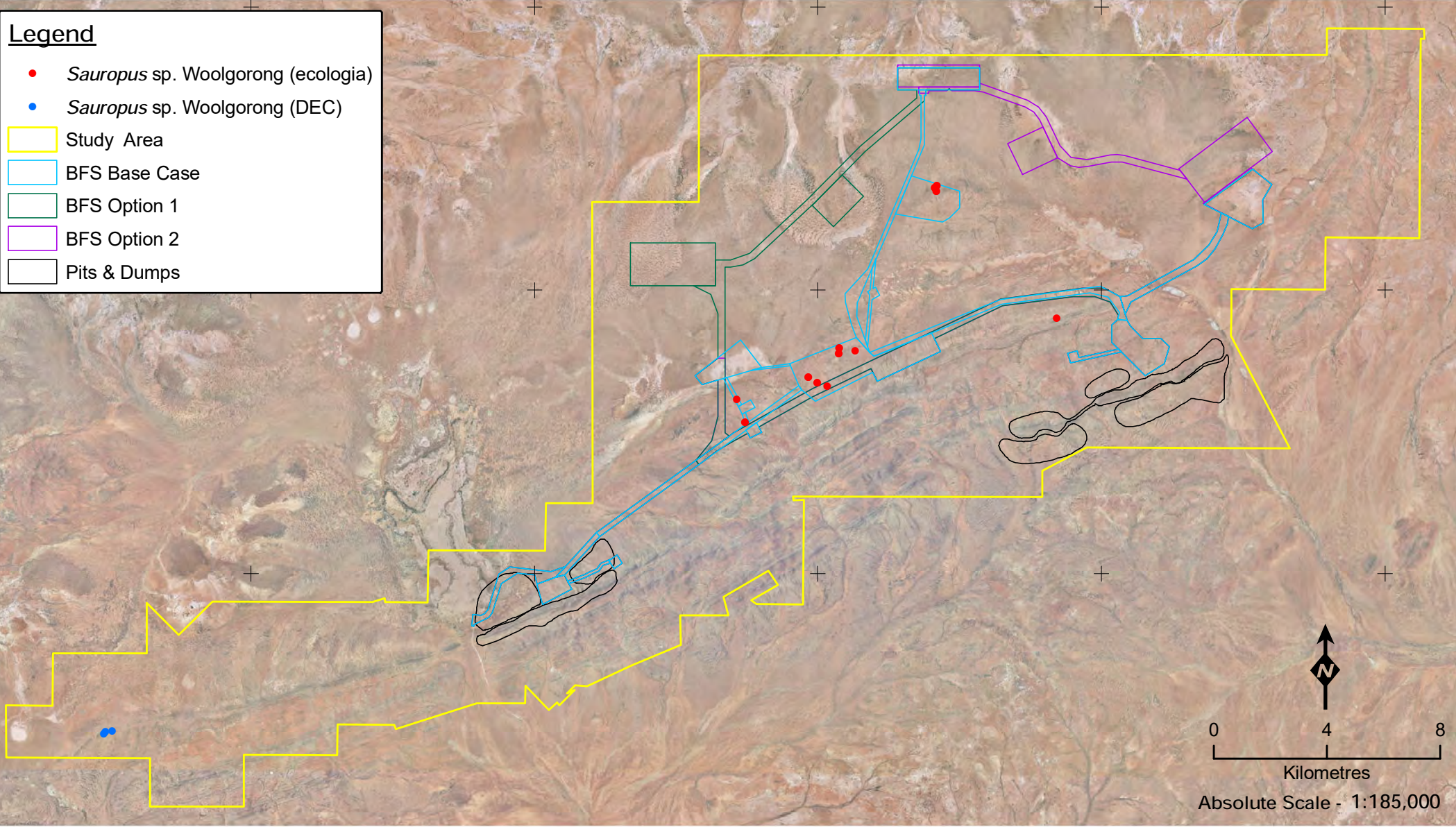
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### Legend

- *Sauropus* sp. Woolgorong (ecologia)
- *Sauropus* sp. Woolgorong (DEC)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Sauropus* sp. Woolgorong  
(M. Officer s.n. 10/8/94) (P3)  
within the Study Area

Figure: 7.5  
Project ID: 722

Drawn: CJM  
Date: 19/06/10

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

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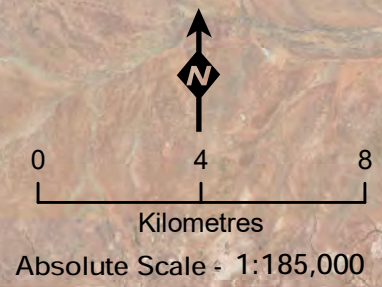
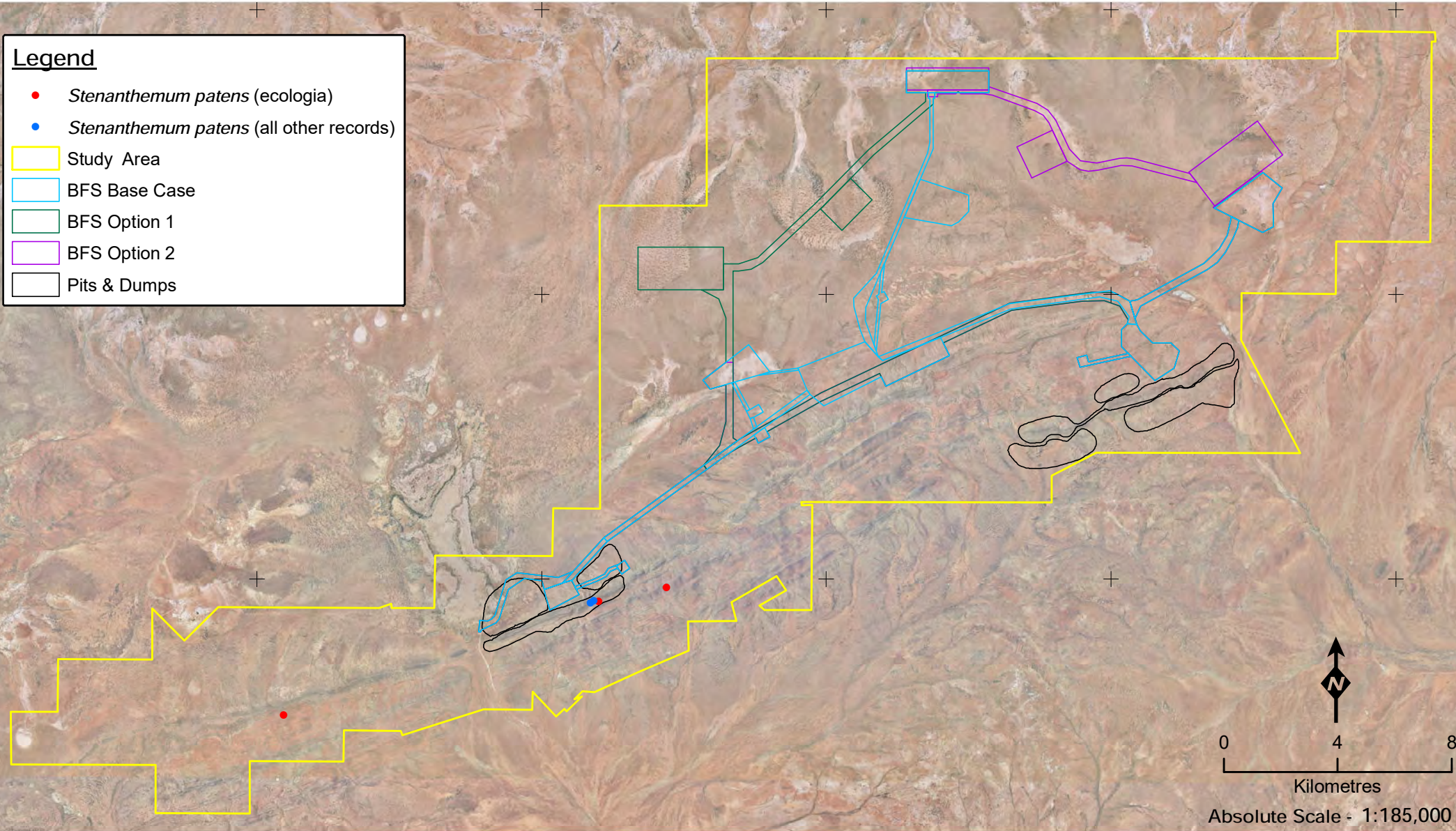
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**Legend**

- *Stenanthemum patens* (ecologia)
- *Stenanthemum patens* (all other records)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Stenanthemum patens* (P1)  
within the Study Area

Figure: 7.6  
Project ID: 722  
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10  
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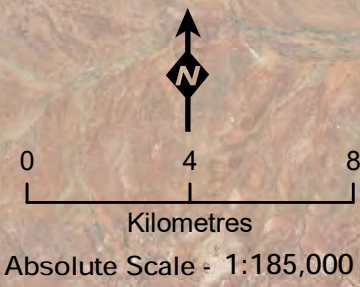
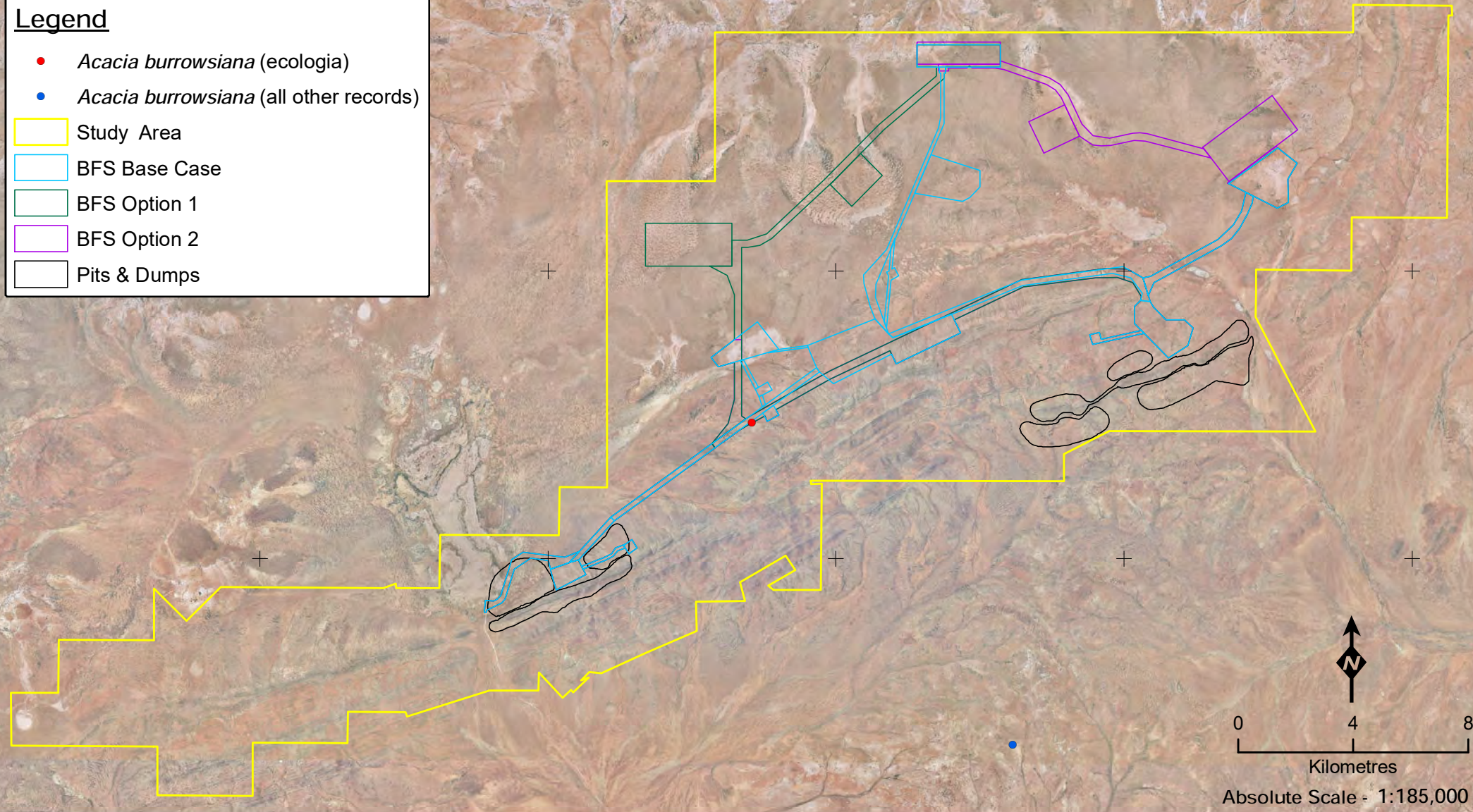
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**Legend**

- *Acacia burrowsiana* (ecologia)
- *Acacia burrowsiana* (all other records)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of *Acacia burrowsiana* (P3)  
within the Study Area

Figure: 7.7  
Project ID: 722

Drawn: CJM  
Date: 19/06/10  
Unique Map ID: S142  
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Coordinate System  
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Projection: Transverse Mercator  
Datum: GDA 1994

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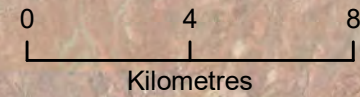
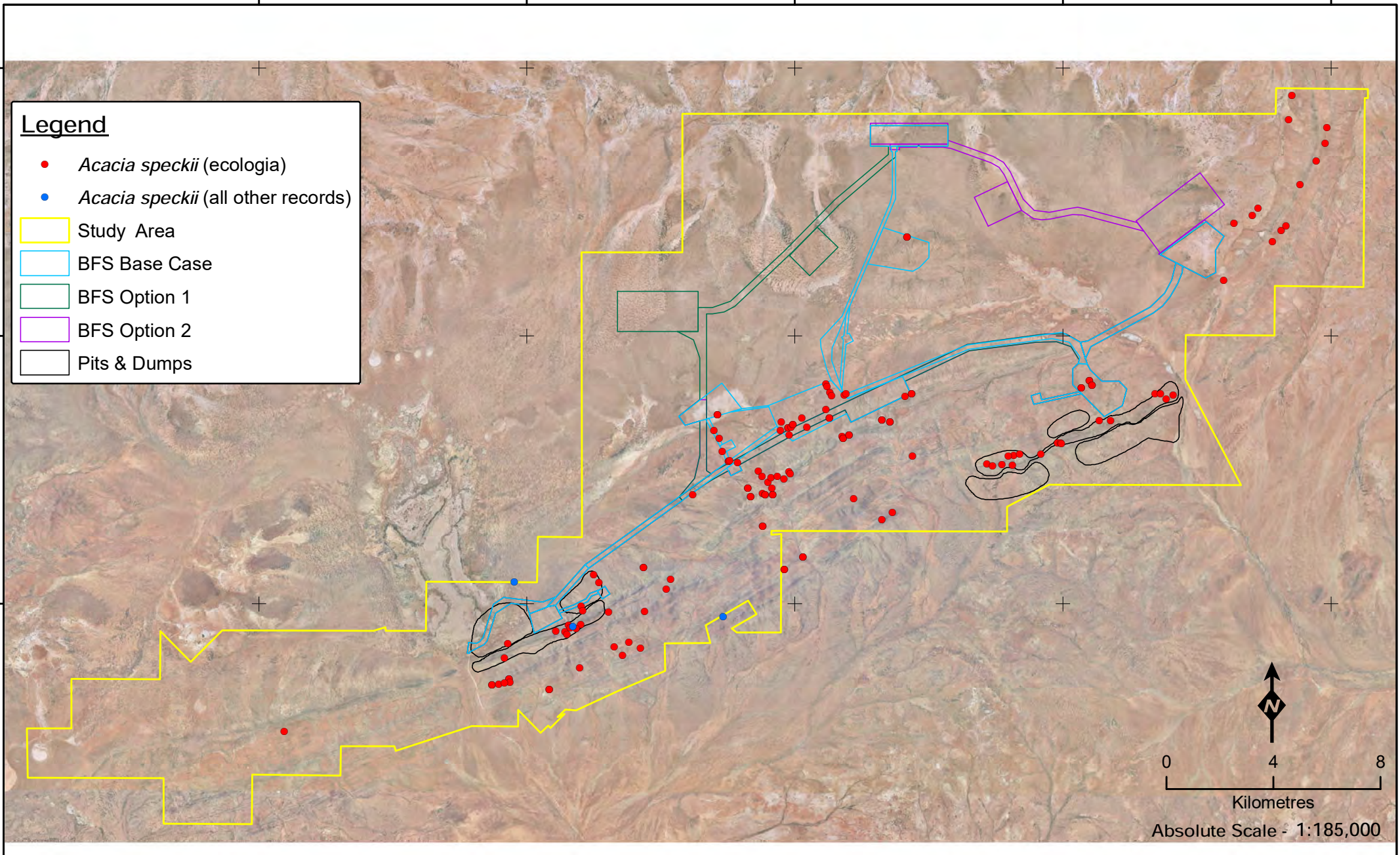
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**Legend**

- *Acacia speckii* (ecologia)
- *Acacia speckii* (all other records)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Absolute Scale - 1:185,000



Location of *Acacia speckii* (P3) within the Study Area

Figure: 7.8  
Project ID: 722

Drawn: CJM  
Date: 19/06/10

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Unique Map ID: S142



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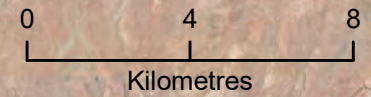
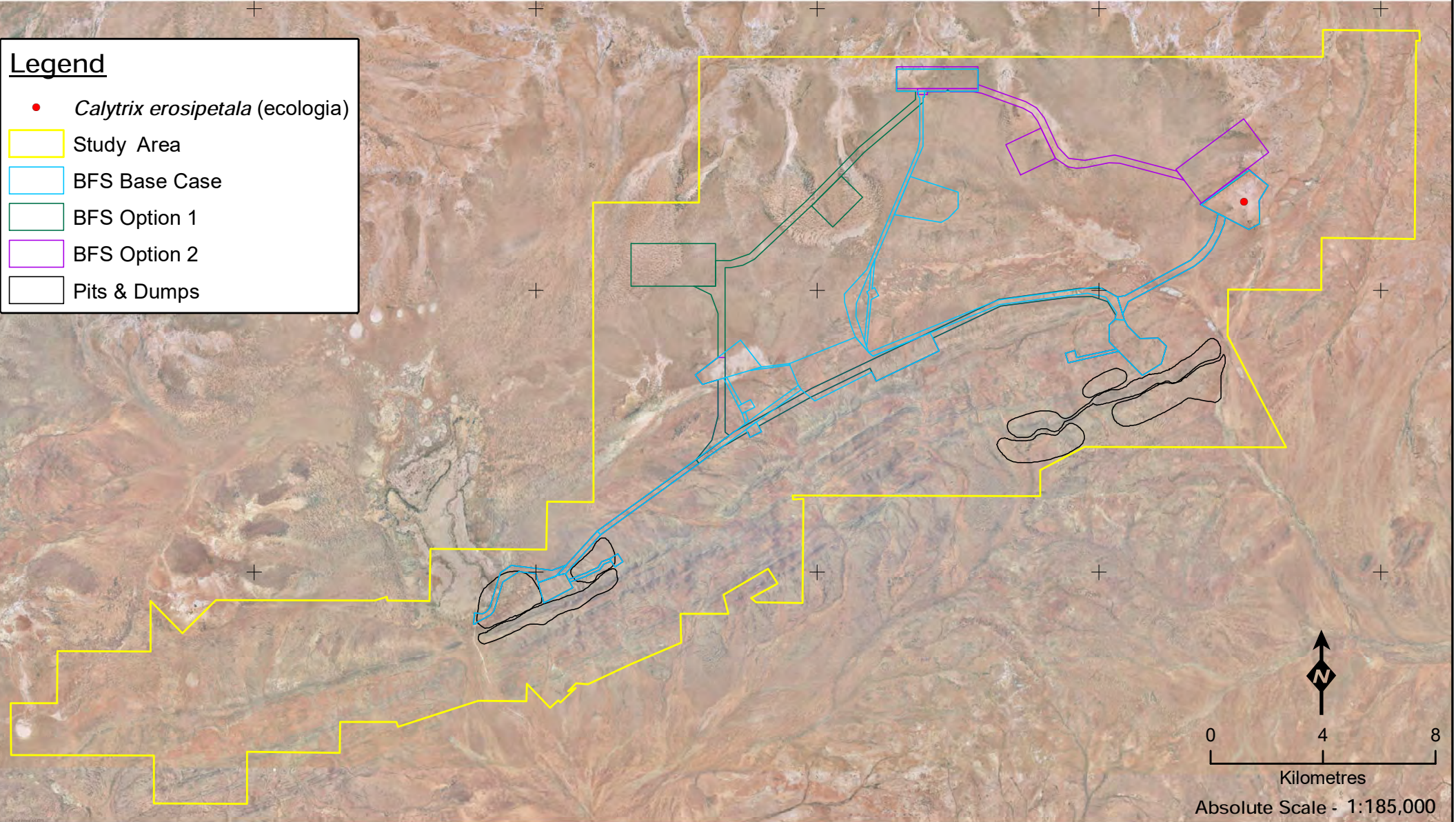
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**Legend**

- *Calytrix erosipetala* (ecologia)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Absolute Scale - 1:185,000



Location of *Calytrix erosipetala* (P3) within the Study Area

Figure: 7.9  
Project ID: 722  
  
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10

Unique Map ID: S142

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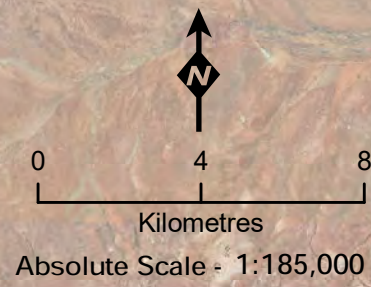
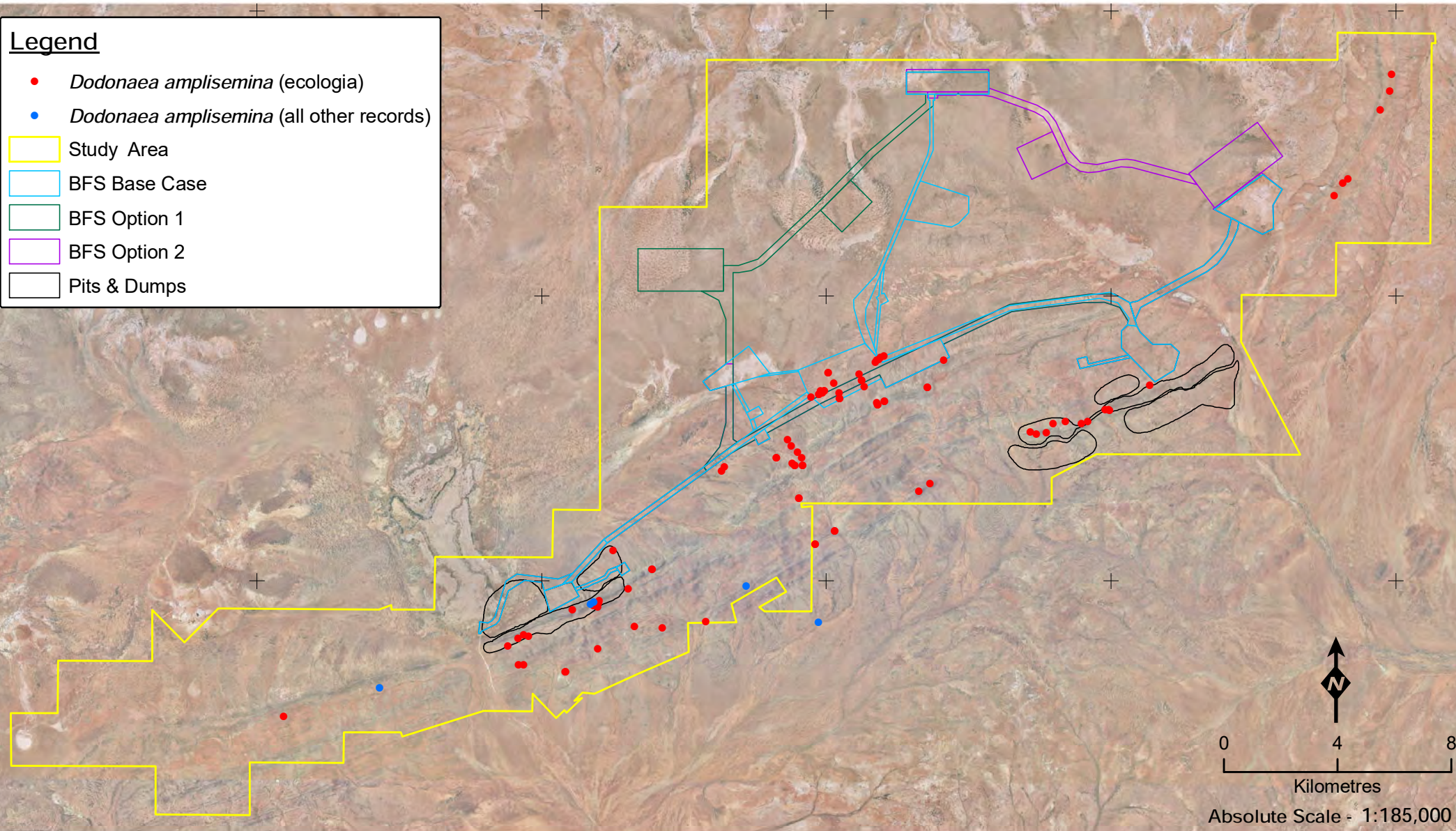
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**Legend**

- *Dodonaea amplisemina* (ecologia)
- *Dodonaea amplisemina* (all other records)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Dodonaea amplisemina* (P3)  
within the Study Area

Figure: 7.10  
Project ID: 722

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10

Unique Map ID: S142

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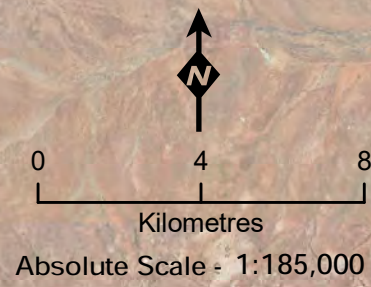
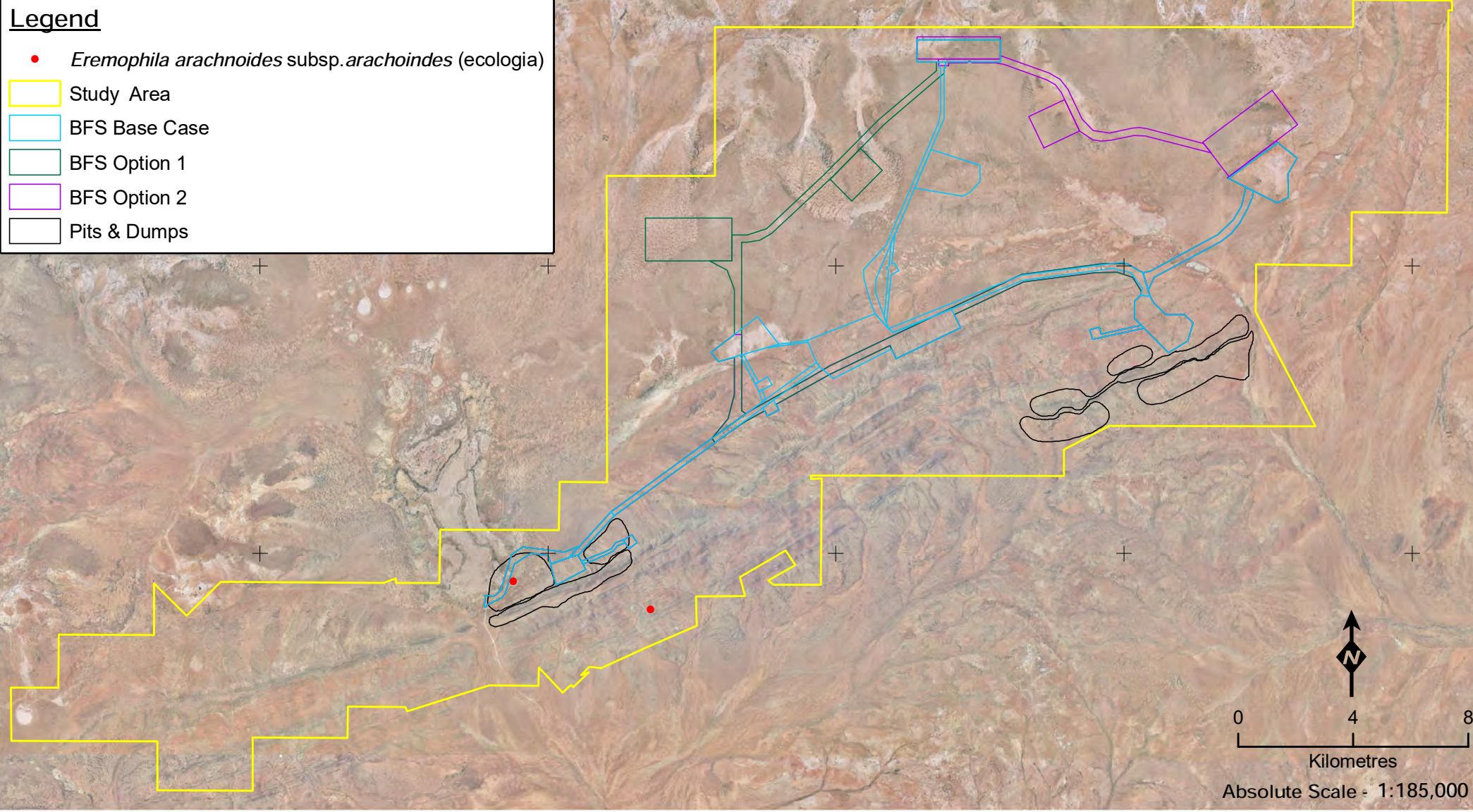
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**Legend**

- *Eremophila arachnoides* subsp. *arachnoides* (ecologia)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of *Eremophila arachnoides* subsp. *arachnoides* (P3) within the Study Area

Figure: 7.11  
Project ID: 722

Drawn: CJM  
Date: 19/06/10

Unique Map ID: S142

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

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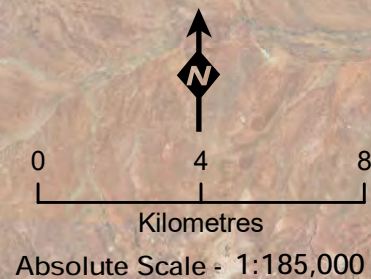
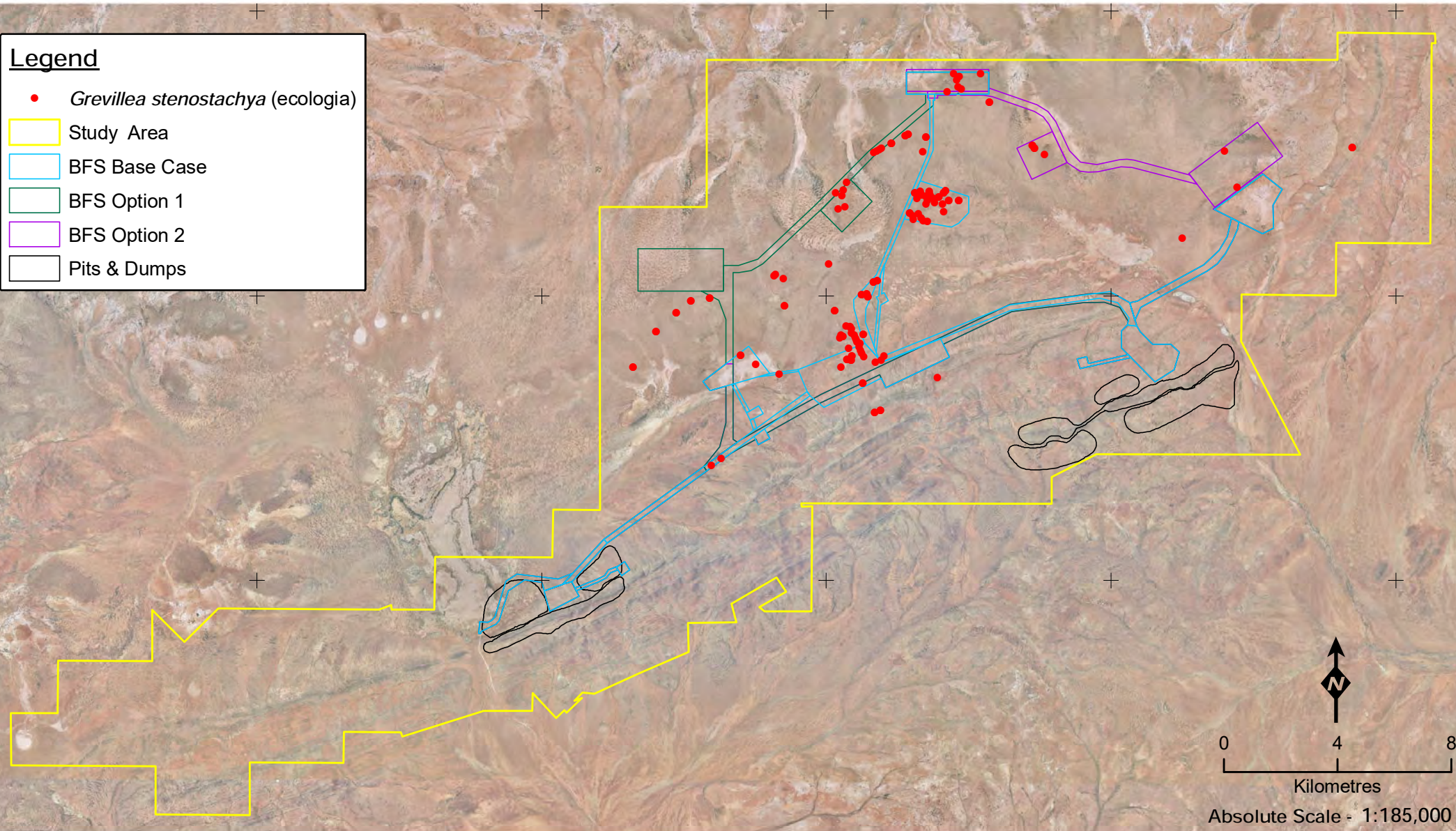
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**Legend**

- *Grevillea stenostachya* (ecologia)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Grevillea stenostachya* (P3)  
within the Study Area

Figure: 7.12  
Project ID: 722  
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10  
Unique Map ID: S142  
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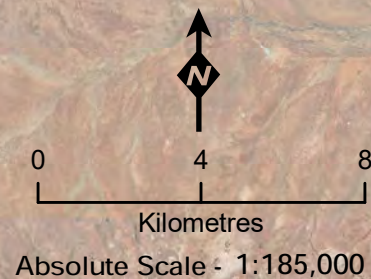
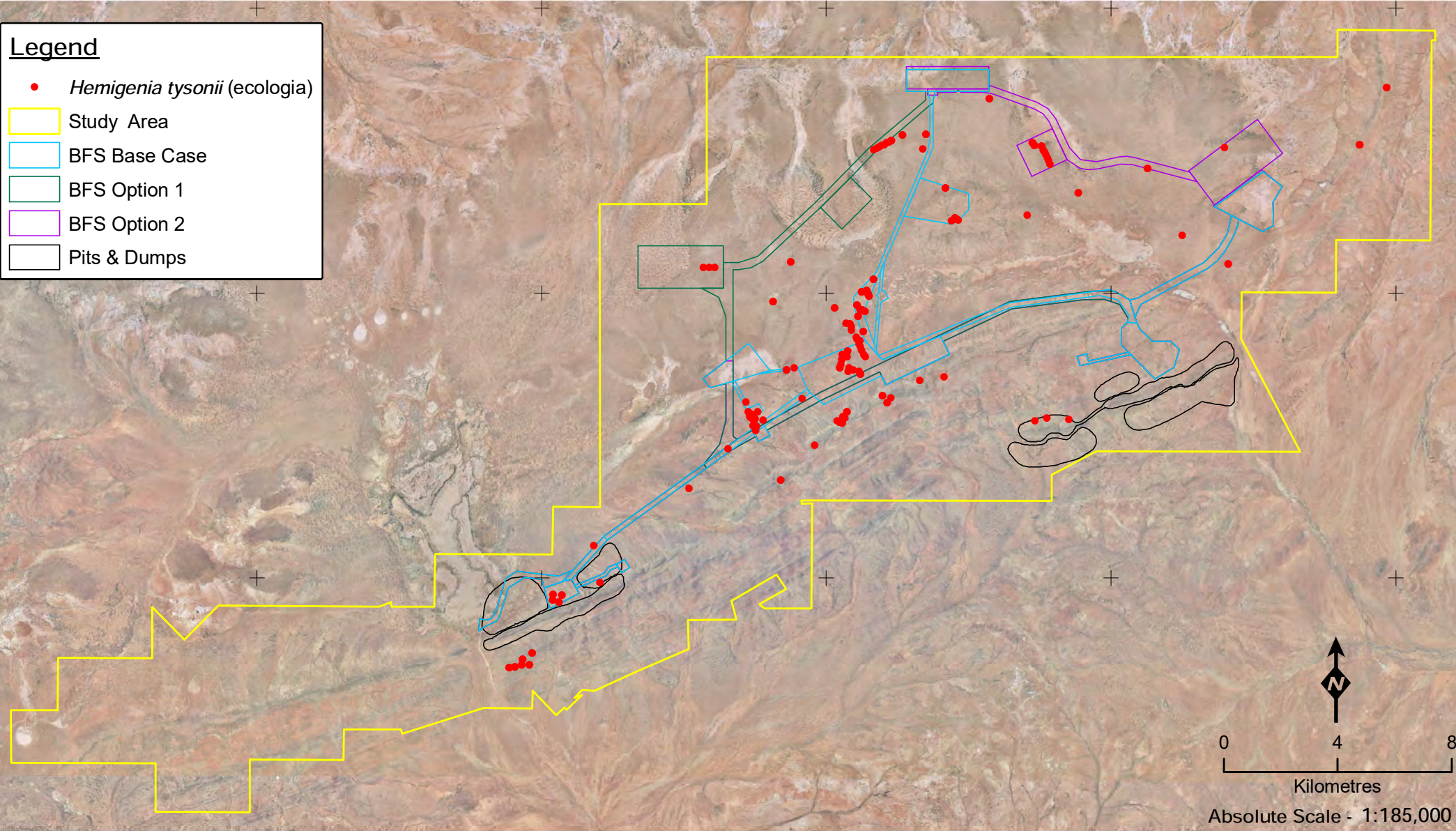
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**Legend**

- *Hemigenia tysonii* (ecologia)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Hemigenia tysonii* (P3)  
within the Study Area

Figure: 7.13  
Project ID: 722  
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10  
Unique Map ID: S142  
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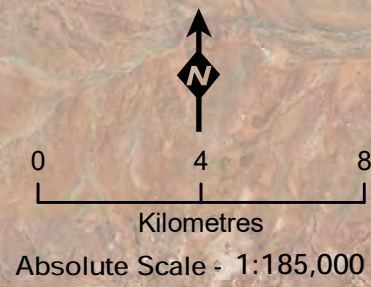
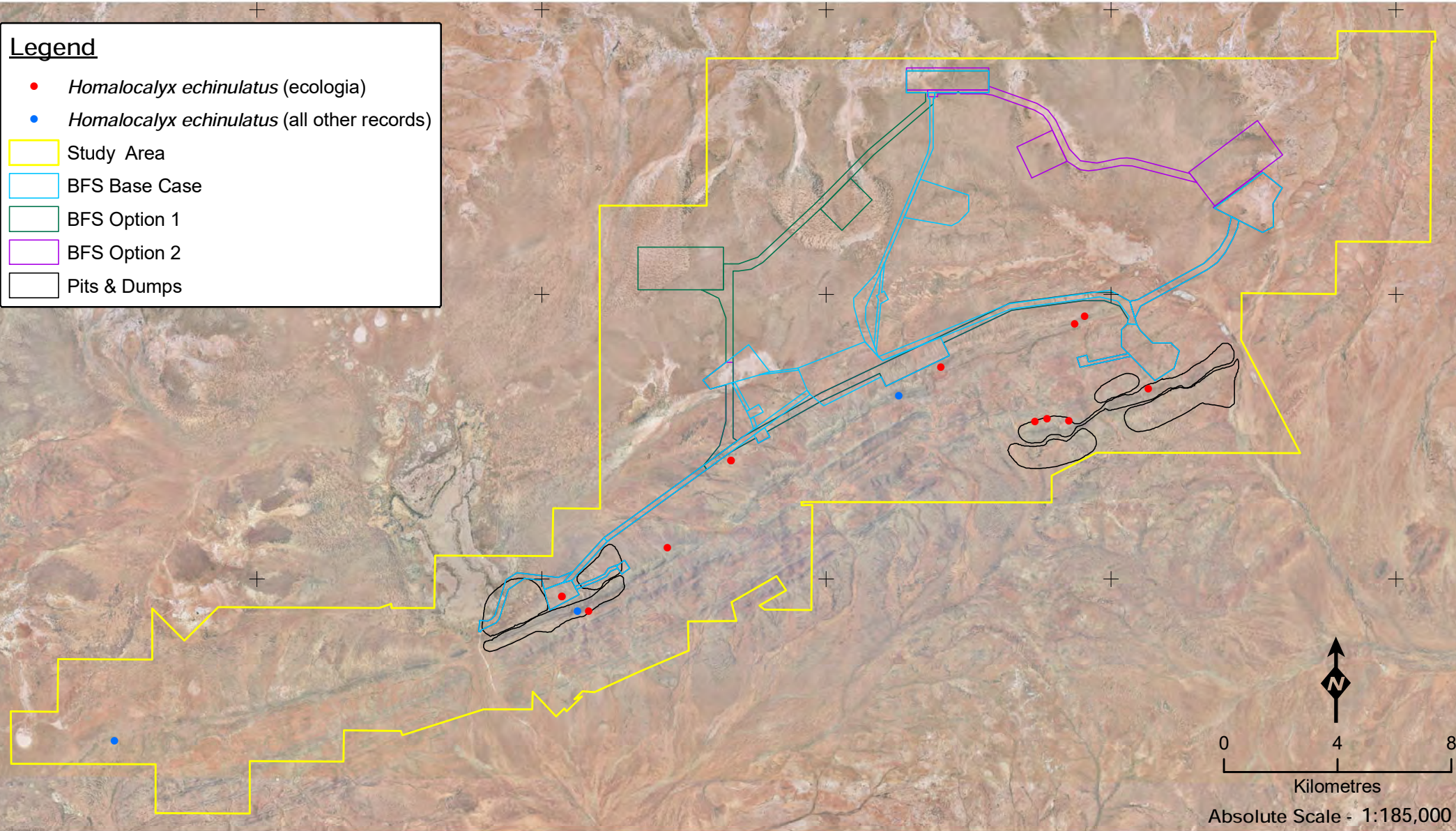
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**Legend**

- *Homalocalyx echinulatus* (ecologia)
- *Homalocalyx echinulatus* (all other records)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Homalocalyx echinulatus* (P3)  
within the Study Area

Figure: 7.14  
Project ID: 722  
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10  
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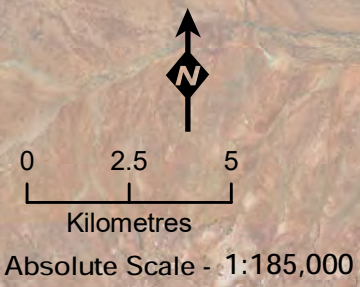
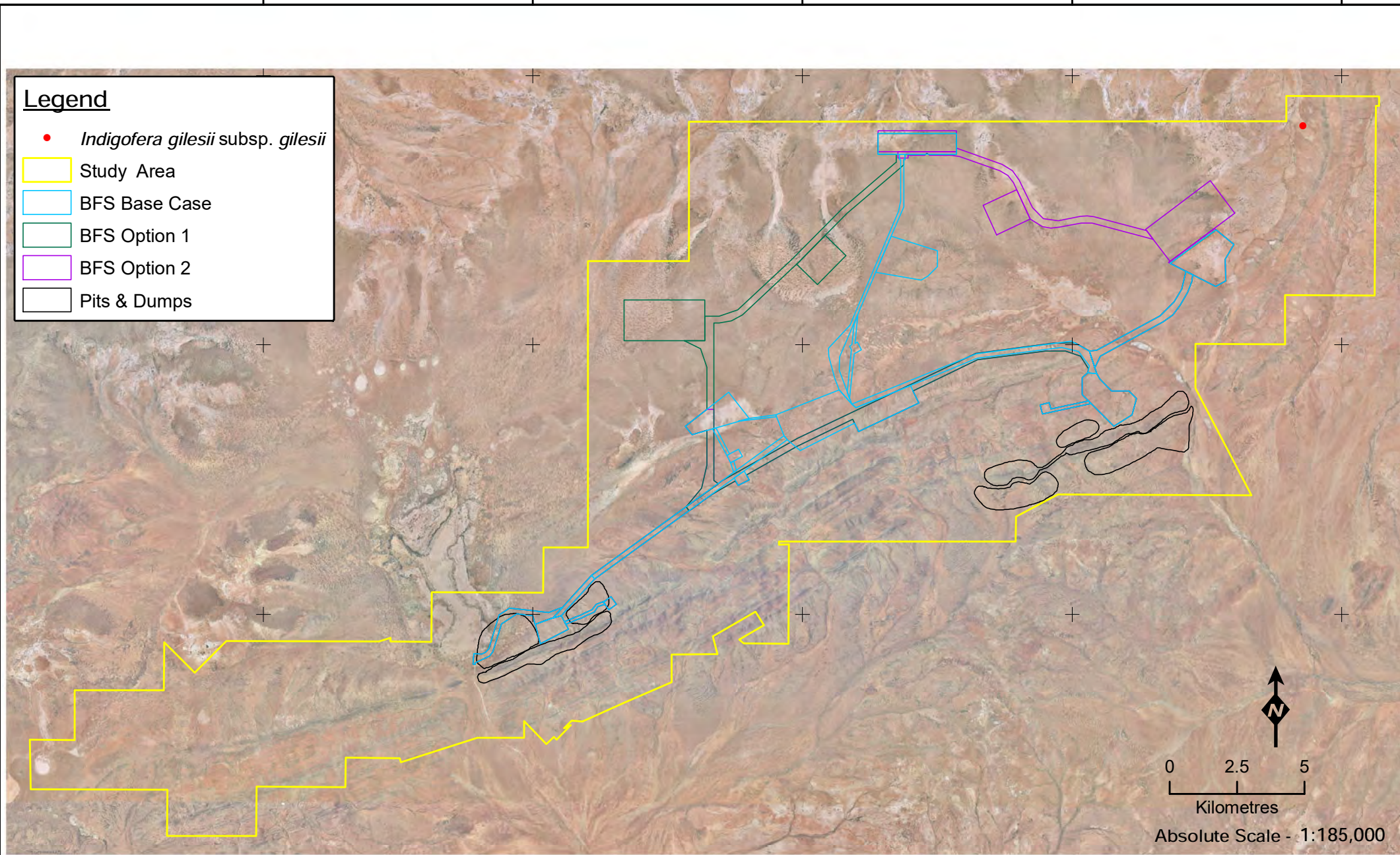
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**Legend**

- *Indigofera gilesii* subsp. *gilesii*
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Indigofera gilesii* subsp. *gilesii* (P3)  
within the Study Area

Figure: 7.15  
Project ID: 722

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: SV  
Date: 24/06/10

Unique Map ID: S142  
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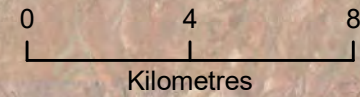
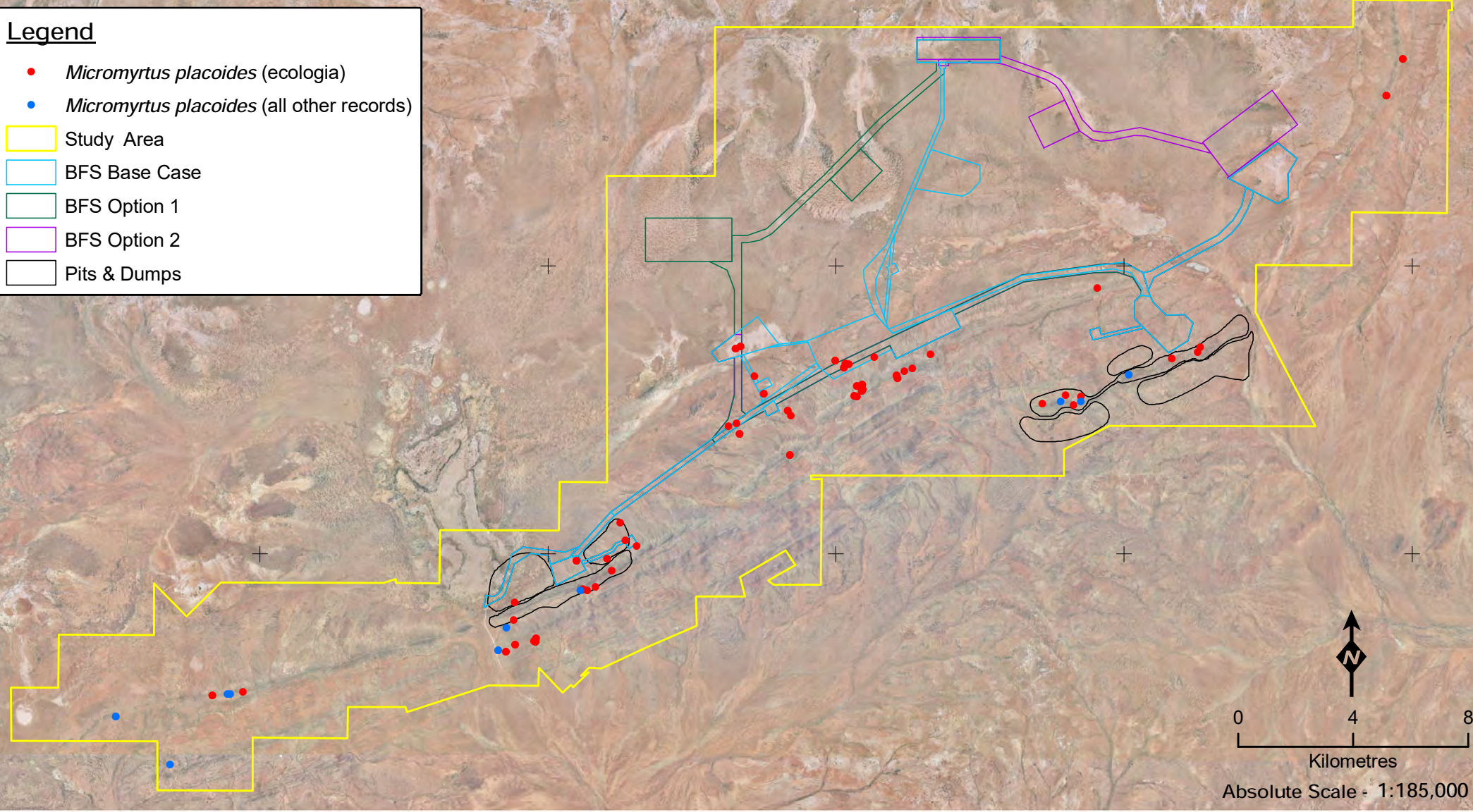
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**Legend**

- *Micromyrtus placoides* (ecologia)
- *Micromyrtus placoides* (all other records)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Absolute Scale - 1:185,000



Location of  
*Micromyrtus placoides* (P3)  
within the Study Area

Figure: 7.16  
Project ID: 722

Drawn: CJM  
Date: 19/06/10

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Unique Map ID: S142



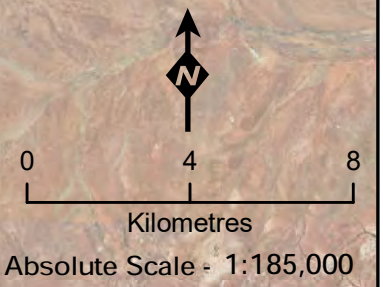
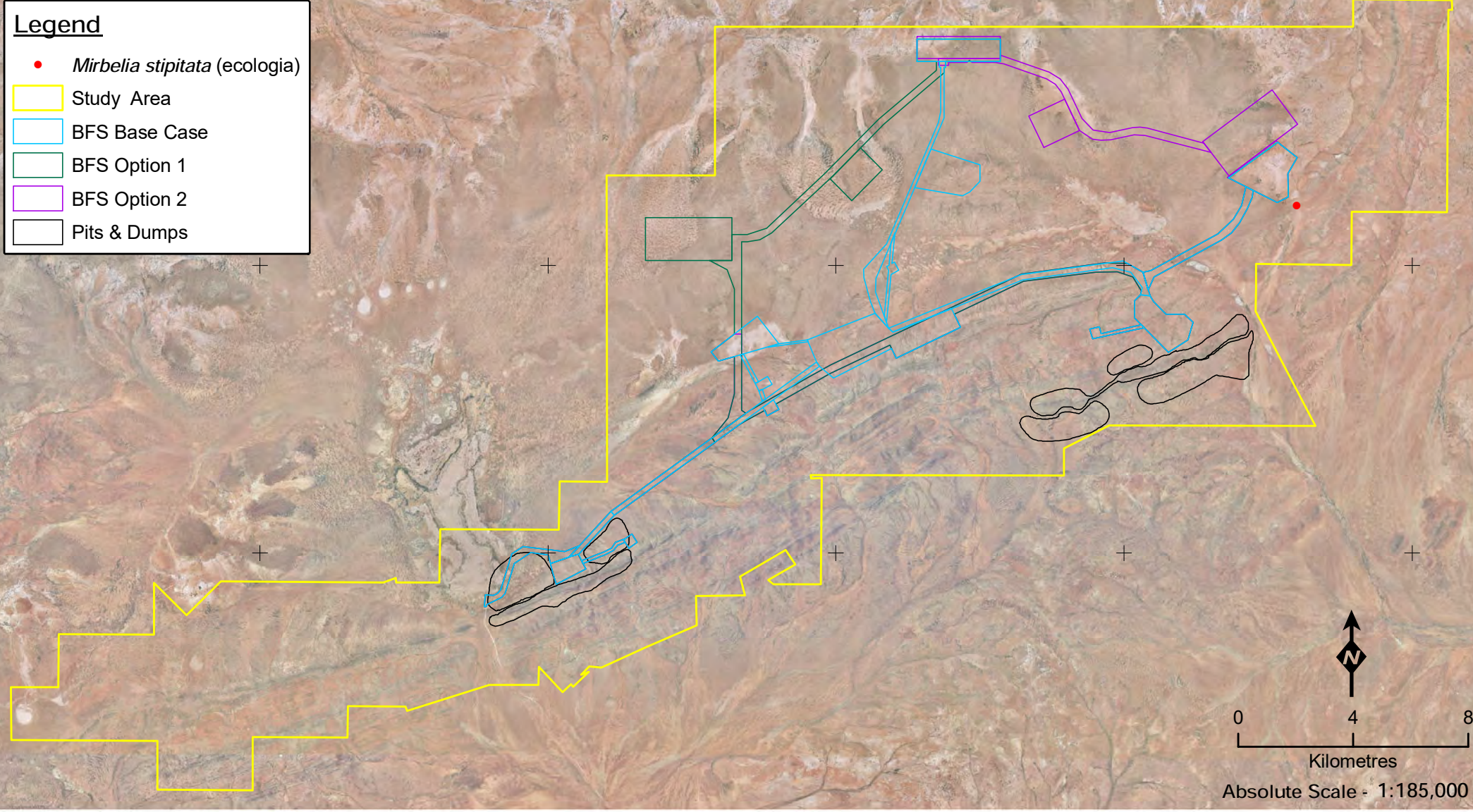
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**Legend**

- *Mirbelia stipitata* (ecologia)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Mirbelia ?stipitata* (P3)  
within the Study Area

Figure: 7.17  
Project ID: 722  
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10  
Unique Map ID: S142  
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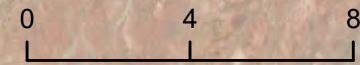
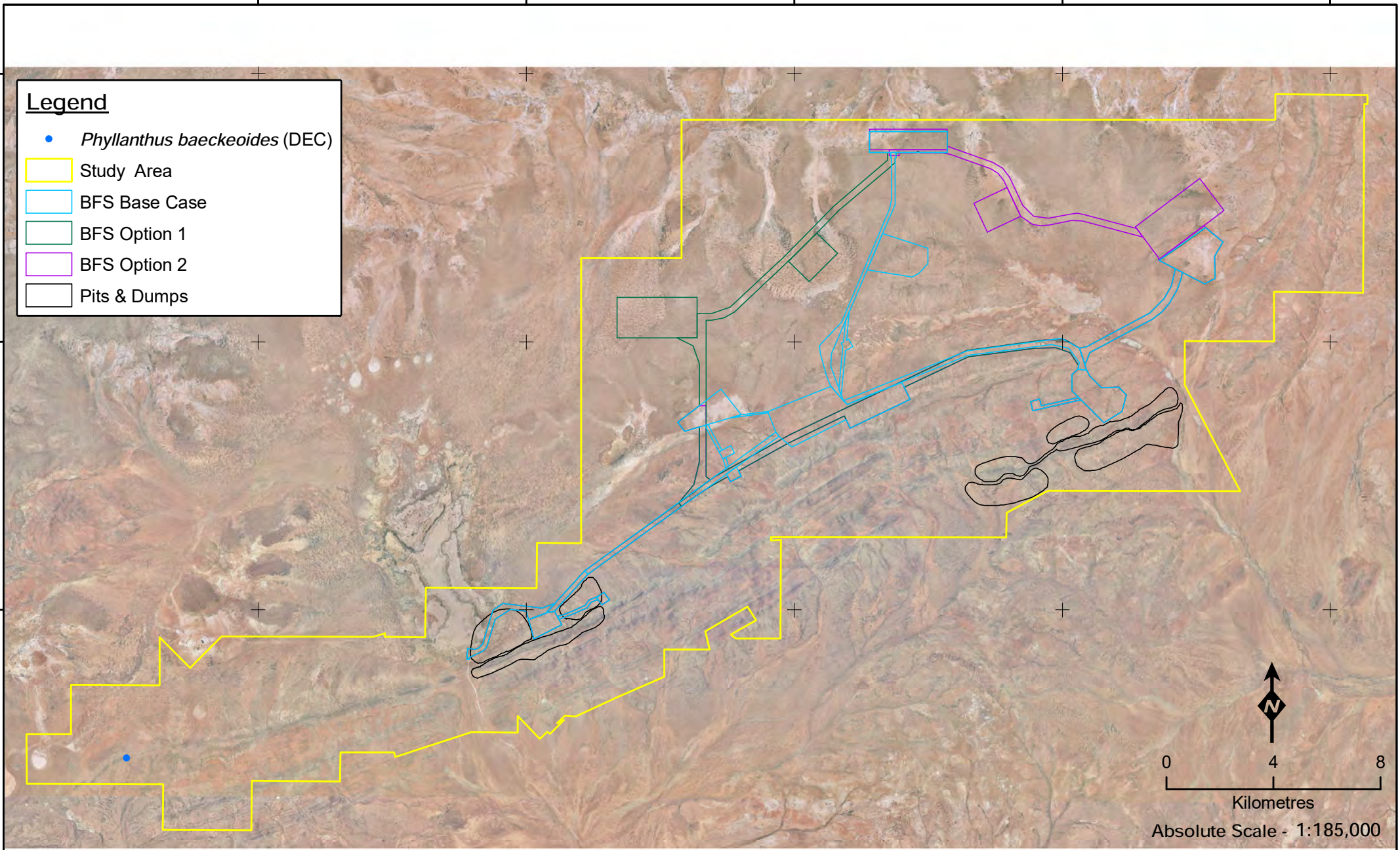
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**Legend**

- *Phyllanthus baeckeoides* (DEC)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Absolute Scale - 1:185,000



Location of  
*Phyllanthus baeckeoides* (P3)  
within the Study Area

Figure: 7.18  
Project ID: 722  
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10

Unique Map ID: S142

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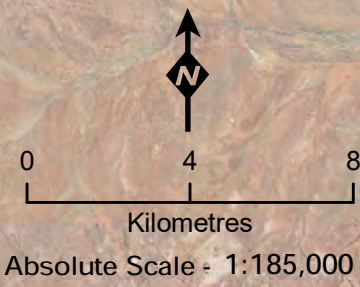
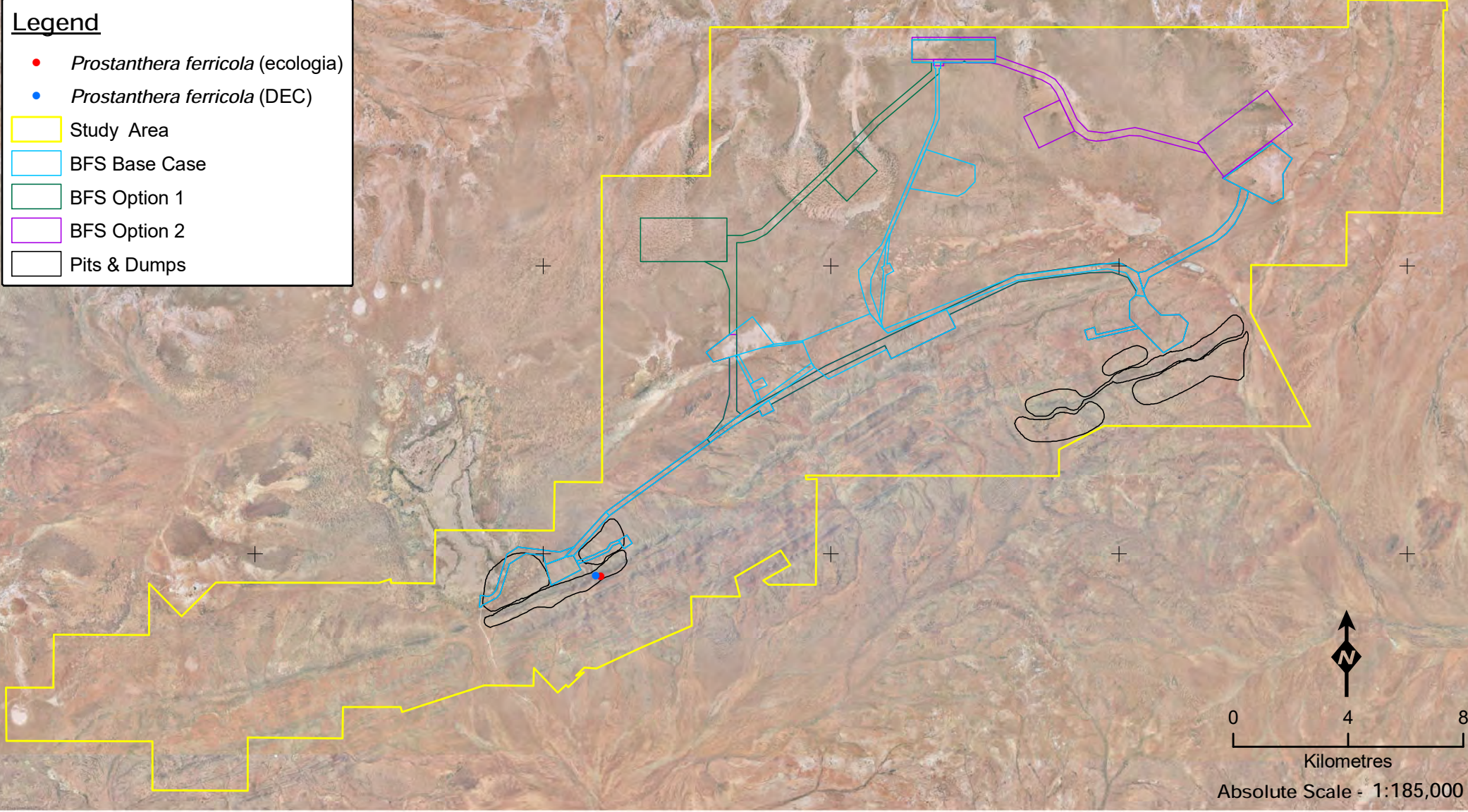
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**Legend**

- *Prostanthera ferricola* (ecologia)
- *Prostanthera ferricola* (DEC)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Prostanthera ferricola* (P3)  
within the Study Area

Figure: 7.19  
Project ID: 722

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10

Unique Map ID: S142

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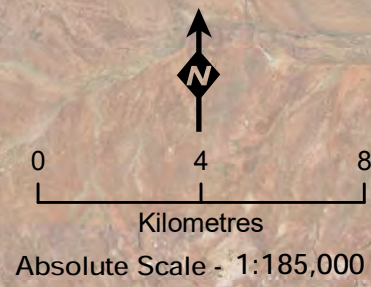
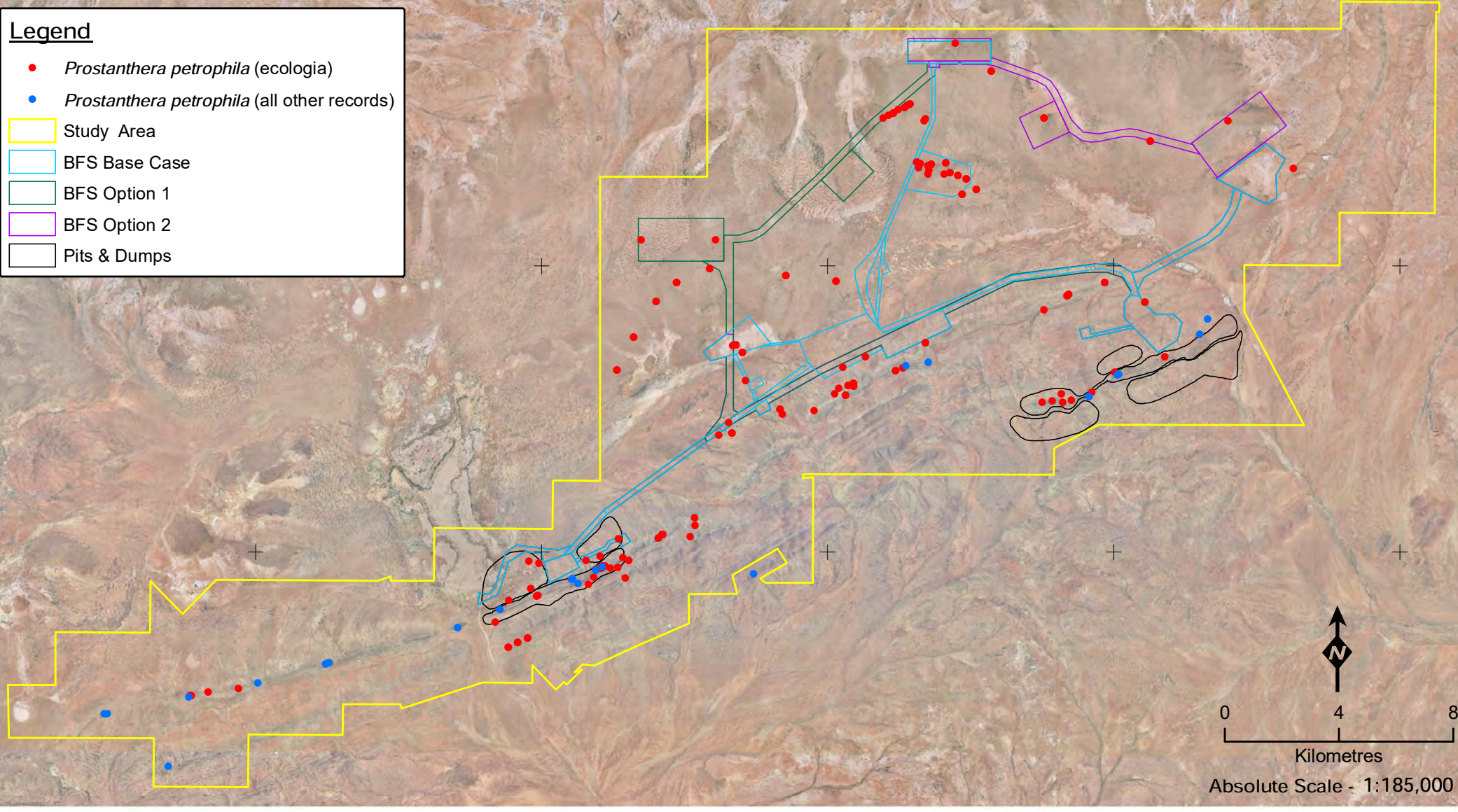
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**Legend**

- *Prostanthera petrophila* (ecologia)
- *Prostanthera petrophila* (all other records)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Prostanthera petrophila* (P3)  
within the Study Area

Figure: 7.20  
Project ID: 722

Coordinate System  
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Projection: Transverse Mercator  
Datum: GDA 1994

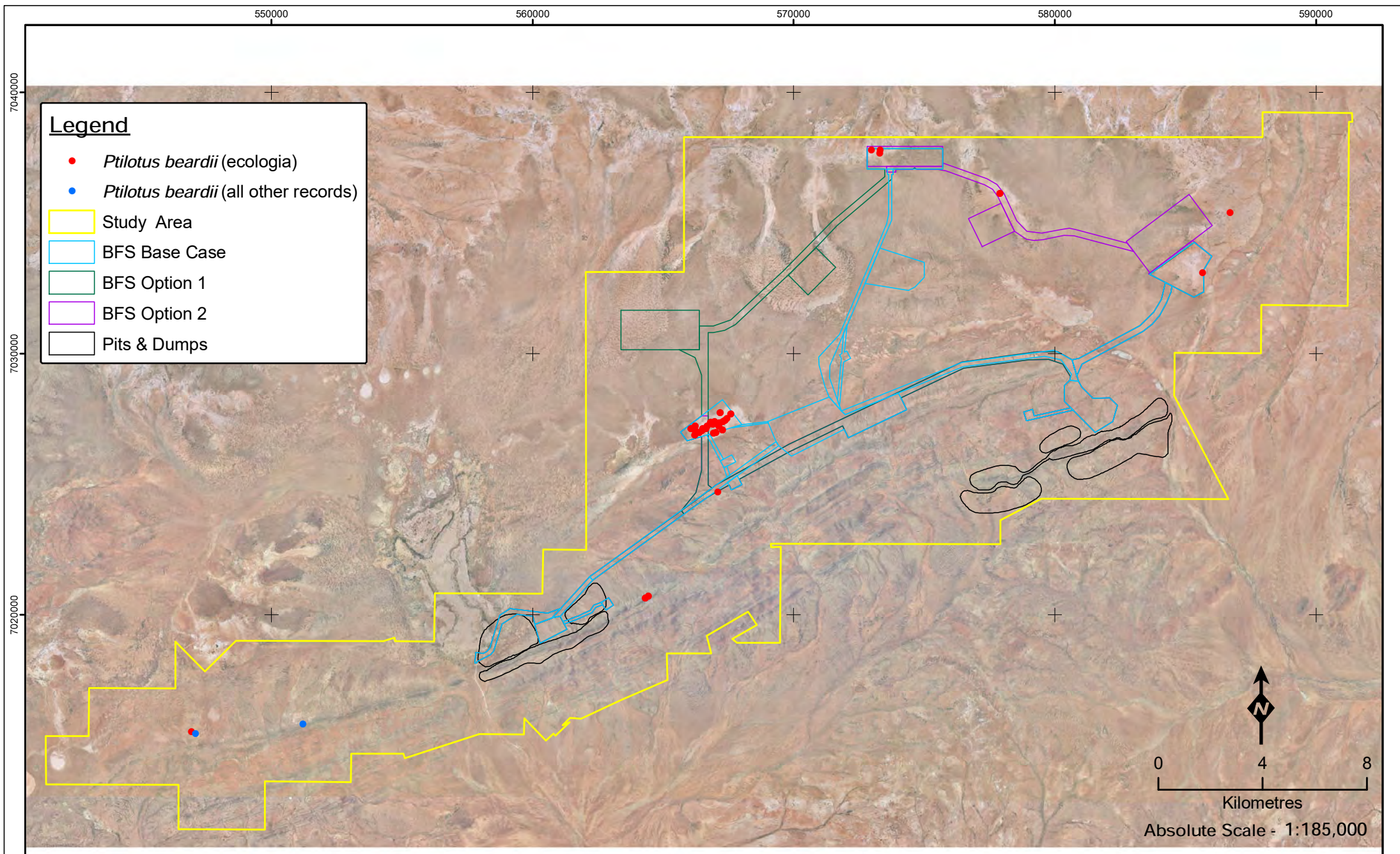
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Date: 19/06/10

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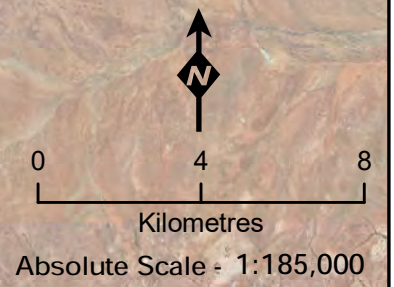


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**Legend**

- *Ptilotus beardii* (ecologia)
- *Ptilotus beardii* (all other records)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Ptilotus beardii* (P3)  
within the Study Area

Figure: 7.21  
Project ID: 722

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

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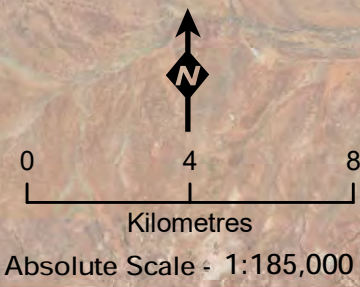
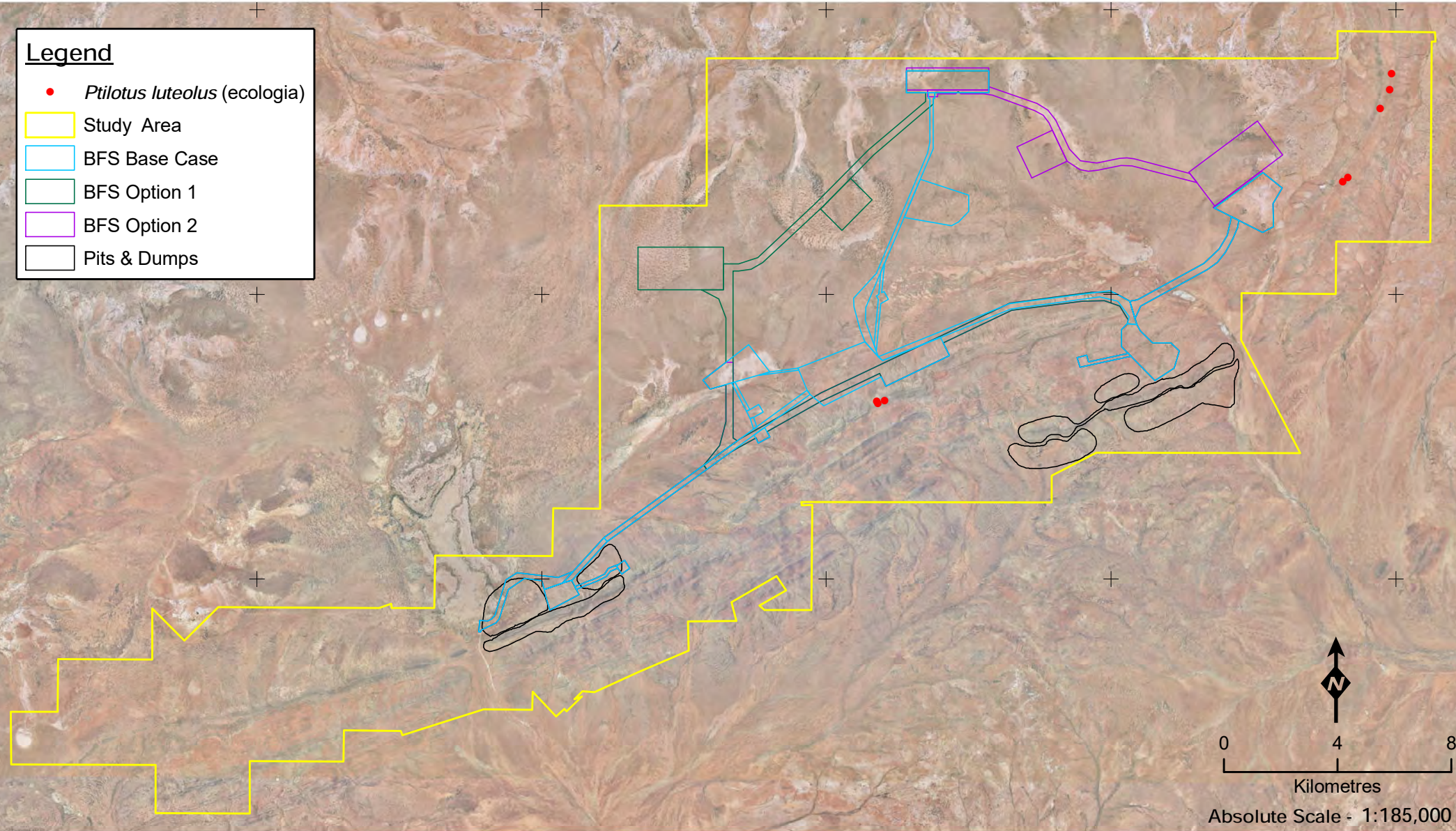
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**Legend**

- *Ptilotus luteolus* (ecologia)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Ptilotus luteolus* (P3)  
within the Study Area

Figure: 7.22  
Project ID: 722

Drawn: CJM  
Date: 19/06/10

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Unique Map ID: S142

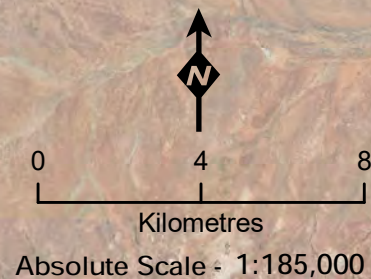
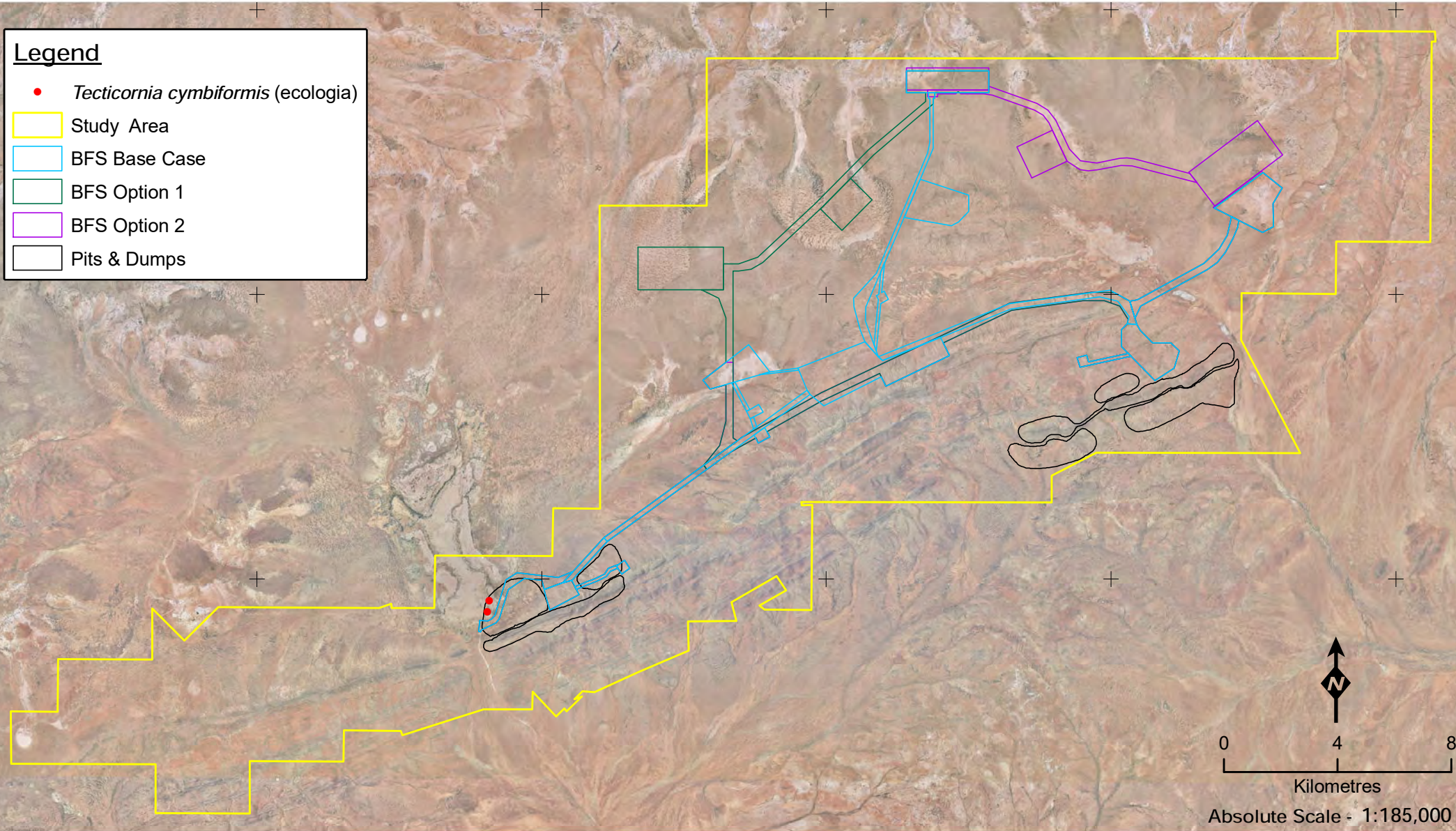
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**Legend**

- *Tecticornia cymbiformis* (ecologia)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Tecticornia cymbiformis* (P3)  
within the Study Area

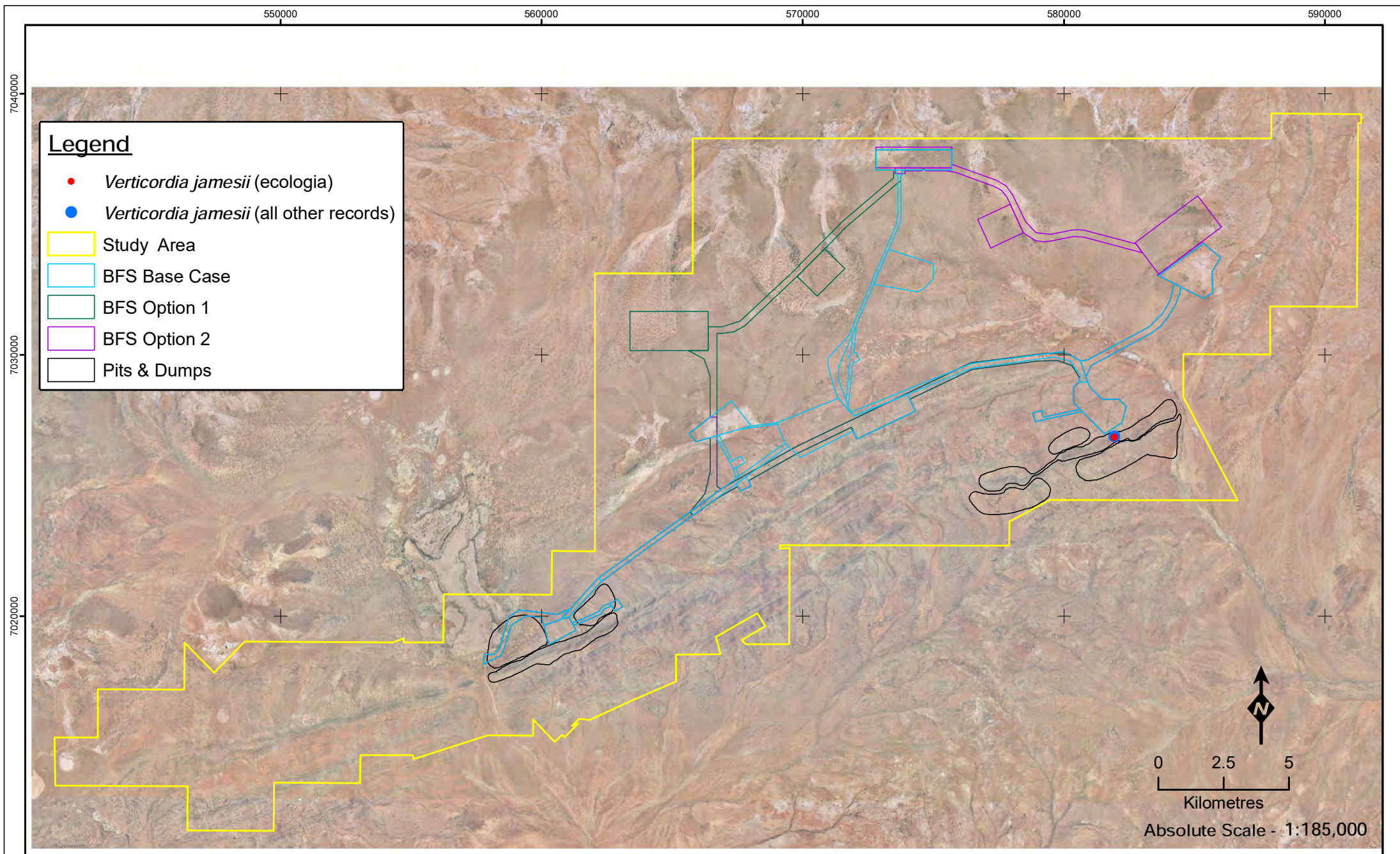
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Coordinate System  
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Projection: Transverse Mercator  
Datum: GDA 1994

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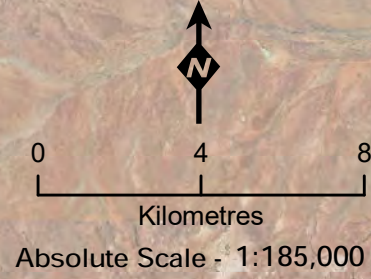
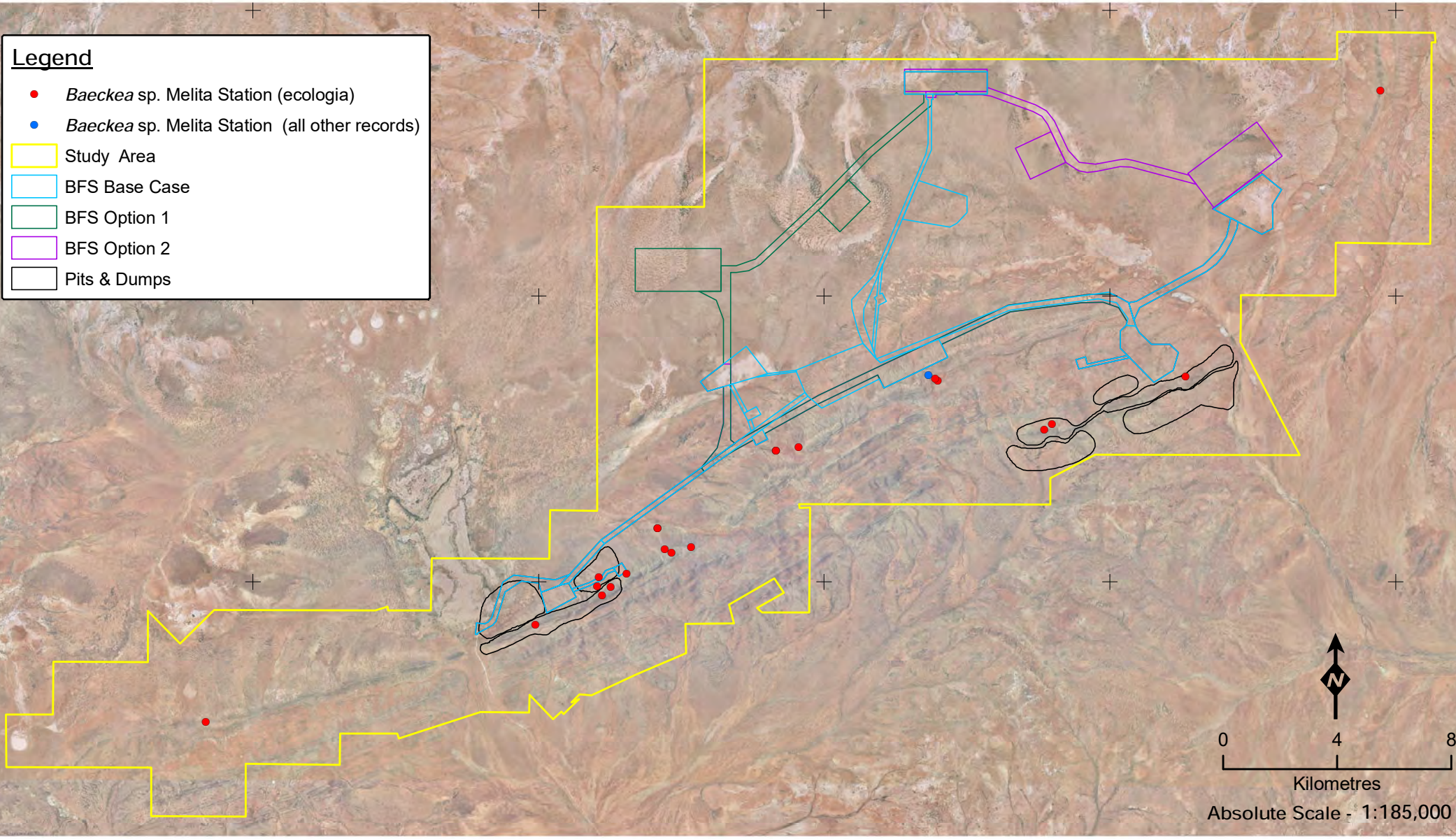
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**Legend**

- *Baeckea* sp. Melita Station (ecologia)
- *Baeckea* sp. Melita Station (all other records)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of *Baeckea* sp. Melita Station (H. Pringle 2738) within the Study Area

Figure: 7.25  
Project ID: 722

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10

Unique Map ID: S142

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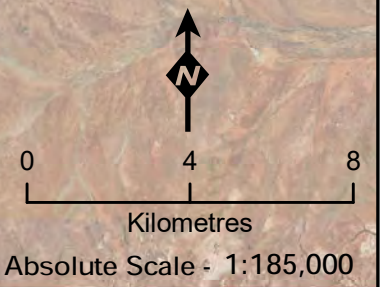
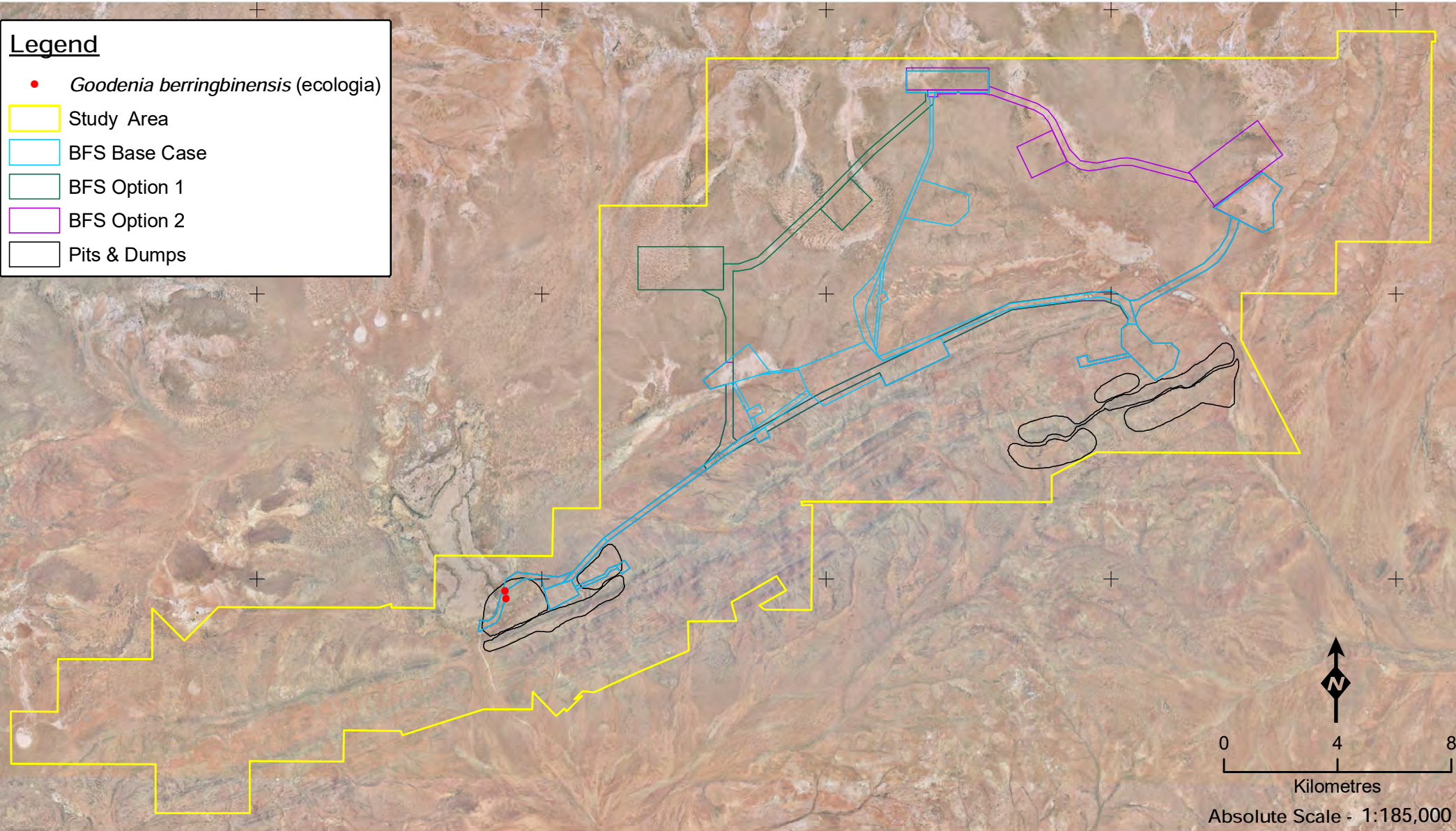
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**Legend**

- *Goodenia berringbinensis* (ecologia)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Goodenia berringbinensis* (P4)  
within the Study Area

Figure: 7.26  
Project ID: 722  
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10  
Unique Map ID: S142  
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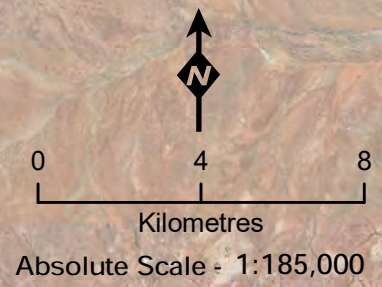
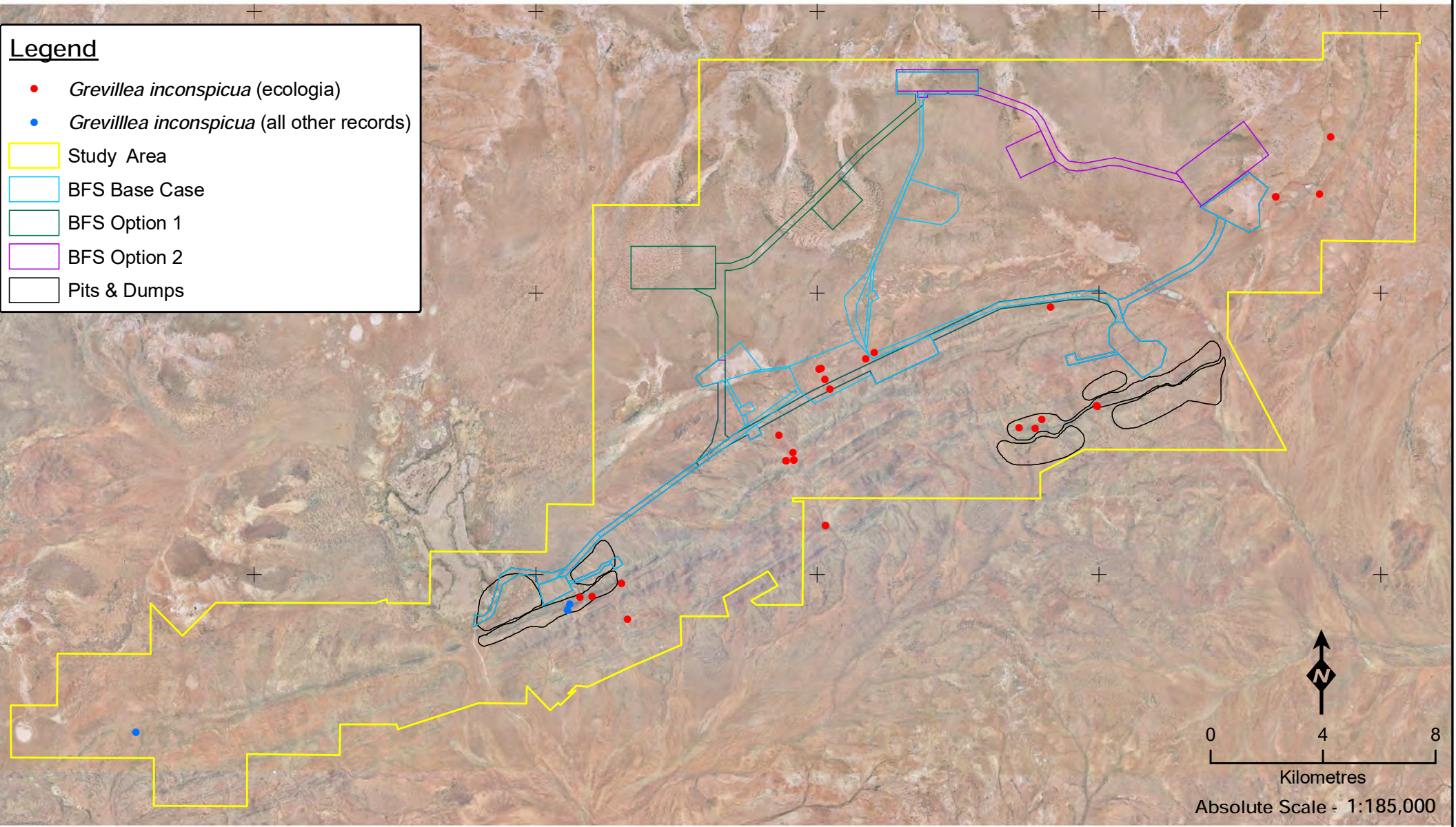
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**Legend**

- *Grevillea inconspicua* (ecologia)
- *Grevillea inconspicua* (all other records)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Grevillea inconspicua* (P4)  
within the Study Area

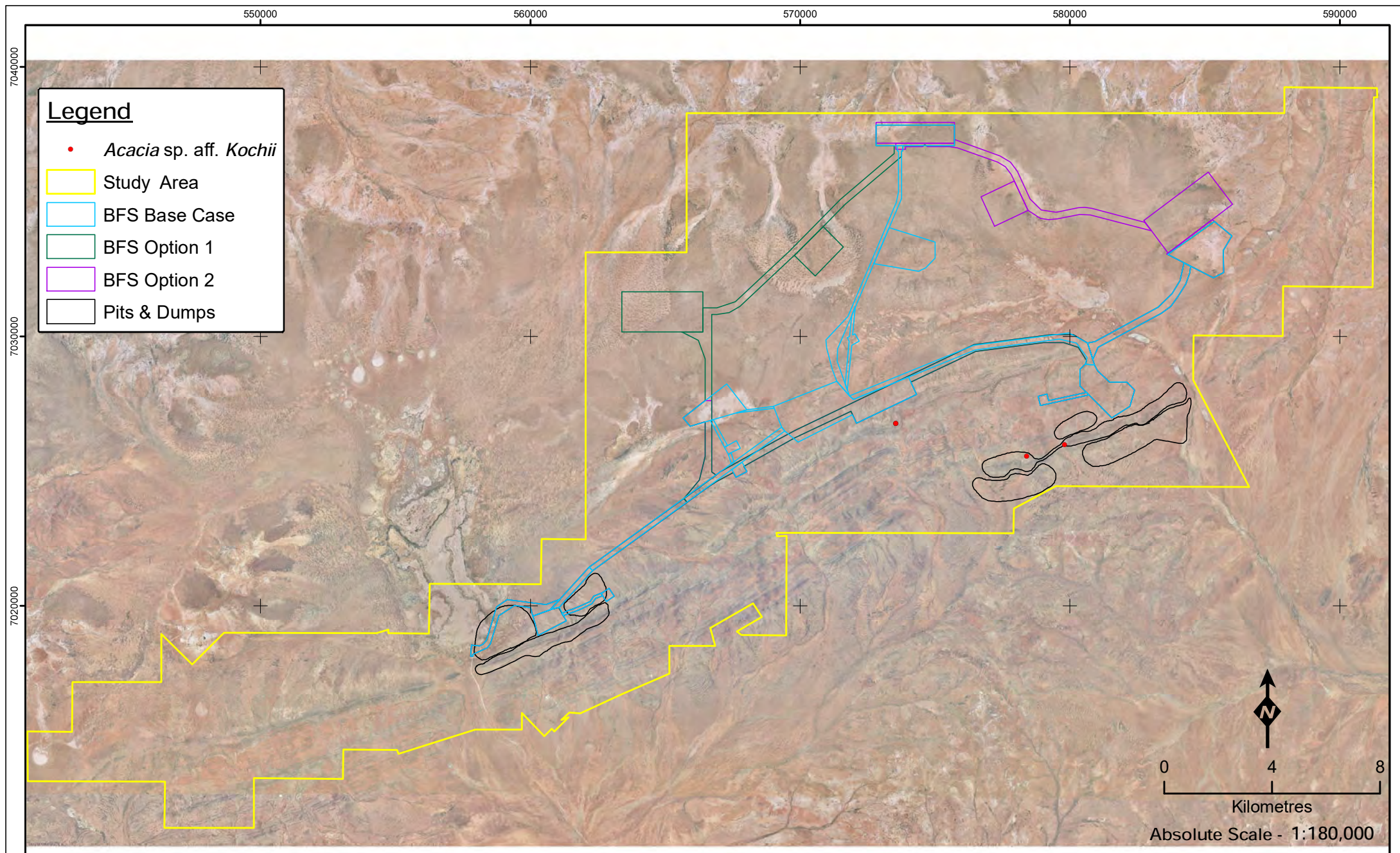
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Project ID: 722

Coordinate System  
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Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10

Unique Map ID: S142  
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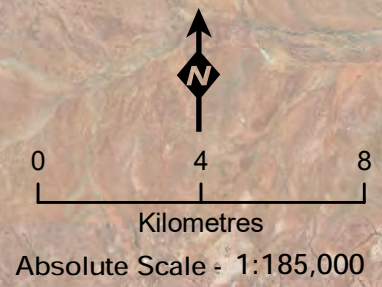
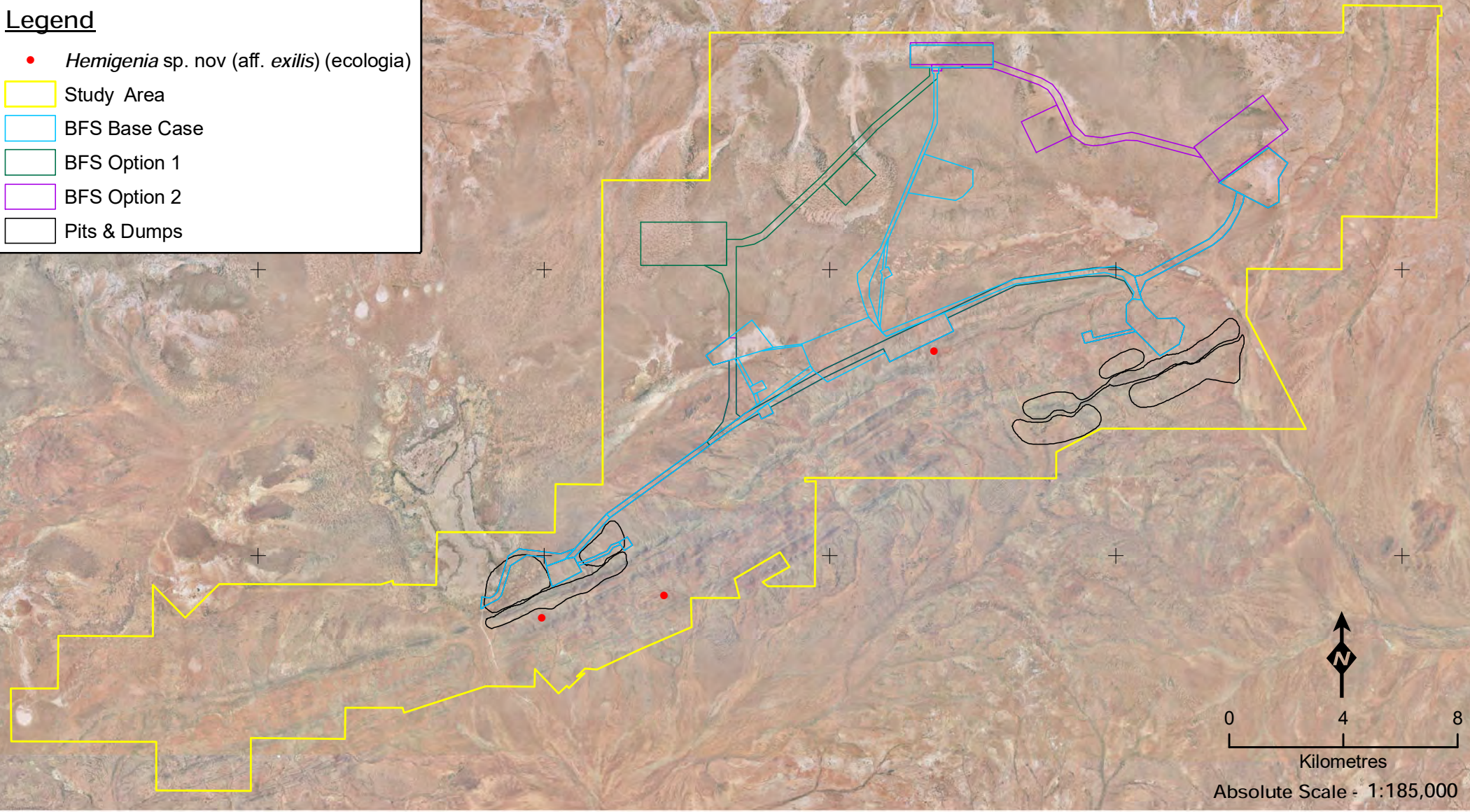
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**Legend**

- *Hemigenia* sp. nov (aff. *exilis*) (ecologia)
- Study Area
- BFS Base Case
- BFS Option 1
- BFS Option 2
- Pits & Dumps



Location of  
*Hemigenia* sp. nov. (aff. *exilis*) (SOI)  
within the Study Area

Figure: 7.29  
Project ID: 722  
  
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Drawn: CJM  
Date: 19/06/10

Unique Map ID: S142

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## 7.2 INDIRECT IMPACTS TO VEGETATION AND FLORA

### 7.2.1 Damage to Vegetation from Dust

Excessive dust can impact plants by clogging stomata. This can affect respiration and transpiration and lead to localised deaths. Excessive dust is most likely to occur at the edges of tracks and at the boundaries of pits and waste dumps. Dust suppression by watering tracks under dry conditions or periods of heavy traffic can reduce this impact, however the water used must not be excessively saline or incremental salinisation of the surrounding soil may occur.

### 7.2.2 Accidental Bushfires

Fires are a frequent occurrence in the arid zones of Australia. Ground truthing and examination of the aerial photography of the Weld Range area indicates that the area has not been frequently burnt in recent times. Spot fires are known to occur during the summer months predominantly through lightning strike.

Although the native flora is adapted and in many instances dependent upon fire for activation of seed germination, too frequent or too hot bushfires can result in detrimental changes to the composition and diversity of the vegetation causing local extinctions of vulnerable species.

The risk of fire as a result of mining activities can be minimised by implementing fire protocols such as; the appropriate isolation of flammable compounds such as hydrocarbons and explosives, localised clearing around working plant, and enforcement of appropriate smoking practices (e.g. no uncontrolled discarding of cigarette butts). Additional tracks in the area as a result of mining may act as a fire break and may help to prevent the spread of small fires once started.

### 7.2.3 Introduction of Weed Species

To date, few weeds have been recorded at Weld Range. The six weed species recorded during the surveys were all present in low numbers. Increased vehicle movements, combined with increased ground disturbance and disposal of water from drilling and dust suppression operations, will provide an opportunity for additional species to become established unless weed hygiene procedures are implemented.

### 7.2.4 Erosion and Compaction due to Off-Road Driving

Many of the landforms at Weld Range are susceptible to damage from off-road driving. The vegetation of the extensive sand plains and clay pans, which are flat and relatively sparsely vegetated, facilitate off-road driving. Soil compaction can make it difficult for plants to re-establish in these areas. The risk of damage to the vegetation can be avoided by implementing and maintaining a strict ban on off-road driving.

### 7.2.5 Effects of Saline Water used in Construction and Operation

The use of saline water in dust suppression along haul roads is common practice at mine sites across Western Australia (Bertuch *et al*, 2004). Salts in the water help to bind the soil and further reduce the dust particles released into the environment from vehicle movement.

Salts tend to accumulate on or near the soil surface in arid environments due to reduced annual rainfall regularly leeching the salts away (Bertuch *et al*, 2004). These concentrated salts can then be distributed into the environment during rainfall events and lead to localised impacts to vegetation adjacent to the haul road and access tracks. Drainage culverts and naturally occurring drainage lines along the access tracks distribute the saline water away and extend the range of the impact.

High concentrations of salts affect plants by reducing the amount of water taken up by the root system. This can lead to severe stress and eventually death. Localised plant deaths and changes in vegetation community structures could potentially occur with the use of saline water for dust suppression and salt tolerant and halophytic (salt loving) species could replace the less salt tolerant species.

Regional modelling of groundwater levels and sampling the water at a number of bores at and in the vicinity of Weld Range (SRK Consulting, 2010) suggest that regional groundwater is fresh (TDS<500 mg/L) to marginal (500 to 1,500 mg/L). However, the salinity at one borehole located in the proposed Madoonga pit area was very high, 46,000 mg/L (SRK, 2008). Discharge of water of this salinity into the surrounding environment would have detrimental effects on the vegetation.

Regular testing of the ground water extracted and used on the operational areas will reduce the potential for saline water to be released into the surrounding environment. As many plant species are damaged by saline water, the release of saline water into the environment must be tightly managed to ensure damage to vegetation does not occur.

The need for dust suppression must be counterbalanced with the risk of saline scalds if non-saline water is not available in sufficient quantities.

#### **7.2.6 Effects of Groundwater Discharge**

Saline and fresh water produced by dewatering activities at Beebyn and Madoonga will be piped to an evaporation pond located in the west of the Study Area directly north of the range. Because the evaporation pond location was not determined during the period of survey, an additional survey to assess the distribution of Priority flora within the area of evaporation and the pipeline will be conducted.

#### **7.2.7 Effects from Altered Surface Water Flow**

Most of the vegetation of the project area utilises surface water for all of its water needs. Mulga (*Acacia aneura*) is particularly dependent on surface water harvesting and susceptible to alterations to flow regimes by infrastructure. As mulga is a common component of much of the vegetation within the Study Area, drainage and water flow will need to be managed to maintain surface water flow to minimise the effects.

#### **7.2.8 Effects on Groundwater Dependent Ecosystems**

Alterations to groundwater levels resulting from bore field pumping can affect phreatophytic vegetation that occurs in the zone of drawdown. The effects depend on the timing, magnitude and rate of drawdown. Pumping of water for the proposed works will need to be managed appropriately so that the phreatophytic vegetation of the project area is not irreversibly affected by changes in groundwater levels.

Current modelling indicates that decreases of between 5 m and 125 m to current groundwater levels could occur over the nine years modelled for the life of the mines at Madoonga and Beebyn. The drawdown contours indicate that decreases could occur in the vicinity of the saline claypans and seasonally inundated zones at Madoonga, the location at which potentially phreatophytic vegetation is present.

The vegetation in this area is dominated by Unit 7a, *Melaleuca stereophloia* and *Cratystylis subspinescens* shrubland over *Tecticornia* spp/*Frankenia laxiflora* low shrubland, with smaller areas of Unit 7b, *Eucalyptus carnei* and *E. trivalvis* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland and mixed tussock grasses. Within the study area these units are restricted to this location.

The degree to which the species present at this location are dependent upon groundwater is unclear; to establish the degree of dependence will require knowledge of the depth to which each species' roots extend and probably some measurement of seasonal variation in transpiration rates. However it is reasonable to assume that if a species is restricted to environments where groundwater is more readily accessible, there may be some dependence. Both *E. carnei* and *E. trivalvis* have been recorded regionally from a range of non-riparian habitats and do not appear to be obligate phreatophytes, although this does not preclude the fact that they may be seasonally phreatophytic at this location. *Melaleuca stereophloia* is much more consistently located on saline flats and lakes, although there are some records from hill slopes. This species may be more susceptible to a decreased water table, particularly if it occurs at a rapid rate such that it cannot adapt by developing a deeper root system. Other shrub species present are likely to have shallower root system and thus be dependent on surface fed water.

Another potential effect of a decreasing water table could be an increasing level of salinity in the soil in the capillary zone above the water table. Species which are accessing water from this zone may be adversely affected by the increasing salinity which inhibits effective water uptake. At present there is insufficient information available regarding the tolerance of the species present to changes in salinity, and the likelihood and extent of such changes.

Current modelling of drawdown cones indicates that the boundary of the drawdown cone, where decreases in the water table are likely to be range from 16 to 26 m, encompasses approximately 15-25% of the main zone of inundation of this unit. A further 5-15% lies between decreases of 26 and 36 m, and less than 5% between decreases of 36 and 46 m.

The risk to GDEs may be lowered considerably by avoiding periods of peak environmental demand and allowing adaptation of dependent biota to a lower water table. If the annual decline in groundwater level can be restricted to the maximum rate of downward growth of the roots of those plants dependent on groundwater, they may still be able to access the water in the capillary fringe above the water table as the water table drops.

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## **8 RECOMMENDATIONS**

Detailed recommendations are listed under two categories; management level and design level. Recommendations at the design level present strategies that will mitigate impacts to the environment inherent in the design of proposed developments. The second level of recommendation is aimed at management strategies designed to minimise possible impacts to the functioning and quality of the biological environment by proposed developments, and to preserve existing conservation values. In order to reduce the impacts to vegetation and flora from mining activities at Weld Range, the following recommendations should be included in management plans for the project area.

### **8.1 DESIGN LEVEL**

#### **RECOMMENDATION 1**

Vegetation clearing and earth works should be carried out at an appropriate time of year to minimise deterioration in surface water flow and / or, appropriate soil stabilisation methods should be used in areas where increased sedimentation could be expected. Drains and culverts should be incorporated into infrastructure crossing minor and major drainage lines to maintain seasonal flow regimes.

#### **RECOMMENDATION 2**

The preferred mine infrastructure footprint option should be selected to minimise impact to the conservation significant vegetation and flora species of the project area.

#### **RECOMMENDATION 3**

Access tracks leading to the Option 1 infrastructure area have not been surveyed for conservation significant flora. Targeted flora surveys of these tracks should be undertaken and every effort should be made to ensure that final alignments should minimise impacts to the priority flora of the area.

#### **RECOMMENDATION 4**

Vegetation clearing should be minimised and kept to that which is absolutely necessary. Whenever possible, areas with large populations of multiple priority flora species should be avoided. Environmental personnel should be present when vegetation is cleared in areas where priority flora species are known to occur, especially Priority 1 and 2 species, to ensure that impacts to priority flora are minimised.

#### **RECOMMENDATION 5**

The height of stockpiles of soil and cleared vegetation should be minimised. Multiple smaller stockpiles, dispersed at regular intervals along the edges of cleared areas, are preferable to a single, large stockpile. Lower stockpiles allow greater retention of biological activity within the soil (bacteria, fungi and lichens), which improves seed germination rates when the soil is reused.



## **RECOMMENDATION 6**

Disturbance to vegetation associated with drainage lines and seasonally inundated low lying areas should be avoided or minimised whenever possible. Removing vegetation associated with drainage lines can lead to accelerated soil erosion or the alteration of surface water flow. Impacts to the vegetation of the halophytic shrubland (Community 7) to the west of Madoonga homestead should be avoided. This community has a restricted distribution within SMC's lease at Weld Range and is potentially a significant habitat for migratory fauna of the area.

## **RECOMMENDATION 7**

Potentially groundwater dependent ecosystems should be identified in the project area. A baseline and long-term monitoring programme should be initiated to document any effects on groundwater dependent ecosystems resulting from groundwater extraction in the project area. Pumping of water for the proposed works will need to be managed appropriately so that any phreatophytic vegetation in the project area is not irreversibly affected by changes in groundwater levels.

## **8.2 MANAGEMENT LEVEL**

### **RECOMMENDATION 8**

Existing environmental procedures should be implemented for staff and contractors. These should include, but not be limited to, managing the risk of fire, the spread of weeds, and encouraging general environmental impact awareness.

### **RECOMMENDATION 9**

A handbook containing photographs of conservation significant and weed species of Weld Range should be provided to all staff involved in vegetation clearing, prior to clearing. This will reduce the likelihood that these species are inadvertently cleared, or in the case of weed species, spread as a result of ground disturbance.

### **RECOMMENDATION 10**

Topsoil stockpiles and areas of rehabilitation should be monitored periodically. Particular attention should be paid to weed species. If population densities or distribution of any weed species is seen to be increasing, eradication procedures should be implemented.

### **RECOMMENDATION 11**

The minimum amount of topsoil possible should be removed when clearing vegetation for short-term structures. Minimal topsoil disturbance will encourage natural regeneration due to retention of the seed store and microbiological activity, which is largely confined to the topsoil. Achieving minimum disturbance will also discourage weeds and other species which proliferate following disturbance.

### **RECOMMENDATION 12**

Areas that have been impacted by earthworks but are not needed for long-term infrastructure should be rehabilitated as soon as practicable after completion of works. This will promote soil stabilisation by plant roots and help to discourage weed proliferation in these areas. Stockpiled topsoil should be used in rehabilitation works as soon as after removal as possible as the seed stored in the soil will be viable.

### **RECOMMENDATION 13**

Off road driving should be limited to reduce impact to vegetation in general and conservation significant flora in particular, and also to reduce areas of soil compaction.

### **RECOMMENDATION 14**

Further surveys should be undertaken to determine the population extent, distribution and taxonomy of the two taxa of interest; *Acacia* sp. nov. (aff. *kochii*) and *Hemigenia* sp. nov. (aff. *exilis*). Currently the only records for these taxa are from Weld Range and additional reproductive material is required to assist in their taxonomic description.

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## 9 STUDY TEAM

The Weld Range vegetation and flora assessment described in this document was planned, coordinated and executed by:



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Licences - "Licence to take flora for scientific purposes"		
The flora and vegetation surveys described in this report were conducted under the authorisation of the following licences issued by the Department of Environment and Conservation:		
	Permit Number	Valid Until
Scott Hitchcock	SL007531	10th May, 2007
	SL007816	30th April, 2008
	SL008095	30th April, 2009
Jeremy Naaykens	SL007508	2nd April, 2007
	SL007795	30th April, 2008

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Rebecca Graham	SL007797	30 <sup>th</sup> April, 2009
Christina Cox	SL008096	30 <sup>th</sup> April, 2009

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**APPENDIX A**

**SUMMARY OF TARGETED FLORA SURVEYS BY  
ECOLOGIA AT WELD RANGE**

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Location	Date of Survey	Survey Details	No. of Species	DRF/Priority Flora Recorded	Status	Reference
W40 to W36 polygon in Tenement E51/0907	July 2009	Targeted rare flora grid search survey of an approximately 1 km <sup>2</sup> area.	73	<i>Euphorbia sarcostemmoides</i> <i>Acacia speckii</i> <i>Dodonaea amplisemina</i> <i>Indigofera gilesii</i> subsp. <i>gilesii</i> <i>Micromyrtus placoides</i> <i>Baeckea</i> sp. Melita Station (H. Pringle 2738)	P1 P3 P3 P3 P4	(ecologia, 2009,h)
W9,W10 and W11 deposits in Tenement TR70/3902	March & April 2009	Targeted rare flora grid search survey of an approximately 0.029 km <sup>2</sup> area.	85	<i>Prostanthera petrophila</i> <i>Acacia speckii</i>	P1 P3	(ecologia, 2009,h)
Campsite Extension in Tenement M 20/0402	March 2009	Targeted rare flora grid search survey of an approximately 0.559 km <sup>2</sup> area.	66	<i>Acacia speckii</i>	P3	(ecologia, 2009,h)
Gravel pits	March 2009	Targeted rare flora grid search survey of an approximately 0.559 km <sup>2</sup> area.		<i>Hemigenia tysonii</i> <i>Grevillea stenostachya</i>	P3 P3	(ecologia, 2009,h)
A polygon in the area between Beebyn and W45 to the east (Tenement E51/907).	November 2008	Targeted rare flora grid search survey of an approximately 2.5 km <sup>2</sup> area.	89	<i>Eremophila ?obliquisekala</i> <i>Ptilotus astrolasius</i> var. <i>luteolus</i> <i>Acacia speckii</i> <i>Dodonaea amplisemina</i> <i>Micromyrtus placoides</i> <i>Prostanthera petrophila</i> <i>Baeckea</i> sp. Melita Station	P1 P1 P3 P3 P3 P4	(ecologia, 2009a)
Gravel Pit extension at the eastern end of the lease.	November 2008	Targeted rare flora survey of approximately 30-40 m width beyond two existing gravel pits.	0	<i>Hemigenia tysonii</i>	P3	(ecologia, 2009b)
W15 pad enlargements and additional new pads.	November 2008	Targeted rare flora survey of 10 m extensions to three existing drillpads and two new 30 m by 30 m drill pad areas (approximately 0.003 km <sup>2</sup> surveyed).	0	No DRF or priority flora recorded.		(ecologia, 2009c)
Polygon South of W12 at Beebyn at the eastern extent of the lease.	October 2008	Targeted rare flora grid search survey covering an area of 0.62 km <sup>2</sup> .	70	<i>Acacia speckii</i> <i>Grevillea stenostachya</i>	P3 P3	(ecologia, 2009d)

Location	Date of Survey	Survey Details	No. of Species	DRF/Priority Flora Recorded	Status	Reference
Extension areas between W30 to W45 (Tenements E20/641 and E51/907).	October 2008	Targeted rare flora survey over an area of approximately 1.7 km <sup>2</sup> .	93	<i>Sauropus</i> sp. Woolgorong <i>Beyeria lapidicola</i> <i>Acacia speckii</i> <i>Dodonaea amplisemina</i> <i>Grevillea stenostachya</i> <i>Hemigenia tysonii</i> <i>Homalocalyx echinulatus</i> <i>Micromyrtus placoides</i> <i>Prostanthera petrophila</i> <i>Baeckea</i> sp. Melita Station <i>Eremophila</i> aff. <i>gracillima</i>	P1 P2 P3 P3 P3 P3 P3 P3 P3 P4 SOI	( <i>ecologia</i> , 2009e)
Hydrological bores –HYM_202 - HYM_204.	September 2008	Targeted rare flora survey of three proposed drill pads and associated access tracks (approximately 0.05 km <sup>2</sup> surveyed).	47	<i>Hemigenia tysonii</i>	P3	( <i>ecologia</i> , 2009f)
Madoonga Infill.	September 2008	Targeted rare flora grid search survey of approximately 1.3 km <sup>2</sup> .	96	<i>Acacia speckii</i> <i>Hemigenia tysonii</i> <i>Homalocalyx echinulatus</i> <i>Micromyrtus placoides</i> <i>Prostanthera petrophila</i>	P3 P3 P3 P3 P3	( <i>ecologia</i> , 2009g)
Lens W6 (tenement E20/641) extension of drill pads.	September 2008	Priority flora impacts survey associated with the enlargement of 10 existing drill pads by approximately 10 m.	0	<i>Micromyrtus placoides</i> <i>Prostanthera petrophila</i> <i>Baeckea</i> sp. Melita Station	P3 P3 P4	( <i>ecologia</i> , 2008a)
Lenses W6 and W20 (Tenement E20/641).	March 2008	Targeted rare flora grid search survey over approximately 1.4 km <sup>2</sup> .	87	<i>Eremophila gracillima</i> <i>Acacia speckii</i> <i>Dodonaea amplisemina</i> <i>Grevillea stenostachya</i> <i>Homalocalyx echinulatus</i> <i>Micromyrtus placoides</i> <i>Prostanthera petrophila</i> <i>Grevillea inconspicua</i>	P1 P3 P3 P3 P3 P3 P3 P4	( <i>ecologia</i> , 2008b)

Location	Date of Survey	Survey Details	No. of Species	DRF/Priority Flora Recorded	Status	Reference
Weld Range Tenement E51/907 (W30 & 31, W33-W35, W38 & 39, W41-W43, W45 & Limestone Well).	March 2008	Targeted rare flora grid search survey with a combined approximate area of 4.6 km <sup>2</sup> .	105	<i>Euphorbia sarcostemmoides</i> <i>Sauropus</i> sp. Woolgorong <i>Acacia speckii</i> <i>Dodonaea amplisemina</i> <i>Hemigenia tysonii</i> <i>Homalocalyx echinulatus</i> <i>Micromyrtus placoides</i> <i>Prostanthera petrophila</i> <i>Baeckea</i> sp. Melita Station	P1 P1 P3 P3 P3 P3 P3 P3 P4	( <i>ecologia</i> , 2008c)
Weld Range Tenement No. E51/907, Lens W41.	April 2007	Targeted rare flora survey of six proposed drill pads and associated access tracks (approximately 0.02 km <sup>2</sup> surveyed).	16	No DRF or Priority Flora recorded.		( <i>ecologia</i> , 2007a)
Weld Range E 51/907, (W33 & W42 north and south)	April 2007	Targeted rare flora survey of 35 proposed drill pads and associated access tracks (approximately 0.12 km <sup>2</sup> surveyed).	31	<i>Acacia speckii</i> <i>Baeckea</i> sp. Melita Station <i>Prostanthera petrophila</i>	P3 P4 P3	( <i>ecologia</i> , 2007b and 2007c)
Weld Range E51/907, Lenses W35 & W36.	April 2007	Targeted rare flora survey of 39 drill pads and associated access tracks (approximately 0.1 km <sup>2</sup> surveyed).	36	<i>Dodonaea amplisemina</i> <i>Baeckea</i> sp. Melita Station	P3 P4	( <i>ecologia</i> , 2007d)
Weld Range Tenement No. E51/907, Lens W43 (encompassing lenses W43, W43 North and W43 Far North) and a Channel Iron Deposit (CID) area (located between lenses W43 and W43 north).	April 2007	Targeted rare flora survey of 22 drill pads and associated access tracks (approximately 0.10 km <sup>2</sup> surveyed).	49	<i>Acacia speckii</i> <i>Dodonaea amplisemina</i> <i>Baeckea</i> sp. Melita Station <i>Grevillea inconspicua</i>	P3 P3 P4 P4	( <i>ecologia</i> , 2007e)
Weld Range E51/907, Lenses W38, W39 & W40.	March 2007	Targeted rare flora survey of 43 drill pads and associated access tracks (approximately 0.08 km <sup>2</sup> surveyed).	49	<i>Dodonaea amplisemina</i> <i>Baeckea</i> sp. Melita Station	P3 P4	( <i>ecologia</i> , 2007f)



Location	Date of Survey	Survey Details	No. of Species	DRF/Priority Flora Recorded	Status	Reference
Weld Range Tenement No. E51/907, Lens W34.	March 2007	Targeted rare flora survey of 19 drill pads and associated access tracks (approximately 0.08 km <sup>2</sup> surveyed).	49	<i>Acacia speckii</i> <i>Baeckea</i> sp. Melita Station	P3 P4	(ecologia, 2007g)
Second pass metallurgical exploration drilling programme at Beebyn and Madoonga (tenement number TR 70/3902) at Weld Range W9, W11 and W14.	February 2007	Targeted rare flora survey of 31 drill pads and associated access tracks (approximately 0.05 km <sup>2</sup> surveyed).	51	<i>Micromyrtus placoides</i>	P3	(ecologia, 2007h)
Weld Range Proposed Campsite Option B and G on tenement TR 70/3902 or M 20/0402.	October 2006	Targeted rare flora survey of a proposed exploration camp site (option B) and proposed access track (approximately 0.008 km <sup>2</sup> surveyed).	21	<i>Hemigenia tysonii</i> <i>Micromyrtus placoides</i>	P3 P3	(ecologia, 2006a)
		Targeted rare flora survey of a proposed exploration camp site (option G) and proposed access track (approximately 0.04 km <sup>2</sup> surveyed).	18	No DRF or Priority Flora recorded.		
Weld Range Proposed Campsite on tenement TR 70/3902.	September 2006	Targeted rare flora survey of a proposed exploration camp site (option A) and proposed access track (approximately 0.04 km <sup>2</sup> surveyed).	46	<i>Micromyrtus placoides</i>	P3	(ecologia, 2006b)
Hampton Hill Joint Venture tenements, infill drill pads between W15, W27, W16, W19, and W28.	September 2006	Targeted rare flora survey of 14 infill drill pads and associated access tracks (approximately 0.01 km <sup>2</sup> surveyed).	91	<i>Micromyrtus placoides</i> <i>Prostanthera petrophila</i>	P3 P3	(ecologia, 2006c)
Weld Range Rare and Priority Flora Survey – TR 70/3902, E 20/208 and M 20/31.	July 2006	Targeted rare flora survey of 57 drill pads and associated access tracks (approximately 0.07 km <sup>2</sup> surveyed).	154	<i>Beyeria lapidicola</i> <i>Micromyrtus placoides</i> <i>Prostanthera petrophila</i> <i>Verticordia jamiesonii</i>	P2 P3 P3 P3	(ecologia, 2006d)

Location	Date of Survey	Survey Details	No. of Species	DRF/Priority Flora Recorded	Status	Reference
		Targeted rare flora survey of 16 drill pads and associated access tracks (approximately 0.03 km <sup>2</sup> surveyed).		<i>Micromyrtus placoides</i> <i>Prostanthera petrophila</i>	P3 P3	

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**APPENDIX B      2010 DEC DATABASE SEARCH**

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Species	Family	Status	Nearest Named Locations	Habitat (WA Herbarium, 2009)	Likelihood of Occurrence at Weld Range
<i>Acacia burrowsiana</i>	FABACEAE	P3	Along Beebyn-Karbar Road NW of Cue	Low stony rise with skeletal soils and quartz, ironstone and schistose rubble on surface, adjacent to Sapphire flats.	Recorded
<i>Acacia speckii</i>	FABACEAE	P3	Weld Range, on Madoonga Station and Telstra tower	Moderately inclined midslope of banded ironstone and basalt with red soils	Recorded
<i>Baeckea</i> sp. Melita Station	MYRTACEAE	P4	Weld Range, NW of Cue	Mid rocky slopes and ironstone breakaways. Red/brown soils over ironstone.	Recorded
<i>Beyeria lapidicola</i>	EUPHORBIACEAE	P1	Weld Range	Plain with a currently dry creek bed. Red-orange sandy clay, fine gravel. Ferrous. No evidence of fire. Good condition. Old track runs through centre of site.	Recorded
<i>Calytrix erosipetala</i>	MYRTACEAE	P3	East of Hillview Homestead	Breakaway weathered granite	Recorded
<i>Dodonaea amplisemina</i>	SAPINDACEAE	P3	Weld Range, on Madoonga Station.	Moderately inclined hillcrest of basalt and some banded ironstone. Slightly rocky basalt outcrop with red soils.	Recorded
<i>Eremophila arachnoides</i> subsp. <i>Arachnoides</i>	SCROPHULARIACEAE	P3	South of Yarrabubba State	On shallow brown loams over limestone	Recorded
<i>Eremophila rhexos</i>	SCROPHULARIACEAE	P1	Weld Range	High hill. Brown loam and rocks over dolerite, quartz and ironstone.	Recorded
<i>Euphorbia sarcostemmoides</i>	EUPHORBIACEAE	P1	Robinson Range, survey site ROBI28	Gently inclined lower slope of banded ironstone with red brown shallow sandy loam soils	Recorded
<i>Goodenia berringbinensis</i>	GOODENIACEAE	P4	Bed of Berringbine Creek, Belele Station	Red sandy loam.	Recorded

Species	Family	Status	Nearest Named Locations	Habitat (WA Herbarium, 2009)	Likelihood of Occurrence at Weld Range
<i>Goodenia lyrata</i>	GOODENIACEAE	P1	West of Laverton	Red sandy loam, near claypan.	Recorded
<i>Grevillea inconspicua</i>	PROTEACEAE	P4	Weld Range, SE of Madoonga Homestead	Red loam/clay soil. Population on greenstone outcrop.	Recorded
<i>Grevillea stenostachya</i>	PROTEACEAE	P3	Belele Station, near Lalgaroo paddock	Red sandy loam.	Recorded
<i>Hemigenia tysonii</i>	LAMIACEAE	P3	Near Government Well on Coodardy Station, Cue	Sand.	Recorded
<i>Homalocalyx echinulatus</i>	MYRTACEAE	P3	Weld Range	Brown loam and rock fragments, ironstone/dolerite.	Recorded
<i>Indigofera gilesii</i> subsp. <i>gilesii</i>	FABACEAE	P3	Glengarry Range, SE of Mooloogool Homestead		Recorded
<i>Micromyrtus placoides</i>	MYRTACEAE	P3	Weld Range slopes below Telecom tower	Brown loam over dolerite & ironstone.	Recorded
<i>Mirbelia stipitata</i>	FABACEAE	P3	Along Cue-Sandstone Road	Base of granite rock. Rangeland. Brown dry loam.	Recorded
<i>Phyllanthus baeckeoides</i>	PHYLLANTHACEAE	P3	Weld Range on Glen Station	Gently inclined lower hillslope to flat of banded ironstone. Very slightly rocky banded ironstone outcrop with red brown soils	Recorded
<i>Prostanthera ferricola</i>	LAMIACEAE	P3	Weld Range, on Madoonga Station.	Steep midslope of banded ironstone and basalt. Slightly rocky banded ironstone and basalt outcrop with red soils.	Recorded
<i>Prostanthera petrophila</i>	LAMIACEAE	P3	Weld Range	Brown loam with dolerite quartz and ironstone blocks.	Recorded
<i>Ptilotus beardii</i>	AMARANTHACEAE	P3	Weld Range	Red orange sandy clay.	Recorded
<i>Ptilotus luteolus</i>	AMARANTHACEAE	P3	South of Meekatharra on Gabanantha Road	Hillslope.	Recorded

Species	Family	Status	Nearest Named Locations	Habitat (WA Herbarium, 2009)	Likelihood of Occurrence at Weld Range
<i>Sauropus</i> sp. <i>Woolgorong</i>	PHYLLANTHACEAE	P1	Weld Range on Glen Station	Moderately inclined upper hillslope of banded ironstone, quartz and chert. Very rocky banded ironstone, quartz and chert outcrop with red brown soils.	Recorded
<i>Stenanthemum patens</i>	RHAMNACEAE	P1	North of Mount Clifford	Rocky hillside.	Recorded
<i>Tecticornia cymbiformis</i>	CHENOPODIACEAE	P3	Lake Anneen	Gently sloping dune before lake floodplain. Red-brown sandy clay.	Recorded
<i>Verticordia jamiesonii</i>	MYRTACEAE	P3	Along Kalli Road	Breakaway, dry red yellow sandy clay over pale red sandstone.	Not recorded



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## APPENDIX C

## COORDINATES AND VEGETATION CONDITION ASSESSMENT OF QUADRATS

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Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
1	Phase 1&2	542005	7014892	Good
2	Phase 1&2	542124	7014740	Good
3	Phase 1	542684	7014676	Good
4	Phase 1	542975	7014538	Good
4a	Phase 2	547554	7014897	Good
5	Phase 1&2	545195	7016854	Good
6	Phase 1&2	544107	7016163	Good
7	Phase 1	547224	7014931	Poor
8	Phase 1	547559	7014896	Excellent
10	Phase 1	547755	7014970	Good
10a	Phase 2	547792	7014738	Good
11	Phase 1&2	547091	7015942	Poor
12	Phase 1	548350	7015087	Good
13	Phase 1	547503	7016136	Good
14	Phase 1	547824	7016428	Good
15	Phase 1&2	547381	7016821	Good
16	Phase 1	548863	7016361	Good
17	Phase 1&2	549879	7017173	Good
18	Phase 1	550527	7017872	Poor
19	Phase 1	551133	7018310	Good
22	Phase 1	569663	7027652	Excellent
23	Phase 1	572647	7026444	Poor
24	Phase 1	571858	7027290	Good
25	Phase 1	572027	7027663	Good
26	Phase 1	573297	7026981	Good
27	Phase 1	574151	7027062	Good
28	Phase 1	573935	7026087	Good
29	Phase 1	574397	7025516	Excellent
30	Phase 1	572381	7026342	Excellent
32	Phase 1	576110	7027945	Good

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
33	Phase 1	576975	7027507	Good
34	Phase 1	577572	7028469	Good
35	Phase 1&2	578440	7028713	Good
36	Phase 1	578288	7029509	Good
37	Phase 1	578433	7029011	Good
38	Phase 1	579045	7028527	Good
39	Phase 1&2	580031	7028802	Good
40	Phase 1	580038	7029085	Good
41	Phase 1&2	580346	7028437	Good
42	Phase 1	581164	7028342	Poor
43	Phase 1&2	581737	7030291	Good
44	Phase 1	582477	7030165	Good
45	Phase 1	582532	7029890	Good
46	Phase 1	583721	7029312	Poor
47	Phase 1	584163	7028555	Good
48	Phase 1	581863	7027164	Excellent
49	Phase 1	580134	7025220	Good
50	Phase 1&2	579888	7025313	Good
51	Phase 1&2	578958	7025464	Poor
52	Phase 1	578405	7024722	Good
53	Phase 1&2	576712	7024043	Good
54	Phase 1&2	576285	7024058	Good
55	Phase 1	576512	7023213	Good
56	Phase 1&2	576624	7022957	Good
57	Phase 1	555361	7018447	Good
58	Phase 1&2	556310	7018553	Poor
59	Phase 1	555937	7016482	Good
60	Phase 1	556788	7016839	Poor
61	Phase 1&2	557351	7018302	Good
62	Phase 1&2	558160	7019242	Good
63	Phase 1	558753	7019308	Good

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
64	Phase 1	558818	7019727	Poor
65	Phase 1	560117	7020303	Good
66	Phase 1	560739	7020177	Poor
67	Phase 1&2	560339	7018774	Good
68	Phase 1	561487	7019282	Excellent
69	Phase 1	562050	7019840	Good
70	Phase 1	563095	7019945	Excellent
71	Phase 1&2	564211	7020601	Good
72	Phase 1	565375	7021598	Good
75	Phase 1	558361	7016368	Good
76	Phase 1	558871	7016000	Excellent
77	Phase 1&2	560388	7016711	Poor
78	Phase 1&2	560836	7016798	Good
79	Phase 1&2	561440	7016893	Good
80	Phase 1	561967	7017599	Good
81	Phase 1&2	563937	7018085	Good
82	Phase 1	565129	7018605	Good
83	Phase 1	566032	7018945	Good
84	Phase 1&2	584124	7031028	Poor
85	Phase 1&2	584862	7031416	Excellent
86	Phase 1	585304	7031787	Good
87	Phase 1	585580	7030838	Good
88	Phase 1&2	585763	7031188	Good
88a	Phase 2	579048	7028520	Good
89	Phase 1	586478	7031056	Excellent
90	Phase 1	585997	7032081	Excellent
91	Phase 1	585672	7033112	Good
92	Phase 1&2	586292	7033420	Good
93	Phase 1	586714	7035414	Good
94	Phase 1&2	587032	7035055	Good
95	Phase 1&2	587295	7034769	Poor

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
96	Phase 1	588225	7035560	Good
97	Phase 1	588203	7035871	Poor
98	Phase 1&2	588797	7035953	Good
99	Phase 1&2	588798	7036525	Good
100	Phase 1&2	588158	7037131	Good
101	Phase 1&2	588450	7038104	Good
102	Phase 1&2	589312	7038142	Good
103	Phase 1	588444	7038690	Good
104	Phase 1	588554	7038981	Good
108	Phase 1&2	562128	7019503	Good
109	Phase 1	581786	7026819	Good
110	Phase 1	548351	7015088	Good
111	Phase 1	549405	7015196	Good
114	Phase 1	563731	7020476	Good
115	Phase 2	541455	7014385	Good
116	Phase 2	544412	7016905	Good
117	Phase 2	546935	7015506	Good
118	Phase 2	547723	7014961	Good
119	Phase 2	557394	7018295	Good
120	Phase 2	558093	7018841	Good
121	Phase 2	558037	7019505	Good
122	Phase 2	580322	7030811	Excellent
123	Phase 2	581695	7030171	Good
124	Phase 2	589437	7037259	Good
125	Phase 2	589791	7037197	Good
126	Phase 2	589471	7037203	Excellent
127	Phase 2	589282	7036626	Good
128	Phase 2	589342	7036616	Excellent
129	Phase 2	589461	7036537	Good
130	Phase 2	589858	7037769	Good
131	Phase 2	587069	7034505	Good

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
132	Phase 2	587781	7034353	Good
133	Phase 2	587937	7034213	Excellent
134	Phase 2	588151	7033952	Good
135	Phase 2	588502	7033622	Poor
136	Phase 2	587841	7033527	Good
137	Phase 2	588342	7034114	Excellent
138	Phase 2	582918	7027232	Good
139	Phase 2	583009	7027197	Good
140	Phase 2	582941	7027205	Good
141	Phase 2	582035	7027062	Good
142	Phase 2	581892	7027044	Good
143	Phase 2	581922	7026918	Good
144	Phase 2	580319	7026328	Good
145	Phase 2	575112	7027432	Good
146	Phase 2	580290	7026302	Good
147	Phase 2	579052	7025125	Good
148	Phase 2	573853	7027002	Excellent
149	Phase 2	573904	7027138	Good
150	Phase 2	573767	7027087	Good
151	Phase 2	573424	7027308	Excellent
152	Phase 2	573471	7027246	Good
153	Phase 2	574031	7027464	Good
154	Phase 2	555848	7017032	Poor
156	Phase 2	555918	7016947	Good
156a	Phase 2	555945	7016882	Good
157	Phase 2	555667	7016771	Good
158	Phase 2	555416	7016811	Good
159	Phase 2	555419	7016931	Poor
160	Phase 2	563572	7018064	Good
161	Phase 2	564239	7018334	Good
162	Phase 2	563264	7018400	Good



Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
163	Phase 2	564463	7019090	Good
164	Phase 2	563797	7018544	Good
165	Phase 2	562938	7019075	Good
166	Phase 2	563695	7019052	Good
167	Phase 2	564390	7019704	Good
168	Phase 2	562094	7019416	Good
169	Phase 2	562005	7019220	Excellent
170	Phase 2	563054	7019695	Good
171	Phase 2	562929	7019904	Good
172	Phase 2	562971	7019839	Good
173	Phase 2	563088	7020263	Good
174	Phase 2	563915	7019886	Good
175	Phase 2	578375	7028962	Good
176	Phase 2	579697	7029433	Good
177	Phase 2	551827	7015815	Good
178	Phase 2	552257	7015792	Good
179	Phase 2	551354	7015776	Good
180	Phase 2	552434	7015962	Good
181	Phase 2	550940	7015223	Good
182	Phase 2	559931	7017810	Good
183	Phase 2	559418	7018409	Poor
BPC01	Phase 3	581233	7031767	Good
BPC02	Phase 3	581030	7031651	Good
BPC03	Phase 3	580844	7031891	Good
BPC04	Phase 3	579977	7031713	Good
BPC05	Phase 3	579814	7031869	Good
BPC06	Phase 3	578651	7032379	Poor
BPC07	Phase 3	577958	7032287	Good
BPC08	Phase 3	577662	7032721	Good
BPC09	Phase 3	579024	7032277	Poor
BPC10	Phase 3	579391	7031751	Good

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
BPE01	Phase 3	586684	7034277	Good
BPE02	Phase 3	585309	7032299	Good
BPE03	Phase 3	585158	7033155	Good
BPE05	Phase 3	585487	7034280	Good
BPE06	Phase 3	585632	7033848	Poor
BPE07	Phase 3	586389	7034215	Good
BPE08	Phase 3	585343	7033633	Good
BPE09	Phase 3	585363	7033496	Good
BPE12	Phase 3	504022	7033223	Good
BPE14a	Phase 3	585451	7032503	Good
BPE14b	Phase 3	585471	7033373	Good
BPE15	Phase 3	585376	7032971	Good
BPE16	Phase 3	585521	7033373	Good
BPW01	Phase 3	577071	7032746	Good
BPW02	Phase 3	577059	7033032	Good
BPW03	Phase 3	576626	7032346	Good
BPW04	Phase 3	573114	7032129	Good
BPW05	Phase 3	573610	7032003	Good
BPW06	Phase 3	575851	7032724	Excellent
BPW07	Phase 3	575210	7032660	Good
BPW08	Phase 3	574389	7032529	Excellent
BPW09	Phase 3	574188	7032469	Excellent
BPW10	Phase 3	574714	7032500	Excellent
BPW13	Phase 3	573979	7032615	Good
HR01	Phase 3	563716	7022514	Excellent
HR02	Phase 3	504383	7022943	Excellent
HR03	Phase 3	565967	7024046	Excellent
HR04	Phase 3	571730	7027665	Excellent
HR05	Phase 3	571137	7027349	Excellent
HR06	Phase 3	567092	7024711	Excellent
HR07	Phase 3	566302	7024279	Excellent

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
HR09	Phase 3	574743	7028902	Good
HR10	Phase 3	575069	7029011	Good
HR11	Phase 3	561103	7020074	Good
HR12	Phase 3	561671	7020815	Good
HR13	Phase 3	562739	7021607	Good
HR14	Phase 3	571935	7027743	Good
HR15	Phase 3	572353	7027955	Good
HR16	Phase 3	576016	7029468	Good
HR17	Phase 3	576849	7029667	Good
HR18	Phase 3	577286	7029627	Excellent
HR19	Phase 3	577838	7029714	Good
HR20	Phase 3	578621	7029801	Good
HR21	Phase 3	579184	7029888	Excellent
HR23a	Phase 3	580496	7029551	Good
HR23b	Phase 3	580171	7029992	Excellent
HR25	Phase 3	580826	7029203	Good
HR26	Phase 3	570579	7027118	Good
HR27	Phase 3	570335	7026986	Good
HR28	Phase 3	570265	7026936	Good
HR29	Phase 3	569789	7026655	Excellent
HR30	Phase 3	569357	7026385	Good
MWD01	Phase 3	558832	7019504	Good
MWD02	Phase 3	558804	7019050	Good
R02	Rail	563317	7025414	Poor
R04	Rail	563415	7026464	Good
R05	Rail	563231	7030325	Good
R06	Rail	563479	7027637	Good
R07	Rail	565650	7026510	Good
R08	Rail	567491	7027591	Good
R09	Rail	565553	7028994	Good
R10	Rail	566320	7030900	Good

Site	Phase	Easting (mE)	Northing (mN)	Vegetation Condition
R11	Rail	568802	7032751	Good
R12	Rail	571003	7034390	Excellent
R13	Rail	571424	7031721	Good
R14	Rail	575257	7031712	Good
R17	Rail	569879	7034562	Good
R18	Rail	569647	7034092	Good
R19	Rail	568182	7029128	Good
R20	Rail	575266	7030644	Good
R21	Rail	573856	7030371	Good
R22	Rail	578561	7031062	Good
R23	Rail	569438	7031261	Excellent

KEY: MWD = Madoonga Waste Dump;  
HR = Haul Road;  
BPW = Borrow Pit West;  
BPC = Borrow Pit Centre;  
BPE = Borrow Pit East;  
R = Rail Corridor.

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**APPENDIX D      NATIONAL VEGETATION INVENTORY SYSTEM (NVIS)  
VEGETATION CLASSIFICATIONS**

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Growth Form	Height (m)	Structural Formation Classes					
Foliage cover and rank*		70-100% (5)	30-70% (4)	10-30% (3)	<10% (2)	0-5% (1)	≈ 0% (N)
TREE	<10,10-30, >30	closed forest	open forest	woodland	isolated clumps of trees	isolated trees	isolated clumps of trees
TREE MALLEE	<3, <10, 10-30	closed mallee forest	open mallee forest	mallee woodland	isolated clumps of mallee trees	isolated mallee trees	isolated clumps of mallee trees
SHRUB	<1,1-2,>2	closed shrubland	shrubland	open shrubland	isolated clumps of shrubs	isolated shrubs	isolated clumps of shrubs
MALLEE SHRUB	<3, <10, 10-30	closed mallee shrubland	mallee shrubland	open mallee shrubland	isolated clumps of mallee shrubs	isolated mallee shrubs	isolated clumps of mallee shrubs
HEATH SHRUB	<1,1-2,>2	closed heathland	heathland	open heathland	isolated clumps of heath shrubs	isolated heath shrubs	isolated clumps of heath shrubs
CHENOPOD SHRUB	<1,1-2,>2	closed chenopod shrubland	chenopod shrubland	open chenopod shrubland	isolated clumps of chenopod shrubs	isolated chenopod shrubs	isolated clumps of chenopod shrubs
SAMPHIRE SHRUB	<0.5,>0.5	closed samphire shrubland	samphire shrubland	open samphire shrubland	isolated clumps of samphire shrubs	isolated samphire shrubs	isolated clumps of samphire shrubs
HUMMOCK GRASS	<2,>2	closed hummock grassland	hummock grassland	open hummock grassland	isolated clumps of hummock grasses	isolated hummock grasses	isolated clumps of hummock grasses
TUSSOCK GRASS	<0.5,>0.5	closed tussock grassland	tussock grassland	open tussock grassland	isolated clumps of tussock grasses	isolated tussock grasses	isolated clumps of tussock grasses
SEDGE	<0.5,>0.5	closed sedgeland	sedgeland	open sedgeland	isolated clumps of sedges	isolated sedges	isolated clumps of sedges
RUSH	<0.5,>0.5	closed rushland	rushland	open rushland	isolated clumps of rushes	isolated rushes	isolated clumps of rushes



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## **APPENDIX E            SITE DESCRIPTIONS FOR PHASES 1,2 AND 3**

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## Phase 1

### 722 WRE Site 01

<b>Described by</b>	JN	<b>Date:</b>	9/11/2006	<b>Type:</b>	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	542023	<b>mE</b>	7014919	<b>mN</b>	
<b>Habitat</b>	Lakeside vegetation on a gentle slope.					
<b>Soil</b>	Red-orange sandy clay with a hard surface crust and loose soil.					
<b>Rock Type</b>						
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Eremophila forrestii</i> ssp. <i>forrestii</i> low open shrubland over <i>Calocephalus multiflorus</i> very open herbs over <i>Aristida contorta</i> tussock grassland. Lakeside vegetation on a gentle slope					
<b>Veg Condition</b>	Good, with grazing by hard hoofed.					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf litter and wood litter under shrubs.					

#### Species List:

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ?cockertoniana</i> , <i>Acacia minyura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Eremophila forrestii</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Chenopodium gaudichaudianum</i> , <i>Dianella revoluta</i> var. <i>divaricata</i> , <i>Eremophila granitica</i> , <i>Eremophila punicea</i> , <i>Senna glaucifolia</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Monachather paradoxus</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Eragrostis cumingii</i> , <i>Eragrostis lanipes</i>
<b>Herbs</b>	2 - 10%	<i>Alternanthera denticulata</i> , <i>Calocephalus multiflorus</i> , <i>Euphorbia drummondii</i> , <i>Gnephosis tenuissima</i>

**722 WRE Site 02**

<b>Described by</b>	JN	<b>Date:</b>	9/11/2006	<b>Type:</b>	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	542124	<b>mE</b>	7014727	<b>mN</b>	
<b>Habitat</b>	Lakeside vegetation on a gentle slope					
<b>Soil</b>	Red-orange sandy clay with a surface crust.					
<b>Rock Type</b>						
<b>Vegetation</b>	Acacia aneura var. aneura low open forest over Acacia tetragonophylla high open shrubland over Melaleuca stereophloia low shrubland to open shrubland over Calocephalus multiflorus open herbs over Aristida contorta open tussock grassland. Lakeside vegetation on a gentle slope.					
<b>Veg Condition</b>	Good with grazing by hard hoofed.					
<b>Fire Age</b>	>5 yrs					
<b>Notes</b>	Moderate to sparse leaf litter and sparse wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>major</i> , <i>Acacia minyura</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Melaleuca stereophloia</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia craspedocarpa</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila forrestii</i> , <i>Eremophila fraseri</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Maireana planifolia</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Eragrostis dielsii</i> , <i>Eragrostis leptocarpa</i> , <i>Eriachne flaccida</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
<b>Climbers</b>	< 2%	<i>Lysiana murrayi</i>
<b>Herbs</b>	10 - 30%	<i>Alternanthera denticulata</i> , <i>Calocephalus multiflorus</i>

### 722 WRE Site 03

<b>Described by</b>	Date: 9/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	542684 mE	7014676 mN
<b>Habitat</b>	Flat plain.		
<b>Soil</b>	Red-orange sand with loose surface soil.		
<b>Rock Type</b>			
<b>Vegetation</b>	<p><i>Acacia pruinocarpa</i> scattered trees and <i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Eremophila forrestii</i> low open shrubland to shrubland and <i>Solanum lasiophyllum</i> low scattered shrubs over <i>Marsdenia australis</i> climbers over <i>Ptilotus polystachyus</i> very open herbs over <i>Monachather paradoxus</i> and <i>Eragrostis lanipes</i> tussock grassland.</p>		
<b>Veg Condition</b>	Good with grazing by hard hoofed		
<b>Fire Age</b>	None evident		
<b>Notes</b>	Sparse leaf and wood litter under shrubs.		

#### Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i>
Shrubs > 2m	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Rhagodia eremaea</i>
Shrubs 1 - 2m	10 - 30%	<i>Eremophila forrestii</i> , <i>Eremophila granitica</i>
Shrubs < 0.5m	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	30 - 70%	<i>Eragrostis lanipes</i> , <i>Monachather paradoxus</i>
Climbers	< 2%	<i>Marsdenia australis</i>
Herbs	2 - 10%	<i>Ptilotus exaltatus</i> var. <i>exaltatus</i> , <i>Ptilotus polystachyus</i> , <i>Sida fibulifera</i>

**722 WRE Site 04**

**Described by** SH                      Date: 9/11/2006                      Type: Q                      20x20

**Location** Weld Range

**MGA Zone** 50                      542975 mE                      7014538 mN

**Habitat** Flat plain.

**Soil** Red-orange sandy clay with loose soil surface.

**Rock Type**

**Vegetation** *Acacia aneura* var. *aneura* low open woodland over *Acacia ramulosa* var. *linophylla* and *Acacia aneura* var. *aneura* high shrubland over *Eremophila forrestii* open shrubland over *Eremophila forrestii* and *Solanum lasiophyllum* low scattered shrubs over *Ptilotus polystachyus* var. *polystachyus* open herbs over *Monachather paradoxus* tussock grassland. Flat plain.

**Veg Condition** Good with grazing by hard hoofed.

**Fire Age** None evident

**Notes** Sparse leaf litter and moderate wood litter under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Psydrax rigidula</i> , <i>Psydrax suaveolens</i>
Shrubs > 2m	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs 1 - 2m	2 - 10%	<i>Eremophila forrestii</i> , <i>Eremophila georgei</i> , <i>Rhagodia eremaea</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i>
Shrubs < 1m	< 2%	<i>Spartothamnella teucriflora</i>
Shrubs < 0.5m	< 2%	<i>Solanum lasiophyllum</i>
Tussock grasses	30 - 70%	<i>Aristida contorta</i> , <i>Eragrostis lanipes</i> , <i>Monachather paradoxus</i>
Herbs	10 - 30%	<i>Ptilotus polystachyus</i> var. <i>polystachyus</i> , <i>Sida fibulifera</i> , <i>Swainsona</i> sp.

**722 WRE Site 05**

<b>Described by</b>	JN	Date:	9/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	545193	mE	7016850	mN	
<b>Habitat</b>	Flat plain.					
<b>Soil</b>	Red-orange sandy loam with a surface crust and fine to coarse gravel.					
<b>Rock Type</b>	Non-banded ferrous and quartz.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>fuliginea</i> low woodland over <i>Acacia aneura</i> var. <i>fuliginea</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Eremophila forrestii</i> low open shrubland over <i>Aristida contorta</i> open tussock grassland. Flat plain.					
<b>Veg Condition</b>	Good with grazing by hard hoofed and tracks.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Sparse leaf and wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia quadrimarginea</i> , <i>Psyrax suaveolens</i> , <i>Santalum spicatum</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila forrestii</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida ammophila</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i> , <i>Monachather paradoxus</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>
<b>Herbs</b>	< 2%	<i>Calandrinia ?translucens</i>



**722 WRE Site 06**

**Described by** SH                      Date: 9/11/2006                      Type: Q                      20x20

**Location** Weld Range

**MGA Zone** 50                      544103 mE                      7016171 mN

**Habitat** Flat plain.

**Soil** Red-orange sandy clay with a cracked clay, fine gravel and loose soil surface layer.

**Rock Type** Few, composed of non-banded ferrous, granite and quartz.

**Vegetation** *Acacia aneura* var. *aneura* scattered low trees over *Acacia aneura* var. *intermedia* and *Acacia ramulosa* var. *linophylla* high open shrubland over *Acacia aneura* var. *intermedia* and *Eremophila forrestii* open shrubland over and *Acacia aneura* var. *intermedia*, *Eremophila forrestii* and *Ptilotus schwartzii* low open shrubland over *Marsdenia australis* climbers over *Calandrinia* sp. Scattered herbs over *Aristida contorta* open tussock grassland.

**Veg Condition** Good condition, grazed by hard hoofed.

**Fire Age** None evident.

**Notes**
**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i>
Shrubs > 2m	2 - 10%	<i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	2 - 10%	<i>Acacia craspedocarpa</i> , <i>Eremophila georgei</i>
Shrubs < 1m	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Eremophila forrestii</i> , <i>Spartothamnella teucriflora</i>
Shrubs < 0.5m	< 2%	<i>Eremophila jucunda</i> , <i>Maireana</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i>
Tussock grasses	10 - 30%	<i>Aristida contorta</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
Climbers	< 2%	<i>Marsdenia australis</i>
Herbs	< 2%	<i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO 19/06)

**722 WRE Site 07**

<b>Described by</b>	SH	Date:	9/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	547224	mE	7014931	mN	
<b>Habitat</b>	Gentle hill slope.					
<b>Soil</b>	Red-orange sandy clay with continuous stones and plates/boulders at surface.					
<b>Rock Type</b>	BIF, non-banded ferrous.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> scattered shrubs to high open shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Solanum lasiophyllum</i> low open heath over <i>Sida excedentifolia</i> open herbs over <i>Cymbopogon ambiguous</i> . Open tussock grassland.					
<b>Veg Condition</b>	Poor, grazed by hard hoof.					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Moderate leaf and sparse wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i> , <i>Psydrax latifolia</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 0.5m</b>	30 - 70%	<i>Dodonaea pachyneura</i> , <i>Eremophila compacta</i> , <i>Olearia plucheacea</i> , <i>Psydrax suaveolens</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguous</i>
<b>Herbs</b>	10 - 30%	<i>Amaranthus</i> sp., <i>Phyllanthus erwinii</i>

**722 WRE Site 08**

<b>Described by</b>	JN	<b>Date:</b>	9/11/2006	<b>Type:</b>	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	547559	<b>mE</b>	7014896	<b>mN</b>	
<b>Habitat</b>	Steep to moderate hill crest.					
<b>Soil</b>	Red-orange sandy clay with surface crust and coarse gravel, and many stones, boulders and plates at surface					
<b>Rock Type</b>	Non-banded ferrous.					
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered low trees over <i>Acacia ramulosa</i> var. <i>ramulosa</i> high open shrubland over <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> open shrubland over <i>Philotheca brucei</i> subsp. <i>brucei</i> and <i>Eremophila glutinosa</i> low shrubland over <i>Goodenia tenuiloba</i> scattered herbs over <i>Eriachne mucronata</i> (desert form) very open tussock grassland. Steep to moderate hill crest.					
<b>Veg Condition</b>	Excellent, grazed by hard hoofed.					
<b>Fire Age</b>	Non evident.					
<b>Notes</b>	Sparse leaf and wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia pruinocarpa</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia sibirica</i> , <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Micromyrtus sulphurea</i> , <i>Scaevola spinescens</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia grasbyi</i> , <i>Dodonaea pachyneura</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Hibiscus sturtii</i> var. <i>forrestii</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Rhagodia eremaea</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Maireana</i> sp., <i>Olearia sturtii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum ellipticum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Austrostipa scabra</i> , <i>Cymbopogon ambiguus</i> , <i>Eriachne mucronata</i> (desert form)
<b>Herbs</b>	< 2%	<i>Goodenia tenuiloba</i> , <i>Olearia plucheacea</i>

**722 WRE Site 10**

<b>Described by</b>	JN	Date:	9/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	547755	mE	7014970	mN	
<b>Habitat</b>	Ridge Crest with moderate slope.					
<b>Soil</b>	Red-orange sandy clay with surface crust, gravel/pebbles, continuous stones/boulders and rock					
<b>Rock Type</b>	BIF					
<b>Vegetation</b>	<i>Acacia minyura</i> high shrubland to scattered low trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Philothea brucei</i> subsp. <i>brevifolia</i> , <i>Eremophila compacta</i> subsp. <i>fecunda</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Sida chrysocalyx</i> scattered herbs over <i>Thyridolepis multiculmis</i> very open tussock grassland. Ridge Crest with moderate slope.					
<b>Veg Condition</b>	Good, grazed by hard hoofed.					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf and wood litter mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia minyura</i> , <i>Psydrax latifolia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia sibirica</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila georgei</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Dodonaea pachyneura</i> , <i>Eremophila ?georgei</i> , <i>Eremophila compacta</i> subsp. <i>fecunda</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Philothea brucei</i> subsp. <i>brevifolia</i> , <i>Prostanthera petrophila</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	2 - 10%	<i>Thyridolepis multiculmis</i>

**722 WRE Site 11**

<b>Described by</b>	SH	Date:	8/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	547084	mE	7015943	mN	
<b>Habitat</b>	Flat plain.					
<b>Soil</b>	Red-orange sandy clay with surface crust and much coarse gravel/pebbles.					
<b>Rock Type</b>	Granite					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees to scattered trees over <i>Acacia aneura</i> var. <i>fuliginea</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Solanum lasiophyllum</i> low scattered shrubs over <i>Goodenia tenuiloba</i> open herbs over <i>Aristida contorta</i> open tussock grassland.					
<b>Veg Condition</b>	Good, grazing by hard hoofed.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Sparse leaf and wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia citrinoviridis</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila georgei</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Eragrostis</i> sp.
<b>Herbs</b>	10 - 30%	<i>Goodenia tenuiloba</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>

**722 WRE Site 12**

<b>Described by</b>	SH	Date: 9/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	548350 mE	7015087 mN	
<b>Habitat</b>	Flat hill crest.			
<b>Soil</b>	Red-orange sandy slay with coarse gravel/pebbles and many stones/boulders and plates at surface.			
<b>Rock Type</b>	BIF, non-banded ferrous, granite and quartz.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia ramulosa</i> var. <i>ramulosa</i> scattered low trees to scattered trees over <i>Acacia ramulosa</i> var. <i>ramulosa</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Thryptomene decussata</i> open shrubland over <i>Micromyrtus placoides</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i> low shrubland over <i>Goodenia tenuiloba</i> . Open herbs over <i>Monachather paradoxus</i> very open tussock grassland.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf and moderate wood litter under shrubs. <i>Micromyrtus placoides</i> population of ~40 on BIF.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Psyrax rigidula</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila glutinosa</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Micromyrtus placoides</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	2 - 10%	<i>Monachather paradoxus</i>
<b>Herbs</b>	10 - 30%	<i>Goodenia tenuiloba</i>

**722 WRE Site 13**

**Described by** SH                      Date: 8/11/2006                      Type: Q                      20x20

**Location** Weld Range

**MGA Zone** 50                      547503 mE                      7016136 mN

**Habitat** Flat plain.

**Soil** Red-orange sandy clay and clay, with loose surface soil.

**Rock Type**

**Vegetation** *Acacia sibirica* scattered low trees over *Acacia sibirica* and *Acacia ramulosa* var. *linophylla* high open shrubland over *Eremophila georgei* and *Eremophila forrestii* open shrubland over *Eremophila georgei*, *Eremophila forrestii* over and *Ptilotus obovatus* var. *obovatus* low scattered shrubs over *Calandrinia ?translucens* scattered herbs over *Aristida contorta* tussock grassland. Flat plain.

**Veg Condition** Good, grazing by hard hoofed.

**Fire Age** >5 yrs

**Notes** Sparse leaf and wood litter under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	<i>Acacia sibirica</i> , <i>Psydrax suaveolens</i>
Shrubs > 2m	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia sibirica</i>
Shrubs 1 - 2m	2 - 10%	<i>Eremophila compacta</i>
Shrubs < 1m	< 2%	<i>Eremophila forrestii</i> , <i>Eremophila georgei</i> , <i>Senna glaucifolia</i>
Shrubs < 0.5m	2 - 10%	<i>Eremophila jucunda</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida ? calyxhymenia</i> , <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i> , <i>Thryptomene decussata</i>
Tussock grasses	30 - 70%	<i>Aristida contorta</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
Herbs	< 2%	<i>Calandrinia ?translucens</i>

**722 WRE Site 14**

<b>Described by</b>	JN	<b>Date:</b>	8/11/2006	<b>Type:</b>	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	547824	mE	7016428	mN	
<b>Habitat</b>	Undulating plain with gentle slope.					
<b>Soil</b>	Red-orange sandy clay with surface crust.					
<b>Rock Type</b>						
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open scrub over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Eremophila forrestii</i> shrubland over <i>Eremophila forrestii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Aristida contorta</i> closed tussock grassland. Undulating plain with gentle slope.					
<b>Veg Condition</b>	Good, grazed by hard hoofed.					
<b>Fire Age</b>	>5 yrs					
<b>Notes</b>	Moderate leaf and wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinocarpa</i> , <i>Acacia sibirica</i>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila forrestii</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila ?georgei</i> , <i>Eremophila fraseri</i> , <i>Eremophila georgei</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26), <i>Sida calyxhymenia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Sida fibulifera</i> , <i>Sida spodochroma</i> , <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	> 70%	<i>Aristida contorta</i> , <i>Eragrostis pergracilis</i>

**722 WRE Site 15**



<b>Described by</b>	Date: 8/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	547370 mE	7016820 mN
<b>Habitat</b>	Flat plain.		
<b>Soil</b>	Red-orange sandy clay with surface crust, gravel/pebbles and many stones/boulders.		
<b>Rock Type</b>	Non-banded ferrous.		
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> and <i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Scaevola spinescens</i> , <i>Eremophila forrestii</i> shrubs and <i>Acacia aneura</i> var. <i>aneura</i> low open shrubland over <i>Eriachne pulchella</i> subsp. <i>pulchella</i> open tussock grassland. Flat plain.		
<b>Veg Condition</b>	Good, grazed by goats, with tracks.		
<b>Fire Age</b>	None evident.		
<b>Notes</b>	Sparse leaf and wood litter under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Chenopodium gaudichaudianum</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Eremophila forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i> , <i>Scaevola spinescens</i> , <i>Sida calyxhymenia</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Maireana georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Sclerolaena eriacantha</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i> , <i>Monachather paradoxus</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>
<b>Herbs</b>	< 2%	<i>Bulbostylis barbata</i>

**722 WRE Site 16**

<b>Described by</b>	Date: 8/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	548863 mE	7016361 mN
<b>Habitat</b>	Flat plain.		
<b>Soil</b>	Red-orange sandy clay and clay with loose surface soil.		
<b>Rock Type</b>			
<b>Vegetation</b>	<i>Acacia anuera</i> var. <i>aneura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Eremophila forrestii</i> shrubland over <i>Eremophila forrestii</i> and <i>Ptilotus schwartzii</i> low open shrubland over <i>Ptilotus polystachyus</i> open herbs over <i>Monachather paradoxus</i> open tussock grassland. Flat plain.		
<b>Veg Condition</b>	Good, grazed by hard hoofed.		
<b>Fire Age</b>	None evident.		
<b>Notes</b>	Moderate leaf and sparse plant litter under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila forrestii</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila forrestii</i> , <i>Eremophila spuria</i> , <i>Ptilotus polystachyus</i> , <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Monachather paradoxus</i> , <i>Ptilotus schwartzii</i>

722 WRE Site 17

<b>Described by</b>	JN	Date:	8/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	549879	mE	7017184	mN	
<b>Habitat</b>	Undulating plain with gentle slope.					
<b>Soil</b>	Red-orange sandy clay with surface crust and loose surface soil.					
<b>Rock Type</b>	Few, non-banded ferrous rocks.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>?intermedia</i> scattered low trees over <i>Acacia aneura</i> var. <i>?intermedia</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Eremophila forrestii</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Eremophila forrestii</i> , <i>Eremophila granitica</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Solanum lasiophyllum</i> low shrubland over <i>Aristida contorta</i> tussock grassland. Undulating plain with gentle slope.					
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.					
<b>Fire Age</b>	>5 yrs					
<b>Notes</b>	Sparse wood and leaf litte under shrubs.					

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>?intermedia</i> , <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia cockertoniana</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i>
Shrubs 1 - 2m	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Eremophila forrestii</i> , <i>Eremophila granitica</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)
Shrubs < 1m	10 - 30%	<i>Eremophila forrestii</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)
Shrubs < 0.5m	10 - 30%	<i>Maireana georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sclerolaena densiflora</i> , <i>Sclerolaena uniflora</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	30 - 70%	<i>Aristida contorta</i> , <i>Thyridolepis multiculmis</i>

**722 WRE Site 18**

<b>Described by</b>	SH	Date:	8/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	550527	mE	7017872	mN	
<b>Habitat</b>	Flat plain.					
<b>Soil</b>	Red-orange sandy clay with loose surface soil.					
<b>Rock Type</b>	Nil					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>intermedia</i> and <i>Acacia craspedocarpa</i> low open woodland to open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Eremophila forrestii</i> open shrubland over <i>Eremophila forrestii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Ptilotus polystachyus</i> herbs over <i>Aristida contorta</i> open hummock grassland. Flat plain.					
<b>Veg Condition</b>	Poor, grazed by goats.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Moderate leaf and sparse wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia pruinocarpa</i> , <i>Psyrax latifolia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Chenopodium gaudichaudianum</i> , <i>Eremophila forrestii</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Solanum ashbyae</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Maireana ?villosa</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida fibulifera</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i>
<b>Herbs</b>	30 - 70%	<i>Ptilotus polystachyus</i>

**722 WRE Site 19**

<b>Described by</b>	JN	Date:	8/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	551133	mE	7018310	mN	
<b>Habitat</b>	Flat plain.					
<b>Soil</b>	Red-orange clay, with cracked clay and crust at surface, and continuous surface plates/boulders.					
<b>Rock Type</b>	BIF, non-banded iron.					
<b>Vegetation</b>	<i>Acacia anuera</i> var. <i>fuliginea</i> scattered low trees over <i>Acacia anuera</i> var. <i>fuliginea</i> and <i>Acacia craspedocarpa</i> high shrubland over <i>Acacia anuera</i> var. <i>fuliginea</i> and <i>Eremophila fraseri</i> open shrubland over <i>Eremophila fraseri</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Aristida contorta</i> open tussock grassland. Flat plain.					
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Leaf and wood litter mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia sibirica</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia craspedocarpa</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila fraseri</i> , <i>Eremophila georgei</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Abutilon macrum</i> , <i>Eremophila glutinosa</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Maireana triptera</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i>
<b>Climbers</b>	< 2%	<i>Rhyncharrhena linearis</i>

**722 WRE Site 22**

<b>Described by</b>	JN	<b>Date:</b>	7/11/2006	<b>Type:</b>	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	569663	mE	7027652	mN	
<b>Habitat</b>	Flat plain.					
<b>Soil</b>	Red-orange sandy clay with surface crust, fine gravel and few coarse gravel/pebbles.					
<b>Rock Type</b>	BIF					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>intermedia</i> low open woodland to scattered trees over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Eremophila forrestii</i> shrubland over <i>Eremophila forrestii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Marsdenia australis</i> climbers over <i>Aristida contorta</i> very open tussock grassland. Flat plain.					
<b>Veg Condition</b>	Excellent, grazed by hard hoofed.					
<b>Fire Age</b>	>5 yrs					
<b>Notes</b>	Sparse leaf and wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Psyrax latifolia</i> , <i>Psyrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila clarkei</i> , <i>Eremophila forrestii</i> , <i>Eremophila georgei</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Chenopodium gaudichaudianum</i> , <i>Senna glaucifolia</i> , <i>Senna stricta</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>
<b>Herbs</b>	< 2%	<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>

**722 WRE Site 23**

<b>Described by</b>	SH	Date: 7/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	572647 mE	7026444 mN	
<b>Habitat</b>	Gentle hill slope.			
<b>Soil</b>	Red-orange sandy clay, with many stones/boulders at surface.			
<b>Rock Type</b>	BIF, non-banded ferrous			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Acacia aneura</i> var. <i>aneura</i> high open shrubland over <i>Prostanthera petrophila</i> open shrubland over <i>Micromyrtus placoides</i> and <i>Aluta aspera</i> subsp. <i>hesperia</i> low open heath over <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> very open herbs over <i>Austrostipa scabra</i> scattered tussock grasses. Gentle hill slope.			
<b>Veg Condition</b>	Poor, grazed by hard hoofed.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Moderate leaf and sparse wood litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> ms (glaucous variant), <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	30 - 70%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila georgei</i> , <i>Prostanthera petrophila</i> , <i>Solanum ashbyae</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Micromyrtus placoides</i>
<b>Tussock grasses</b>	< 2%	<i>Austrostipa scabra</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
<b>Herbs</b>	2 - 10%	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Erymophyllum ramosum</i> , <i>Goodenia tenuiloba</i> , <i>Podolepis lessonii</i>

**722 WRE Site 24**

<b>Described by</b>	JN	<b>Date:</b>	7/11/2006	<b>Type:</b>	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	571858	mE	7027290	mN	
<b>Habitat</b>	Undulating plain with gentle slope.					
<b>Soil</b>	Red-orange sandy clay, with surface crust and common coarse gravel and stones.					
<b>Rock Type</b>	BIF non-banded ferrous.					
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered trees over <i>Acacia aneura</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Eremophila forrestii</i> and <i>Acacia aneura</i> shrubland over <i>Eremophila forrestii</i> low shrubland over <i>Sida chrysocalyx</i> very open herbs over <i>Eragrostis eriopoda</i> scattered tussock grasses. Undulating plain with gentle slope.					
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Moderate to sparse leaf and wood litter.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> , <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Psydrax latifolia</i> , <i>Psydrax rigidula</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Eremophila forrestii</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila ?jucunda</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Eragrostis eriopoda</i>



**722 WRE Site 25**

<b>Described by</b>	SH	Date: 7/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	572027 mE	7027663 mN	
<b>Habitat</b>	Flat plain.			
<b>Soil</b>	Red-orange sandy clay with loose soil at surface.			
<b>Rock Type</b>	Nil			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered low trees to scattered trees over <i>Acacia aneura</i> var. <i>fuliginea</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> open scrub over <i>Senna artemisioides</i> subsp. <i>helmsii</i> open shrubland over <i>Eremophila granitica</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Ptilotus polystachyus</i> open herbs over <i>Eriachne helmsii</i> very open tussock grassland.			
<b>Veg Condition</b>	Good, grazed by hard hoofed.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Moderate wood and leaf litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia pruinocarpa</i> , <i>Psydrax rigidula</i> , <i>Santalum acuminatum</i>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia rhodophloia</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Eremophila granitica</i> , <i>Senna stricta</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Abutilon macrum</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna artemisioides</i> subsp. <i>x sturtii</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Eriachne helmsii</i>
<b>Herbs</b>	10 - 30%	<i>Ptilotus polystachyus</i>

**722 WRE Site 26**

<b>Described by</b>	SH	Date:	7/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	573297	mE	7026981	mN	
<b>Habitat</b>	Gentle hill slope.					
<b>Soil</b>	Red-orange sandy clay, with continuous coarse gravel/pebbles and rocks/boulders at surface.					
<b>Rock Type</b>	BIF, non-banded ferrous, granite.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia cockertoniana</i> high shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> open shrubland over <i>Micromyrtus sulphurea</i> and <i>Dodonaea pachyneura</i> low scattered shrubs over <i>Goodenia tenuiloba</i> open herbs over <i>Eriachne pulchella</i> subsp. <i>pulchella</i> scattered tussock grasses. Gentle hill slope, BIF, non-banded ferrous, granite.					
<b>Veg Condition</b>	Good, grazed by hard hoofed.					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Moderate wood and sparse leaf litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia cockertoniana</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Acacia exocarpoides</i> , <i>Eremophila georgei</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Micromyrtus sulphurea</i> , <i>Senna</i> sp. Meekatharra(E. Bailey 1-26), <i>Solanum ashbyae</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Dodonaea pachyneura</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Stenanthemum petraeum</i>
<b>Tussock grasses</b>	< 2%	<i>Eriachne pulchella</i> subsp. <i>pulchella</i>
<b>Herbs</b>	10 - 30%	<i>Goodenia tenuiloba</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>

**722 WRE Site 27**

<b>Described by</b>	SH	Date:	7/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	574151	mE	7027062	mN	
<b>Habitat</b>	Flat plain.					
<b>Soil</b>	Red-orange sandy clay with continuous surface plates/boulders					
<b>Rock Type</b>	BIF, ?calcrete and ?granite					
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered trees over <i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia cockertoniana</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Acacia cockertoniana</i> and <i>Thryptomene decussata</i> shrubland over <i>Thryptomene decussata</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i> shrubs low open shrubland over <i>Ptilotus schwartzii</i> very open herbs over <i>Grass</i> sp. scattered tussock grasses.					
<b>Veg Condition</b>	Good, with grazing by hard hoofed.					
<b>Fire Age</b>	None Evident					
<b>Notes</b>	Sparse leaf litter and wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia cockertoniana</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia exocarpoides</i> , <i>Eremophila forrestii</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila georgei</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna</i> sp. Meekatharra(E. Bailey 1-26)
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Dodonaea pachyneura</i> , <i>Dodonaea rigida</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Hemigenia tysonii</i> , <i>Ptilotus schwartzii</i> , <i>Sida calyxhymenia</i> , <i>Stenanthemum petraeum</i>
<b>Tussock grasses</b>	< 2%	POACEAE sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i>

**722 WRE Site 28**

<b>Described by</b>	JN	Date:	7/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	573935	mE	7026087	mN	
<b>Habitat</b>	Small, gentle to moderate hill slope.					
<b>Soil</b>	Red-orange sandy clay, with fine gravel and few surface stones/boulders at surface.					
<b>Rock Type</b>	Non-banded ferrous, ferrous laterite					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low woodland to woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Eremophila georgei</i> low open heath to shrubland. Small, gentle to moderate hill slope.					
<b>Veg Condition</b>	Good, grazed by hard hoofed.					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Moderate wood and leaf litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Psydrax latifolia</i> , <i>Psydrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ?cockertoniana</i> , <i>Acacia grasbyi</i> , <i>Acacia pruinocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia pruinocarpa</i> , <i>Acacia tetragonophylla</i> , <i>Chenopodium gaudichaudianum</i> , <i>Eremophila georgei</i> , <i>Eremophila</i> sp.
<b>Shrubs &lt; 1m</b>	30 - 70%	<i>Eremophila forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila simulans</i> subsp. <i>Simulans</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Maireana georgei</i> , <i>Maireana</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sclerolaena eriacantha</i> , <i>Sida ? Calyxhymenia</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Eragrostis eriopoda</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i> , <i>Marsdenia australis</i>

**722 WRE Site 29**

<b>Described by</b>	JN	Date: 7/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	574397 mE	7025516 mN	
<b>Habitat</b>	Hill slope/crest with moderate slope.			
<b>Soil</b>	Red orange sandy clay/clay, with surface crust and continuous surface-level plates/stones/boulders.			
<b>Rock Type</b>	BIF, non-banded ferrous, granite.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia</i> sp. <i>Weld Range</i> high shrubland over <i>Acacia</i> sp. <i>Weld Range</i> and <i>Acacia speckii</i> open heath over <i>Senna glaucifolia</i> , <i>Eremophila georgei</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Marsdenia australis</i> climbers over <i>Austrostipa scabra</i> very open tussock grassland. Hill slope/crest with moderate slope, BIF, non-banded ferrous, granite.			
<b>Veg Condition</b>	Excellent, grazed by hard hoofed.			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf and moderate to sparse wood litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. <i>Weld Range</i> (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	30 - 70%	<i>Acacia speckii</i> , <i>Eremophila georgei</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Austrostipa scabra</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>

**722 WRE Site 30**

<b>Described by</b>	JN	Date:	7/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	572381	mE	7026342	mN	
<b>Habitat</b>	Moderate to steep hill slope.					
<b>Soil</b>	Red-orange sandy clay/clay, with surface crust, continuous stones/boulders and surface-level plates.					
<b>Rock Type</b>	BIF, non-banded ferrous.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high open shrubland to low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Prostanthera petrophila</i> shrubland over <i>Aluta aspera</i> subsp. <i>hesperia</i> low open heath. Moderate to steep hill slope.					
<b>Veg Condition</b>	Excellent, grazed by hard hoofed.					
<b>Fire Age</b>	>5 yrs					
<b>Notes</b>	Sparse leaf and moderate to sparse wood litter mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia pruinocarpa</i> , <i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia exocarpoides</i> , <i>Acacia rhodophloia</i> , <i>Dodonaea pachyneura</i> , <i>Eremophila georgei</i> , <i>Prostanthera petrophila</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila ?margarethae</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Micromyrtus placoides</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Psydrax rigidula</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	30 - 70%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i>

**722 WRE Site 32**

<b>Described by</b>	SH	Date: 6/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	576110 mE	7027945 mN	
<b>Habitat</b>	Flat plain, with wash-out.			
<b>Soil</b>	Red-orange sandy clay/clay with loose surface soil.			
<b>Rock Type</b>				
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia aneura</i> var. <i>argentea</i> woodland over <i>Acacia ramulosa</i> var. <i>ramulosa</i> low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open scrub over <i>Eremophila clarkei</i> and <i>Eremophila forrestii</i> low open shrubland to shrubland over <i>Sida chrysocalyx</i> very open herbs over <i>Monachather paradoxus</i> scattered tussock grasses. Flat plain, with wash-out.			
<b>Veg Condition</b>	Good, grazed by hard hoofed.			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf and plentiful wood litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>argentea</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila simulans</i> subsp. <i>simulans</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila clarkei</i> , <i>Eremophila forrestii</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Maireana</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Monachather paradoxus</i>
<b>Herbs</b>	2 - 10%	<i>Myriocephalus guerinae</i> , <i>Ptilotus polystachyus</i>

**722 WRE Site 33**

<b>Described by</b>	Date: 6/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	576975 mE	7027507 mN
<b>Habitat</b>	Undulating plain with gentle slope.		
<b>Soil</b>	Red-orange sandy clay, with surface crust, fine to coarse gravel, common stones/boulders.		
<b>Rock Type</b>	BIF, non-banded ferrous.		
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered trees over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia pruinocarpa</i> scattered low trees over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia aneura</i> var. <i>intermedia</i> open shrubland to open scrub over <i>Eremophila forestii</i> low open shrubland over <i>Monachather paradoxus</i> very open tussock grassland. Undulating plain with gentle slope.		
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.		
<b>Fire Age</b>	>5 yrs		
<b>Notes</b>	Sparse wood and leaf litter under shrubs.		

**Species List:**

<b>Trees 10 - 30m</b>	< 2%	<i>Acacia pruinocarpa</i> , <i>Corymbia lenziana</i>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Psydrax latifolia</i>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Eremophila clarkei</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila ?georgei</i> , <i>Eremophila forrestii</i> , <i>Eremophila simulans</i> subsp. <i>Simulans</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Monachather paradoxus</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>



**722 WRE Site 34**

<b>Described by</b>	Date: 6/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	577572 mE	7028469 mN
<b>Habitat</b>	Flat plain with wash out.		
<b>Soil</b>	Red-orange sandy clay, with loose surface soil.		
<b>Rock Type</b>			
<b>Vegetation</b>	<i>Acacia cuthbertsonii</i> and <i>Acacia pruinocarpa</i> woodland over <i>Acacia cuthbertsonii</i> and <i>Acacia aneura</i> var. <i>intermedia</i> low open forest over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Eremophila forrestii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Abutilon macrum</i> very open herbs over <i>Austrostipa scabra</i> open tussock grassland.		
<b>Veg Condition</b>	Good.		
<b>Fire Age</b>	None evident		
<b>Notes</b>	Moderate leaf and wood litter has been washed and deposited against shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia cuthbertsonii</i> , <i>Acacia pruinocarpa</i> , <i>Psyrax latifolia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Chenopodium gaudichaudianum</i> , <i>Eremophila clarkei</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Abutilon macrum</i> , <i>Eremophila foliosissima</i> , <i>Eremophila forrestii</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna stricta</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Maireana</i> sp., <i>Prostanthera petrophila</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida fibulifera</i> , <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Austrostipa scabra</i> , <i>Monachather paradoxus</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>
<b>Herbs</b>	2 - 10%	<i>Euphorbia boophthona</i>

**722 WRE Site 35**

<b>Described by</b>	Date: 6/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	578426 mE	7028712 mN
<b>Habitat</b>	Undulating plain with gentle slope.		
<b>Soil</b>	Red-orange sandy clay with surface crust.		
<b>Rock Type</b>			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland to open woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland to high shrubland over <i>Eremophila granitica</i> and <i>Eremophila foliosissima</i> low shrubland over <i>Ptilotus polystachyus</i> very open herbs over <i>Monachather paradoxus</i> . Open tussock grassland. Undulating plain with gentle slope.		
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.		
<b>Fire Age</b>	>5 yrs		
<b>Notes</b>	Moderate to sparse leaf and wood litter under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia pruinoarpa</i> , <i>Psydrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Grevillea nematophylla</i> subsp. <i>supraplana</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila granitica</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Abutilon macrum</i> , <i>Chenopodium gaudichaudianum</i> , <i>Eremophila foliosissima</i> , <i>Eremophila forrestii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Maireana villosa</i> , <i>Ptilotus exaltatus</i> var. <i>exaltatus</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida fibulifera</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Monachather paradoxus</i>
<b>Herbs</b>	10 - 30%	<i>Ptilotus polystachyus</i>



**722 WRE Site 37**

<b>Described by</b>	Date: 6/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	578433 mE	7029011 mN
<b>Habitat</b>	Gentle hill slope/crest.		
<b>Soil</b>	Red-orange sandy clay with continuous surface-level plates/boulders.		
<b>Rock Type</b>	BIF, non-banded ferrous.		
<b>Vegetation</b>	<p><i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia</i> aff. <i>quadrimarginea</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Thryptomene decussata</i> scattered tall shrubs over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Philotheca brucei</i> subsp. <i>brucei</i> open shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i>, <i>Philotheca brucei</i> subsp. <i>brucei</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Goodenia tenuiloba</i> very open herbs over <i>Eriachne mucronata</i> (desert form) open tussock grassland. Gentle hill slope/crest.</p>		
<b>Veg Condition</b>	Good.		
<b>Fire Age</b>	None evident.		
<b>Notes</b>	Moderate leaf and sparse wood litter under shrubs. 6 <i>Prostanthera petrophila</i> plants found on BIF.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia</i> aff. <i>quadrimarginea</i> , <i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Dodonaea petiolaris</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Solanum ashbyae</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Grevillea berryana</i> , <i>Prostanthera petrophila</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94), <i>Sida fibulifera</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)
<b>Tussock grasses</b>	10 - 30%	<i>Eriachne mucronata</i> (desert form), <i>Eriachne pulchella</i>
<b>Herbs</b>	2 - 10%	<i>Goodenia tenuiloba</i>

**722 WRE Site 38**

<b>Described by</b>	Date: 6/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	579045 mE	7028527 mN
<b>Habitat</b>	Drainage area with gentle slope and no distinct channels.		
<b>Soil</b>	Red-orange sandy clay/clay, with surface crust and loose soil.		
<b>Rock Type</b>			
<b>Vegetation</b>	<p><i>Acacia pruinocarpa</i> scattered tall trees over <i>Acacia aneura</i> var. <i>aneura</i> low woodland to open forest over <i>Acacia linophylla</i> high shrubland over <i>Eremophila georgei</i> shrubland over <i>Eremophila forrestii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Glycine canescens</i> climbers and <i>Sida fibulifera</i> open herbs over <i>Thyridolepis multiculmis</i> very open tussock grassland. Drainage area with gentle slope and no distinct channels.</p>		
<b>Veg Condition</b>	Good.		
<b>Fire Age</b>	>5 yrs		
<b>Notes</b>	Moderate leaf and wood litter under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Psyrax latifolia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Chenopodium gaudichaudianum</i> , <i>Eremophila clarkei</i> , <i>Eremophila clarkei</i> , <i>Eremophila georgei</i> , <i>Eremophila glutinosa</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Abutilon macrum</i> , <i>Eremophila forrestii</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Hibiscus burtonii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna</i> sp. Meekatharra(E. Bailey 1-26), <i>Sida fibulifera</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Thyridolepis multiculmis</i>
<b>Climbers</b>	< 2%	<i>Glycine canescens</i>
<b>Herbs</b>	< 2%	<i>Oxalis perennans</i>

**722 WRE Site 39**

<b>Described by</b>	Date: 6/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	580021 mE	7028822 mN
<b>Habitat</b>	Undulating plain.		
<b>Soil</b>	Red-orange sandy clay, with surface crust, and common coarse gravel/pebbles and stones/boulders.		
<b>Rock Type</b>	BIF, non-banded ferrous.		
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> open woodland over <i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Acacia aneura</i> var. <i>aneura</i> low open shrubland and <i>Maireana</i> sp. low shrubland over <i>Sida fibulifera</i> very open herbs over <i>Aristida contorta</i> very open tussock grassland. Undulating plain.		
<b>Veg Condition</b>	Good, grazed by hard hoofed.		
<b>Fire Age</b>	None evident.		
<b>Notes</b>	Sparse leaf and wood litter under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	2 - 10%	<i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Eremophila clarkei</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Chenopodium gaudichaudianum</i> , <i>Eremophila georgei</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Maireana</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Sida fibulifera</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i>
<b>Climbers</b>	2 - 10%	<i>Duperreya commixta</i>

**722 WRE Site 40**

<b>Described by</b>	Date: 6/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	580038 mE	7029085 mN
<b>Habitat</b>	Flat plain.		
<b>Soil</b>	Red-orange sandy clay with surface crust and scattered fine gravel.		
<b>Rock Type</b>	BIF.		
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered trees over <i>Acacia pruinocarpa</i> and <i>Acacia aneura</i> var. <i>intermedia</i> low woodland over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Eremophila forrestii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Aristida contorta</i> open tussock grassland. Flat plain.		
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.		
<b>Fire Age</b>	None evident.		
<b>Notes</b>	Sparse wood and leaf litter under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia pruinocarpa</i> , <i>Psydrax latifolia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Chenopodium gaudichaudianum</i> , <i>Eremophila clarkei</i> , <i>Eremophila forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Abutilon macrum</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Eremophila georgei</i> , <i>Hibiscus burtonii</i> , <i>Maireana georgei</i> , <i>Maireana tomentosa</i> , <i>Maireana triptera</i> , <i>Maireana villosa</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	2 - 10%	<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>

**722 WRE Site 41**

<b>Described by</b>	Date: 6/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	580335 mE	7028443 mN
<b>Habitat</b>	Flat plain.		
<b>Soil</b>	Red-orange sandy clay, with much fine gravel, loose soil and coarse gravel/pebbles at surface.		
<b>Rock Type</b>	BIF, non-banded ferrous, granite, quartz.		
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> high open shrubland over <i>Eremophila forrestii</i> low open shrubland to shrubland over <i>Ptilotus schwartzii</i> very open herbs over <i>Monachather paradoxus</i> open tussock grassland. Flat plain, BIF, non-banded ferrous, granite, quartz.		
<b>Veg Condition</b>	Good.		
<b>Fire Age</b>	None evident.		
<b>Notes</b>	Sparse wood and leaf litter mainly under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila forrestii</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila georgei</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus schwartzii</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Monachather paradoxus</i>
<b>Herbs</b>	2 - 10%	<i>Ptilotus polystachyus</i>



**722 WRE Site 42**

<b>Described by</b>	Date: 6/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	581164 mE	7028342 mN
<b>Habitat</b>	Flat plain and creek bank.		
<b>Soil</b>	Red-orange sandy clay/clay with loose surface soil.		
<b>Rock Type</b>			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland to woodland over <i>Acacia sibirica</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> open scrub over <i>Eremophila forrestii</i> shrubs and <i>Acacia ramulosa</i> var. <i>linophylla</i> open heath over <i>Eremophila forrestii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Abutilon otocarpum</i> open herbs over <i>Eragrostis dielsii</i> and <i>Aristida contorta</i> closed tussock grassland.		
<b>Veg Condition</b>	Poor, grazed by hard hoofed.		
<b>Fire Age</b>	None evident.		
<b>Notes</b>	Moderate leaf and wood litter under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	10 - 30%	<i>Brachychiton gregorii</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Brachychiton gregorii</i>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia ?cockertoniana</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia sibirica</i>
<b>Shrubs 1 - 2m</b>	30 - 70%	<i>Eremophila forrestii</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Abutilon otocarpum</i> , <i>Eremophila ?georgei</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Grevillea deflexa</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Abutilon</i> sp., <i>Eremophila georgei</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Sida fibulifera</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	> 70%	<i>Aristida contorta</i> , <i>Austrostipa scabra</i> , <i>Cymbopogon ambiguus</i> , <i>Eragrostis dielsii</i>
<b>Herbs</b>	10 - 30%	<i>Calandrinia ?translucens</i> , <i>Lobelia heterophylla</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>

**722 WRE Site 43**

<b>Described by</b>	Date: 4/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	581723 mE	7030241 mN
<b>Habitat</b>	Undulating plain with gentle slope.		
<b>Soil</b>	Brown loam/clay loam with hummus and loose soil at surface. Few rocks.		
<b>Rock Type</b>	Sparse calcrete.		
<b>Vegetation</b>	<i>Eucalyptus lucasii</i> low open forest to woodland over <i>Senna artemisioides</i> subsp. <i>filifolia</i> low shrubland to open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Ptilotus exaltatus</i> var. <i>exaltatus</i> herbs over <i>Austrostipa scabra</i> open tussock grassland. Undulating plain with gentle slope.		
<b>Veg Condition</b>	Excellent, grazed by hard hoofed.		
<b>Fire Age</b>	>5 yrs		
<b>Notes</b>	Widespread and plentiful leaf and wood litter.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	30 - 70%	<i>Eucalyptus lucasii</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Eremophila longifolia</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Pimelea microcephala</i> subsp. <i>microcephala</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Abutilon macrum</i> , <i>Chenopodium gaudichaudianum</i> , <i>Hibiscus</i> sp., <i>Maireana</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Dissocarpus paradoxus</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Austrostipa scabra</i> , <i>Enneapogon caerulescens</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>
<b>Herbs</b>	30 - 70%	<i>Ptilotus exaltatus</i> var. <i>exaltatus</i> , <i>Zygophyllum eremaeum</i>

**722 WRE Site 44**

<b>Described by</b>	Date: 4/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	582477 mE	7030165 mN
<b>Habitat</b>	Flat plain.		
<b>Soil</b>	Red-orange sandy clay, with cracked clay surface and loose soil.		
<b>Rock Type</b>			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia tetragonophylla</i> and <i>Eremophila galeata</i> high open shrubland over <i>Eremophila galeata</i> open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low scattered shrubs over <i>Ptilotus aervoides</i> open herbs over <i>Eragrostis pergracilis</i> and <i>Aristida contorta</i> tussock grassland.		
<b>Veg Condition</b>	Good, grazed by hard hoofed.		
<b>Fire Age</b>	None evident.		
<b>Notes</b>	Sparse wood and leaf litter under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia craspedocarpa</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila galeata</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Chenopodium gaudichaudianum</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila oldfieldii</i> subsp. <i>angustifolia</i> , <i>Ptilotus divaricatus</i> var. <i>divaricatus</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Enneapogon caerulescens</i> , <i>Eragrostis pergracilis</i>
<b>Herbs</b>	10 - 30%	<i>Euphorbia</i> sp., <i>Ptilotus aervoides</i>

**722 WRE Site 45**

<b>Described by</b>	Date: 4/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	582532 mE	7029890 mN
<b>Habitat</b>	Crest of a small gently sloped hill (mound).		
<b>Soil</b>	Yellow/orange sandy clay/cloay loam, with surface crust, fine gravel and common coarse		
<b>Rock Type</b>	gravel/pebbles and small rocks.		
<b>Vegetation</b>	BIF, calcrete, granite.		
<b>Veg Condition</b>	<i>Acacia burkittii</i> high shrubland over <i>Eremophila falcata</i> and <i>Acacia burkittii</i> shrubland over <i>Senna artemisioides</i> subsp. <i>filifolia</i> low open shrubland over <i>Austrostipa scabra</i> tussock grassland. Crest of a small gently sloped hill (mound), BIF, calcrete, granite.		
<b>Fire Age</b>	Good, grazed by hard hoofed, with tracks.		
<b>Notes</b>	None evident.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia burkittii</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila falcata</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Senna</i> sp. Meekatharra(E. Bailey 1-26)
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila fraseri</i> , <i>Eremophila subfloccosa</i> subsp. <i>lanata</i> , <i>Pimelea microcephala</i> subsp. <i>microcephala</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Scaevola tomentosa</i> , <i>Senna artemisioides</i> subsp. <i>x sturtii</i> , <i>Solanum lasiophyllum</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Austrostipa scabra</i>

**722 WRE Site 46**

<b>Described by</b>	Date: 5/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	583721 mE	7029312 mN
<b>Habitat</b>	Flat plain with minor channel.		
<b>Soil</b>	Red-orange sandy clay, with cracked clay surface and loose soil.		
<b>Rock Type</b>			
<b>Vegetation</b>	<i>Acacia sibirica</i> scattered low trees over <i>Acacia tetragonophylla</i> and <i>Eremophila galeata</i> open to high open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low scattered shrubs over <i>Ptilotus aervooides</i> very open herbs over <i>Aristida contorta</i> tussock grassland.		
<b>Veg Condition</b>	Poor, grazed by hard hoofed.		
<b>Fire Age</b>	None evident.		
<b>Notes</b>	Negligable leaf and sparse wood litter under shubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia sibirica</i> , <i>Acacia sibirica</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia craspedocarpa</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila galeata</i> , <i>Rhagodia eremaea</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Abutilon macrum</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Eragrostis leptocarpa</i>
<b>Herbs</b>	2 - 10%	<i>Ptilotus aervooides</i> , <i>Streptoglossa cylindriceps</i>
<b>Epiphytes</b>	< 2%	<i>Amyema fitzgeraldii</i>

**722 WRE Site 47**

<b>Described by</b>	Date: 5/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	584163 mE	7028555 mN
<b>Habitat</b>	Undulating plain with complex minor channels on a gentle slope.		
<b>Soil</b>	Red-orange sand/sandy clay, with a surface crust, fine gravel, loose soil and coarse pebbles/gravel.		
<b>Rock Type</b>	Non-banded ferrous. Few.		
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low woodland to woodland over <i>Acacia tetragonophylla</i> open shrubland to high shrubland over <i>Eremophila fraseri</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low scattered shrubs over <i>Duperreya sericea</i> climbers over <i>Abutilon macrum</i> very open herbs over <i>Aristida contorta</i> open tussock grassland. Undulating plain with complex minor channels on a gentle slope.		
<b>Veg Condition</b>	Good, grazed by hard hoofed.		
<b>Fire Age</b>	None evident.		
<b>Notes</b>	Moderate leaf and wood litter under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Eremophila longifolia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Leptomeria preissiana</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Abutilon macrum</i> , <i>Alternanthera denticulata</i> , <i>Eremophila fraseri</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Maireana</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Eragrostis australasica</i>
<b>Climbers</b>	2 - 10%	<i>Amyema fitzgeraldii</i> , <i>Duperreya sericea</i> , <i>Glycine canescens</i> , <i>Glycine</i> sp.
<b>Herbs</b>	2 - 10%	<i>Parietaria cardiostegia</i>

**722 WRE Site 48**

<b>Described by</b>	Date: 5/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	581863 mE	7027164 mN
<b>Habitat</b>	Small hill crest.		
<b>Soil</b>	Red-orange sandy clay, with surface crust, and continuous coarse gravel/pebbles, stones and surface		
<b>Rock Type</b>	plates/boulders at surface.		
<b>Vegetation</b>	Non-banded ferrous.		
<b>Veg Condition</b>	<i>Acacia aneura</i> var. <i>aneura</i> shrubland to high shrubland over <i>Thryptomene decussata</i> low shrubland over <i>Goodenia tenuiloba</i> scattered herbs over <i>Eriachne pulchella</i> subsp. <i>pulchella</i> very open tussock grassland. Small hill crest.		
<b>Fire Age</b>	Excellent, grazed by hard hoofed.		
<b>Notes</b>	>5 yrs		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia rhodophloia</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Dodonaea pachyneura</i> , <i>Eremophila georgei</i> , <i>Micromyrtus sulphurea</i> , <i>Philothea brucei</i> subsp. <i>brucei</i> , <i>Senna</i> sp. Meekatharra(E. Bailey 1-26)
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Solanum ashbyae</i> , <i>Stenanthemum petraeum</i> , <i>Thryptomene decussata</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	< 2%	<i>Goodenia tenuiloba</i>

**722 WRE Site 49**

<b>Described by</b>	Date: 5/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	580134 mE	7025220 mN
<b>Habitat</b>	Flat plain.		
<b>Soil</b>	Red-orange sandy clay with loose surface soil.		
<b>Rock Type</b>			
<b>Vegetation</b>	<p><i>Acacia aneura</i> var. <i>aneura</i> open woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> scattered low trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Eremophila forrestii</i> shrubland over <i>Eremophila forrestii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Rhyncharrhena linearis</i> climbers over <i>Sida fibulifera</i> very open herbs over <i>Monachather paradoxus</i> very open tussock grassland. Flat plain.</p>		
<b>Veg Condition</b>	Good.		
<b>Fire Age</b>	None evident.		
<b>Notes</b>	Sparse leaf and wood litter mainly under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Psyrax latifolia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	30 - 70%	<i>Eremophila clarkei</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Abutilon oxycarpum</i> subsp. <i>prostratum</i> , <i>Eremophila exilifolia</i> , <i>Eremophila forrestii</i> , <i>Eremophila forrestii</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Maireana</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sclerolaena convexula</i> , <i>Sida fibulifera</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Cymbopogon ambiguus</i> , <i>Enneapogon caerulescens</i> , <i>Monachather paradoxus</i>
<b>Climbers</b>	< 2%	<i>Rhyncharrhena linearis</i>

**722 WRE Site 50**



<b>Described by</b>	Date: 5/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	579893 mE	7025318 mN
<b>Habitat</b>	Lower gentle hill slope.		
<b>Soil</b>	Orange sandy clay with surface crust and common fine to coarse gravel/pebbles.		
<b>Rock Type</b>	BIF.		
<b>Vegetation</b>	<p><i>Grevillea berryana</i> scattered trees over <i>Acacia aneura</i> var. <i>intermedia</i> low open woodland over <i>Acacia aneura</i> var. <i>intermedia</i> open scrub over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Grevillea berryana</i> shrubland over <i>Eremophila forrestii</i> low shrubland over <i>Sida chrysocalyx</i> very open herbs over <i>Monachather paradoxus</i> scattered tussock grasses. Lower gentle hill slope.</p>		
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.		
<b>Fire Age</b>	>5 yrs		
<b>Notes</b>	Sparse leaf and moderate wood litter under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Grevillea berryana</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila forrestii</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila forrestii</i> , <i>Eremophila jucunda</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i>

**722 WRE Site 51**

<b>Described by</b>	Date: 5/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	578949 mE	7025479 mN
<b>Habitat</b>	Tall ridge crest with steep slope.		
<b>Soil</b>	Red-orange sandy clay, with continuous coarse gravel, rocks/boulders and surface level plates.		
<b>Rock Type</b>	BIF		
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland to scattered low trees over <i>Thryptomene decussata</i> shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Thryptomene decussata</i> low open heath over <i>Austrostipa scabra</i> very open tussock grassland. Tall ridge crest with steep slope.		
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.		
<b>Fire Age</b>	>5 yrs		
<b>Notes</b>	Sparse leaf and wood litter under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Acacia pruinocarpa</i> , <i>Cymbopogon ambiguus</i> , <i>Eremophila forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Philothea brucei</i> subsp. <i>brucei</i>
<b>Shrubs &lt; 0.5m</b>	30 - 70%	<i>Dodonaea pachyneura</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Austrostipa scabra</i> , <i>Eriachne helmsii</i>

**722 WRE Site 52**

<b>Described by</b>	SH	Date:	5/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	578405	mE	7024722	mN	
<b>Habitat</b>	Flat plain.					
<b>Soil</b>	Red-orange sandy clay, with cracked clay surface and many surface stones/boulders.					
<b>Rock Type</b>	BIF, non-banded ferrous					
<b>Vegetation</b>	<p><i>Acacia cockertoniana</i> and <i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high open shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Eremophila georgei</i> low scattered shrubs to scattered shrubs over <i>Eremophila jucunda</i> low scattered shrubs over <i>Ptilotus schwartzii</i> scattered herbs over <i>Aristida contorta</i> very open tussock grassland. Flat plain.</p>					
<b>Veg Condition</b>	Good.					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf and moderate wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia cockertoniana</i> , <i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia cockertoniana</i> , <i>Eremophila forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila georgei</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila jucunda</i> , <i>Ptilotus schwartzii</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i>
<b>Herbs</b>	< 2%	<i>Calandrinia ?translucens</i> , <i>Myriocephalus guerinae</i>

**722 WRE Site 53**

**Described by** JN                      Date: 5/11/2006                      Type: Q                      20x20  
**Location** Weld Range  
**MGA Zone** 50                      576712 mE                      7024044 mN  
**Habitat** Flat plain.  
**Soil** Red-orange sandy plain, with surface crust and loose soil. Common coarse gravel and boulders are found at surface.  
**Rock Type** BIF, non-banded ferrous.  
**Vegetation** *Acacia aneura* var. *aneura* high shrubland to scattered low trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Acacia aneura* var. *aneura* low open shrubland over *Aristida contorta* open tussock grassland. Flat plain.  
**Veg Condition** Good, grazed by hard hoofed, with tracks.  
**Fire Age** None evident.

**Notes**
**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Psyrdrax latifolia</i>
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs < 1m	2 - 10%	<i>Eremophila forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
Shrubs < 0.5m	< 2%	<i>Eremophila jucunda</i> , <i>Maireana georgei</i> , <i>Maireana</i> sp., <i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	10 - 30%	<i>Aristida contorta</i> , <i>Monachather paradoxus</i>
Climbers	< 2%	<i>Marsdenia australis</i>
Herbs	< 2%	<i>Myriocephalus guerinae</i>

**722 WRE Site 54**

<b>Described by</b>	JN	Date: 5/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	576288 mE	7024069 mN	
<b>Habitat</b>	Flat plain.			
<b>Soil</b>	Red-orange sandy clay, with surface crust.			
<b>Rock Type</b>				
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>fuliginea</i> open forest over <i>Acacia aneura</i> var. <i>aneura</i> low woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Eremophila forrestii</i> open heath over <i>Eremophila forrestii</i> and <i>Eremophila foliosissima</i> low shrubland over <i>Marsdenia australis</i> climbers and <i>Sida fibulifera</i> open herbs over <i>Monachather paradoxus</i> open tussock grassland. Flat plain.			
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.			
<b>Fire Age</b>	>5 yrs			
<b>Notes</b>	Moderate wood and leaf litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia minyura</i> , <i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	30 - 70%	<i>Eremophila clarkei</i> , <i>Eremophila clarkei</i> , <i>Eremophila forrestii</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila foliosissima</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila georgei</i> , <i>Maireana</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida fibulifera</i> , <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Monachather paradoxus</i> , <i>Thyridolepis multiculmis</i>
<b>Climbers</b>	2 - 10%	<i>Marsdenia australis</i>
<b>Herbs</b>	10 - 30%	<i>Lobelia heterophylla</i> , <i>Ptilotus polystachyus</i> var. <i>polystachyus</i>

**722 WRE Site 55**

**Described by** SH                      Date: 5/11/2006                      Type: Q                      20x20

**Location** Weld Range

**MGA Zone** 50                      576512 mE                      7023213 mN

**Habitat** Flat plain

**Soil**

**Rock Type**

**Vegetation** *Grevillea berryana* scattered trees over *Acacia aneura* var. *aneura* scattered low trees over *Acacia aneura* var. *aneura* and *Acacia aneura* var. *fuliginea* high shrubland over *Eremophila forrestii* scattered shrubs over *Eremophila forrestii* , *Eremophila foliosissima*, *Eremophila jucunda* subsp. *jucunda* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Monachather paradoxus* very open tussock grassland.

**Veg Condition**

**Fire Age**

**Notes**

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Grevillea berryana</i> , <i>Psyrax rigidula</i> , <i>Psyrax suaveolens</i>
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>fuliginea</i>
Shrubs < 1m	2 - 10%	<i>Eremophila forrestii</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i>
Shrubs < 0.5m	2 - 10%	<i>Eremophila foliosissima</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum lasiophyllum</i>
Tussock grasses	2 - 10%	<i>Monachather paradoxus</i>
Herbs	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i>

**722 WRE Site 56**

<b>Described by</b>	SH	Date: 5/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	576631 mE	7022957 mN	
<b>Habitat</b>	Minor channel surrounded by relatively bare clay pan.			
<b>Soil</b>	Red-orange sandy clay, with surface crust and loose soil..			
<b>Rock Type</b>				
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Grevillea berryana</i> scattered low trees to scattered trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Acacia ramulosa</i> var. <i>ramulosa</i> open scrub over <i>Eremophila forrestii</i> shrubland over <i>Eremophila foliosissima</i> low shrubland over <i>Ptilotus schwartzii</i> very open herbs over <i>Thyridolepis multiculmis</i> very open tussock grassland. Minor channel surrounded by relatively bare clay pan.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Moderate leaf and sparse wood litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Grevillea berryana</i> , <i>Psyrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia minyura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila clarkei</i> , <i>Eremophila forrestii</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila foliosissima</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila ?jucunda</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Thyridolepis multiculmis</i>
<b>Herbs</b>	2 - 10%	<i>Waitzia acuminata</i> var. <i>acuminata</i>

**722 WRE Site 57**

**Described by** JN                      Date: 10/11/2006                      Type: Q                      20x20  
**Location** Weld Range  
**MGA Zone** 50                      555361 mE                      7018447 mN  
**Habitat** Flat plain.  
**Soil** Red-orange sandy clay with surface crust, fine gravel and loose soil.  
**Rock Type**  
**Vegetation** *Acacia aneura* var. *aneura* low open woodland to scattered trees over *Acacia aneura* var. *aneura* and *Acacia ramulosa* var. *linophylla* open scrub over *Acacia ramulosa* var. *linophylla* and *Acacia craspedocarpa* open shrubland over *Eremophila punicea* low shrubland over *Ptilotus exaltatus* var. *exaltatus* scattered herbs over *Eragrostis pergracilis* open tussock grassland. Flat plain.  
**Veg Condition** Good, grazed by hard hoofed, with tracks.  
**Fire Age** >5 yrs  
**Notes** Sparse leaf and moderate wood litter under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
Trees < 10m	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
Shrubs > 2m	30 - 70%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i>
Shrubs 1 - 2m	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Rhagodia eremaea</i>
Shrubs < 1m	10 - 30%	<i>Eremophila georgei</i> , <i>Eremophila punicea</i> , <i>Maireana lobiflora</i> , <i>Senna stricta</i> , <i>Spartothamnella teucriflora</i>
Shrubs < 0.5m	2 - 10%	<i>Eremophila falcata</i> , <i>Eremophila latrobei</i> subsp. <i>filiformis</i> , <i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sclerolaena densiflora</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	10 - 30%	<i>Aristida contorta</i> , <i>Eragrostis pergracilis</i>
Climbers	< 2%	<i>Marsdenia australis</i>
Herbs	< 2%	<i>Calandrinia translucens</i> , <i>Ptilotus exaltatus</i> var. <i>exaltatus</i>



**722 WRE Site 58**

<b>Described by</b>	SH	Date: 10/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	556308 mE	7018551 mN	
<b>Habitat</b>	Salt pan			
<b>Soil</b>	Red-orange sandy clay with loose soil at surface.			
<b>Rock Type</b>				
<b>Vegetation</b>	<i>Cratystylis subspinescens</i> high shrubland over <i>Melaleuca stereophloia</i> and <i>Cratystylis subspinescens</i> low open shrubland to shrubland over <i>Halosarcia indica</i> subsp. <i>leiostachya</i> and <i>Frankenia laxiflora</i> low shrubland over <i>Podolepis capillaris</i> very open herbs over <i>Eragrostis pergracilis</i> open tussock grassland. Salt pan.			
<b>Veg Condition</b>	Good.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Sparse wood and leaf litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Leptomeria preissiana</i> , <i>Melaleuca stereophloia</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Cratystylis subspinescens</i> , <i>Eremophila glabra</i> subsp. <i>glabra</i> , <i>Eremophila glabra</i> subsp. <i>tomentosa</i> , <i>Eremophila maculata</i> subsp. <i>brevifolia</i> , <i>Muehlenbeckia florulenta</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Atriplex</i> sp., <i>Atriplex vesicaria</i> , <i>Eremophila georgei</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Frankenia laxiflora</i> , <i>Podolepis capillaris</i> , <i>Pterocaulon sphacelatum</i> , <i>Ptilotus divaricatus</i> var. <i>divaricatus</i> , <i>Tecticornia doleiformis</i> , <i>Tecticornia indica</i> subsp. <i>leiostachya</i>
<b>Tussock grasses</b>	10 - 30%	<i>Eragrostis pergracilis</i>

**722 WRE Site 59**

<b>Described by</b>	Date: 10/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range		
<b>MGA Zone</b>	50	555937 mE	7016482 mN
<b>Habitat</b>	Creek bank and bed with gentle slope.		
<b>Soil</b>	Red-orange sand/sandy clay with surface crust and loose soil. Continuous coarse gravel/pebbles, stones and surface level plates/boulders.		
<b>Rock Type</b>	BIF, non-banded ferrous.		
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low woodland to woodland over <i>Acacia sibirica</i> low woodland over <i>Acacia sibirica</i> and <i>Acacia</i> sp. Weld Range high open shrubland over <i>Senna</i> sp. Meekatharra and <i>Eremophila georgei</i> open shrubland over <i>Senna</i> sp. Meekatharra, <i>Eremophila forrestii</i> and <i>Calytrix desolata</i> low open shrubland over <i>Pluchea dentex</i> scattered herbs over <i>Cymbopogon ambiguus</i> very open tussock grassland. Creek bank and bed with gentle slope.		
<b>Veg Condition</b>	Good, grazed by hard hoofed		
<b>Fire Age</b>	?		
<b>Notes</b>	Sparse leaf and moderate wood litter mainly under shrubs.		

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Grevillea berryana</i>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia sibirica</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. D. 2994), <i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila exilifolia</i> , <i>Eremophila forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila glutinosa</i> , <i>Eremophila macmillaniana</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna</i> sp. Meekatharra (Bailey 1-26)
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Calytrix desolata</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna artemisioides</i> subsp. <i>filiifera</i> , <i>Senna artemisioides</i> subsp. <i>x artemisioides</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Austrostipa scabra</i> , <i>Cymbopogon ambiguus</i> , <i>Monachather paradoxum</i>
<b>Climbers</b>	< 2%	<i>Duperreya sericea</i> , <i>Marsdenia australis</i>
<b>Herbs</b>	< 2%	<i>Pluchea dentex</i>

**722 WRE Site 60**

**Described by** JN                      **Date:** 10/11/2006                      **Type:** Q                      20x20

**Location** Weld Range

**MGA Zone** 50                      556788 mE                      7016839 mN

**Habitat** Flat plain, approximately 30m to the south-west of a creek bed.

**Soil** Red-orange sandy clay/clay, with loose soil at surface.

**Rock Type**

**Vegetation** *Acacia aneura* and *Hakea lorea* subsp. *lorea* scattered trees over *Hakea lorea* subsp. *lorea* low open woodland over *Acacia ramulosa* var. *linophylla* and *Eremophila forrestii* high shrubland over *Eremophila forrestii*, *Senna* sp. Meekatharra and *Senna artemisioides* subsp. *sturtii* open heath over *Senna artemisioides* subsp. *sturtii*, *Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* low shrubland over *Glycine canescens* climbers over *Abutilon oxycarpum* subsp. *prostratum* very open herbs over *Aristida contorta* tussock grassland. Flat plain, approximately 30m to the south-west of a creek bed.

**Veg Condition** Poor, grazed by hard hoofed.

**Fire Age** None evident.

**Notes** Moderate leaf and sparse wood litter under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees 10 - 30m	< 2%	<i>Hakea lorea</i> subsp. <i>lorea</i>
Trees < 10m	2 - 10%	<i>Acacia aneura</i> , <i>Acacia craspedocarpa</i> , <i>Hakea lorea</i> subsp. <i>Lorea</i>
Shrubs > 2m	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs 1 - 2m	30 - 70%	<i>Eremophila forrestii</i> , <i>Eremophila macmillaniana</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i>
Shrubs < 1m	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Eremophila georgei</i> , <i>Eremophila glutinosa</i> , <i>Eremophila granitica</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna artemisioides</i> subsp. x <i>sturtii</i> , <i>Senna</i> sp. Meekatharra(E. Bailey 1-26)
Shrubs < 0.5m	2 - 10%	<i>Abutilon oxycarpum</i> subsp. <i>prostratum</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna</i> sp. Meekatharra x <i>artemisioides</i> subsp. x <i>sturtii</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	30 - 70%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Eragrostis lanipes</i>
Climbers	< 2%	<i>Glycine canescens</i>

**722 WRE Site 61**

<b>Described by</b>	JN	Date:	10/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	557395	mE	7018295	mN	
<b>Habitat</b>	Flat flood plain.					
<b>Soil</b>	Orange sandy clay with surface crust, loose soil and coarse gravel.					
<b>Rock Type</b>	Non-banded ferrous, calcrete.					
<b>Vegetation</b>	<i>Pittosporum angustifolium</i> scattered low trees to scattered trees over <i>Melaleuca stereophloia</i> scattered tall shrubs over <i>Cratystylis subspinescens</i> and <i>Melaleuca stereophloia</i> shrubland over <i>Melaleuca stereophloia</i> , <i>Cratystylis subspinescens</i> , <i>Halosarcia indica</i> subsp. <i>leiostachya</i> and <i>Frankenia laxiflora</i> low open heath over <i>Sonchus oleraceus</i> scattered herbs over <i>Aristida contorta</i> very open tussock grassland. Flat flood plain.					
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Sparse wood and leaf litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Pittosporum angustifolium</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Cratystylis subspinescens</i> , <i>Eremophila glabra</i> subsp. <i>glabra</i> , <i>Leptomeria preissiana</i> , <i>Melaleuca stereophloia</i> , <i>Muehlenbeckia florulenta</i>
<b>Shrubs &lt; 1m</b>	30 - 70%	<i>Atriplex nummularia</i> , <i>Frankenia laxiflora</i> , <i>Maireana</i> sp.3, <i>Tecticornia indica</i> subsp. <i>leiostachya</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Atriplex bunburyana</i> , <i>Frankenia laxiflora</i> , <i>Lawrencia chrysoderma</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sclerolaena patentiscuspis</i> , <i>Sida fibulifera</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Eragrostis dielsii</i>
<b>Herbs</b>	< 2%	<i>Brachyscome ciliaris</i> var. <i>ciliaris</i> , <i>Centaurium clementii</i> , <i>Cullen cinereum</i> , <i>Sonchus oleraceus</i> , <i>Swainsona laciniata</i>

**722 WRE Site 62**

<b>Described by</b>	SH	Date: 10/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	558162 mE	7019250 mN	
<b>Habitat</b>	Flat plain. ?Seep samphire flat.			
<b>Soil</b>	Red-orange and white sandy clays and clays. Cracked clay and loose soil at surface.			
<b>Rock Type</b>				
<b>Vegetation</b>	<i>Eucalyptus gypsophila</i> low woodland to woodland over <i>Cratystylis subspinescens</i> shrubland to scattered tall shrubs over <i>Lawrenzia chrysoderma</i> , <i>Cratystylis subspinescens</i> and <i>Atriplex bunburyana</i> low shrubland over <i>Angianthus tomentosus</i> open herbs over <i>Eragrostis dielsii</i> tussock grassland. Flat plain. ?Seep samphire flat.			
<b>Veg Condition</b>	Good.			
<b>Fire Age</b>	>5 yrs			
<b>Notes</b>	Sparse leaf and wood litter under trees.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	10 - 30%	<i>Eucalyptus carnei</i>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Eucalyptus carnei</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Cratystylis subspinescens</i> , <i>Eremophila pantonii</i> , <i>Leptomeria preissiana</i> , <i>Scaevola spinescens</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila glabra</i> subsp. <i>tomentosa</i> , <i>Pittosporum angustifolium</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Atriplex bunburyana</i> , <i>Atriplex vesicaria</i> , <i>Frankenia laxiflora</i> , <i>Lawrenzia chrysoderma</i> , <i>Pittosporum angustifolium</i> , <i>Tecticornia doleiformis</i> , <i>Zygophyllum aurantiacum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Eragrostis dielsii</i>
<b>Herbs</b>	10 - 30%	<i>Angianthus tomentosus</i> , <i>Goodenia lyrata</i> , <i>Minuria cunninghamii</i> , <i>Rhodanthe humboldtiana</i>

**722 WRE Site 63**

<b>Described by</b>	JN	Date: 10/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	558753 mE	7019308 mN	
<b>Habitat</b>	Flat flood plain area, seasonally inundated.			
<b>Soil</b>	Red-orange sandy clay, with surface crust.			
<b>Rock Type</b>				
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>fuliginea</i> and <i>Grevillea striata</i> low open woodland to open woodland over <i>Acacia craspedocarpa</i> and <i>Acacia tetragonophylla</i> high shrubland over <i>Melaleuca stereophloia</i> shrubland over <i>Melaleuca stereophloia</i> and <i>Scaevola spinescens</i> low open shrubland over <i>Goodenia</i> sp. Weld Range open herbs over <i>Eragrostis pergracilis</i> very open tussock grassland. Flat flood plain area, seasonally inundated.			
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Moderate wood and leaf litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	2 - 10%	<i>Grevillea striata</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Grevillea striata</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia craspedocarpa</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila longifolia</i> , <i>Grevillea nematophylla</i> subsp. <i>supraplana</i> , <i>Melaleuca stereophloia</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Ptilotus divaricatus</i> var. <i>divaricatus</i> , <i>Senna stricta</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila maculata</i> subsp. <i>brevifolia</i> , <i>Scaevola spinescens</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Alternanthera denticulata</i>
<b>Tussock grasses</b>	2 - 10%	<i>Eragrostis pergracilis</i> , <i>Eriachne flaccida</i>
<b>Climbers</b>	< 2%	<i>Lysiana murrayi</i>
<b>Herbs</b>	10 - 30%	<i>Bergia perennis</i> subsp. <i>exigua</i> , <i>Calocephalus multiflorus</i> , <i>Goodenia berringbinensis</i> , <i>Goodenia tenuiloba</i> , <i>Marsilea</i> sp.

**722 WRE Site 64**

<b>Described by</b>	SH	Date: 10/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	558818 mE	7019727 mN	
<b>Habitat</b>	Flat plain.			
<b>Soil</b>	Red-orange sandy clay.			
<b>Rock Type</b>				
<b>Vegetation</b>	<i>Grevillea striata</i> and <i>Acacia ramulosa</i> var. <i>ramulosa</i> low open woodland to scattered trees over <i>Grevillea nematophylla</i> subsp. <i>supraplana</i> and <i>Acacia tetragonophylla</i> high open shrubland over <i>Scaevola spinescens</i> open shrubland over <i>Ptilotus divaricatus</i> var. <i>divaricatus</i> low shrubland over <i>Calocephalus multiflorus</i> herbs over <i>Eriachne flaccida</i> open tussock grassland.			
<b>Veg Condition</b>	Poor, grazed by hard hoofed, with tracks. Large quantities of litter scattered around due to proximity to dump.			
<b>Fire Age</b>	?			
<b>Notes</b>	Plentiful leaf litter and moderate wood litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Grevillea striata</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Eremophila longifolia</i> , <i>Grevillea striata</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia victoriae</i> , <i>Grevillea nematophylla</i> subsp. <i>supraplana</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Scaevola spinescens</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Ptilotus divaricatus</i> var. <i>divaricatus</i>
<b>Tussock grasses</b>	10 - 30%	<i>Austrostipa elegantissima</i> , <i>Eriachne flaccida</i>
<b>Climbers</b>	< 2%	<i>Amyema fitzgeraldii</i>
<b>Herbs</b>	< 2%	<i>Alternanthera denticulata</i> , <i>Calocephalus multiflorus</i>

**722 WRE Site 65**

<b>Described by</b>	JN	Date: 12/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	560117 mE	7020303 mN	
<b>Habitat</b>	Flat plain.			
<b>Soil</b>	Red-orange sandy clay, with surface crust, fine gravel and loose soil.			
<b>Rock Type</b>	Non-banded ferrous.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low woodland to scattered trees over <i>Acacia craspedocarpa</i> and <i>Acacia aneura</i> var. <i>aneura</i> open shrubland to high shrubland over <i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i> low shrubland over <i>Eriachne pulchella</i> subsp. <i>pulchella</i> open tussock grassland. Flat plain.			
<b>Veg Condition</b>	Good, grazed by hard hoofed.			
<b>Fire Age</b>	None-evident.			
<b>Notes</b>	Sparse leaf and moderate wood litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Psyrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia craspedocarpa</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Chenopodium gaudichaudianum</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>filiformis</i> , <i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Maireana melanocoma</i> , <i>Maireana</i> sp.2, <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
<b>Climbers</b>	< 2%	<i>Lysiana murrayi</i>
<b>Herbs</b>	< 2%	<i>Bergia perennis</i> subsp. <i>exigua</i> , <i>Goodenia tenuiloba</i> , <i>Schoenia cassiniana</i>



**722 WRE Site 66**

**Described by** SH                      Date: 12/11/2006                      Type: Q                      20x20

**Location** Weld Range

**MGA Zone** 50                      560739 mE                      7020177 mN

**Habitat** Flat plain.

**Soil** Red-orange sandy clay, with loose surface soil and animal excrement.

**Rock Type**

**Vegetation** *Acacia aneura* var. *intermedia* low open woodland to open woodland over *Acacia ramulosa* var. *linophylla* scattered shrubs to open scrub over *Eremophila glutinosa* and *Senna artemisioides* subsp. *helmsii* low open shrubland over *Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* low scattered shrubs over *Marsdenia australis* climbers over *Ptilotus polystachyus* var. *polystachyus* open herbs over *Aristida contorta* and *Monachather paradoxus* open tussock grassland.

**Veg Condition** Poor, grazed by hard hoofed.

**Fire Age** None evident.

**Notes** Sparse leaf and moderate wood litter mainly under shrubs. The area has been heavily grazed by goats, which were not disturbed by human proximity.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	<i>Acacia aneura</i> var. <i>intermedia</i>
Shrubs > 2m	30 - 70%	<i>Acacia murrayana</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Rhagodia eremaea</i>
Shrubs < 1m	2 - 10%	<i>Eremophila forrestii</i> , <i>Ptilotus polystachyus</i> var. <i>polystachyus</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
Shrubs < 0.5m	< 2%	<i>Eremophila glutinosa</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	10 - 30%	<i>Aristida contorta</i> , <i>Monachather paradoxus</i>
Climbers	< 2%	<i>Lysiana murrayi</i> , <i>Marsdenia australis</i>
Herbs	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i>

**722 WRE Site 67**

<b>Described by</b>	SH	Date: 12/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	560339 mE	7018774 mN	
<b>Habitat</b>	Moderate hill slope.			
<b>Soil</b>	Red-orange sandy clay, with continuous stones and surface level plates/boulders.			
<b>Rock Type</b>	Non-banded ferrous			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low woodland over <i>Thryptomene decussata</i> and <i>Acacia aneura</i> var. <i>aneura</i> high open shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Eremophila compacta</i> open shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Solanum lasiophyllum</i> low open shrubland over <i>Sida chrysocalyx</i> very open herbs over <i>Eriachne pulchella</i> subsp. <i>pulchella</i> very open tussock grassland. Moderate hill slope.			
<b>Veg Condition</b>	Good, grazed by hard hoofed.			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse wood and leaf litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila compacta</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Cymbopogon ambiguus</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
<b>Herbs</b>	2 - 10%	<i>Cheilanthes lasiophylla</i>

**722 WRE Site 68**

<b>Described by</b>	JN	Date: 12/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	561487 mE	7019282 mN	
<b>Habitat</b>	Steep hill slope.			
<b>Soil</b>	Red-orange sandy clay with surface crust, and continuous coarse gravel, surface level plates and			
<b>Rock Type</b>	boulders.			
<b>Vegetation</b>	BIF.			
<b>Veg Condition</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia aneura</i> var. <i>intermedia</i> high shrubland to scattered low trees over <i>Thryptomene decussata</i> and <i>Acacia sibirica</i> shrubland over <i>Thryptomene decussata</i> and <i>Eremophila compacta</i> low shrubland over <i>Sida</i> sp. <i>Excedentifolia</i> very open herbs over <i>Eriachne helmsii</i> scattered tussock grasses. Steep hill slope.			
<b>Fire Age</b>	Excellent, grazed by hard hoofed.			
<b>Notes</b>	None evident.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia rhodophloia</i> , <i>Acacia sibirica</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila compacta</i> , <i>Eremophila glutinosa</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Dodonaea pachyneura</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i> , <i>Eriachne helmsii</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	2 - 10%	<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)

**722 WRE Site 69**

<b>Described by</b>	SH	Date: 12/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	562050 mE	7019840 mN	
<b>Habitat</b>	Minor channel, washout from hill.			
<b>Soil</b>	Red-orange sandy clay with fine to coarse gravel and continuous surface boulders.			
<b>Rock Type</b>	Non-banded ferrous, calcrete and granite.			
<b>Vegetation</b>	<p><i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia rhodophloia</i> and <i>Thryptomene decussata</i> scattered tall shrubs over <i>Baeckea</i> sp. Melita Station and <i>Acacia rhodophloia</i> scattered shrubs over <i>Micromyrtus placoides</i>, <i>Baeckea</i> sp. Melita Station and <i>Aluta aspera</i> subsp. <i>hesperia</i> low shrubland over <i>Goodenia tenuiloba</i> scattered herbs over Grass sp. scattered tussock grasses.</p>			
<b>Veg Condition</b>	Good, grazed by hard hoofed.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Sparse leaf and wood litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia rhodophloia</i> , <i>Acacia sibirica</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Baeckea</i> sp. Melita Station (H. Pringle 2738), <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Micromyrtus placoides</i> , <i>Philothea brucei</i> subsp. <i>brevifolia</i> , <i>Prostanthera petrophila</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Hemigenia tysonii</i> , <i>Stenanthemum petraeum</i>
<b>Tussock grasses</b>	< 2%	POACEAE sp.
<b>Herbs</b>	< 2%	<i>Goodenia tenuiloba</i>

**722 WRE Site 70**

<b>Described by</b>	JN	Date:	12/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	563095	mE	7019945	mN	
<b>Habitat</b>	Hills lope and crest with a moderate slope.					
<b>Soil</b>	Red-orange sandy clay with surface crust, and continuous coarse gravel, stones/boulders and					
<b>Rock Type</b>	surface level plates.					
<b>Vegetation</b>	BIF, non-banded ferrous.					
<b>Veg Condition</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia aneura</i> high shrubland over <i>Acacia aneura</i> and <i>Thryptomene decussata</i> shrubland over <i>Thryptomene decussata</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Philotheca brucei</i> subsp. <i>brucei</i> low shrubland over <i>Sida</i> sp. <i>Excedentifolia</i> scattered herbs over <i>Monochathe</i> sp very open tussock grassland.					
<b>Fire Age</b>	Excellent, grazed by hard hoofed.					
<b>Notes</b>	None evident.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Psyrax rigidula</i> , <i>Santalum spicatum</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia aneura</i> , <i>Dodonaea pachyneura</i> , <i>Eremophila glutinosa</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925), <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	2 - 10%	<i>Cymbopogon ambiguus</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	< 2%	<i>Goodenia tenuiloba</i> , <i>Monachather paradoxus</i>

**722 WRE Site 71**

<b>Described by</b>	SH	Date: 12/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	564237 mE	7020615 mN	
<b>Habitat</b>	Moderate hill slope.			
<b>Soil</b>	Red-orange sandy clay with stones and continuous surface-level plates/boulders.			
<b>Rock Type</b>	BIF, non-banded ferrous.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low woodland over <i>Thryptomene decussata</i> high open shrubland over <i>Eremophila glutinosa</i> open heath over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Sida excedentifolia</i> low open shrubland over <i>Goodenia tenuiloba</i> open herbs over <i>Eragrostis eriopoda</i> scattered tussock grasses.			
<b>Veg Condition</b>	Good, grazed by hard hoofed.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	SE face 140°. Approximately 80 <i>Prostanthera petrophila</i> on SE face, around 40 of those inside the quadrat. Numbers reduce after the BIF outcrop.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia minyura</i> , <i>Grevillea berryana</i> , <i>Psydrax suaveolens</i>
<b>Shrubs 1 - 2m</b>	30 - 70%	<i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila glutinosa</i> , <i>Prostanthera petrophila</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)
<b>Tussock grasses</b>	< 2%	<i>Eragrostis eriopoda</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>
<b>Herbs</b>	10 - 30%	<i>Goodenia tenuiloba</i>

**722 WRE Site 72**

<b>Described by</b>	JN	Date: 12/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	565375 mE	7021598 mN	
<b>Habitat</b>	Undulating plain with gentle slope.			
<b>Soil</b>	Red-orange sandy clay with surface crust and fine gravel.			
<b>Rock Type</b>	Non-banded ferrous.			
<b>Vegetation</b>	<i>Grevillea berryana</i> scattered trees over <i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Eremophila forrestii</i> shrubland over <i>Eremophila forrestii</i> , <i>Solanum lasiophyllum</i> and <i>Eremophila margarethae</i> low shrubland over <i>Sida chrysocalyx</i> very open herbs over <i>Monachather paradoxus</i> very open tussock grassland. Undulating plain with gentle slope.			
<b>Veg Condition</b>	Good, grazed by hard hoofed, tracks.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Sparse wood and leaf litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Grevillea berryana</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila forrestii</i> , <i>Eremophila granitica</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila glutinosa</i> , <i>Mirbelia rhagodioides</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila margarethae</i> , <i>Hibiscus burtonii</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i>

**722 WRE Site 75**

<b>Described by</b>	SH	Date: 10/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	558361 mE	7016368 mN	
<b>Habitat</b>	Flat plain, including culvert drain.			
<b>Soil</b>	Red-orange sandy clay, with loose soil and common coarse gravel/pebbles.			
<b>Rock Type</b>	BIF, non-banded ferrous and quartz.			
<b>Vegetation</b>	<p><i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Senna glaucifolia</i> high open shrubland over <i>Eremophila forrestii</i> and <i>Senna glaucifolia</i> open shrubland over <i>Eremophila forrestii</i>, <i>Senna glaucifolia</i> and <i>Ptilotus schwartzii</i> low scattered shrubs over <i>Ptilotus polystachyus</i> very open herbs over <i>Aristida contorta</i> very open tussock grassland. Flat plain, including culvert drain.</p>			
<b>Veg Condition</b>	Good, grazed by hard hoofed.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Sparse leaf and wood litter mainly under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Eremophila forrestii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Maireana</i> sp., <i>Solanum ashbyae</i> , <i>Tribulus suberosus</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila margarethae</i> , <i>Maireana georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Sida spodochroma</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i>
<b>Herbs</b>	2 - 10%	<i>Ptilotus polystachyus</i>



**722 WRE Site 76**

<b>Described by</b>	JN	Date:	10/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	558871	mE	7016000	mN	
<b>Habitat</b>	Moderate hill slope.					
<b>Soil</b>	Red-orange sandy clay, with surface crust, and continuous srones/boulders and surface-level plates.					
<b>Rock Type</b>	Non-banded ferrous.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland to open scrub over <i>Eremophila macmillaniana</i> low shrubland to shrubland over <i>Sida atrovirens</i> scattered herbs over <i>Aristida contorta</i> tussock grassland. Moderate hill slope.					
<b>Veg Condition</b>	Excellent, grazed by hard hoofed.					
<b>Fire Age</b>	None-evident.					
<b>Notes</b>	Sparse leaf and moderate wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Psyrdrax latifolia</i>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia craspedocarpa</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila macmillaniana</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Calytrix desolata</i> , <i>Eremophila glutinosa</i> , <i>Senna</i> sp. Meekatharra(E. Bailey 1-26), <i>Tribulus suberosus</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Abutilon macrum</i> , <i>Abutilon otoparpum</i> , <i>Ptilotus helipteroides</i> var. <i>helipteroides</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i>

**722 WRE Site 77**

<b>Described by</b>	SH	Date: 11/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	560383 mE	7016704 mN	
<b>Habitat</b>	Flat plain, creek bed and bank.			
<b>Soil</b>	Red-orange sandy clay, with loose soil and coarse gravel/pebbles continuous at surface.			
<b>Rock Type</b>	Non-banded ferrous, granite, quartz.			
<b>Vegetation</b>	<p><i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia aneura</i> var. <i>intermedia</i> woodland to low open forest over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Senna</i> sp. Meekatharra low open shrubland to shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Marsdenia australis</i> climbers over <i>Abutilon macrum</i> and <i>Sida fibulifera</i> open herbs over <i>Aristida contorta</i> and <i>Austrostipa scabra</i> open tussock grassland.</p>			
<b>Veg Condition</b>	Good, grazed by hard hoofed.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Sparse leaf and moderate wood litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Psyrax latifolia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia pruinocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Chenopodium gaudichaudianum</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Abutilon macrum</i> , <i>Eremophila georgei</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i> , <i>Senna artemisioides</i> subsp. x <i>sturtii</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Acacia exocarpoides</i> , <i>Eremophila forrestii</i> , <i>Eremophila</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida fibulifera</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Austrostipa scabra</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon</i> sp.
<b>Climbers</b>	2 - 10%	<i>Marsdenia australis</i>
<b>Herbs</b>	10 - 30%	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>

**722 WRE Site 78**

<b>Described by</b>	JN	Date: 11/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	560839 mE	7016798 mN	
<b>Habitat</b>	Hill slope and crest with moderate to gentle slope.			
<b>Soil</b>	Red-orange sandy clay with surface crust, and continuous stones/boulders and surface-level plates.			
<b>Rock Type</b>	Non-banded ferrous.			
<b>Vegetation</b>	Acacia aneura var. aneura scattered low trees over Acacia sp. Weld Range high shrubland over Acacia sp. Weld Range and Eremophila glutinosa shrubland over Eremophila glutinosa and Eremophila exilifolia low shrubland over Aristida contorta open tussock grassland. Hill slope and crest with moderate to gentle slope.			
<b>Veg Condition</b>	Excellent, grazed by hard hoofed.			
<b>Fire Age</b>	>5 yrs			
<b>Notes</b>	Sparse leaf and moderate wood litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia speckii</i> , <i>Eremophila exilifolia</i> , <i>Eremophila glutinosa</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Dodonaea amplisemina</i> , <i>Eremophila forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila glutinosa</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Heliotropium ovalifolium</i> , <i>Hibiscus sturtii</i> var. <i>forrestii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i>

**722 WRE Site 79**

<b>Described by</b>	SH	Date: 11/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	561459 mE	7016891 mN	
<b>Habitat</b>	Hill slope/crest facing north.			
<b>Soil</b>	Red-orange sandy clay with continuous surface stones/boulders and surface-level plates.			
<b>Rock Type</b>	BIF, non-banded ferrous.			
<b>Vegetation</b>	<p><i>Acacia aneura</i> var. <i>aneura</i> low woodland over <i>Acacia</i> sp. Weld Range and <i>Acacia longispinea</i> high shrubland over <i>Eremophila glutinosa</i> and <i>Eremophila macmillaniana</i> open shrubland over <i>Eremophila glutinosa</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Ptilotus helipteroides</i> var. <i>helipteroides</i> and <i>Goodenia tenuiloba</i> open herbs over <i>Eriachne pulchella</i> subsp. <i>pulchella</i> and <i>Aristida contorta</i> very open tussock grassland. Hill slope/crest facing north.</p>			
<b>Veg Condition</b>	Good, grazed by hard hoofed.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Sparse leaf litter and moderate wood litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Psydrax rigidula</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia longispinea</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila macmillaniana</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus helipteroides</i> var. <i>helipteroides</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Sida spodochroma</i> , <i>Solanum lasiophyllum</i> , <i>Tribulus suberosus</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Enneapogon</i> sp., <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
<b>Herbs</b>	10 - 30%	<i>Goodenia tenuiloba</i>

**722 WRE Site 80**

<b>Described by</b>	JN	Date:	11/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	561967	mE	7017599	mN	
<b>Habitat</b>	Moderate hill slope.					
<b>Soil</b>	Red-orange sandy clay with surface crust, amd continuous stones/boulders and surface-level plates.					
<b>Rock Type</b>	Non-banded ferrous.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia</i> sp. Weld Range and <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Acacia</i> sp. Weld Range and <i>Eremophila macmillaniana</i> shrubland over <i>Eremophila macmillaniana</i> and <i>Dodonaea</i> sp. Ninghan low shrubland over <i>Sida atrovirens</i> scattered herbs over <i>Aristida contorta</i> open tussock grassland. Moderate hill slope.					
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.					
<b>Fire Age</b>	None evident.					

**Notes**
**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia speckii</i> , <i>Eremophila macmillaniana</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Cymbopogon ambiguus</i> , <i>Eremophila forrestii</i> , <i>Eremophila glutinosa</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Dodonaea amplisemina</i> , <i>Halgania cyanea</i> var. Allambi Stn (B.W. Strong 676), <i>Heliotropium ovalifolium</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i>

**722 WRE Site 81**

**Described by** SH                      Date: 11/11/2006                      Type: Q                      20x20

**Location** Weld Range

**MGA Zone** 50                      563953 mE                      7018088 mN

**Habitat** Lower gentle hill slope and gully sides.

**Soil** Red-orange sandy clay/clay, with coarse gravel/pebbles and stones/boulders at surface.

**Rock Type**

**Vegetation** *Acacia aneura* var. *aneura* low open woodland to scattered trees over *Acacia* sp. Weld Range high shrubland over *Senna artemisioides* subsp. *helmsii* open heath over *Senna artemisioides* subsp. *helmsii*, *Eremophila glutinosa* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Ptilotus helipteroides* var. *helipteroides* open herbs over *Aristida contorta* open tussock grassland.

**Veg Condition**
**Fire Age**
**Notes**
**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Brachychiton gregorii</i>
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	30 - 70%	<i>Senna artemisioides</i> subsp. <i>helmsii</i>
Shrubs < 1m	2 - 10%	<i>Eremophila georgei</i> , <i>Eremophila glutinosa</i> , <i>Eremophila glutinosa</i> , <i>Senna</i> sp. Meekatharra(E. Bailey 1-26), <i>Solanum ashbyae</i> , <i>Tribulus suberosus</i>
Shrubs < 0.5m	2 - 10%	<i>Abutilon otocarpum</i> , <i>Abutilon oxycarpum</i> subsp. <i>prostratum</i> , <i>Heliotropium ovalifolium</i> , <i>Indigofera monophylla</i> , <i>Maireana georgei</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)
Tussock grasses	10 - 30%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon</i> sp.
Climbers	< 2%	<i>Glycine canescens</i> , <i>Marsdenia australis</i>
Herbs	10 - 30%	<i>Ptilotus helipteroides</i> var. <i>helipteroides</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>

**722 WRE Site 82**

<b>Described by</b>	JN	Date: 11/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	565129 mE	7018605 mN	
<b>Habitat</b>	Creek bed and bank with gentle slope.			
<b>Soil</b>	Red-orange sandy clay with loose soil, and continuous coarse gravel and stones/boulders.			
<b>Rock Type</b>	BIF, non-banded ferrous			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Grevillea berryana</i> low woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia</i> sp. Weld Range high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Acacia</i> sp. Weld Range shrubland over <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> and <i>Senna artemisioides</i> subsp. <i>sturtii</i> low shrubland over <i>Marsdenia australis</i> climbers over <i>Abutilon</i> sp. scattered herbs over <i>Cymbopogon ambiguus</i> open tussock grassland. Creek bed and bank with gentle slope.			
<b>Veg Condition</b>	Good, grazed by goats, with tracks.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Moderate to sparse leaf and wood litter mainly under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Grevillea berryana</i> , <i>Psyrax latifolia</i> , <i>Psyrax rigidula</i> , <i>Psyrax suaveolens</i> , <i>Santalum spicatum</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Eremophila phyllopoda</i> , <i>Rhagodia eremaea</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>artemisioides</i> subsp. x <i>sturtii</i> , <i>Sida</i> ? <i>calyxhymenia</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Abutilon oxycarpum</i> subsp. <i>prostratum</i> , <i>Abutilon</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Austrostipa scabra</i> , <i>Cymbopogon ambiguus</i> , <i>Digitaria</i> br, <i>Enneapogon caerulescens</i>
<b>Climbers</b>	< 2%	<i>Glycine canescens</i> , <i>Marsdenia australis</i>
<b>Herbs</b>	< 2%	<i>Duperreya sericea</i> , <i>Trichodesma zeylanicum</i>

**722 WRE Site 83**

<b>Described by</b>	SH	Date: 11/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	566032 mE	7018945 mN	
<b>Habitat</b>	Lower hill slope.			
<b>Soil</b>	Red-orange sandy clay, with common coarse gravel and rocks/boulders.			
<b>Rock Type</b>	BIF, non-banded ferrous.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Eremophila glutinosa</i> and <i>Eremophila forrestii</i> scattered shrubs and low scattered shrubs over <i>Sida excedentifolia</i> low open heath over <i>Goodenia tenuiloba</i> open herbs over <i>Monachather paradoxus</i> scattered tussock grasses. Lower hill slope.			
<b>Veg Condition</b>	Good, grazed by hard hoofed.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Moderate leaf and wood litter mainly under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Psydrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila forrestii</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i> , <i>Maireana villosa</i>
<b>Shrubs &lt; 0.5m</b>	30 - 70%	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Hibiscus burtonii</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925), <i>Solanum lasiophyllum</i> , <i>Tribulus suberosus</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	10 - 30%	<i>Goodenia tenuiloba</i>



**722 WRE Site 84**

**Described by** SH                      Date: 4/11/2006                      Type: Q                      20x20

**Location** Weld Range

**MGA Zone** 50                      584122 mE                      7031020 mN

**Habitat** Flat plain.

**Soil** Red-orange sandy clay with loose soil at surface.

**Rock Type**

**Vegetation** *Acacia aneura* var. *aneura* low open woodland over *Acacia aneura* var. *aneura*, *Acacia aneura* var. *intermedia* and *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* low open shrubland to shrubland over *Ptilotus obovatus* var. *obovatus* low scattered shrubs over *Marsdenia australis* climbers over *Rhodanthe citrina* and *Ptilotus polystachyus* scattered herbs over *Monachather paradoxus* and *Eragrostis lanicaulis* open tussock grassland. Flat plain.

**Veg Condition** Good, grazed by hard hoofed.

**Fire Age** None evident.

**Notes** Moderate leaf and sparse wood litter under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i>
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs 1 - 2m	10 - 30%	<i>Eremophila granitica</i>
Shrubs < 1m	2 - 10%	<i>Eremophila forrestii</i>
Shrubs < 0.5m	< 2%	<i>Abutilon macrum</i> , <i>Hemigenia tysonii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum centrale</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	10 - 30%	<i>Aristida contorta</i> , <i>Eragrostis lanipes</i> , <i>Monachather paradoxus</i>
Climbers	< 2%	<i>Marsdenia australis</i>
Herbs	< 2%	<i>Ptilotus polystachyus</i> , <i>Rhodanthe citrina</i>

**722 WRE Site 85**

**Described by** SH                      Date: 4/11/2006                      Type: Q                      20x20  
**Location** Weld Range  
**MGA Zone** 50                      584851 mE                      7031422 mN  
**Habitat** Flat plain and ?sump.  
**Soil** Red-orange/brown sandy clay, with loose soil at surface.  
**Rock Type**  
**Vegetation** *Corymbia lenziana* scattered tall trees over *Acacia ramulosa* var. *ramulosa* scattered low trees over *Acacia minyura* and *Acacia ramulosa* var. *linophylla* high open shrubland over *Eremophila granitica* and *Senna artemisioides* subsp. x *artemisioides* shrubland over *Eremophila forrestii* low open shrubland and *Ptilotus obovatus* var. *obovatus* low shrubland over *Marsdenia australis* climbers over *Abutilon macrum* open herbs over *Eragrostis lanicaulis* open tussock grassland. Flat plain and ?sump.  
**Veg Condition** Good.  
**Fire Age** None evident.  
**Notes** Plentiful leaf and moderate wood litter under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	<i>Acacia minyura</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Corymbia lenziana</i> , <i>Psyrax rigidula</i>
Shrubs 1 - 2m	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Solanum ashbyae</i>
Shrubs < 1m	2 - 10%	<i>Abutilon macrum</i> , <i>Eremophila forrestii</i> , <i>Eremophila granitica</i> , <i>Rhagodia eremaea</i> , <i>Senna artemisioides</i> subsp. x <i>artemisioides</i>
Shrubs < 0.5m	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sclerolaena densiflora</i> , <i>Solanum centrale</i> , <i>Spartothamnella teucriflora</i>
Tussock grasses	10 - 30%	<i>Eragrostis lanipes</i> , <i>Thyridolepis multiculmis</i>
Climbers	< 2%	<i>Marsdenia australis</i>
Herbs	10 - 30%	<i>Rhodanthe citrina</i>

**722 WRE Site 86**

<b>Described by</b>	SH	Date: 11/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	585304 mE	7031787 mN	
<b>Habitat</b>	Flat plain.			
<b>Soil</b>	Red-orange sandy clay with loose surface soil.			
<b>Rock Type</b>				
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees and scattered trees over <i>Acacia minyura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Eremophila granitica</i> shrubland over <i>Eremophila granitica</i> low open shrubland over <i>Aristida holathera</i> var. <i>holathera</i> and <i>Thyridolepis multiculmis</i> open tussock grassland. Flat plain.			
<b>Veg Condition</b>	Good, grazed by hard hoofed.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Moderate leaf and wood litter mainly under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia minyura</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila granitica</i> , <i>Solanum ashbyae</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila ?georgei</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila simulans</i> subsp. <i>simulans</i> , <i>Sida fibulifera</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida holathera</i> var. <i>holathera</i> , <i>Eriachne helmsii</i> , <i>Iseilema membranaceum</i> , <i>Thyridolepis multiculmis</i>
<b>Herbs</b>	< 2%	<i>Myriocephalus guerinae</i>

**722 WRE Site 87**

<b>Described by</b>	SH	Date:	4/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	585580	mE	7030838	mN	
<b>Habitat</b>	Flat plain.					
<b>Soil</b>	Red-orange sandy clay with loose soil at surface.					
<b>Rock Type</b>						
<b>Vegetation</b>	<p><i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia sibirica</i> low open woodland to woodland over <i>Acacia craspedocarpa</i> and <i>Acacia tetragonophylla</i> high open shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> scattered shrubs over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Glycine canescens</i> climbers over <i>Abutilon macrum</i> open herbs over <i>Aristida contorta</i> open tussock grassland. Flat plain.</p>					
<b>Veg Condition</b>	Good, grazed by hard hoofed.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Moderate leaf and wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia sibirica</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia burkittii</i> , <i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Eremophila forrestii</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Abutilon macrum</i> , <i>Eremophila ?forrestii</i> , <i>Eremophila exilifolia</i> , <i>Eremophila georgei</i> , <i>Grevillea deflexa</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i>
<b>Climbers</b>	2 - 10%	<i>Glycine canescens</i>
<b>Herbs</b>	10 - 30%	<i>Lobelia heterophylla</i> , <i>Vittadinia ?sulcata</i>

**722 WRE Site 88**

<b>Described by</b>	JN	<b>Date:</b>	4/11/2006	<b>Type:</b>	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	585763	<b>mE</b>	7031188	<b>mN</b>	
<b>Habitat</b>	Gently sloped undulating plain, adjacent to a drainage complex.					
<b>Soil</b>	Red-orange sandy clay with surface crust, loose soil and fine gravel.					
<b>Rock Type</b>	Granite. Few.					
<b>Vegetation</b>	<i>Acacia sibirica</i> open woodland over <i>Acacia sibirica</i> and <i>Acacia craspedocarpa</i> low woodland over <i>Acacia sibirica</i> and <i>Acacia tetragonophylla</i> open shrubland to high open shrubland over <i>Acacia sibirica</i> , <i>Acacia tetragonophylla</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Aristida contorta</i> tussock grassland. Gently sloped undulating plain, adjacent to a drainage complex, Granite.					
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Sparse leaf and wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	2 - 10%	<i>Acacia sibirica</i>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia burkittii</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Acacia sibirica</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Eremophila exilifolia</i> , <i>Eremophila forrestii</i> , <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Senna artemisioides</i> subsp. <i>x artemisioides</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Enneapogon caerulescens</i>

**722 WRE Site 89**

<b>Described by</b>	JN	Date:	4/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	586478	mE	7031056	mN	
<b>Habitat</b>	Hill crest with gentle slope.					
<b>Soil</b>	Red-orange sandy clay/clay, with surface crust and continuous coarse gravel/pebbles,					
<b>Rock Type</b>	stones/boulders and surface-level plates.					
<b>Vegetation</b>	BIF					
<b>Veg Condition</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Thryptomene decussata</i> low shrubland to shrubland over <i>Sida excedentifolia</i> scattered herbs. Hill crest with gentle slope.					
<b>Fire Age</b>	<i>Thryptomene decussata</i> low shrubland to shrubland over <i>Sida excedentifolia</i> scattered herbs.					
<b>Notes</b>	Hill crest with gentle slope.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Psyrdrax rigidula</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia rhodophloia</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Grevillea berryana</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila forrestii</i> , <i>Eremophila jucunda</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus schwartzii</i> , <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925), <i>Solanum lasiophyllum</i>

**722 WRE Site 90**

<b>Described by</b>	JN	Date:	4/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	585997	mE	7032081	mN	
<b>Habitat</b>	Wide flat drainage complex with gentle slope.					
<b>Soil</b>	Red-orange sand/sandy clay with surface crust, loose soil and many stones/boulders.					
<b>Rock Type</b>	BIF, non-banded ferrous.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered trees over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia burkittii</i> low woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia tetragonophylla</i> high shrubland over <i>Acacia jamesiana</i> open shrubland over <i>Calytrix desolata</i> and <i>Grevillea deflexa</i> low open shrubland over <i>Aristida contorta</i> open tussock grassland. Wide flat drainage complex with gentle slope.					
<b>Veg Condition</b>	Excellent, grazed by hard hoofed.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Sparse leaf and sparse to moderate wood litter under trees.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia burkittii</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Acacia sibirica</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia speckii</i> , <i>Acacia tetragonophylla</i> , <i>Calytrix desolata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Acacia sibirica</i> , <i>Eremophila exilifolia</i> , <i>Eremophila forrestii</i> , <i>Grevillea deflexa</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Sida calyxhymenia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila fraseri</i> , <i>Mirbelia ?stipitata</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>

**722 WRE Site 91**

<b>Described by</b>	SH	Date:	4/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	585672	mE	7033112	mN	
<b>Habitat</b>	Flat plain.					
<b>Soil</b>	Red-orange clay, with cracked surface and loose soil.					
<b>Rock Type</b>						
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia tetragonophylla</i> and <i>Acacia craspedocarpa</i> scattered shrubs to scattered tall shrubs over <i>Senna</i> sp. Meekatharra, <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Ptilotus beardii</i> low shrubland over <i>Maireana georgei</i> open herbs over <i>Aristida contorta</i> open tussock grassland. Flat plain.					
<b>Veg Condition</b>	Good, grazed by hard hoofed.					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf and wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia craspedocarpa</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila georgei</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Maireana villosa</i> , <i>Senna</i> sp. Meekatharra(E. Bailey 1-26)
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Maireana georgei</i> , <i>Maireana</i> sp., <i>Ptilotus beardii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i>
<b>Herbs</b>	10 - 30%	<i>Pogonolepis stricta</i> , <i>Pogonolepis stricta</i> , <i>Portulaca oleracea</i> , <i>Ptilotus aervoides</i>



**722 WRE Site 92**

<b>Described by</b>	JN	Date:	4/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	586292	mE	7033420	mN	
<b>Habitat</b>	Creek bed and bank with gentle slope.					
<b>Soil</b>	Red-orange sand/sandy clay, with surface crust and loose soil.					
<b>Rock Type</b>	Claystone. Few.					
<b>Vegetation</b>	<i>Acacia sibirica</i> low woodland to open woodland over <i>Acacia tetragonophylla</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Acacia tetragonophylla</i> open shrubland over <i>Prostanthera althoferi</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Duperreya sericea</i> climbers over <i>Abutilon macrum</i> very open herbs over <i>Aristida contorta</i> open tussock grassland. Creek bed and bank with gentle slope.					
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.					
<b>Fire Age</b>	>5 yrs					
<b>Notes</b>	Sparse to moderate leaf and wood litter spread on banks. No vegetation growth on creek bed.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	2 - 10%	<i>Acacia sibirica</i>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Santalum spicatum</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila fraseri</i> , <i>Eremophila georgei</i> , <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> , <i>Prostanthera albiflora</i> , <i>Rhagodia er</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Abutilon macrum</i> , <i>Eremophila fraseri</i> , <i>Eremophila forrestii</i> , <i>Eremophila mackinlayi</i> , <i>spathulata</i> , <i>Eremophila macmillaniana</i> , <i>Grevillea inconspicua</i> , <i>Prostanthera a</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna</i> sp. Meek (E. Bailey 1-26), <i>Sida calyxhymentia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Abutilon macrum</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Eremophila exilifolia</i>
<b>Climbers</b>	2 - 10%	<i>Duperreya sericea</i>
<b>Herbs</b>	2 - 10%	<i>Pluchea dentex</i> , <i>Podolepis capillaris</i>

**722 WRE Site 93**

**Described by** JN                      Date: 3/11/2006                      Type: Q                      20x20  
**Location** Weld Range  
**MGA Zone** 50                      586714 mE                      7035414 mN  
**Habitat** Undulating plain, with minor channel and gentle slope.  
**Soil** Red-orange sand/sandy clay with loose soil and many surface-level plates/boulders.  
**Rock Type** Granite  
**Vegetation** *Acacia aneura* var. *aneura* high shrubland to low open woodland over *Acacia craspedocarpa* shrubland over *Senna* sp. Meekatharra, *Eremophila platycalyx* subsp. *platycalyx*, *Sida calyxhymenia* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Aristida contorta* very open tussock grassland. Undulating plain, with minor channel and gentle slope, Granite.  
**Veg Condition** Good, grazed by hard hoofed, with tracks  
**Fire Age** 1-5 yrs  
**Notes** Sparse wood and leaf litter under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia craspedocarpa</i>
Shrubs 1 - 2m	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> , <i>Scaevola spinescens</i> , <i>Senna artemisioides</i> subsp. <i>petiolaris</i>
Shrubs < 1m	10 - 30%	<i>Eremophila fraseri</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Scaevola spinescens</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26), <i>Sida calyxhymenia</i> , <i>Solanum lasiophyllum</i>
Shrubs < 0.5m	10 - 30%	<i>Frankenia setosa</i> , <i>Maireana carnosa</i> , <i>Maireana glomerifolia</i> , <i>Maireana trichoptera</i> , <i>Ptilotus beardii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	2 - 10%	<i>Aristida contorta</i> , <i>Austrostipa elegantissima</i> , <i>Enneapogon caeruleus</i>

**722 WRE Site 94**

<b>Described by</b>	JN	Date:	3/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	587028	mE	7035053	mN	
<b>Habitat</b>	Small granite hill crest with gentle slope.					
<b>Soil</b>	Red-orange sandy clay with surface crust, fine gravel and common surface-level plates/boulders.					
<b>Rock Type</b>	Granite					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia</i> sp. Weld Range open shrubland to high open shrubland over <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Indigofera monophylla</i> low shrubland over <i>Aristida contorta</i> tussock grassland. Small granite hill crest with gentle slope, Granite.					
<b>Veg Condition</b>	Excellent, grazed by hard hoofed.					
<b>Fire Age</b>	>5 yrs					
<b>Notes</b>	Moderate wood and sparse leaf litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila forrestii</i> , <i>Senna glaucifolia</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Abutilon oxycarpum</i> subsp. <i>prostratum</i> , <i>Indigofera monophylla</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon caeruleus</i>
<b>Herbs</b>	< 2%	<i>Cheilanthes lasiophylla</i>

**722 WRE Site 95**

<b>Described by</b>	SH	Date:	3/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	587291	mE	7034764	mN	
<b>Habitat</b>	Flat plain.					
<b>Soil</b>	Red-orange sand, with fine to coarse gravel and many surface level plates/boulders					
<b>Rock Type</b>	Granite, quartz.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia</i> sp. Weld Range and <i>Acacia rhodophloia</i> high open shrubland over <i>Senna glaucifolia</i> open shrubland over <i>Eremophila exilifolia</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Aristida contorta</i> open tussock grassland. Flat plain, Granite, quartz.					
<b>Veg Condition</b>	Poor, grazed by hard hoofed.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Sparse leaf and wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia rhodophloia</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Abutilon macrum</i> , <i>Eremophila exilifolia</i> , <i>Eremophila forrestii</i> , <i>Indigofera monophylla</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Abutilon macrum</i> , <i>Abutilon oxycarpum</i> subsp. <i>prostratum</i> , <i>Hibiscus sturtii</i> var. <i>forrestii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon caeruleus</i>
<b>Herbs</b>	< 2%	<i>Cheilanthes lasiophylla</i> , <i>Goodenia tenuiloba</i>

**722 WRE Site 96**

<b>Described by</b>	SH	Date:	3/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	588225	mE	7035560	mN	
<b>Habitat</b>	Creek bed and bank.					
<b>Soil</b>	Red-orange sandy clay/clay, with continuous coarse gravel and stones/boulders.					
<b>Rock Type</b>	BIF, non-banded ferrous.					
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> and <i>Acacia ramulosa</i> var. <i>ramulosa</i> open woodland over <i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia quadrimarginea</i> and <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Senna artemisioides</i> subsp. <i>sturtii</i> low open shrubland to open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Grevillea inconspicua</i> low shrubland over <i>Abutilon macrum</i> herbs over <i>Cymbopogon ambiguus</i> very open tussock grassland. Creek bed and bank.					
<b>Veg Condition</b>	Good, grazed by hard hoofed.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Plentiful wood and leaf litter widespread.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinocarpa</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Eremophila longifolia</i> , <i>Psychotria rigidula</i> , <i>Santalum spicatum</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia quadrimarginea</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia rhodophloia</i> , <i>Acacia tetragonophylla</i> , <i>Senna artemisioides</i> subsp. x <i>sturtii</i> , <i>Solanum ashbyae</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Abutilon macrum</i> , <i>Eremophila macmillaniana</i> , <i>Eremophila spathulata</i> , <i>Grevillea inconspicua</i> , <i>Senna artemisioides</i> subsp. x <i>artemisioides</i> , <i>Senna glaucifolia</i> , <i>Senna calyxhymenia</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Eremophila exilifolia</i> , <i>Euphorbia boophthona</i> , <i>Hibiscus burtonii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus rotundifolius</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Eriachne pulchella</i>
<b>Climbers</b>	30 - 70%	<i>Glycine canescens</i> , <i>Marsdenia australis</i>
<b>Herbs</b>	30 - 70%	<i>Cheilanthes lasiophylla</i> , <i>Pluchea dentex</i> , <i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>

**722 WRE Site 97**

<b>Described by</b>	SH	Date: 3/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	588203 mE	7035871 mN	
<b>Habitat</b>	Flat plain.			
<b>Soil</b>	Red-orange sandy clay with loose soil and common coarse gravel at surface.			
<b>Rock Type</b>	Non-banded ferrous			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered tall shrubs over <i>Ptilotus rotundifolius</i> scattered shrubs over <i>Eremophila spathulata</i> , <i>Sclerolaena uniflora</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Calandrinia translucens</i> scattered herbs over <i>Aristida contorta</i> very open tussock grassland. Flat plain.			
<b>Veg Condition</b>	Poor, grazed by hard hoofed.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Sparse leaf and moderate wood litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Psyrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia tetragonophylla</i> , <i>Ptilotus rotundifolius</i> , <i>Solanum ashbyae</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila spathulata</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Hibiscus sturtii</i> var. <i>forrestii</i> , <i>Maireana georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sclerolaena uniflora</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i>
<b>Herbs</b>	< 2%	<i>Calandrinia translucens</i>

**722 WRE Site 98**

<b>Described by</b>	SH	Date:	3/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	588807	mE	7035944	mN	
<b>Habitat</b>	Lower hill slope.					
<b>Soil</b>	Red-orange sandy clay with common surface stones/boulders.					
<b>Rock Type</b>	NIF, non-banded ferrous.					
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered trees over <i>Acacia ramulosa</i> var. <i>ramulosa</i> high shrubland to low woodland over <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Senna glaucifolia</i> open shrubland over <i>Eremophila forrestii</i> , <i>Dodonaea petiolaris</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Goodenia tenuiloba</i> herbs over <i>Enneapogon caerulescens</i> scattered tussock grasses. Lower hill slope.					
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.					
<b>Fire Age</b>	Non-evident					
<b>Notes</b>	Sparse wood and leaf litter mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia pruinocarpa</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i> , <i>Solanum ashbyae</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila forrestii</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Dodonaea petiolaris</i> , <i>Maireana georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)
<b>Tussock grasses</b>	< 2%	<i>Enneapogon caerulescens</i>
<b>Herbs</b>	30 - 70%	<i>Goodenia tenuiloba</i> , <i>Hibiscus</i> sp., <i>Ptilotus roei</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)

**722 WRE Site 99**

<b>Described by</b>	JN	Date:	3/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	588795	mE	7036524	mN	
<b>Habitat</b>	Small gently sloped hill crest/slope.					
<b>Soil</b>	Red-orange sandy clay/clay with surface crust, coarse gravel and continuous stones/boulders at					
<b>Rock Type</b>	surface.					
<b>Vegetation</b>	BIF, non-banded ferrous.					
<b>Veg Condition</b>	<i>Acacia aneura</i> var. <i>aneura</i> high open shrubland to low open woodland over <i>Acacia tetragonophylla</i> open shrubland over <i>Senna</i> sp. Meekatharra and <i>Maireana triptera</i> low shrubland over <i>Ptilotus exaltatus</i> var. <i>exaltatus</i> very open herbs over <i>Aristida contorta</i> very open tussock grassland. Small gently sloped hill crest/slope.					
<b>Fire Age</b>	Excellent, grazed by hard hoofed.					
<b>Notes</b>	>5 yrs					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Senna stricta</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Eremophila phyllopoda</i> subsp. <i>phyllopoda</i> , <i>Eremophila spathulata</i> , <i>Maireana melanocoma</i> , <i>Ptilotus rotundifolius</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Maireana georgei</i> , <i>Maireana triptera</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sclerolaena eriacantha</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Enneapogon caerulescens</i>
<b>Herbs</b>	2 - 10%	<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>



**722 WRE Site 100**

<b>Described by</b>	JN	Date:	3/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	588177	mE	7037086	mN	
<b>Habitat</b>	Creek bed and banks on a moderate to gentle slope.					
<b>Soil</b>	Red-orange sand/sandy clay with loose surface soil.					
<b>Rock Type</b>	Non-banded ferrous, granite. Few.					
<b>Vegetation</b>	<i>Acacia ramulosa</i> var. <i>ramulosa</i> and <i>Acacia burkittii</i> low woodland to open forest over <i>Acacia burkittii</i> high shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> open shrubland over <i>Eremophila margarethae</i> , <i>Sida calyxhymenia</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Duperreya commixta</i> climbers over <i>Abutilon macrum</i> open herbs over <i>Eragrostis kennedyae</i> open tussock grassland. Creek bed and banks on a moderate to gentle slope, Non-banded ferrous, granite.					
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Moderate leaf and wood litter widespread.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	30 - 70%	<i>Acacia burkittii</i>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia burkittii</i> , <i>Psyrdrax latifolia</i> , <i>Psyrdrax rigidula</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Eremophila exilifolia</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> , <i>artemisioides</i> subsp. <i>filifolia</i> , <i>Senna artemisioides</i> subsp. <i>x sturtii</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Abutilon macrum</i> , <i>Eremophila margarethae</i> , <i>Maireana ?villosa</i> , <i>Prostanthera albiflora</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida calyxhymenia</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Enneapogon caerulescens</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Cymbopogon ambiguus</i> , <i>Eragrostis australasica</i> , <i>Eragrostis kennedyae</i>
<b>Climbers</b>	< 2%	<i>Duperreya commixta</i>
<b>Herbs</b>	10 - 30%	<i>Cheilanthes lasiophylla</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Lobelia heterophylla</i>

**722 WRE Site 101**

<b>Described by</b>	JN	<b>Date:</b>	3/11/2006	<b>Type:</b>	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	588431	<b>mE</b>	7038080	<b>mN</b>	
<b>Habitat</b>	Undulating plain with gentle slope.					
<b>Soil</b>	Red-orange sandy clay with surface crust, loose soil, coarse gravel and many surface-level plates.					
<b>Rock Type</b>	Granite.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high open shrubland to low open woodland over <i>Acacia</i> sp. Weld Range open shrubland over <i>Eremophila</i> spathulata and <i>Senna artemisioides</i> subsp. <i>helmsii</i> low shrubland over <i>Aristida contorta</i> tussock grassland. Undulating plain with gentle slope, Granite.					
<b>Veg Condition</b>	Excellent, with tracks,					
<b>Fire Age</b>	>5 yrs					
<b>Notes</b>	Sparse leaf and wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia tetragonophylla</i> , <i>Eremophila spathulata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia speckii</i> , <i>Eremophila georgei</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Indigofera brevidens</i> , <i>Maireana melanocoma</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Abutilon oxycarpum</i> subsp. <i>prostratum</i> , <i>Euphorbia boophthona</i> , <i>Grevillea deflexa</i> , <i>Hibiscus coatesii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> ,

**722 WRE Site 102**

<b>Described by</b>	SH	Date:	3/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	589305	mE	7038158	mN	
<b>Habitat</b>	Foot slope.					
<b>Soil</b>	Red-orange sandy clay with much coarse gravel/pebbles..					
<b>Rock Type</b>	BIF, non-banded ferrous, granite.					
<b>Vegetation</b>	<p><i>Acacia pruinocarpa</i> scattered tall trees and <i>Acacia aneura</i> var. <i>aneura</i> scattered trees over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia minyura</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i>, <i>Acacia minyura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> open scrub over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Senna glaucifolia</i> and <i>Sida chrysocalyx</i> low scattered shrubs over <i>Goodenia tenuiloba</i> herbs over <i>Aristida contorta</i> scattered tussock grasses. Footslope, BIF, non-banded ferrous, granite.</p>					
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Moderate leaf and sparse wood litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i> , <i>Psydrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia minyura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila glutinosa</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila simulans</i> subsp. <i>simulans</i> , <i>Euphorbia boophthona</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i>
<b>Herbs</b>	30 - 70%	<i>Goodenia tenuiloba</i>

**722 WRE Site 103**

<b>Described by</b>	SH	Date:	3/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	588444	mE	7038690	mN	
<b>Habitat</b>	Undulating plain.					
<b>Soil</b>	Red-orange sandy clay, with much coarse gravel at surface.					
<b>Rock Type</b>	BIF, granite, quartz.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees to scattered trees over <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> scattered tall shrubs over <i>Eremophila fraseri</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i> open shrubland over <i>Eremophila exilifolia</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Maireana triptera</i> very open herbs over <i>Aristida contorta</i> open tussock grassland. Undulating plain, BIF, granite, quartz.					
<b>Veg Condition</b>	Good, grazed by hard hoofed.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Sparse leaf and wood litter mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila fraseri</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26), <i>Solanum ashbyae</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila exilifolia</i> , <i>Maidenia</i> sp., <i>Maireana georgei</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila phyllopoda</i> subsp. <i>phyllopoda</i> , <i>Eremophila spathulata</i> , <i>Maireana triptera</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Enneapogon caeruleus</i>

**722 WRE Site 104**

<b>Described by</b>	JN	<b>Date:</b>	3/11/2006	<b>Type:</b>	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	588554	mE	7038981	mN	
<b>Habitat</b>	Undulating plain with gentle slope.					
<b>Soil</b>	Red-orange sandy clay, with loose surface soil, and continuous coarse gravel and stones/boulders.					
<b>Rock Type</b>	Non-banded ferrous.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia aneura</i> var. <i>aneura</i> open shrubland to high open shrubland over <i>Acacia jamesiana</i> open shrubland over <i>Senna glaucifolia</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Aristida contorta</i> tussock grassland. Undulating plain with gentle slope.					
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.					
<b>Fire Age</b>	>5 yrs					
<b>Notes</b>	Sparse wood and leaf litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia speckii</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Eremophila fraseri</i> , <i>Eremophila spathulata</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila exilifolia</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i>

**722 WRE Site 108**

<b>Described by</b>	JN	Date: 11/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	562128 mE	7019499 mN	
<b>Habitat</b>	Moderate to steep sloped hill crest.			
<b>Soil</b>	Red-orange sandy clay, with surface crust and continuous stones/boulders and surface-level plates.			
<b>Rock Type</b>	BIF.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Thryptomene decussata</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Thryptomene decussata</i> and <i>Eremophila glutinosa</i> low shrubland over <i>Sida excedentifolia</i> very open herbs. Moderate to steep sloped hill crest.			
<b>Veg Condition</b>	Excellent, grazed by hard hoofed.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Sparse leaf and wood litter mainly under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia rhodophloia</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Dodonaea petiolaris</i> , <i>Eremophila compacta</i> subsp. <i>fecunda</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Prostanthera petrophila</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus schwartzii</i> , <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)
<b>Tussock grasses</b>	< 2%	<i>Monachather paradoxus</i>

**722 WRE Site 109**

<b>Described by</b>	SH	Date:	5/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	581786	mE	7026819	mN	
<b>Habitat</b>	Gentle hill slope					
<b>Soil</b>	Red-orange sandy clay with continuous stones/boulders and surface-level plates.					
<b>Rock Type</b>	BIF, non-banded ferrous.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland to scattered trees over <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia sibirica</i> and <i>Acacia rhodophloia</i> high open shrubland over <i>Eremophila glutinosa</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i> low shrubland to open heath over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low scattered shrubs over <i>Sida</i> sp. and <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> scattered herbs over <i>Cymbopogon ambiguus</i> and <i>Eriachne pulchella</i> subsp. <i>dominii</i> scattered tussock grasses.					
<b>Veg Condition</b>	Good, grazed by hard hoofed, with tracks.					
<b>Fire Age</b>	?					
<b>Notes</b>	Sparse wood and leaf litter mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Santalum spicatum</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia rhodophloia</i> , <i>Acacia sibirica</i>
<b>Shrubs 1 - 2m</b>	30 - 70%	<i>Acacia speckii</i> , <i>Eremophila glutinosa</i> , <i>Scaevola spinescens</i> , <i>Solanum ashbyae</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Philotheca brucei</i> subsp. <i>brevifolia</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Dodonaea pachyneura</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Prostanthera petrophila</i> , <i>Sida calyxhymenia</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)
<b>Tussock grasses</b>	< 2%	<i>Cymbopogon ambiguus</i> , <i>Eriachne mucronata</i> , <i>Eriachne pulchella</i> subsp. <i>dominii</i>
<b>Herbs</b>	< 2%	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)

**722 WRE Site 110**

<b>Described by</b>	SH	Date:	9/11/2006	Type:	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	548351	mE	7015088	mN	
<b>Habitat</b>	Gentle hill slope and crest					
<b>Soil</b>	Red-orange sandy clay, with continuous coarse gravel, stones/boulders and surface level plates.					
<b>Rock Type</b>	BIF, non-banded ferrous.					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia sibirica</i> high open shrubland over <i>Thryptomene decussata</i> shrubland over <i>Calytrix desolata</i> and <i>Micromyrtus sulphurea</i> low shrubland over <i>Goodenia tenuiloba</i> herbs over <i>Monachather paradoxus</i> scattered tussock grasses. Gentle hill slope and crest.					
<b>Veg Condition</b>	Good, grazed by hard hoofed.					
<b>Fire Age</b>	None evident.					
<b>Notes</b>	Sparse wood and leaf litter under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia sibirica</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Baeckea</i> sp. Melita Station (H. Pringle 2738), <i>Dodonaea pachyneura</i> , <i>Eremophila georgei</i> , <i>Micromyrtus sulphurea</i> , <i>Prostanthera petrophila</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Calytrix desolata</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Micromyrtus placoides</i> , <i>Monachather paradoxus</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i> , <i>Eriachne helmsii</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
<b>Herbs</b>	30 - 70%	<i>Goodenia tenuiloba</i> , <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)



**722 WRE Site 111**

<b>Described by</b>	JN	<b>Date:</b>	9/11/2006	<b>Type:</b>	Q	20x20
<b>Location</b>	Weld Range					
<b>MGA Zone</b>	50	549405	<b>mE</b>	7015196	<b>mN</b>	
<b>Habitat</b>	Moderate hill slope.					
<b>Soil</b>	Red-orange sandy clay, with surface crust, and continuous coarse gravel, stones/boulders and					
<b>Rock Type</b>	surface-level plates.					
<b>Vegetation</b>	BIF					
<b>Veg Condition</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Thryptomene decussata</i> and <i>Eremophila georgei</i> shrubland over <i>Philothea brucei</i> subsp. <i>brucei</i> , <i>Micromyrtus sulphuræ</i> and <i>Eremophila georgei</i> low shrubland over <i>Austrostipa scabra</i> scattered tussock grasses. Moderate hill slope.					
<b>Fire Age</b>	Good, grazed by hard hoofed, with tracks.					
<b>Notes</b>	None evident.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia rhodophloia</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i> , <i>Eremophila georgei</i> , <i>Eremophila glutinosa</i> , <i>Hakea recurva</i> subsp. <i>arida</i> , <i>Micromyrtus sulphurea</i> , <i>Philothea brucei</i> subsp. <i>brucei</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Calytrix desolata</i> , <i>Dodonaea pachyneura</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Micromyrtus placoides</i> , <i>Scaevola spinescens</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Prostanthera petrophila</i> , <i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Austrostipa scabra</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	< 2%	<i>Olearia humilis</i>

**722 WRE Site 114**

<b>Described by</b>	SH	Date: 12/11/2006	Type: Q	20x20
<b>Location</b>	Weld Range			
<b>MGA Zone</b>	50	563731 mE	7020476 mN	
<b>Habitat</b>	Gully sides with minor channel.			
<b>Soil</b>	Red-orange sandy clay, with fine gravel and continuous coarse gravel and stones/boulders at surface.			
<b>Rock Type</b>	BIF, non-banded ferrous, granite, quartz			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland to open woodland over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Eremophila macmillaniana</i> and <i>Scaevola spinescens</i> shrubland over <i>Eremophila exilifolia</i> , <i>Senna glaucifolia</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Goodenia tenuiloba</i> very open herbs over Grass sp. Scattered tussock grasses.			
<b>Veg Condition</b>	Good, grazed by hard hoofed.			
<b>Fire Age</b>	None evident.			
<b>Notes</b>	Sparse leaf and moderate wood litter under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ?ligulata</i> , <i>Acacia sibirica</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila macmillaniana</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila exilifolia</i> , <i>Micromyrtus sulphurea</i> , <i>Philotheca brucei</i> subsp. <i>brevifolia</i> , <i>Scaevola spinescens</i> , <i>Tribulus suberosus</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna glaucifolia</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)
<b>Tussock grasses</b>	< 2%	<i>Cymbopogon ambiguus</i>
<b>Herbs</b>	2 - 10%	<i>Goodenia tenuiloba</i>

**Phase 2**

**722 WRE Site 01**

<b>Described by</b>	AC	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	542005 mE	7014892	mN
<b>Habitat</b>	Flat/plain, negligible slope, next to dry lake			
<b>Soil</b>	Red-orange sand, loose soil			
<b>Rock Type</b>	Few quartz rocks			
<b>Vegetation</b>	<i>Acacia aneura</i> and <i>Acacia ramulosa</i> var. <i>ramulosa</i> high shrubland over <i>Eremophila forrestii</i> scattered shrubs over <i>Aristida holathera</i> and <i>Monachather paradoxus</i> tussock grassland.			
<b>Veg Condition</b>	Good; animals tracks			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Negligible wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> , <i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia tetragonophylla</i> , <i>Eremophila forrestii</i> , <i>Melaleuca stereophloia</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Ptilotus polystachyus</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Monachather paradoxus</i> , POACEAE sp.
<b>Climbers</b>	< 2%	<i>Cuscuta epithymum</i>
<b>Herbs</b>	< 2%	<i>Dianella revoluta</i> var. <i>divaricata</i> , <i>Gnephosis tenuissima</i> , <i>Wahlenbergia</i> sp.

**722 WRE Site 02**

<b>Described by</b>	JN	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV, Lake			
<b>MGA Zone</b>	50	542124 mE	7014740	50
<b>Habitat</b>	Flat/plain, lakeside, negligible slope			
<b>Soil</b>	Yellow-orange sandy clay, with a surface crust, fine gravel, and loose soil			
<b>Rock Type</b>	Nil			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low woodland over <i>Acacia tetragonophylla</i> high open shrubland over <i>Melaleuca stereophloia</i> low open shrubland to open shrubland over <i>Aristida contorta</i> open tussock grassland. Flat/plain, lakeside.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia craspedocarpa</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Melaleuca stereophloia</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Chenopodium gaudichaudianum</i> , <i>Rhagodia eremaea</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Eragrostis dielsii</i>
<b>Climbers</b>	< 2%	<i>Lysiana ? murrayi</i>

**722 WRE Site 4a**

<b>Described by</b>	AC	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	547554 mE	7014897 mN	
<b>Habitat</b>	Midslope to ridgetop, moderate slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust.			
<b>Rock Type</b>	Many BIF coarse gravel/pebbles and stones/boulders.			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> and <i>Acacia aneura</i> var. <i>microcarpa</i> high open shrubland over <i>Philothea brucei</i> subsp. <i>brucei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Olearia stuartii</i> and <i>Eremophila glut</i> low shrubland.			
<b>Veg Condition</b>	Good, grazing by hard-hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia pruinocarpa</i> , <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia sibirica</i> , <i>Eremophila glutinosa</i> , <i>Micromyrtus sulphurea</i> , <i>Philothea brucei</i> subsp. <i>brucei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Acacia grasbyi</i> , <i>Dodonaea pachyneura</i> , <i>Olearia stuartii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Cymbopogon ambiguus</i> , <i>Eriachne mucronata</i> (typical form), <i>Monachather paradoxus</i>
<b>Herbs</b>	< 2%	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>

**722 WRE Site 05**

<b>Described by</b>	SH	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	545195 mE	7016854 mN	
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Red-orange sand and sandy clay, with fine gravel and loose soil			
<b>Rock Type</b>	Common ferrous, granite, and quartz fine gravel.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> low open shrubland to open shrubland over <i>Aristida contorta</i> open tussock grassland. Flat/plain.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Psydrax suaveolens</i> , <i>Santalum lanceolatum</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia craspedocarpa</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Rhagodia eremaea</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila georgei</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus schwartzii</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i>

**722 WRE Site 06**

<b>Described by</b>	JN	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV, near road to lake			
<b>MGA Zone</b>	50	544107 mE	7016163 mN	
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust and fine gravel			
<b>Rock Type</b>	Few to common ferrous and quartz coarse gravel/pebbles and stones/boulders			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high open shrubland to low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Acacia aneura</i> var. <i>aneura</i> shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Eremophila jucunda</i> subsp. <i>jucunda</i> low open shrubland over <i>Aristida contorta</i> open tussock grassland. Flat/plain.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 yrs)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia craspedocarpa</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila georgei</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Monachather paradoxus</i>

**722 WRE Site 10a**

<b>Described by</b>	SH	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	547792 mE	7014738	mN
<b>Habitat</b>	Flat/plain and footslope, negligible slope			
<b>Soil</b>	Red-orange sandy clay, with loose soil.			
<b>Rock Type</b>	Common ferrous and granite stones.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> low open shrubland to shrubland over <i>Aristida contorta</i> very open tussock grassland. Flat/plain and footslope, granite stones.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia grasbyi</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Beyeria</i> sp. Murchison (B. Jeanes s.n. 7/7/2005), <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila simulans</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila glutinosa</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Maireana georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i> , <i>Thryptomene decussata</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i>
<b>Herbs</b>	< 2%	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>



**722 WRE Site 11**

<b>Described by</b>	SH	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	547091 mE	7015942 mN	
<b>Habitat</b>	Flat/plain to footslope.			
<b>Soil</b>	Red-orange sand to sandy clay			
<b>Rock Type</b>	Many granite and quartz coarse gravel/pebbles and stones/boulders			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland to high open shrubland over <i>Aristida contorta</i> very open tussock grassland. Flat/plain to footslope.			
<b>Veg Condition</b>	Poor; grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila glutinosa</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Solanum centrale</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i>
<b>Herbs</b>	< 2%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 15**

<b>Described by</b>	AC	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	547381 mE	7016821 mN	
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Red-orange sandy clay, surface crust			
<b>Rock Type</b>	Many ferrous and quartz coarse gravel/pebbles			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> and <i>Acacia aneura</i> var. <i>aneura</i> high shrubland. Flat/plain.			
<b>Veg Condition</b>	Good, signs of grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila georgei</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)
<b>Shrubs &lt; 1m</b>	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Acacia ?quadrimarginea</i> , <i>Maireana ? tomentosa</i> , <i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Monachather paradoxus</i>

**722 WRE Site 17**

<b>Described by</b>	JN	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	549879 mE	7017173 mN	
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>				
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high open shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Eremophila forrestii</i> subsp. <i>forrestii</i> shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland. Flat/plain.			
<b>Veg Condition</b>	Good; grazing by hard hooved animals			
<b>Fire Age</b>	none evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia sibirica</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila hughesii</i> subsp. <i>hughesii</i> , <i>Eremophila simulans</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna glaucifolia</i> , <i>Solanum lasiophyllum</i>

**722 WRE Site 35**

<b>Described by</b>	SH	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn			
<b>MGA Zone</b>	50	578440 mE	7028713 mN	
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Red-orange clay loam, with a surface crust			
<b>Rock Type</b>	Nil			
<b>Vegetation</b>	<i>Acacia ramulosa</i> var. <i>ramulosa</i> high shrubland over <i>Acacia ramulosa</i> var. <i>ramulosa</i> and <i>Acacia quadrimarginea</i> shrubland over <i>Monachather paradoxus</i> tussock grassland. Flat/plain.			
<b>Veg Condition</b>	Good, grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia pruinocarpa</i> , <i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>ramulosa</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia quadrimarginea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila ?clarkei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Rhagodia eremaea</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Monachather paradoxus</i>

**722 WRE Site 39**

**Described by** SH      **Date:** 21/04/07      **Type:** Q      20x20

**Location**

**MGA Zone** 50      580031 mE      7028802 mN

**Habitat** Plain/flat, negligible slope

**Soil** Red-orange sandy clay, with loose soil

**Rock Type** Common non-banded ferrous and granite coarse gravel/pebbles

**Vegetation** *Acacia pruinocarpa* scattered low trees over *Acacia aneura* var. *aneura* high open shrubland over *Acacia ramulosa* var. *linophylla* open shrubland over *Ptilotus obovatus* var. *obovatus* low shrubland over *Ptilotus schwartzii* very open herbs over *Aristida contorta* scattered tussock grasses. Plain/Flat.

**Veg Condition** Good, grazing by hard hooved animals

**Fire Age** None evident

**Notes** Sparse leaf litter, mainly under shrubs. Negligible wood litter.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	<i>Acacia pruinocarpa</i>
Shrubs > 2m	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia tetragonophylla</i>
Shrubs 1 - 2m	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Psyrdrax latifolia</i>
Shrubs < 1m	< 2%	<i>Eremophila clarkei</i> , <i>Eremophila georgei</i>
Shrubs < 0.5m	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	< 2%	<i>Aristida contorta</i> , <i>Enneapogon caerulescens</i>
Herbs	10 - 30%	<i>Ptilotus schwartzii</i>

**722 WRE Site 41**

<b>Described by</b>	JN	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Plain behind Beebyn			
<b>MGA Zone</b>	50	580346 mE	7028437 mN	
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust and fine gravel.			
<b>Rock Type</b>	Common ferrous coarse gravel/pebbles			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered trees over <i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland to high shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> low shrubland over <i>Monachather paradoxus</i> very open tussock grassland. Flat/plain.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Grevillea berryana</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus schwartzii</i>
<b>Tussock grasses</b>	2 - 10%	<i>Monachather paradoxus</i>

**722 WRE Site 43**

<b>Described by</b>	AC	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn			
<b>MGA Zone</b>	50	581737 mE	7030291 mN	
<b>Habitat</b>	Flat/plain, negligible slope.			
<b>Soil</b>	Red-orange sandy clay, with a surface crust.			
<b>Rock Type</b>	Few calcrete			
<b>Vegetation</b>	<i>Eucalyptus lucasii</i> woodland over <i>Senna artemisioides</i> subsp. <i>filifolia</i> and <i>Eucalyptus lucasii</i> high open shrubland over <i>Eucalyptus lucasii</i> (emergent) scattered shrubs over <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Ptilotus polystachyus</i> low shrubland and <i>Salsola australis</i> low scattered shrubs. Flat/plain.			
<b>Veg Condition</b>	Good, grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	10 - 30%	<i>Eucalyptus lucasii</i>
<b>Trees &lt; 10m</b>	< 2%	<i>Eucalyptus lucasii</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Senna artemisioides</i> subsp. <i>filifolia</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia tetragonophylla</i> , <i>Eremophila longifolia</i> , <i>Pimelea microcephala</i> subsp. <i>microcephala</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus polystachyus</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Salsola australis</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Eragrostis australasica</i>
<b>Herbs</b>	< 2%	<i>Maireana</i> sp.

**722 WRE Site 50**

<b>Described by</b>	JN	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn, southern side, lower footslopes			
<b>MGA Zone</b>	50	579888 mE	7025313	mN
<b>Habitat</b>	Footslope, gentle slope			
<b>Soil</b>	Red-orange sandy clay with a surface crust			
<b>Rock Type</b>	Common BIF and ferrous coarse gravel and pebbles.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Eremophila forrestii</i> subsp. <i>forrestii</i> shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> low shrubland over <i>Monachather paradoxus</i> very open tussock grassland. Footslope, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 years)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate to sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Grevillea berryana</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila georgei</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Monachather paradoxus</i>



**722 WRE Site 51**

<b>Described by</b>	SH	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn			
<b>MGA Zone</b>	50	578958 mE	7025464 mN	
<b>Habitat</b>	Moderate slope, midslope.			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Continuous BIF and ferrous stones and boulders			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Thryptomene decussata</i> open heath over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open heath over <i>Aristida holathera</i> var. <i>holathera</i> open tussock grassland. Moderate slope, midslope.			
<b>Veg Condition</b>	Poor; track and proposed drillpad			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>
<b>Shrubs 1 - 2m</b>	30 - 70%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila glutinosa</i> , <i>Philothea brucei</i> subsp. <i>brucei</i>
<b>Shrubs &lt; 0.5m</b>	30 - 70%	<i>Dodonaea pachyneura</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Aristida holathera</i> var. <i>holathera</i>
<b>Herbs</b>	< 2%	<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Stylidium longibracteatum</i>

**722 WRE Site 53**

<b>Described by</b>	JN	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Western Beebyn			
<b>MGA Zone</b>	50	576712 mE	7024043	mN
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust and some fine gravel			
<b>Rock Type</b>	Many BIF and ferrous coarse gravel, pebbles, stones, and boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland to low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Acacia aneura</i> var. <i>aneura</i> low open shrubland over <i>Monachather paradoxus</i> very open tussock grassland. Flat/plain.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 yrs)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila georgei</i> , <i>Solanum lasiophyllum</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Enneapogon caerulescens</i> , <i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i>

**722 WRE Site 54**

<b>Described by</b>	AC	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn			
<b>MGA Zone</b>	50	576285 mE	7024058 mN	
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Red-orange clay, with a surface crust			
<b>Rock Type</b>	Common ferrous coarse gravel/pebbles.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia craspedocarpa</i> open scrub over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Eremophila foliosissima</i> low open shrubland over <i>Monachather paradoxus</i> and <i>Aristida contorta</i> very open tussock grassland. Flat/plain.			
<b>Veg Condition</b>	Good; grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Plentiful widespread leaf litter. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia craspedocarpa</i> , <i>Acacia pruinocarpa</i> , <i>Psyrax latifolia</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila ?clarkei</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila foliosissima</i> , <i>Eremophila georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Monachather paradoxus</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>

**722 WRE Site 56**

<b>Described by</b>	SH	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn South			
<b>MGA Zone</b>	50	576624 mE	7022957 mN	
<b>Habitat</b>	Flat/plain, negligble slope			
<b>Soil</b>	Red-orange sandy clay, with loose soil			
<b>Rock Type</b>	Common BIF, ferrous and quartz coarse gravel and pebbles.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Eremophila foliosissima</i> low open heath over <i>Marsdenia australis</i> climbers over <i>Eragrostis eriopoda</i> very open tussock grassland. Flat/plain.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia craspedocarpa</i> , <i>Grevillea berryana</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila ?clarkei</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>
<b>Shrubs &lt; 0.5m</b>	30 - 70%	<i>Eremophila foliosissima</i> , <i>Psydrax rigidula</i> , <i>Psydrax suaveolens</i> , <i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Eragrostis eriopoda</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>
<b>Herbs</b>	< 2%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 58**

<b>Described by</b>	SH	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	556310 mE	7018553 mN	
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Red-orange sand to sandy clay, clay, with a surface crust and loose soil			
<b>Rock Type</b>	Few granite and BIF rocks			
<b>Vegetation</b>	<i>Melaleuca stereophloia</i> scattered tall shrubs over <i>Cratystylis subspinescens</i> shrubland over <i>Melaleuca stereophloia</i> , <i>Cratystylis subspinescens</i> and <i>Halosarcia indica</i> subsp. <i>bidens</i> low open heath. Flat/plain.			
<b>Veg Condition</b>	Degraded; heavy grazing			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly undre shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Melaleuca stereophloia</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Cratystylis subspinescens</i> , <i>Eremophila</i> sp., <i>Leptomeria preissiana</i>
<b>Shrubs &lt; 1m</b>	30 - 70%	<i>Frankenia</i> sp., <i>Muehlenbeckia florulenta</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Atriplex ?vesicaria</i> , <i>Atriplex bunburyana</i> , <i>Dissocarpus paradoxus</i> , <i>Maireana georgei</i> , <i>Maireana melanocoma</i> , <i>Melaleuca stereophloia</i> , <i>Sclerolaena fusiformis</i> , <i>Tecticornia indica</i> subsp. <i>bidens</i>

**722 WRE Site 61**

<b>Described by</b>	AC	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	557351 mE	7018302 mN	
<b>Habitat</b>	Flat/plain, floodplain, negligible slope.			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Nil			
<b>Vegetation</b>	<i>Melaleuca stereophloia</i> and <i>Cratystylis subspinescens</i> shrubland over <i>Halosarcia indica</i> subsp. <i>bidens</i> low shrubland. Flat/plain, floodplain.			
<b>Veg Condition</b>	Good; grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Cratystylis subspinescens</i> , <i>Melaleuca stereophloia</i> , <i>Muehlenbeckia florulenta</i> , <i>Pittosporum angustifolium</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Atriplex bunburyana</i> , <i>Frankenia laxiflora</i> , <i>Maireana</i> sp., <i>Tecticornia indica</i> subsp. <i>bidens</i> , <i>Tecticornia indica</i> subsp. <i>bidens</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i> , <i>Eragrostis pergracilis</i>
<b>Herbs</b>	< 2%	<i>Hibiscus burtonii</i>

**722 WRE Site 62**

<b>Described by</b>	SH	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Madoonga			
<b>MGA Zone</b>	50	558160 mE	7019242 mN	
<b>Habitat</b>	Flat/plain, negligible slope.			
<b>Soil</b>	Red-orange and white sandy clay, with a surface crust			
<b>Rock Type</b>	Few calcrete			
<b>Vegetation</b>	<i>Eucalyptus gypsophila</i> low open woodland to open woodland over <i>Cratystylis subspinescens</i> shrubland over <i>Lawrencia chrysoderma</i> and <i>Frankenia ?laxiflora</i> low shrubland over <i>Eragrostis pergracilis</i> open tussock grassland. Flat/plain.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	2 - 10%	<i>Eucalyptus carnei</i> , <i>Eucalyptus gypsophila</i> , <i>Eucalyptus trivalva</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Eucalyptus carnei</i> , <i>Eucalyptus gypsophila</i> , <i>Eucalyptus trivalva</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Cratystylis subspinescens</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila pantonii</i> , <i>Leptomeria preissiana</i> , <i>Pittosporum angustifolium</i> , <i>Scaevola spinescens</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Zygophyllum eremaeum</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Atriplex nummularia</i> , <i>Frankenia laxiflora</i> , <i>Tecticornia cymbiformis</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Frankenia ?laxiflora</i> , <i>Lawrencia chrysoderma</i> , <i>Tecticornia indica</i> subsp. <i>bidens</i>
<b>Tussock grasses</b>	10 - 30%	<i>Eragrostis pergracilis</i>

**722 WRE Site 67**

<b>Described by</b>	AC	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	W14			
<b>MGA Zone</b>	50	560374 mE	7018601 mN	
<b>Habitat</b>	North-east facing midslope, moderate slope.			
<b>Soil</b>	Orange to brown clay loam.			
<b>Rock Type</b>	Common BIF stones/boulders			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Solanum lasiophyllum</i> and <i>Eremophila latrobei</i> low open shrubland over <i>Sida excedentifolia</i> open herbs. North-east facing midslope, moderate slope.			
<b>Veg Condition</b>	Good, grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Plentiful leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>		<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &lt; 1m</b>		<i>Eremophila latrobei</i> , <i>Solanum lasiophyllum</i>
<b>Shrubs &lt; 0.5m</b>		<i>Ptilotus schwartzii</i>
<b>Tussock grasses</b>		<i>Cymbopogon ambiguus</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>		<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)



**722 WRE Site 71**

<b>Described by</b>	SH	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>				
<b>MGA Zone</b>	50	564211 mE	7020601	mN
<b>Habitat</b>	Ridgetop, gentle to negligible slope			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Continuous to many BIF and granite stones and boulders			
<b>Vegetation</b>	<i>Grevillea berryana</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Grevillea berryana</i> open scrub over <i>Thryptomene decussata</i> open shrubland over <i>Eremophila glutinosa</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i> low shrubland over <i>Sida excedentifolia</i> very open herbs. Ridgetop, gentle to negligible slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia minyura</i> , <i>Grevillea berryana</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia sibirica</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila glutinosa</i> , <i>Prostanthera petrophila</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila margarethae</i> , <i>Ptilotus schwartzii</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i>
<b>Herbs</b>	2 - 10%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 77**

<b>Described by</b>	SH	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	East of camp			
<b>MGA Zone</b>	50	560388 mE	7016711 mN	
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Red-orange sandy clay, with some loose soil			
<b>Rock Type</b>	Common ferrous and quartz coarse gravel and pebbles.			
<b>Vegetation</b>	<p><i>Acacia aneura</i> var. <i>aneura</i> low woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Senna glaucifolia</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i> open shrubland over <i>Senna glaucifolia</i>, <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Marsdenia australis</i> climbers over <i>Aristida contorta</i> and <i>Cymbopogon ambiguus</i> open tussock grassland. Flat/plain.</p>			
<b>Veg Condition</b>	Poor, evidence of goats			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> , <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i> , <i>Psydrax latifolia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila georgei</i> , <i>Rhagodia eremaea</i> , <i>Scaevola spinescens</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna artemisioides</i> subsp. <i>x sturtii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Maireana</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon caerulescens</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>

722 WRE Site 78

<b>Described by</b>	JN	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Ridge behind camp			
<b>MGA Zone</b>	50	560836 mE	7016798 mN	
<b>Habitat</b>	Gentle to moderate slope, ridgetop			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous ferrous stones/boulders and surface level plates			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia</i> sp. Weld Range shrubland to high shrubland over <i>Eremophila glutinosa</i> low shrubland over <i>Aristida contorta</i> open tussock grassland. Gentle to moderate slope, ridgetop.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 years)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

Species List:

Stratum	Cover	Species within each stratum
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila exilifolia</i> , <i>Eremophila glutinosa</i> , <i>Mirbelia ?stipitata</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i> , <i>Tribulus suberosus</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Dodonaea amplisemina</i> , <i>Heliotropium</i> sp., <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i>

**722 WRE Site 79**

**Described by** AC      **Date:** 20/04/07      **Type:** Q      20x20

**Location** W14

**MGA Zone** 50      561440 mE      7016893 mN

**Habitat** Ridgetop, gentle slope

**Soil** Red-orange clay, with a surface crust

**Rock Type** Many BIF stones and boulders

**Vegetation** *Acacia ramulosa* var. *linophylla* and *Acacia aneura* var. *aneura* high shrubland over *Eremophila macmillaniana* open shrubland over *Eremophila glutinosa* and *Senna artemisioides* subsp. *helmsii* low shrubland and *Solanum lasiophyllum* low scattered shrubs over *Aristida contorta* tussock grassland. Ridgetop, gentle slope.

**Veg Condition**

**Fire Age**

**Notes**

**Species List:**

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs 1 - 2m	2 - 10%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Eremophila macmillaniana</i> , <i>Senna glaucifolia</i>
Shrubs < 1m	10 - 30%	<i>Eremophila glutinosa</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
Shrubs < 0.5m	< 2%	<i>Eremophila latrobei</i> , <i>Solanum lasiophyllum</i> , <i>Tribulus suberosus</i>
Tussock grasses	30 - 70%	<i>Aristida contorta</i> , <i>Monachather paradoxus</i>
Herbs	< 2%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 81**

<b>Described by</b>	AC	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	W14			
<b>MGA Zone</b>	50	563937 mE	7018085 mN	
<b>Habitat</b>	Moderate slope, midslope			
<b>Soil</b>	Red clay			
<b>Rock Type</b>	Mnay BIF coarse gravel/pebbles and stones			
<b>Vegetation</b>	<i>Acacia</i> sp. Weld Range and <i>Acacia aneura</i> var. <i>aneura</i> high open shrubland over <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open heath over <i>Aristida contorta</i> very open tussock grassland. Moderate slope, midslope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs &lt; 1m</b>	30 - 70%	<i>Eremophila exilifolia</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Maireana georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna glaucifolia</i> , <i>Solanum lasiophyllum</i> , <i>Tribulus suberosus</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i>

**722 WRE Site 84**

<b>Described by</b>	SH	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	584124 mE	7031028 mN	
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Red-orange sand to sandy clay, with loose soil			
<b>Rock Type</b>	Nil			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered low trees over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia aneura</i> var. <i>fuliginea</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> low shrubland over <i>Aristida</i> sp. open tussock grassland. Flat/plain.			
<b>Veg Condition</b>	SH, Flat/plain.			
<b>Fire Age</b>	Poor			
<b>Notes</b>	None evident			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia pruinocarpa</i> , <i>Psyrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila jucunda</i> , <i>Hemigenia tysonii</i> , <i>Solanum ferocissimum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida</i> sp., <i>Eragrostis lanipes</i>

**722 WRE Site 85**

<b>Described by</b>	JN	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld North			
<b>MGA Zone</b>	50	584862 mE	7031416 mN	
<b>Habitat</b>	Flat/plain, negligible slope.			
<b>Soil</b>	Red-orange sand to sandy clay, with loose soil.			
<b>Rock Type</b>	Nil			
<b>Vegetation</b>	<i>Corymbia lenziana</i> open woodland to scattered tall trees over <i>Acacia aneura</i> var. <i>intermedia</i> low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Eremophila hughesii</i> subsp. <i>hughesii</i> and <i>Eremophila forrestii</i> subsp. <i>forrestii</i> low shrubland to shrubland over <i>Eremophila hughesii</i> subsp. <i>hughesii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland. Flat/plain.			
<b>Veg Condition</b>	Excellent			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs and trees - plentiful under <i>Corymbia</i> sp.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Corymbia lenziana</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinocarpa</i> , <i>Corymbia lenziana</i> , <i>Psyrax rigidula</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila hughesii</i> subsp. <i>hughesii</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna artemisioides</i> subsp. x <i>artemisioides</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Senna ?glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>

**722 WRE Site 88**

<b>Described by</b>	SH	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn North			
<b>MGA Zone</b>	50	579048 mE	7028520 mN	
<b>Habitat</b>	Flat/plain, negligible slope, possible soak			
<b>Soil</b>	Red-orange sandy clay to clay, with loose soil and no rocks			
<b>Rock Type</b>				
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> and <i>Acacia aneura</i> var. <i>aneura</i> open woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Psydrax latifolia</i> low woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Marsdenia australis</i> climbers over <i>Abutilon</i> sp. and <i>Sida fibulifera</i> very open herbs. Flat/plain, possible soak.			
<b>Veg Condition</b>	Good, grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate widespread leaf litter. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia craspedocarpa</i> , <i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia craspedocarpa</i> , <i>Acacia pruinocarpa</i> , <i>Psydrax latifolia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila ?clarkei</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila gilesii</i> subsp. <i>variabilis</i> , <i>Rhagodia eremaea</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila glutinosa</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i> , <i>Aristida holathera</i> var. <i>holathera</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>
<b>Herbs</b>	2 - 10%	<i>Abutilon</i> sp., <i>Sida fibulifera</i>



**722 WRE Site 88a**

<b>Described by</b>	AC	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	585765 mE	7031197 mN	
<b>Habitat</b>	Flat/plain, creek bed and bank, gentle slope.			
<b>Soil</b>	Red-orange sand with a surface crust and some loose soil			
<b>Rock Type</b>	Few ferrous and quartz stones.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia sibirica</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Solanum lasiophyllum</i> low scattered shrubs over <i>Aristida contorta</i> tussock grassland. Flat/plain, creek bed and bank, gentle slope.			
<b>Veg Condition</b>	Good; grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia sibirica</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia burkittii</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila platycalyx</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Hakea preissii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus polystachyus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon caerulescens</i>
<b>Climbers</b>	< 2%	<i>Duperreya commixta</i>

**722 WRE Site 92**

**Described by** AC      **Date:** 16/04/07      **Type:** Q      20x20

**Location** Weld Range North

**MGA Zone**

**Habitat** Flat/plain, creek bed.

**Soil** Red-orange sand, with loose soil and some fine gravel.

**Rock Type**

**Vegetation** *Acacia ramulosa* var. *linophylla*, *Acacia tetragonophylla* and *Acacia aneura* open scrub over *Eremophila forrestii* subsp. *forrestii* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Enneapogon caerulescens* and *Aristida contorta* open tussock grassland. Flat/plain, creek bed.

**Veg Condition**

**Fire Age**

**Notes**

**Species List:**

Stratum	Cover	Species within each stratum
Shrubs > 2m	30 - 70%	<i>Acacia aneura</i> , <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia tetragonophylla</i> , <i>Santalum spicatum</i>
Shrubs 1 - 2m	< 2%	<i>Eremophila</i> aff. <i>georgei</i> , <i>Eremophila platycalyx</i> , <i>Prostanthera althoferi</i> subsp. <i>althoferi</i> , <i>Senna artemisioides</i> subsp. <i>x sturtii</i>
Shrubs < 1m	2 - 10%	<i>Eremophila exilifolia</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Grevillea inconspicua</i> , <i>Prostanthera petrophila</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
Shrubs < 0.5m	< 2%	<i>Mirbelia ?stipitata</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	10 - 30%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon caerulescens</i> , <i>Eragrostis</i> sp.
Herbs	< 2%	<i>Sida</i> sp.

**722 WRE Site 94**

<b>Described by</b>	AC	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	587032 mE	7035055 mN	
<b>Habitat</b>	Flat/plain, gentle slope			
<b>Soil</b>	Orange sandy clay			
<b>Rock Type</b>	Common granite stones/boulders and surface level plates			
<b>Vegetation</b>	<i>Acacia</i> sp. Weld Range high shrubland over <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Senna glaucifolia</i> shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland and <i>Eremophila platycalyx</i> low scattered shrubs over <i>Cymbopogon ambiguus</i> and <i>Enneapogon caerulescens</i> open tussock grassland. Flat/plain, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Acacia minyura</i> , <i>Eremophila platycalyx</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon caerulescens</i>

**722 WRE Site 95**

**Described by** SH      **Date:** 17/04/07      **Type:** Q      20x20

**Location** Weld Range North East

**MGA Zone** 50      587295 mE      7034769 mN

**Habitat** Flat/plain, with a minor channel and possible granite soak. Negligible slope

**Soil** Red-orange sand

**Rock Type**

**Vegetation** *Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range and *Acacia rhodophloia* high open shrubland over *Eremophila exilifolia* scattered shrubs over *Eremophila exilifolia* and *Ptilotus obovatus* var. *obovatus* low open shrubland over *Cymbopogon ambiguus* very open tussock grassland. Flat/plain, with a minor channel and possible granite soak.

**Veg Condition** Good

**Fire Age** None evident

**Notes**

**Species List:**

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia rhodophloia</i> , <i>Acacia sibirica</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i>
Shrubs < 1m	< 2%	<i>Eremophila exilifolia</i> , <i>Hakea lorea</i> , <i>Senna glaucifolia</i>
Shrubs < 0.5m	2 - 10%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	2 - 10%	<i>Cymbopogon ambiguus</i> , <i>Enneapogon caerulescens</i>

**722 WRE Site 98**

<b>Described by</b>	SH	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North East			
<b>MGA Zone</b>	50	588797 mE	7035953	mN
<b>Habitat</b>	Footslope, negligible slope			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Many ferrous pieces of fine gravel and coarse gravel/pebbles.			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Senna glaucifolia</i> open shrubland over <i>Eremophila forrestii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland. Footslope.			
<b>Veg Condition</b>				
<b>Fire Age</b>				
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Chenopodium gaudichaudianum</i> , <i>Dodonaea petiolaris</i> , <i>Eremophila forrestii</i> , <i>Eremophila spathulata</i> , <i>Solanum lasiophyllum</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Maireana georgei</i> , <i>Maireana triptera</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>

**722 WRE Site 99**

<b>Described by</b>	JN	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld North			
<b>MGA Zone</b>	50	588798 mE	7036525 mN	
<b>Habitat</b>	Footslope, gentle slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust.			
<b>Rock Type</b>	Continuous ferrous and quartz coarse gravel/pebbles, stones/boulders, and surface level plates.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia tetragonophylla</i> high open shrubland over <i>Acacia tetragonophylla</i> scattered shrubs over <i>Senna</i> sp. Meekatharra and <i>Maireana georgei</i> low shrubland. Footslope, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 years)			
<b>Notes</b>	Sparse leaf litter (mainly under shrubs). Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila spathulata</i> , <i>Ptilotus rotundifolius</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Maireana georgei</i> , <i>Maireana triptera</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>

**722 WRE Site 100**

<b>Described by</b>	AC	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	588158 mE	7037131 mN	
<b>Habitat</b>	Flat/plain, gentle slope.			
<b>Soil</b>	Orange to brown clay loam, with a surface crust and some fine gravel.			
<b>Rock Type</b>	Common ferrous and quartz fine gravel.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia aneura</i> var. <i>intermedia</i> low woodland over <i>Acacia tetragonophylla</i> and <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> high open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Senna</i> sp. 1 shrubland over <i>Aristida contorta</i> open tussock grassland.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia craspedocarpa</i> , <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila compacta</i> subsp. <i>compacta</i> , <i>Eremophila exilifolia</i> , <i>Eremophila forrestii</i> , <i>Eremophila galeata</i> , <i>Eremophila platycalyx</i> , <i>Rhagodia eremaea</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus polystachyus</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Sida ectogama</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Maireana triptera</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i>

**722 WRE Site 101**

<b>Described by</b>	AC	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	588450 mE	7038104	mN
<b>Habitat</b>	Flat/plain, negligible slope.			
<b>Soil</b>	Red-orange sandy clay, with fine gravel and loose soil			
<b>Rock Type</b>	Many ferrous, granite, and quartz coarse gravel and pebbles.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high open shrubland over <i>Eremophila spathulata</i> open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Solanum lasiophyllum</i> low scattered shrubs over <i>Aristida contorta</i> tussock grassland. Flat/plain.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila spathulata</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Acacia tetragonophylla</i> , <i>Grevillea extorris</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i>



**722 WRE Site 102**

<b>Described by</b>	SH	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North East			
<b>MGA Zone</b>	50	589312 mE	7038142	mN
<b>Habitat</b>	Footslope, negligible slope			
<b>Soil</b>	Red-orange sandy clay, with fine gravel			
<b>Rock Type</b>	Many ferrous and granite coarse gravel/pebbles			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia minyura</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Eremophila simulans</i> subsp. <i>simulans</i> and <i>Ptilotus schwartzii</i> low open shrubland over <i>Sida excedentifolia</i> very open herbs, Footslope.			
<b>Veg Condition</b>	Good; track at edge of quadrat			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia pruinocarpa</i> , <i>Psyrdrax latifolia</i> , <i>Psyrdrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia minyura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Grevillea berryana</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila simulans</i> subsp. <i>simulans</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum lasiophyllum</i>

**722 WRE Site 108**

<b>Described by</b>	AC	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	W14			
<b>MGA Zone</b>	50	562128 mE	7019503	mN
<b>Habitat</b>	Ridgetop, moderate slope			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Common BIF stones and boulders			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Aluta aspera</i> subsp. <i>hesperia</i> and <i>Thryptomene decussata</i> open heath <i>Sida excedentifolia</i> and <i>Ptilotus schwartzii</i> scattered herbs over <i>Monachather paradoxus</i> very open tussock grassland. Ridgetop, moderate slope.			
<b>Veg Condition</b>	Good, grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	30 - 70%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia rhodophloia</i> , <i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Grevillea berryana</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> , <i>Prostanthera petrophila</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Monachather paradoxus</i>
<b>Herbs</b>	< 2%	<i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

722 WRE Site 115

<b>Described by</b>	SH	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Lakeside			
<b>MGA Zone</b>	50	541455 mE	7014385 mN	
<b>Habitat</b>	Flat/plain, lake bank			
<b>Soil</b>	Red-orange sand to sandy clay, with loose soil.			
<b>Rock Type</b>	Nil			
<b>Vegetation</b>	<p><i>Acacia aneura</i> low open woodland over <i>Melaleuca stereophloia</i> high open shrubland over <i>Eremophila forrestii</i> shrubland over <i>Eremophila forrestii</i> and <i>Solanum lasiophyllum</i> low open shrubland over <i>Eragrostis lanipes</i> and <i>Aristida contorta</i> tussock grassland. Flat/plain, lake bank.</p>			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	<i>Acacia aneura</i>
Shrubs > 2m	2 - 10%	<i>Acacia murrayana</i> , <i>Acacia sibirica</i>
Shrubs 1 - 2m	10 - 30%	<i>Acacia craspedocarpa</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila compacta</i> subsp. <i>compacta</i> , <i>Eremophila forrestii</i> , <i>Melaleuca stereophloia</i>
Shrubs < 0.5m	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	30 - 70%	<i>Aristida contorta</i> , <i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Eragrostis lanipes</i> , <i>Monachather paradoxus</i> , POACEAE sp.

**722 WRE Site 116**

<b>Described by</b>	AC	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	544412 mE	7016905 mN	
<b>Habitat</b>	Flat plain, negligible slope			
<b>Soil</b>	Red-orange sandy clay, with loose soil			
<b>Rock Type</b>	Common quartz stones			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high open shrubland over <i>Eremophila galeata</i> and <i>Acacia tetragonophylla</i> scattered shrubs over <i>Eriachne helmsii</i> tussock grassland.			
<b>Veg Condition</b>	Good, kangaroo track through site			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Negligible leaf litter. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia aneura</i> var. <i>conifera</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila galeata</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Sida ectogama</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Acacia craspedocarpa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila punicea</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida holathera</i> , <i>Eriachne pulchella</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	< 2%	<i>Dianella revoluta</i> var. <i>divaricata</i>

**722 WRE Site 117**

<b>Described by</b>	JN	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Near W17			
<b>MGA Zone</b>	50	546935 mE	7015506 mN	
<b>Habitat</b>	Midslope, minor crest, gentle slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous ferrous coarse gravel/pebbles and stones/boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high open shrubland to scattered low trees over <i>Acacia grasbyi</i> open shrubland over <i>Acacia grasbyi</i> and <i>Ptilotus beardii</i> low shrubland over <i>Aristida contorta</i> very open tussock grassland. Midslope, minor crest, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 years)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate to sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Hakea recurva</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia grasbyi</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Dodonaea adenophora</i> , <i>Eremophila glutinosa</i> , <i>Senna</i> sp. Austin (A. Strid 20210), <i>Thryptomene decussata</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Maireana glomerifolia</i> , <i>Ptilotus beardii</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Eriachne mucronata</i>

**722 WRE Site 118**

<b>Described by</b>	JN	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	547723 mE	7014961 mN	
<b>Habitat</b>	Ridgetop, moderate slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous ferrous coarse gravel/pebbles, stones/boulders, and surface level plates			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> low open woodland to scattered trees over <i>Acacia craspedocarpa</i> and <i>Acacia aneura</i> var. <i>fuliginea</i> high shrubland over <i>Thryptomene decussata</i> shrubland over <i>Philotheca brucei</i> subsp. <i>brucei</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Aristida contorta</i> very open tussock grassland. Ridgetop, moderate slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>fuliginea</i> , <i>Acacia craspedocarpa</i> , <i>Acacia sibirica</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Solanum ashbyae</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Dodonaea pachyneura</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> , <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> , <i>Micromyrtus sulphurea</i> , <i>Olearia plucheacea</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Prostanthera petrophila</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i>
<b>Climbers</b>	< 2%	<i>Duperreya commixta</i>
<b>Herbs</b>	< 2%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 119**

<b>Described by</b>	JN	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Samphire plain			
<b>MGA Zone</b>	50	557394 mE	7018295 mN	
<b>Habitat</b>	Undulating plain; isolated patch of woodland in a samphire plain.			
<b>Soil</b>	Red-orange sandy clay, with loose soil			
<b>Rock Type</b>				
<b>Vegetation</b>	<i>Pittosporum angustifolium</i> low open woodland to scattered trees over <i>Leptomeria preissiana</i> high open shrubland over <i>Cratystylis subspinescens</i> and <i>Senna artemisioides</i> subsp. <i>filifolia</i> shrubland over <i>Atriplex cephalantha</i> , <i>Scaevola spinescens</i> , <i>Halosarcia indica</i> subsp. <i>bidens</i> and <i>Frankenia laxiflora</i> low shrubland over <i>Aristida contorta</i> very open tussock grassland. Undulating plain; isolated patch of woodland in a samphire plain.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Pittosporum angustifolium</i> , <i>Santalum spicatum</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia victoriae</i> , <i>Leptomeria preissiana</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Atriplex cephalantha</i> , <i>Cratystylis subspinescens</i> , <i>Eremophila subfloccosa</i> subsp. <i>lanata</i> , <i>Melaleuca stereophloia</i> , <i>Scaevola spinescens</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila glabra</i> subsp. <i>glabra</i> , <i>Tecticornia indica</i> subsp. <i>bidens</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Frankenia laxiflora</i> , <i>Podolepis capillaris</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Enneapogon caerulescens</i>

**722 WRE Site 120**

<b>Described by</b>	AC	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Madoonga			
<b>MGA Zone</b>	50	558093 mE	7018841 mN	
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Orange clay with a surface crust.			
<b>Rock Type</b>	Nil			
<b>Vegetation</b>	<i>Eucalyptus carnei</i> woodland over <i>Eremophila pantonii</i> scattered shrubs over <i>Atriplex</i> sp. and <i>Tecticornia cymbiformis</i> low open shrubland over <i>Eragrostis pergracilis</i> open tussock grassland. Flat/plain.			
<b>Veg Condition</b>	Good; grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate widespread leaf litter. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	10 - 30%	<i>Eucalyptus carnei</i> , <i>Eucalyptus carnei</i>
<b>Trees &lt; 10m</b>	< 2%	<i>Eucalyptus carnei</i> , <i>Eucalyptus carnei</i>
<b>Mallee tree</b>	< 2%	<i>Eucalyptus trivalva</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia victoriae</i> , <i>Eremophila pantonii</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Acacia exocarpoides</i> , <i>Acacia tetragonophylla</i> , <i>Atriplex</i> sp., <i>Cratystylis subspinescens</i> , <i>Eremophila glabra</i> subsp. <i>glabra</i> , <i>Eremophila subfloccosa</i> subsp. <i>lanata</i> , <i>Scaevola spinescens</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Frankenia laxiflora</i> , <i>Melaleuca stereophloia</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Solanum lasiophyllum</i> , <i>Tecticornia cymbiformis</i> , <i>Tecticornia indica</i> subsp. <i>bidens</i>
<b>Tussock grasses</b>	10 - 30%	<i>Eragrostis pergracilis</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	< 2%	<i>Calocephalus multiflorus</i> , <i>Centaurium</i> sp.



**722 WRE Site 121**

<b>Described by</b>	JN	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Ex's near samphire			
<b>MGA Zone</b>	50	558037 mE	7019505 mN	
<b>Habitat</b>	Flat/plain, edges of samphire plain, negligible slope			
<b>Soil</b>	Red-orange to brown sandy clay, with a surface crust and some loose soil			
<b>Rock Type</b>	Nil			
<b>Vegetation</b>	<i>Eucalyptus trivalva</i> low open woodland to woodland over <i>Eucalyptus trivalva</i> low open mallee forest over <i>Exocarpos aphyllus</i> scattered tall shrubs over <i>Acacia victoriae</i> open shrubland over <i>Eremophila glabra</i> subsp. <i>glabra</i> , <i>Scaevola spinescens</i> and <i>Frankenia laxiflora</i> low shrubland over <i>Aristida contorta</i> open tussock grassland. Flat/plain, edges of samphire plain.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs and trees. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	10 - 30%	<i>Eucalyptus carnei</i> , <i>Eucalyptus trivalva</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Eucalyptus carnei</i> , <i>Eucalyptus trivalva</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia murrayana</i> , <i>Acacia victoriae</i> , <i>Exocarpos aphyllus</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Eremophila glabra</i> subsp. <i>glabra</i> , <i>Eremophila subfloccosa</i> subsp. <i>lanata</i> , <i>Scaevola spinescens</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Atriplex nummularia</i> , <i>Cratystylis subspinescens</i> , <i>Lawrencia chrysoderma</i> , <i>Melaleuca stereophloia</i> , <i>Muehlenbeckia florulenta</i> , <i>Tecticornia</i> sp.
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Frankenia laxiflora</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i>

**722 WRE Site 122**

<b>Described by</b>	JN	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	580322 mE	7030811 mN	
<b>Habitat</b>	Flat/plain to undulating plain, with a negligible slope.			
<b>Soil</b>	Brown loam, with loose soil			
<b>Rock Type</b>	Nil			
<b>Vegetation</b>	<i>Eucalyptus lucasii</i> low woodland to open forest over <i>Eucalyptus lucasii</i> (saplings) low open mallee woodland over <i>Acacia tetragonophylla</i> high open shrubland over <i>Senna artemisioides</i> subsp. <i>filifolia</i> open shrubland over <i>Pimelea microcephala</i> subsp. <i>microcephala</i> , <i>Abutilon oxycarpum</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Duperreya commixta</i> climbers. Flat/plain to undulating plain.			
<b>Veg Condition</b>	Excellent			
<b>Fire Age</b>	Old (>5 yrs)			
<b>Notes</b>	Plentiful, widespread leaf litter. Plentiful wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	30 - 70%	<i>Eucalyptus lucasii</i>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Eucalyptus lucasii</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Chenopodium gaudichaudianum</i> , <i>Eremophila longifolia</i> , <i>Pimelea microcephala</i> subsp. <i>microcephala</i> , <i>Pittosporum angustifolium</i> , <i>Santalum lanceolatum</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Abutilon oxycarpum</i> , <i>Eremophila georgei</i> , <i>Eremophila subfloccosa</i> subsp. <i>lanata</i> , <i>Solanum lasiophyllum</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Abutilon oxycarpum</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Tussock grasses</b>	< 2%	<i>Enneapogon caerulescens</i> , <i>Eragrostis australasica</i> , POACEAE sp.
<b>Climbers</b>	10 - 30%	<i>Duperreya commixta</i>

**722 WRE Site 123**

<b>Described by</b>	SH	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld North			
<b>MGA Zone</b>	50	581695 mE	7030171 mN	
<b>Habitat</b>	Flat/plain, negligible slope			
<b>Soil</b>	Brown sand to sandy clay, with loose soil			
<b>Rock Type</b>	Few granite and quartz stones.			
<b>Vegetation</b>	<i>Acacia aneura</i> low open woodland over <i>Eucalyptus lucasii</i> low mallee woodland over <i>Sida calyxhymenia</i> open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Ptilotus divaricatus</i> var. <i>divaricatus</i> low open heath over <i>Ptilotus polystachyus</i> open herbs. Flat/plain.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Plentiful widespread leaf litter. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Psyrax latifolia</i>
<b>Mallee tree</b>	10 - 30%	<i>Eucalyptus lucasii</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia aneura</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia craspedocarpa</i> , <i>Acacia pruinocarpa</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs &lt; 1m</b>	30 - 70%	<i>Eremophila galeata</i> , <i>Ptilotus divaricatus</i> var. <i>divaricatus</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Rhagodia eremaea</i> , <i>Sida calyxhymenia</i> , <i>Solanum lasiophyllum</i>
<b>Shrubs &lt; 0.5m</b>	30 - 70%	<i>Eremophila foliosissima</i> , <i>Maireana ?georgei</i> , <i>Spartothamnella teucriflora</i>
<b>Herbs</b>	10 - 30%	<i>Abutilon ?oxycarpum</i> , <i>Ptilotus polystachyus</i>

**722 WRE Site 124**

<b>Described by</b>	SH	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North East			
<b>MGA Zone</b>	50	589437 mE	7037259 mN	
<b>Habitat</b>	Midslope, north west facing, gentle slope.			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Continuous BIF, grantie, quartz, and ferrous stones/boulders and surface level plates			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Thryptomene decussata</i> high open shrubland over <i>Eremophila margarethae</i> low scattered shrubs and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Goodenia tenuiloba</i> open herbs over <i>Eriachne pulchella</i> very open tussock grassland. Midslope, north west facing, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Psydrax rigidula</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Eriachne pulchella</i>
<b>Herbs</b>	10 - 30%	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Goodenia tenuiloba</i>

**722 WRE Site 125**

<b>Described by</b>	JN	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld North			
<b>MGA Zone</b>	50	589791 mE	7037197 mN	
<b>Habitat</b>	Midslope, hill crest on side of range, south east facing gentle slope.			
<b>Soil</b>	Red-orange sandy clay, with a surface crust and fine gravel			
<b>Rock Type</b>	Continuous to many ferrous coarse gravel/pebbles and stones/boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia</i> sp. Weld Range and <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Acacia</i> sp. Weld Range and <i>Eremophila macmillaniana</i> shrubland over <i>Eremophila macmillaniana</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Ptilotus astrolasius</i> var. <i>luteolus</i> low open shrubland.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate to sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia tetragonophylla</i> , <i>Eremophila macmillaniana</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia speckii</i> , <i>Acacia tetragonophylla</i> , <i>Calytrix desolata</i> , <i>Eremophila macmillaniana</i> , <i>Ptilotus rotundifolius</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Acacia speckii</i> , <i>Eremophila exilifolia</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila macmillaniana</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus rotundifolius</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Dodonaea amplisemina</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Mirbelia ?stipitata</i> , <i>Ptilotus astrolasius</i> var. <i>luteolus</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>

**722 WRE Site 126**

<b>Described by</b>	AC	<b>Date:</b> 15/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	589471 mE	7037203 mN	
<b>Habitat</b>	Ridgetop, gentle slope (slopes down, south to north).			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Many BIF coarse gravel/pebbles, stones/boulders and surface level plates.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Thryptomene decussata</i> high open shrubland over <i>Thryptomene decussata</i> and <i>Baeckea</i> sp. Melita Station open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Goodenia</i> sp. very open herbs over <i>Eriachne helmsii</i> scattered tussock grasses. Ridgetop, gentle slope (slopes down, south to north).			
<b>Veg Condition</b>	Excellent			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Negligible wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Baeckea</i> sp. Melita Station (H. Pringle 2738), <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila exilifolia</i> , <i>Eremophila glutinosa</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	< 2%	<i>Eriachne helmsii</i>
<b>Herbs</b>	2 - 10%	<i>Goodenia</i> sp., <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 127**

<b>Described by</b>	SH	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North East			
<b>MGA Zone</b>	50	589282 mE	7036626 mN	
<b>Habitat</b>	Midslope, north-west facing, moderate slope.			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Continuous BIF and ferrous stones/boulders and surface-level plates.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high open shrubland over <i>Eremophila margarethae</i> scattered shrubs over <i>Eremophila margarethae</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Marsdenia australis</i> climbers. Midslope, north-west facing, moderate slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum lasiophyllum</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>
<b>Herbs</b>	< 2%	<i>Cheilanthes lasiophylla</i>

**722 WRE Site 128**

<b>Described by</b>	AC	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	589342 mE	7036616 mN	
<b>Habitat</b>	Midslope, east south east facing, steep slope.			
<b>Soil</b>	Red-orange clay			
<b>Rock Type</b>	Continuous stones/boulders and surface-level plates, BIF.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Thryptomene decussata</i> high shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open heath and <i>Solanum ashbyae</i> low scattered shrubs over <i>Goodenia</i> sp. and <i>Sida ?chrysocalyx</i> very open herbs. Midslope, east south east facing, steep slope.			
<b>Veg Condition</b>	Excellent			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Thryptomene decussata</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Psydrax latifolia</i> , <i>Psydrax suaveolens</i>
<b>Shrubs &lt; 1m</b>	30 - 70%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Hibiscus ?burtonii</i> , <i>Solanum ashbyae</i> , <i>Tribulus suberosus</i>
<b>Herbs</b>	2 - 10%	<i>Cheilanthes sieberi</i> , <i>Goodenia</i> sp., <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)



**722 WRE Site 129**

<b>Described by</b>	JN	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld North, south-east face of range			
<b>MGA Zone</b>	50	589461 mE	7036537	mN
<b>Habitat</b>	Midslope, moderate south-east facing slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Conintuous BIF and ferrous coarse gravel/pebbles and stones/boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia</i> sp. Weld Range shrubland to high shrubland over <i>Eremophila macmillaniana</i> , <i>Dodonaea</i> sp. <i>Ninghan</i> and <i>Eremophila exilifolia</i> low shrubland. Midslope, moderate south-east facing slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate to sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila macmillaniana</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila exilifolia</i> , <i>Ptilotus rotundifolius</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Dodonaea amplisemina</i> , <i>Ptilotus astrolasius</i> var. <i>luteolus</i>

**722 WRE Site 130**

<b>Described by</b>	JN	<b>Date:</b> 16/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	589858 mE	7037769 mN	
<b>Habitat</b>	Midslope to ridgetop, gentle slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous ferrous coarse gravel/pebbles, stones/boulders, and surface level plates.			
<b>Vegetation</b>	<p><i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia</i> sp. Weld Range high open shrubland over <i>Acacia</i> sp. Weld Range and <i>Acacia speckii</i> shrubland over <i>Eremophila macmillaniana</i>, <i>Eremophila exilifolia</i> and <i>Ptilotus astrolasius</i> var. <i>luteolus</i> low open shrubland over <i>Aristida contorta</i> very open tussock grassland. Midslope to ridgetop, gentle slope.</p>			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 years)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i> , <i>Grevillea berryana</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila macmillaniana</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila exilifolia</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Dodonaea amplisemina</i> , <i>Ptilotus astrolasius</i> var. <i>luteolus</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i>

**722 WRE Site 131**

<b>Described by</b>	JN	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	587069 mE	7034505 mN	
<b>Habitat</b>	Undulating plain, small granite dome crest. Gentle slope.			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Many granite pieces of fine gravel and stones/boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> low open woodland over <i>Acacia</i> sp. Weld Range open shrubland to high shrubland over <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Solanum lasiophyllum</i> low shrubland over <i>Cymbopogon ambiguus</i> very open tussock grassland. Undulating plain, small granite dome crest. Gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate to sparse wood litter. Sparse leaf litter, mainly under shrubs.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Santalum spicatum</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila exilifolia</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila platycalyx</i> subsp. <i>platycalyx</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon caerulescens</i>

**722 WRE Site 132**

<b>Described by</b>	AC	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	587781 mE	7034353 mN	
<b>Habitat</b>	Rocky scree footslope, north-west side of ridge, gentle slope.			
<b>Soil</b>	Red-orange clay, with a surface crust			
<b>Rock Type</b>	Many BIF, and a few quartz, coarse gravel and pebbles.			
<b>Vegetation</b>	<i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Acacia aneura</i> high shrubland over <i>Acacia aneura</i> (emergent), <i>Eremophila spathulata</i> and <i>Ptilotus rotundifolius</i> shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Solanum lasiophyllum</i> low scattered shrubs over <i>Sida excedentifolia</i> scattered herbs over <i>Aristida contorta</i> scattered tussock grasses. Rocky scree footslope, north-west side of ridge, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Negligible wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila spathulata</i> , <i>Psydrax suaveolens</i> , <i>Ptilotus rotundifolius</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Senna glaucifolia</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i>
<b>Herbs</b>	< 2%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 133**

<b>Described by</b>	JN	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	587937 mE	7034213 mN	
<b>Habitat</b>	Ridgetop, gentle slope			
<b>Soil</b>	Red-orange sandy clay with a surface crust			
<b>Rock Type</b>	Continuous BIF and ferrous coarse gravel, pebbles, stones, and boulders.			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered trees over <i>Acacia aneura</i> var. <i>aneura</i> low woodland over <i>Acacia aneura</i> var. <i>aneura</i> open shrubland to high shrubland over <i>Eremophila spathulata</i> low shrubland over <i>Goodenia tenuiloba</i> very open herbs. Ridgetop, gentle slope.			
<b>Veg Condition</b>	Excellent			
<b>Fire Age</b>	Old (>5 years)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia pruinocarpa</i> , <i>Psyrdrax latifolia</i> , <i>Psyrdrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila spathulata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus rotundifolius</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i>
<b>Herbs</b>	2 - 10%	<i>Goodenia tenuiloba</i>

**722 WRE Site 134**

<b>Described by</b>	SH	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North-East			
<b>MGA Zone</b>	50	588151 mE	7033952 mN	
<b>Habitat</b>	Midslope, south-west facing, minor drainage channel just below site, gully sides with a gentle slope.			
<b>Soil</b>	Red-orange clay			
<b>Rock Type</b>	Continuous ferrous coarse gravel/pebbles, and stones/boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia</i> sp. Weld Range high shrubland over <i>Eremophila macmillaniana</i> open shrubland over <i>Eremophila exilifolia</i> and <i>Dodonaea</i> sp. <i>Ninghan</i> low shrubland over <i>Enneapogon caerulescens</i> and <i>Aristida contorta</i> very open tussock grassland. Midslope, south-west facing, minor drainage channel just below site, gully sides with a gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila macmillaniana</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila exilifolia</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Dodonaea amplisemina</i> , <i>Ptilotus astrolasius</i> var. <i>luteolus</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida ectogama</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Enneapogon caerulescens</i>
<b>Herbs</b>	< 2%	<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)

**722 WRE Site 135**

<b>Described by</b>	SH	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North East			
<b>MGA Zone</b>	50	588502 mE	7033622	mN
<b>Habitat</b>	Midslope, gentle slope, north-west facing.			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Continuous, ferrous, granite, and quartz			
<b>Vegetation</b>	<i>Acacia aneura</i> and <i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Eremophila macmillaniana</i> low scattered shrubs to scattered tall shrubs over <i>Euphorbia boophthona</i> scattered herbs over <i>Aristida contorta</i> open tussock grassland. Midslope, gentle slope, north-west facing.			
<b>Veg Condition</b>	Poor; heavily grazed by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> , <i>Acacia aneura</i> var. <i>aneura</i> , <i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Eremophila macmillaniana</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila exilifolia</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Prostanthera althoferi</i> subsp. <i>althoferi</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i>
<b>Herbs</b>	< 2%	<i>Euphorbia boophthona</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)

**722 WRE Site 136**

<b>Described by</b>	JN	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	587841 mE	7033527	mN
<b>Habitat</b>	Ridgetop, gentle slope			
<b>Soil</b>	Red-orange sandy clay with a surface crust			
<b>Rock Type</b>	Continuous to many ferrous coarse gravel, pebbles, stones, and boulders			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia</i> sp. Weld Range shrubland to high open shrubland over <i>Eremophila macmillaniana</i> , <i>Eremophila exilifolia</i> , <i>Ptilotus rotundifolius</i> and <i>Dodonaea</i> sp. <i>Ninghan</i> low shrubland over <i>Aristida contorta</i> open tussock grassland. Ridgetop, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Eremophila macmillaniana</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila exilifolia</i> , <i>Ptilotus rotundifolius</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Dodonaea amplisemina</i> , <i>Grevillea inconspicua</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i>



**722 WRE Site 137**

<b>Described by</b>	AC	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Weld Range North			
<b>MGA Zone</b>	50	588342 mE	7034114 mN	
<b>Habitat</b>	Ridgetop, gentle slope			
<b>Soil</b>	Red-orange clay, with a surface crust			
<b>Rock Type</b>	Many BIF coarse gravel, pebbles, and stones.			
<b>Vegetation</b>	<i>Acacia</i> sp. Weld Range and <i>Acacia speckii</i> shrubland over <i>Eremophila macmillaniana</i> and <i>Ptilotus astrolasius</i> var. <i>luteolus</i> low open shrubland over <i>Aristida contorta</i> very open tussock grassland. Ridgetop, gentle slope.			
<b>Veg Condition</b>	Excellent			
<b>Fire Age</b>	None evident			
<b>Notes</b>				

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila exilifolia</i> , <i>Eremophila macmillaniana</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Dodonaea amplisemina</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Ptilotus astrolasius</i> var. <i>luteolus</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i>

**722 WRE Site 138**

<b>Described by</b>	SH	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn North East			
<b>MGA Zone</b>	50	582918 mE	7027232 mN	
<b>Habitat</b>	Midslope, north face. Moderate slope.			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Continuous ferrous stones/boulders and surface-level plates.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered tall shrubs to scattered low trees over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Cymbopogon ambiguus</i> and <i>Enneapogon caerulescens</i> very open tussock grassland. Midslope, north face. Moderate slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila galeata</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26), <i>Solanum lasiophyllum</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila macmillaniana</i> , <i>Hibiscus burtonii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Tribulus suberosus</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon caerulescens</i>

**722 WRE Site 139**

<b>Described by</b>	JN	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	South-facing slope, Beebyn east			
<b>MGA Zone</b>	50	583009 mE	7027197 mN	
<b>Habitat</b>	Midslope, moderate slope.			
<b>Soil</b>	Red-orange sandy clay with a surface crust			
<b>Rock Type</b>	Continuous BIF and ferrous coarse gravel/pebbles and stones/boulders.			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered trees over <i>Acacia aneura</i> var. <i>aneura</i> high open shrubland to low woodland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Thryptomene decussata</i> open heath over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open heath. Midslope, moderate slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate to sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	30 - 70%	<i>Dodonaea petiolaris</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila georgei</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i>
<b>Shrubs &lt; 0.5m</b>	30 - 70%	<i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Olearia stuartii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>

**722 WRE Site 140**

<b>Described by</b>	AC	<b>Date:</b> 17/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn			
<b>MGA Zone</b>	50	582941 mE	7027205 mN	
<b>Habitat</b>	Ridgetop, moderate to gentle slope.			
<b>Soil</b>	Red-orange sandy clay, with a surface crust.			
<b>Rock Type</b>	Many BIF coarse gravel/pebbles and stones/boulders			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> scattered tall shrubs over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open heath. Ridgetop, moderate to gentle slope.			
<b>Veg Condition</b>	Good; grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &lt; 1m</b>	30 - 70%	<i>Eremophila ?georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Dodonaea ?pachyneura</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Senna glaucifolia</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Cymbopogon ambiguus</i>

**722 WRE Site 141**

**Described by** SH      **Date:** 18/04/07      **Type:** Q      20x20

**Location** Beebyn

**MGA Zone** 50      582035 mE      7027062 mN

**Habitat** Flat/plain, negligible slope

**Soil** Red orange hard clay pan

**Rock Type** Few ferrous pebbles

**Vegetation** *Grevillea berryana* low open woodland over *Acacia aneura* var. *intermedia* and *Acacia aneura* var. *aneura* high open shrubland over *Acacia ramulosa* var. *linophylla* scattered shrubs over *Eremophila forrestii* subsp. *forrestii* and *Eremophila georgei* low shrubland over *Maireana georgei* very open herbs over *Monachather paradoxus* very open tussock grassland.

**Veg Condition**

**Fire Age**

**Notes**

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	<i>Grevillea berryana</i> , <i>Psyrax latifolia</i>
Shrubs > 2m	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Psyrax suaveolens</i>
Shrubs 1 - 2m	< 2%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i> , <i>Chenopodium gaudichaudianum</i> , <i>Eremophila georgei</i> , <i>Senna glaucifolia</i>
Shrubs < 1m	10 - 30%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
Shrubs < 0.5m	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	2 - 10%	<i>Monachather paradoxus</i>
Herbs	2 - 10%	<i>Hibiscus burtonii</i> , <i>Maireana georgei</i>

**722 WRE Site 142**

<b>Described by</b>	AC	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn			
<b>MGA Zone</b>	50	581892 mE	7027044 mN	
<b>Habitat</b>	Flat/plain to footslope, gentle slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Many BIF coarse gravel, pebbles and stones			
<b>Vegetation</b>	<i>Grevillea berryana</i> and <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Eremophila georgei</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland and <i>Solanum lasiophyllum</i> low scattered shrubs over <i>Ptilotus schwartzii</i> scattered herbs over <i>Aristida contorta</i> very open tussock grassland. Flat/plain to footslope, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Grevillea berryana</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Psyrdrax latifolia</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Maireana georgei</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	< 2%	<i>Cheilanthes sieberi</i> , <i>Ptilotus schwartzii</i>

**722 WRE Site 143**

<b>Described by</b>	JN	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn			
<b>MGA Zone</b>	50	581922 mE	7026918 mN	
<b>Habitat</b>	Ridgetop, gentle slope.			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous ferrous and BIF stones, boulders, and surface-level plates			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland to scattered low trees over <i>Thryptomene decussata</i> shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Thryptomene decussata</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland. Ridgetop, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse to negligible leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia rhodophloia</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila glutinosa</i> , <i>Philothea brucei</i> subsp. <i>brucei</i> , <i>Solanum lasiophyllum</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Tussock grasses</b>	< 2%	<i>Monachather paradoxus</i>

**722 WRE Site 144**

<b>Described by</b>	SH	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn			
<b>MGA Zone</b>	50	580319 mE	7026328 mN	
<b>Habitat</b>	Moderate slope, north facing midslope.			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Continuous BIF and ferrous stones, boulders, and surface-level plates.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Eremophila margarethae</i> low shrubland and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low scattered shrubs. Moderate slope, north facing midslope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	none evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila margarethae</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Dodonaea pachyneura</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Solanum ellipticum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i>



722 WRE Site 145

<b>Described by</b>	JN	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn centre - footslope northern face			
<b>MGA Zone</b>				
<b>Habitat</b>	Moderate to gentle slope, footslope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Many BIF and ferrous coarse gravel, pebbles, stones, and boulders			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland to low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Eremophila forest ssp forest</i> low shrubland over <i>Monachather paradoxus</i> very open tussock grassland.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 yrs)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
Shrubs > 2m	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Grevillea berryana</i>
Shrubs 1 - 2m	10 - 30%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>
Shrubs < 1m	10 - 30%	<i>Eremophila forrestii</i> subsp. <i>Forrestii</i> , <i>Eremophila glutinosa</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
Shrubs < 0.5m	10 - 30%	<i>Eremophila forrestii</i> subsp. <i>Forrestii</i> , <i>Ptilotus schwartzii</i> , <i>Senna glaucifolia</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum ashbyae</i> , <i>Solanum ellipticum</i>
Tussock grasses	2 - 10%	<i>Monachather paradoxus</i>

**722 WRE Site 146**

<b>Described by</b>	AC	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn			
<b>MGA Zone</b>	50	580290 mE	7026302 mN	
<b>Habitat</b>	Ridgetop, gentle slope			
<b>Soil</b>	Red-orange clay			
<b>Rock Type</b>	Many BIF stones/boulders and surface-level plates			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Thryptomene decussata</i> open shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Solanum lasiophyllum</i> and <i>Tribulus suberosus</i> low scattered shrubs over <i>Monachather paradoxus</i> scattered tussock grasses. Ridgetop, gentle slope.			
<b>Veg Condition</b>	Good; grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila georgei</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Dodonaea ?petiolaris</i> , <i>Maireana georgei</i> , <i>Philothea brucei</i> subsp. <i>brucei</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26), <i>Solanum lasiophyllum</i> , <i>Tribulus suberosus</i>
<b>Tussock grasses</b>	< 2%	<i>Cymbopogon ambiguus</i> , <i>Monachather paradoxus</i>

**722 WRE Site 147**

**Described by** AC      **Date:** 18/04/07      **Type:** Q      20x20

**Location** Beebyn

**MGA Zone** 50      579052 mE      7025125 mN

**Habitat** Flat/plain, gentle slope

**Soil** Red-orange clay loam, with a surface crust

**Rock Type** Common BIF coarse gravel and pebbles

**Vegetation** *Grevillea berryana* scattered low trees over *Acacia aneura* var. *aneura* high shrubland over *Acacia ramulosa* var. *linophylla*, *Eremophila forrestii* subsp. *forrestii*, *Senna artemisioides* subsp. *sturtii* and *Eremophila ?clarkei* open heath over *Acacia aneura* var. *aneura* (emergent) low open shrubland. Flat/plain, gentle slope.

**Veg Condition**

**Fire Age**

**Notes**

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	<i>Grevillea berryana</i>
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Psyrax latifolia</i>
Shrubs 1 - 2m	30 - 70%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila ?clarkei</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Senna artemisioides</i> subsp. <i>x sturtii</i>
Shrubs < 1m	< 2%	<i>Acacia pruinocarpa</i> , <i>Eremophila latrobei</i> , <i>Psyrax suaveolens</i>
Shrubs < 0.5m	2 - 10%	<i>Eremophila glutinosa</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i>

**722 WRE Site 148**

<b>Described by</b>	AC	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn northwest			
<b>MGA Zone</b>	50	573853 mE	7027002 mN	
<b>Habitat</b>	Flat/plain, with a minor drainage channel and a gentle slope.			
<b>Soil</b>	Red clay, with a surface crust and fine gravel			
<b>Rock Type</b>	Many, ferrous			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> and <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Acacia exocarpoides</i> open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland and <i>Solanum lasiophyllum</i> low scattered shrubs. Flat/plain, with a minor drainage channel and a gentle slope.			
<b>Veg Condition</b>	Excellent			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i> , <i>Santalum acuminatum</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia exocarpoides</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Ptilotus obovatus</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Scaevola spinescens</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Maireana ? tomentosa</i> , <i>Solanum lasiophyllum</i>
<b>Climbers</b>	< 2%	<i>Lysiana ? murrayi</i>

722 WRE Site 149

<b>Described by</b>	JN	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Down on flats, below breakaway behind Beebyn			
<b>MGA Zone</b>	50	573904 mE	7027138 mN	
<b>Habitat</b>	Drainage basin below breakaway			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous to many ferrous coarse gravel and pebbles, stones and boulders.			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> low woodland over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Acacia sibirica</i> shrubland over <i>Acacia exocarpoides</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

Species List:

Stratum	Cover	Species within each stratum
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia sibirica</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia exocarpoides</i> , <i>Dodonaea viscosa</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i> , <i>Grevillea stenostachya</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Dodonaea viscosa</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Maireana georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Stenanthemum petraeum</i>

**722 WRE Site 150**

<b>Described by</b>	SH	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn North			
<b>MGA Zone</b>	50	573767 mE	7027087 mN	
<b>Habitat</b>	Flat/plain, breakaway drainage area, negligible slope			
<b>Soil</b>	Red-orange sand, with fine gravel			
<b>Rock Type</b>	Many granite and quartz coarse gravel, pebbles, and surface level plates			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia coolgardiensis</i> subsp. <i>effusa</i> high open shrubland over <i>Acacia exocarpoides</i> shrubland over <i>Philothea brucei</i> subsp. <i>brucei</i> and <i>Hibiscus sturtii</i> var. <i>forrestii</i> low shrubland. Flat/plain, breakaway drainage area.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Psyrax latifolia</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia effusifolia</i> , <i>Acacia minyura</i> , <i>Grevillea berryana</i> , <i>Hakea recurva</i> subsp. <i>arida</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia exocarpoides</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia pruinocarpa</i> , <i>Eremophila forrestii</i> , <i>Eremophila georgei</i> , <i>Philothea brucei</i> subsp. <i>brucei</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Dodonaea viscosa</i> subsp. <i>angustissima</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Hibiscus sturtii</i> var. <i>forrestii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i>

**722 WRE Site 151**

**Described by** AC      **Date:** 18/04/07      **Type:** Q      20x20

**Location** North West of Beebyn

**MGA Zone** 50      573424 mE      7027308 mN

**Habitat** Ridgetop, gentle slope.

**Soil**

**Rock Type**

**Vegetation** *Acacia aneura* var. *aneura* high shrubland over *Thryptomene decussata* and *Eremophila glutinosa* shrubland over *Eremophila latrobei* and *Stenanthemum petraeum* low shrubland over *Sida excedentifolia* and *Ptilotus schwartzii* scattered herbs over *Monachather paradoxus* scattered tussock grasses. Ridgetop, gentle slope.

**Veg Condition** Excellent

**Fire Age** None evident

**Notes**

**Species List:**

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i> , <i>Psyrax latifolia</i>
Shrubs 1 - 2m	10 - 30%	<i>Eremophila glutinosa</i> , <i>Thryptomene decussata</i>
Shrubs < 1m	2 - 10%	<i>Acacia exocarpoides</i> , <i>Eremophila latrobei</i>
Shrubs < 0.5m	10 - 30%	<i>Prostanthera petrophila</i> , <i>Stenanthemum petraeum</i>
Tussock grasses	< 2%	<i>Monachather paradoxus</i>
Herbs	< 2%	<i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 152**

<b>Described by</b>	SH	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Beebyn North			
<b>MGA Zone</b>	50	573471 mE	7027246 mN	
<b>Habitat</b>	Midslope, minor channel, with a gentle slope			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Many BIF coarse gravel/pebbles and stones/boulders			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Acacia coolgardiensis</i> subsp. <i>effusa</i> open shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> low open heath over <i>Senna glaucifolia</i> low open shrubland over <i>Sida ?chrysocalyx</i> very open herbs. Midslope, minor channel, with a gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Grevillea berryana</i> , <i>Psydrax latifolia</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia effusifolia</i> , <i>Acacia exocarpoides</i> , <i>Eremophila ?georgei</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	30 - 70%	<i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Dodonaea viscosa</i> subsp. <i>angustissima</i> , <i>Ptilotus schwartzii</i> , <i>Senna glaucifolia</i>
<b>Herbs</b>	2 - 10%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)



**722 WRE Site 153**

<b>Described by</b>	SH	<b>Date:</b> 18/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Footslopes of range near breakaway behind Beebyn			
<b>MGA Zone</b>	50	574031 mE	7027464	mN
<b>Habitat</b>	Moderate to gentle slope, midslope.			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous BIF coarse gravel/pebbles and stones/boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high open shrubland to scattered low trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Aluta aspera</i> subsp. <i>hesperia</i> low open heath. Moderate to gentle slope, midslope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 years)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia rhodophloia</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Homalocalyx echinulatus</i>

**722 WRE Site 154**

<b>Described by</b>	SH	<b>Date:</b> 19/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV East			
<b>MGA Zone</b>	50	555848 mE	7017032 mN	
<b>Habitat</b>	Ridgetop, negligible slope			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Many BIF and jasperlite stones and boulders			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Acacia sibirica</i> open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open heath and <i>Solanum lasiophyllum</i> low open shrubland over <i>Sida excedentifolia</i> very open herbs. Ridgetop.			
<b>Veg Condition</b>	Poor; grazing by hard hooved animals and adjacent clearing			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia sibirica</i>
<b>Shrubs &lt; 1m</b>	30 - 70%	<i>Eremophila margarethae</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i>
<b>Herbs</b>	2 - 10%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 156**

<b>Described by</b>	JN	<b>Date:</b> 19/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Midslope west of W14 range			
<b>MGA Zone</b>	50	555918 mE	7016947	mN
<b>Habitat</b>	Steep to moderate slope, midslope.			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous BIF and ferrous coarse gravel/pebbles, stones/boulders, and surface level plates.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low woodland to scattered trees over <i>Acacia aneura</i> var. <i>aneura</i> shrubland to high shrubland over <i>Eremophila ?georgei</i> and <i>Ptilotus schwartzii</i> low shrubland. Steep to moderate slope, midslope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 years)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila ?georgei</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Dodonaea pachyneura</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Grevillea berryana</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>

722 WRE Site 156a

<b>Described by</b>	AC	<b>Date:</b> 19/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	555945 mE	7016882 mN	
<b>Habitat</b>	Foothslope, moderate slope			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Many BIF and ferrous coarse gravel and pebbles.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> open scrub <i>Aluta aspera</i> subsp. <i>hesperia</i> low shrubland over <i>Monachather paradoxus</i> and <i>Aristida contorta</i> very open tussock grassland. Foothslope, moderate slope.			
<b>Veg Condition</b>	Good; goat tracks through site			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Moderate wood litter.			

Species List:

Stratum	Cover	Species within each stratum
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	< 2%	<i>Psydrax suaveolens</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Monachather paradoxus</i>

**722 WRE Site 157**

<b>Described by</b>	AC	<b>Date:</b> 19/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	555667 mE	7016771 mN	
<b>Habitat</b>	Footslope, moderate slope			
<b>Soil</b>	Red-orange clay			
<b>Rock Type</b>	Common BIF coarse gravel and pebbles			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Grevillea berryana</i> low shrubland to high shrubland over <i>Sida excedentifolia</i> scattered herbs. Footslope, moderate slope.			
<b>Veg Condition</b>	Good; grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Grevillea berryana</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Herbs</b>	< 2%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 158**

<b>Described by</b>	JN	<b>Date:</b> 19/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Midslope of range west of W14			
<b>MGA Zone</b>	50	555416 mE	7016811	50
<b>Habitat</b>	Midslope, moderate slope.			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous BIF and ferrous coarse gravel/pebbles, stones/boulders and surface-level plates			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> open woodland over <i>Acacia aneura</i> var. <i>aneura</i> high shrubland to low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Thryptomene decussata</i> shrubland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Eremophila ?georgei</i> low shrubland. Midslope, moderate slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 years)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	2 - 10%	<i>Acacia pruinocarpa</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia minyura</i> x <i>ayersiana</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Eremophila forrestii</i> subsp. <i>Forrestii</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila forrestii</i> subsp. <i>Forrestii</i> , <i>Eremophila ?georgei</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila simulans</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila forrestii</i> subsp. <i>Forrestii</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum lasiophyllum</i>

**722 WRE Site 159**

<b>Described by</b>	SH	<b>Date:</b> 19/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV East			
<b>MGA Zone</b>	50	555419 mE	7016931 mN	
<b>Habitat</b>	Ridgetop, negligible slope			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Continuous to many BIF stones and boulders.			
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered low trees over <i>Acacia minyura</i> x <i>ayersiana</i> high shrubland over <i>Acacia sibirica</i> open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Solanum lasiophyllum</i> low shrubland over <i>Sida excedentifolia</i> very open herbs. Ridgetop.			
<b>Veg Condition</b>	Poor; grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia minyura</i> x <i>ayersiana</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia sibirica</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila margarethae</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Herbs</b>	2 - 10%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 160**

<b>Described by</b>	SH	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	West of Site 81			
<b>MGA Zone</b>	50	563572 mE	7018064 mN	
<b>Habitat</b>	South-east facing midslope, gentle slope.			
<b>Soil</b>	Red-orange sandy clay, with loose soil			
<b>Rock Type</b>	Many ferrous coarse gravel, pebbles, stones, and boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia</i> sp. Weld Range and <i>Acacia speckii</i> high shrubland over <i>Senna glaucifolia</i> low open shrubland to shrubland over <i>Maireana georgei</i> low open heath over <i>Aristida contorta</i> open tussock grassland. South-east facing midslope, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia grasbyi</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila arachnoides</i> subsp. <i>arachnoides</i> , <i>Eremophila glutinosa</i> , <i>Hakea preissii</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Solanum lasiophyllum</i>
<b>Shrubs &lt; 0.5m</b>	30 - 70%	<i>Maireana georgei</i> , <i>Psydrax rigidula</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sclerolaena</i> sp., <i>Tribulus suberosus</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Enneapogon caerulescens</i>
<b>Herbs</b>	< 2%	<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)



**722 WRE Site 161**

<b>Described by</b>	JN	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Ridge crest behind 10 point turn gully			
<b>MGA Zone</b>	50	564239 mE	7018334 mN	
<b>Habitat</b>	Ridgetop/hill crest, gentle slope			
<b>Soil</b>	Red-orange sandy clay, surface crust			
<b>Rock Type</b>	Continuous BIF and ferrous coarse gravel/pebbles and stones/boulders			
<b>Vegetation</b>	<i>Acacia</i> sp. Weld Range high shrubland over <i>Acacia</i> sp. Weld Range and <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> low shrubland over <i>Aristida contorta</i> open tussock grassland. Ridgetop/hill crest, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 years)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila exilifolia</i> , <i>Eremophila glutinosa</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Eremophila phyllopoda</i> subsp. <i>phyllopoda</i> , <i>Rhagodia eremaea</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i> , <i>Tribulus suberosus</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Dodonaea amplisemina</i> , <i>Maireana georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Enneapogon caerulescens</i>

**722 WRE Site 162**

<b>Described by</b>	SH	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Midslope, negligible slope			
<b>MGA Zone</b>	50	563264 mE	7018400 mN	
<b>Habitat</b>	Midslope, negligible slope			
<b>Soil</b>	Red-orange sand to sandy clay, with loose soil			
<b>Rock Type</b>	Common granite and quartz coarse gravel, pebbles, stones, and boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> scattered low trees over <i>Acacia</i> sp. Weld Range high shrubland over <i>Senna glaucifolia</i> shrubland over <i>Grevillea inconspicua</i> , <i>Dodonaea</i> sp. <i>Ninghan</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Aristida contorta</i> open tussock grassland. Midslope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Grevillea inconspicua</i> , <i>Senna artemisioides</i> subsp. <i>x artemisioides</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila glutinosa</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Tribulus suberosus</i>
<b>Shrubs &lt; 0.5m</b>	30 - 70%	<i>Dodonaea amplisemina</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i>
<b>Herbs</b>	< 2%	<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)

**722 WRE Site 163**

<b>Described by</b>	JN	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Hill behind 10 point turn gully			
<b>MGA Zone</b>	50	564463 mE	7019090 mN	
<b>Habitat</b>	Midslope on small hill before main range, moderate to gentle slope.			
<b>Soil</b>	Red-orange to yellow sandy clay, with a surface crust and some fine gravel.			
<b>Rock Type</b>	Common ferrous and laterite like coarse gravel/pebbles and stones/boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia grasbyi</i> high shrubland over <i>Acacia grasbyi</i> and <i>Acacia tetragonophylla</i> shrubland over <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Eremophila glutinosa</i> and <i>Sida ? Calyxhymenia</i> low shrubland. Midslope on small hill before main range, moderate to gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse to negligible leaf litter, mainly under shrubs. Moderate to sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia grasbyi</i> , <i>Acacia tetragonophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila glutinosa</i> , <i>Grevillea berryana</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida ectogama</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Solanum lasiophyllum</i>

**722 WRE Site 164**

<b>Described by</b>	AC	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	W14			
<b>MGA Zone</b>	50	563797 mE	7018544 mN	
<b>Habitat</b>	Upper slope, almost ridgetop, moderate slope.			
<b>Soil</b>	Red clay, with a surface crust			
<b>Rock Type</b>	Continuous ferrous stones and boulders			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Eremophila macmillaniana</i> and <i>Acacia speckii</i> shrubland over <i>Aristida contorta</i> tussock grassland. Upper slope, almost ridgetop, moderate slope.			
<b>Veg Condition</b>	Good, grazing by hard hooved animals.			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia speckii</i> , <i>Eremophila macmillaniana</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon caerulescens</i>
<b>Herbs</b>	< 2%	<i>Cheilanthes lasiophylla</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 165**

<b>Described by</b>	SH	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	West of Telstra tower			
<b>MGA Zone</b>	50	562938 mE	7019075 mN	
<b>Habitat</b>	Ridgetop, negligible slope			
<b>Soil</b>	Red-orange sandy clay, with fine gravel			
<b>Rock Type</b>	Many BIF and ferrous coarse gravel, pebbles, stones, and boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Thryptomene decussata</i> open shrubland over <i>Eremophila glutinosa</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i> low shrubland over <i>Sida excedentifolia</i> and <i>Ptilotus schwartzii</i> very open herbs. Ridgetop.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia exocarpoides</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila glutinosa</i> , <i>Prostanthera petrophila</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
<b>Herbs</b>	2 - 10%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 166**

<b>Described by</b>	AC	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	W14			
<b>MGA Zone</b>	50	563695 mE	7019052	mN
<b>Habitat</b>	Foothlope, moderate slope			
<b>Soil</b>	Red clay			
<b>Rock Type</b>	Many BIF stones, boulders, and surface level plates			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland and <i>Tribulus suberosus</i> low scattered shrubs over <i>Aristida contorta</i> open tussock grassland. Foothlope, moderate slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila latrobei</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Tribulus suberosus</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Enneapogon caerulescens</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>
<b>Herbs</b>	< 2%	<i>Cheilanthes lasiophylla</i>

**722 WRE Site 167**

<b>Described by</b>	JN	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>				
<b>MGA Zone</b>	50	564390 mE	7019704 mN	
<b>Habitat</b>	Midslope, steep to moderate slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous ferrous coarse gravel/pebbles, stones/boulders and surface-level plates			
<b>Vegetation</b>	<i>Acacia</i> sp. Weld Range shrubland to high shrubland over <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> low shrubland over <i>Aristida contorta</i> open tussock grassland. Midslope, steep to moderate slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila georgei</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Abutilon otoparpum</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Hibiscus sturtii</i> var. <i>forrestii</i> , <i>Mirbelia ?stipitata</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Heliotropium</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Stenanthemum patens</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i>

**722 WRE Site 168**

<b>Described by</b>	SH	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	W14			
<b>MGA Zone</b>	50	562094 mE	7019416 mN	
<b>Habitat</b>	Midslope, moderate slope			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Continuous BIF, ferrous and granite stones, boulders, and surface-level plates.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> open scrub over <i>Eremophila glutinosa</i> shrubland over <i>Dodonaea pachyneura</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low scattered shrubs over <i>Aristida holathera</i> scattered tussock grasses. Midslope, moderate slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>fuliginea</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia exocarpoides</i> , <i>Dodonaea pachyneura</i> , <i>Eremophila glutinosa</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Prostanthera petrophila</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila margarethae</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i> , <i>Aristida holathera</i>



722 WRE Site 169

<b>Described by</b>	JN	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	North face of ridge opposite W14			
<b>MGA Zone</b>	50	562005 mE	7019220 mN	
<b>Habitat</b>	Steep to moderate midslope.			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous BIF and ferrous coarse gravel/pebbles, stones/boulders and surface level plates.			
<b>Vegetation</b>	<i>Acacia</i> sp. Weld Range high shrubland over <i>Acacia</i> sp. Weld Range and <i>Eremophila macmillaniana</i> shrubland over <i>Eremophila macmillaniana</i> and <i>Calytrix desolata</i> low shrubland over <i>Aristida contorta</i> very open tussock grassland. Steep to moderate midslope.			
<b>Veg Condition</b>	Excellent			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Calytrix desolata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia quadrimarginea</i> , <i>Dodonaea petiolaris</i> , <i>Eremophila macmillaniana</i> , <i>Grevillea inconspicua</i> , <i>Ptilotus rotundifolius</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i> , <i>Stenanthemum patens</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Dodonaea amplisemina</i> , <i>Heliotropium</i> sp., <i>Prostanthera ferricola</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i>

**722 WRE Site 170**

<b>Described by</b>	JN	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Gully between W14 ridgeline and Ridge behind camp			
<b>MGA Zone</b>	50	563054 mE	7019695 mN	
<b>Habitat</b>	Creek bank and creek bed, gentle slope			
<b>Soil</b>	Red-orange sandy clay, with loose soil			
<b>Rock Type</b>	Many BIF and ferrous coarse gravel, pebbles, stones, boulders, and surface level plates.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia</i> sp. Weld Range and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Acacia</i> sp. Weld Range shrubland over <i>Eremophila exilifolia</i> and <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> low shrubland over <i>Cymbopogon ambiguus</i> open tussock grassland. Creek bank and creek bed, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 years)			
<b>Notes</b>	Moderate to sparse leaf litter. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila exilifolia</i> , <i>Eremophila georgei</i> , <i>Grevillea inconspicua</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Eremophila macmillaniana</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Prostanthera petrophila</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , <i>Sida calyxhymenia</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Dodonaea amplisemina</i> , <i>Heliotropium</i> sp., <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Cymbopogon ambiguus</i>

722 WRE Site 171

<b>Described by</b>	SH	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	W14 East			
<b>MGA Zone</b>	50	562929 mE	7019904 mN	
<b>Habitat</b>	Foothlope, negligible slope (scree)			
<b>Soil</b>	Red-orange sandy clay			
<b>Rock Type</b>	Many BIF coarse gravel, pebbles, and stones and boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Thryptomene decussata</i> open shrubland over <i>Aluta aspera</i> subsp. <i>hesperia</i> low shrubland over <i>Sida excedentifolia</i> very open herbs. Foothlope, negligible slope (scree).			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i>
Shrubs 1 - 2m	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Thryptomene decussata</i>
Shrubs < 1m	30 - 70%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Dodonaea petiolaris</i>
Shrubs < 0.5m	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Solanum lasiophyllum</i>
Herbs	2 - 10%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 172**

<b>Described by</b>	AC	<b>Date:</b> 20/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	W14			
<b>MGA Zone</b>	50	562971 mE	7019839 mN	
<b>Habitat</b>	Ridgetop, gentle slope			
<b>Soil</b>	Red-orange clay, with a surface crust			
<b>Rock Type</b>	Stones/boulders			
<b>Vegetation</b>	Many BIF and ferrous stones / boulders			
<b>Veg Condition</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Thryptomene decussata</i> shrubland over <i>Eremophila latrobei</i> low shrubland. Ridgetop, gentle slope.			
<b>Fire Age</b>	Good, grazing by hard hooved animals			
<b>Notes</b>	None evident			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia grasbyi</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila latrobei</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Eriachne helmsii</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	< 2%	<i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 173**

**Described by** AC      **Date:** 20/04/07      **Type:** Q      20x20

**Location**

**MGA Zone** 50      563088 mE      7020263 mN

**Habitat** Moderate slope, footslope

**Soil** Red-orange clay

**Rock Type** Many ferrous coarse gravel / pebbles.

**Vegetation** *Acacia aneura* var. *aneura* high open shrubland over *Baeckea* sp. Melita Station shrubland over *Micromyrtus placoides* low shrubland over *Eriachne helmsii* very open tussock grassland. Moderate slope, footslope.

**Veg Condition** Good, goat track through site

**Fire Age** none evident

**Notes** Negligible leaf litter. Moderate wood litter.

**Species List:**

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
Shrubs 1 - 2m	10 - 30%	<i>Baeckea</i> sp. Melita Station (H. Pringle 2738), <i>Thryptomene decussata</i>
Shrubs < 1m	10 - 30%	<i>Micromyrtus placoides</i>
Shrubs < 0.5m	< 2%	<i>Psydrax latifolia</i> , <i>Solanum lasiophyllum</i>
Tussock grasses	2 - 10%	<i>Eriachne helmsii</i>

**722 WRE Site 174**

**Described by** JN      **Date:** 20/04/07      **Type:** Q      20x20

**Location** Midslope on ridge beside W14 ridge

**MGA Zone** 50      563915 mE      7019886 mN

**Habitat** Moderate to gentle slope on foot to midslope

**Soil** Red-orange sandy clay, with a surface crust

**Rock Type** Continuous ferrous and BIF coarse gravel, pebbles, stones, and boulders

**Vegetation** *Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range and *Acacia ramulosa* var. *linophylla* high shrubland over *Acacia ramulosa* var. *linophylla* and *Eremophila macmillaniana* shrubland over *Eremophila macmillaniana* low open shrubland over *Aristida contorta* very open tussock grassland. Moderate to gentle slope on foot to midslope.

**Veg Condition**

**Fire Age**

**Notes**

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	<i>Psyrax latifolia</i>
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
Shrubs 1 - 2m	10 - 30%	<i>Eremophila macmillaniana</i>
Shrubs < 1m	2 - 10%	<i>Acacia sibirica</i> , <i>Hibiscus sturtii</i> var. <i>forrestii</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
Shrubs < 0.5m	2 - 10%	<i>Solanum lasiophyllum</i>
Tussock grasses	2 - 10%	<i>Aristida contorta</i>

**722 WRE Site 175**

<b>Described by</b>	JN	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Ridge behind Beebyn			
<b>MGA Zone</b>	50	578375 mE	7028962 mN	
<b>Habitat</b>	Ridgetop, gentle slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous patches of BIF coarse gravel/pebbles, stones/boulders, and surface-level plates.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high open shrubland to low open woodland over <i>Thryptomene decussata</i> and <i>Acacia aneura</i> var. <i>aneura</i> shrubland over <i>Eremophila glutinosa</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i> low shrubland. Ridgetop, gentle slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	Old (>5 yrs)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Thryptomene decussata</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Prostanthera petrophila</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia grasbyi</i> , <i>Acacia minyura</i> , <i>Eremophila glutinosa</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus ?schwartzii</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i> , <i>Eragrostis eriopoda</i> , <i>Eriachne mucronata</i>

**722 WRE Site 176**

<b>Described by</b>	JN	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	North of Beebyn			
<b>MGA Zone</b>	50	579697 mE	7029433 mN	
<b>Habitat</b>	Ridgetop and upper slope, moderate slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Common BIF stones/boulders			
<b>Vegetation</b>	<i>Thryptomene decussata</i> shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Eriachne helmsii</i> very open tussock grassland. Ridgetop and upper slope, moderate slope.			
<b>Veg Condition</b>	Good, grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Dodonaea viscosa</i> subsp. <i>angustissima</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Prostanthera petrophila</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila latrobei</i> , <i>Micromyrtus sulphurea</i>
<b>Tussock grasses</b>	2 - 10%	<i>Cymbopogon ambiguus</i> , <i>Eriachne helmsii</i>
<b>Herbs</b>	< 2%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)



**722 WRE Site 177**

<b>Described by</b>	JN	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Range towards W17			
<b>MGA Zone</b>	50	551827 mE	7015815 mN	
<b>Habitat</b>	Midslope to ridgetop, moderate to gentle slopes			
<b>Soil</b>	Yellow sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous to many BIF and ferrous coarse gravel/pebbles, stones/boulders.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland to high shrubland over <i>Acacia aneura</i> var. <i>aneura</i> , <i>Eremophila glutinosa</i> and <i>Aluta aspera</i> subsp. <i>hesperia</i> low open shrubland. Midslope to ridgetop, moderate to gentle slopes.			
<b>Veg Condition</b>	Good, heavily grazed			
<b>Fire Age</b>	Old (>5 years)			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>major</i> , <i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum lasiophyllum</i>

**722 WRE Site 178**

<b>Described by</b>	AC	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	552257 mE	7015792 mN	
<b>Habitat</b>	Creekbed, footslope and minor drainage channel. Gentle slope.			
<b>Soil</b>	Orange sandy clay			
<b>Rock Type</b>				
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia grasbyi</i> high shrubland over <i>Eremophila georgei</i> shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Eriachne helmsii</i> very open tussock grassland. Creekbed, footslope and minor drainage channel. Gentle slope.			
<b>Veg Condition</b>	Good, grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Moderate leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia grasbyi</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia tetragonophylla</i> , <i>Eremophila georgei</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Eremophila glutinosa</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Cymbopogon ambiguus</i> , <i>Eriachne helmsii</i>

722 WRE Site 179

<b>Described by</b>	JN	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	551354 mE	7015776 mN	
<b>Habitat</b>	Steep to moderate midslope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous BIF stones/boulders and surface level plates			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland to scattered low trees over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Thryptomene decussata</i> shrubland over <i>Thryptomene decussata</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland. Steep to moderate midslope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, minaly under shrubs. Sparse wood litter.			

Species List:

Stratum	Cover	Species within each stratum
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i>
Shrubs < 1m	10 - 30%	<i>Thryptomene decussata</i>
Shrubs < 0.5m	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32), <i>Solanum lasiophyllum</i>

**722 WRE Site 180**

<b>Described by</b>	AC	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	HHJV			
<b>MGA Zone</b>	50	552434 mE	7015962 mN	
<b>Habitat</b>	Midslope, moderate slope			
<b>Soil</b>	Red-orange clay, surface crust			
<b>Rock Type</b>	Many ferrous coarse gravel/pebbles and stones.			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia</i> sp. Weld Range high shrubland over <i>Dodonaea pachyneura</i> , <i>Eremophila glutinosa</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Sida excedentifolia</i> very open herbs. Midslope, moderate slope.			
<b>Veg Condition</b>	Good, grazing by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	< 2%	<i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Dodonaea pachyneura</i> , <i>Eremophila glutinosa</i> , <i>Philothea brucei</i> subsp. <i>brucei</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i>
<b>Herbs</b>	2 - 10%	<i>Ptilotus schwartzii</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site 181**

<b>Described by</b>	SH	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	W17 (track up)			
<b>MGA Zone</b>	50	550940 mE	7015223 mN	
<b>Habitat</b>	Footslope, negligible slope			
<b>Soil</b>	Red-orange sand, with loose soil			
<b>Rock Type</b>	Many granite and quartz coarse gravel/pebbles and stones/boulders.			
<b>Vegetation</b>	<i>Acacia</i> sp. Weld Range high open shrubland over <i>Senna artemisioides</i> subsp. <i>sturtii</i> shrubland over <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> and <i>Dodonaea</i> sp. Ninghan low shrubland over <i>Aristida contorta</i> tussock grassland. Footslope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia speckii</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila glutinosa</i> , <i>Senna artemisioides</i> subsp. x <i>sturtii</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Dodonaea amplisemina</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Maireana georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i> , <i>Stenanthemum patens</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon caeruleus</i>

**722 WRE Site 182**

<b>Described by</b>	JN	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	Midslope ridge opposite W14 towards main road			
<b>MGA Zone</b>	50	559931 mE	7017810	mN
<b>Habitat</b>	Midslope, moderate slope			
<b>Soil</b>	Red-orange sandy clay, with a surface crust			
<b>Rock Type</b>	Continuous BIF as coarse gravel/pebbles, stones/boulder, and surface level plates			
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> high shrubland to low open woodland over <i>Acacia</i> sp. Weld Range shrubland over <i>Senna glaucifolia</i> low shrubland over <i>Aristida contorta</i> very open tussock grassland. Midslope, moderate slope.			
<b>Veg Condition</b>	Good			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Moderate wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Psyrax latifolia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila exilifolia</i> , <i>Eremophila macmillaniana</i> , <i>Hemigenia</i> sp. nov (aff. <i>exilis</i> ), <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i>

**722 WRE Site 183**

<b>Described by</b>	SH	<b>Date:</b> 21/04/07	<b>Type:</b> Q	20x20
<b>Location</b>	W14			
<b>MGA Zone</b>	50	559418 mE	7018409 mN	
<b>Habitat</b>	Midslope, gentle north-facing slope.			
<b>Soil</b>	Red-orange sand to sandy clay			
<b>Rock Type</b>	Continuous BIF, ferrous and quartz stones/boulders and surface level plates			
<b>Vegetation</b>	<i>Acacia aneura</i> open shrubland to high shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> low open shrubland over <i>Ptilotus schwartzii</i> very open herbs over <i>Aristida contorta</i> scattered tussock grasses. Midslope, gentle north-facing slope.			
<b>Veg Condition</b>	Poor, grazed by hard hooved animals			
<b>Fire Age</b>	None evident			
<b>Notes</b>	Sparse leaf litter, mainly under shrubs. Sparse wood litter.			

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Acacia pruinocarpa</i> , <i>Grevillea berryana</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus schwartzii</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	< 2%	<i>Aristida contorta</i>

## Phase 3 Burrow Pits

### 722 WRE Site BPC01

<b>Described by</b>	CG	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	BPC East					
<b>MGA Zone</b>	50	581233	<b>mE</b>	7031767	<b>mN</b>	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>conifera</i> low woodland over <i>Senna artemisioides</i> subsp. <i>petiolaris</i> open shrubland over <i>Ptilotus obovatus</i> low open heath over <i>Aristida contorta</i> closed tussock grassland.					
<b>Veg Condition</b>	Excellent (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Neg leaf litter, sparse wood litter.					

### Species List:

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	<i>Acacia aneura</i> var. <i>conifera</i> , <i>Eremophila longifolia</i>
Shrubs > 2m	< 2%	<i>Acacia tetragonophylla</i>
Shrubs 1 - 2m	2 - 10%	<i>Acacia victoriae</i> , <i>Grevillea striata</i> , <i>Rhagodia eremaea</i> , <i>Senna artemisioides</i> subsp. <i>petiolaris</i>
Shrubs < 0.5m	30 - 70%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum ashbyae</i>
Tussock grasses	> 70%	<i>Aristida contorta</i> , <i>Enneapogon cylindricus</i> , <i>Enneapogon cylindricus</i>



**722 WRE Site BPC02**

<b>Described by</b>	CG	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	BPC East					
<b>MGA Zone</b>	50	581030	mE	7031651	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange/brown sand					
<b>Rock Type</b>	Surface crust, loose soil, coarse gravel/pebbles					
<b>Vegetation</b>	Mixed <i>Acacia</i> spp. high open shrubland over <i>Senna artemisioides</i> subsp. <i>petiolaris</i> and <i>Ptilotus obovatus</i> low shrubland over <i>Enneapogon cylindricus</i> ) open tussock grassland.					
<b>Veg Condition</b>	Excellent (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Neg leaf and wood litter.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i> , <i>Acacia victoriae</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia tetragonophylla</i> , <i>Acacia victoriae</i> , <i>Eremophila falcata</i> , <i>Eremophila glabra</i> subsp. <i>tomentosa</i> , <i>Pimelea microcephala</i> subsp. <i>microcephala</i> , <i>Rhagodia eremaea</i> , <i>Scaevola spinescens</i> , <i>Senna artemisioides</i> subsp. <i>Petiolaris</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia murrayana</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Senna artemisioides</i> subsp. <i>Petiolaris</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Enneapogon cylindricus</i>
<b>Sedges</b>	< 2%	<i>Austrostipa elegantissima</i>
<b>Climbers</b>	< 2%	CONVOLVULACEAE sp.
<b>Herbs</b>	< 2%	<i>Maireana appressa</i> , <i>Ptilotus exaltatus</i>

**722 WRE Site BPC03**

<b>Described by</b>	CG	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Burrow Pit C					
<b>MGA Zone</b>	50	580844	<b>mE</b>	7031891	<b>mN</b>	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust, fine gravel					
<b>Vegetation</b>	Mixed <i>Acacia</i> spp. high shrubland over <i>Senna artemisioides</i> subsp. <i>petiolaris</i> low scattered shrubs over <i>Ptilotus obovatus</i> low shrubland over <i>Aristida contorta</i> and <i>Monochatne paridoxus</i> open tussock grassland.					
<b>Veg Condition</b>	Excellent (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf and wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>conifera</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia burkittii</i> , <i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Psyrdrax suaveolens</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Senna artemisioides</i> subsp. <i>petiolaris</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Enneapogon cylindricus</i> , <i>Monachather paradoxus</i>

**722 WRE Site BPC04**

<b>Described by</b>	CG	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Burrow Pit C					
<b>MGA Zone</b>	50	579977	mE	7031713	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange/brown sand					
<b>Rock Type</b>	Surface crust, fine gravel, coarse gravel/pebbles					
<b>Vegetation</b>	<i>Acacia burkittii</i> open scrub over <i>Senna artemisioides</i> subsp. <i>petiolaris</i> open shrubland over <i>Ptilotus obovatus</i> low shrubland over <i>Enneapogon cylindricus</i> scattered tussock grassland.					
<b>Veg Condition</b>	Excellent (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Neg leaf litter, sparse wood litter.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia burkittii</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna artemisioides</i> subsp. <i>petiolaris</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Scaevola spinescens</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	< 2%	<i>Enneapogon cylindricus</i>
<b>Herbs</b>	< 2%	<i>Ptilotus exaltatus</i>

**722 WRE Site BPC05**

<b>Described by</b>	CG	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Burrow Pit C					
<b>MGA Zone</b>	50	579814	<b>mE</b>	7031869	<b>mN</b>	
<b>Habitat</b>	Flat/plain, dry lake bed					
<b>Soil</b>	Red-orange/brown sandy clay					
<b>Rock Type</b>	Cracked clay, surface crust, fine gravel, coarse gravel/pebbles					
<b>Vegetation</b>	<i>Eremophila maculata</i> subsp. <i>brevifolia</i> low open heath over <i>Enneapogon cylindricus</i> very open tussock grassland.					
<b>Veg Condition</b>	Excellent (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Neg leaf and wood litter.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &lt; 0.5m</b>	30 - 70%	<i>Eremophila maculata</i> subsp. <i>brevifolia</i> , <i>Sclerolaena diacantha</i>
<b>Tussock grasses</b>	2 - 10%	<i>Enneapogon cylindricus</i>
<b>Herbs</b>	< 2%	<i>Lawrenzia densiflora</i> , <i>Streptoglossa liatroides</i>

**722 WRE Site BPC06**

<b>Described by</b>	SH	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Beebyru North					
<b>MGA Zone</b>	50	578651	mE	7032379	mN	
<b>Habitat</b>	Flat/plain, calcrete pan (seasonally inundated) gilgai					
<b>Soil</b>	Orange clay					
<b>Rock Type</b>	Cracked clay, surface crust, coarse gravel/pebbles					
<b>Vegetation</b>	<i>Eremophila maculata</i> subsp. <i>brevifolia</i> and <i>Sclerolaena diacantha</i> low shrubland over <i>Lawrenzia densiflora</i> very open herbs over <i>Enneapogon</i> sp. and <i>Eragrostis dielsii</i> very open tussock grassland.					
<b>Veg Condition</b>	Poor (heavily grazed, trampled - cows)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Neg leaf and wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Eremophila maculata</i> subsp. <i>brevifolia</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Sclerolaena diacantha</i> , <i>Sclerolaena diacantha</i>
<b>Tussock grasses</b>	2 - 10%	<i>Enneapogon cylindricus</i> , <i>Enneapogon</i> sp., <i>Eragrostis dielsii</i> , <i>Sporobolus australasicus</i>
<b>Herbs</b>	2 - 10%	<i>Lawrenzia densiflora</i> , <i>Ptilotus exaltatus</i> var. <i>exaltatus</i>

**722 WRE Site BPC07**

<b>Described by</b>	SH	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Beebyru North					
<b>MGA Zone</b>	50	577958	mE	7032287	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange hard clay					
<b>Rock Type</b>	Solid clay (10%), fine gravel (80%), coarse gravel/pebbles (10%)					
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> and <i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia aneura</i> var. <i>aneura</i> high open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Ptilotus schwartzii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Solanum ashbyae</i> low open shrubland over <i>Eriachne pulchella</i> subsp. <i>dominii</i> and <i>Aristida contorta</i> very open tussock grassland.					
<b>Veg Condition</b>	Good (old drill lines adjacent, grazing track)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Mod leaf litter, sparse wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>major</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Rhagodia eremaea</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Enchylaena tomentosa</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Eragrostis eriopoda</i> , <i>Eriachne pulchella</i> subsp. <i>dominii</i> , <i>Monachather paradoxus</i>

**722 WRE Site BPC08**

<b>Described by</b>	SH	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Beebyru North					
<b>MGA Zone</b>	50	577662	<b>mE</b>	7032721	<b>mN</b>	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Orange sandy clay					
<b>Rock Type</b>	Fine gravel (40%), loose soil (20%), coarse gravel/pebbles (40%)					
<b>Vegetation</b>	<i>Eucalyptus striatocalyx</i> scattered trees over <i>Eremophila falcata</i> open shrubland to high open shrubland over <i>Senna stricta</i> low open shrubland over <i>Ptilotus exaltatus</i> var. <i>exaltatus</i> very open herbs over <i>Enneapogon caeruleus</i> open tussock grassland.					
<b>Veg Condition</b>	Good (grazing, trampling)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Mod leaf litter, sparse wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	< 2%	<i>Eucalyptus striatocalyx</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Eremophila falcata</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia</i> aff. <i>oswaldii</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila falcata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Acacia pruinocarpa</i> , <i>Eremophila falcata</i> , <i>Senna stricta</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sclerolaena diacantha</i> , <i>Sclerolaena diacantha</i> , <i>Senna artemisioides</i> subsp. <i>petiolaris</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	10 - 30%	<i>Enneapogon caeruleus</i>
<b>Herbs</b>	2 - 10%	<i>Lawrenzia densiflora</i> , <i>Ptilotus exaltatus</i> var. <i>exaltatus</i>

**722 WRE Site BPC09**

<b>Described by</b>	SH	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Burrow Pit C					
<b>MGA Zone</b>	50	579024	mE	7032277	mN	
<b>Habitat</b>	Flat/plain, riparian far BPC6					
<b>Soil</b>	Orange sand/sandy clay					
<b>Rock Type</b>	Cracked clay (5%), fine gravel (60%), loose soil (10%), coarse gravel/pebbles (25%)					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia burkittii</i> and <i>Acacia victoriae</i> open shrubland over <i>Scaevola spinescens</i> and <i>Senna stricta</i> low open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Enneapogon caerulescens</i> and <i>Eragrostis setifolia</i> open tussock grassland.					
<b>Veg Condition</b>	Poor (heavily trampled)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf litter, neg wood litter, mainly under shrubs					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia burkittii</i> , <i>Acacia tetragonophylla</i> , <i>Acacia victoriae</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Rhagodia eremaea</i> , <i>Scaevola spinescens</i> , <i>Senna stricta</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Eremophila maculata</i> subsp. <i>brevifolia</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sclerolaena diacantha</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Enneapogon caerulescens</i> , <i>Eragrostis setifolia</i>
<b>Herbs</b>	< 2%	<i>Ptilotus exaltatus</i> var. <i>exaltatus</i> , <i>Sclerolaena diacantha</i>



**722 WRE Site BPC10**

<b>Described by</b>	SH	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Burrow Pit C					
<b>MGA Zone</b>	50	579391	mE	7031751	mN	
<b>Habitat</b>	Flat/plain, slight calcrete mound					
<b>Soil</b>	Orange clay/sandy clay					
<b>Rock Type</b>	Loose soil (5%), coarse gravel/pebbles (5%), stones (90%)					
<b>Vegetation</b>	<i>Acacia burkittii</i> high shrubland over <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Enneapogon caerulescens</i> open tussock grassland.					
<b>Veg Condition</b>	Good (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse wood and leaf litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia burkittii</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Grevillea berryana</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Exocarpos aphyllus</i> , <i>Pimelea microcephala</i> subsp. <i>microcephala</i> , <i>Rhagodia eremaea</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Sida ectogama</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Enchylaena tomentosa</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Senna stricta</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Enneapogon caerulescens</i>
<b>Herbs</b>	< 2%	<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>

**722 WRE Site BPE01**

<b>Described by</b>	CG	<b>Date:</b>	07/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Burrow Pit East					
<b>MGA Zone</b>	50	586684	mE	7034277	mN	
<b>Habitat</b>	Flat/plain, creek bed, creek bank					
<b>Soil</b>	Red-orange sand/sandy clay					
<b>Rock Type</b>	Surface crust, loose soil, stones/boulders					
<b>Vegetation</b>	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994) and <i>Acacia tetragonophylla</i> open scrub over <i>Eremophila fraseri</i> subsp. <i>parva medium</i> shrubland over <i>Enneapogon cylindricus</i> and <i>Aristida contorta</i> very open tussock grassland.					
<b>Veg Condition</b>	Excellent (grazing disturbance)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf litter mainly under shrubs, neg wood litter					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia tetragonophylla</i> , <i>Eremophila fraseri</i> subsp. <i>Parva</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila exilifolia</i> , <i>Eremophila fraseri</i> subsp. <i>Parva</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila platycalyx</i> subsp. <i>platycalyx</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Acacia craspedocarpa</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Enneapogon cylindricus</i>

**722 WRE Site BPE02**

<b>Described by</b>	SH	<b>Date:</b>	07/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Limestone Bore					
<b>MGA Zone</b>	50	585309	mE	7032299	mN	
<b>Habitat</b>	Flat/plain, low lying Mulga					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Loose soil (95%), coarse gravel/pebbles (5%)					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia aneura</i> var. <i>intermedia</i> low woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>Acacia aneura</i> var. <i>aneura</i> high shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> sometimes with <i>Eremophila georgei</i> open heath over <i>Monachather paradoxus</i> open tussock grassland.					
<b>Veg Condition</b>	Good (minimal grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Moderate leaf and wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia pruinocarpa</i> , <i>Psyrax latifolia</i> , <i>Psyrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>argentea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	30 - 70%	<i>Eremophila clarkei</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila georgei</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Hibiscus coatesii</i> , <i>Maireana villosa</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida cardiophylla</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	10 - 30%	<i>Eriachne lanata</i> , <i>Monachather paradoxus</i>

**722 WRE Site BPE03**

<b>Described by</b>	CG	<b>Date:</b>	07/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Plateau					
<b>MGA Zone</b>	50	585158	mE	7033155	mN	
<b>Habitat</b>	Flat/plain, ridgetop, plateau above breakaway					
<b>Soil</b>	White/orange sand					
<b>Rock Type</b>	Surface crust, fine gravel, loose soil, coarse gravel/pebbles, stones/boulders, surface level plates					
<b>Vegetation</b>	<i>Acacia ramulosa</i> var. <i>ramulosa</i> and <i>Acacia burkittii</i> shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> low open shrubland over <i>Calytrix erosipetala</i> low shrubland over <i>Tripogon loliiformis</i> very open tussock grassland.					
<b>Veg Condition</b>	Excellent (grazing disturbance)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Neg leaf and wood litter.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia burkittii</i> , <i>Acacia pruinocarpa</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Eremophila glutinosa</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Calytrix erosipetala</i> , <i>Enchylaena tomentosa</i> , <i>Micromyrtus sulphurea</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	2 - 10%	<i>Monachather paradoxus</i> , <i>Tripogon loliiformis</i>

**722 WRE Site BPE05**

<b>Described by</b>	SH	<b>Date:</b>	07/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Burrow Pit East					
<b>MGA Zone</b>	50	585487	mE	7034280	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Sandy clay (60%)					
<b>Rock Type</b>	Fine gravel (40%)					
<b>Vegetation</b>	<i>Acacia aneura</i> low open woodland over <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) and <i>Senna glaucifolia</i> low open shrubland to shrubland over <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Aristida contorta</i> open tussock grassland.					
<b>Veg Condition</b>	Good					
<b>Fire Age</b>	Not speciifed					
<b>Notes</b>	Sparse leaf and wood litter.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia cockertoniana</i> , <i>Acacia tetragonophylla</i> , <i>Senna glaucifolia</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26)
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26), <i>Sida ectogama</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila georgei</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Maireana georgei</i> , <i>Maireana villosa</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>

**722 WRE Site BPE06**

<b>Described by</b>	SH	<b>Date:</b>	07/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Limestone Bore					
<b>MGA Zone</b>	50	585632	mE	7033848	mN	
<b>Habitat</b>	Granite dome, base of: see notes					
<b>Soil</b>	Orange clay					
<b>Rock Type</b>	Fine gravel (80%), loose soil (20%)					
<b>Vegetation</b>	<i>Acacia rhodophloia</i> shrubland to high shrubland over <i>Prostanthera albiflora</i> low open shrubland over <i>Drosera macrantha</i> subsp. <i>eremaea</i> open herbs over <i>Tripogon loliiformis</i> , <i>Eragrostis tenellula</i> and <i>Aristida contorta</i> tussock grassland.					
<b>Veg Condition</b>	Poor (significant grazing)					
<b>Fire Age</b>	Old >5 yrs					
<b>Notes</b>	Moderate leaf and wood litter mainly under shrubs. This quad incorporates the veg type at the base of a large Granite dome.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia rhodophloia</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia rhodophloia</i> , <i>Psyrax rigidula</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila georgei</i> , <i>Prostanthera albiflora</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Rulingia luteiflora</i> , <i>Sida cardiophylla</i> , <i>Solanum ellipticum</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Eragrostis cumingii</i> , <i>Eragrostis tenellula</i> , <i>Tripogon loliiformis</i>
<b>Herbs</b>	10 - 30%	<i>Drosera macrantha</i> subsp. <i>eremaea</i>

**722 WRE Site BPE07**

<b>Described by</b>	SH	<b>Date:</b>	07/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Limestone Bore					
<b>MGA Zone</b>	50	586389	mE	7034215		50
<b>Habitat</b>	Small, low granite outcrop (see notes*)					
<b>Soil</b>	Red-orange clay					
<b>Rock Type</b>	Loose soil (10%), stones/boulders (90%)					
<b>Vegetation</b>	<i>Acacia ramulosa</i> var. <i>linophylla</i> low open woodland over <i>Acacia citrinoviridis</i> and <i>Acacia speckii</i> high shrubland over <i>Eremophila exilifolia</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i> low open shrubland to open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Enneapogon cylindricus</i> very open tussock grassland.					
<b>Veg Condition</b>	Good (grazing disturbance)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf and wood litter mainly under shrubs. Medium sized granite rocks forming a linear mound approx 40 m wide by 700 m long.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia citrinoviridis</i> , <i>Acacia speckii</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia citrinoviridis</i> , <i>Eremophila exilifolia</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Senna artemisioides</i> subsp. <i>x sturtii</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Hibiscus coatesii</i> , <i>Indigofera monophylla</i> , <i>Maireana convexa</i> , <i>Maireana georgei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon cylindricus</i>
<b>Herbs</b>	< 2%	<i>Cheilanthes lasiophylla</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Sida</i> sp. dark green fruits ( <i>S. van Leeuwen</i> 2260)

**722 WRE Site BPE08**

**Described by** CG      **Date:** 07/07/08      **Type:** Q      20x20

**Location** Burrow Pit East

**MGA Zone** 50      585343 mE      7033633 mN

**Habitat** Gully sides, breakaway, moderate slope

**Soil** Red-orange sand

**Rock Type** Surface crust, stones/boulders, surface level plates

**Vegetation** *Acacia aneura* var. *microcarpa* and *Acacia pruinocarpa* low open woodland over *Acacia burkittii* high open shrubland over *Acacia craspedocarpa* open shrubland over *Acacia craspedocarpa* and *Eremophila latrobei* subsp. *latrobei* low open heath and *Ptilotus obovatus* var. *obovatus* low shrubland.

**Veg Condition** Excellent (grazing disturbance)

**Fire Age** None evident

**Notes**
**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia pruinocarpa</i>
Shrubs > 2m	2 - 10%	<i>Acacia burkittii</i>
Shrubs 1 - 2m	2 - 10%	<i>Acacia aulacophylla</i> , <i>Acacia craspedocarpa</i> , <i>Eremophila latrobei</i> subsp. <i>Latrobei</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Scaevola spinescens</i>
Shrubs < 1m	30 - 70%	<i>Eremophila latrobei</i> subsp. <i>Latrobei</i> , <i>Sida ectogama</i>
Shrubs < 0.5m	10 - 30%	<i>Ptilotus obovatus</i> var. <i>obovatus</i>



**722 WRE Site BPE09**

<b>Described by</b>	CG	<b>Date:</b>	07/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Borrow Pit East					
<b>MGA Zone</b>	50	585363	mE	7033496	mN	
<b>Habitat</b>	Breakaway, moderate slope					
<b>Soil</b>	White sand					
<b>Rock Type</b>	Surface crust, fine gravel, coarse gravel/pebbles, stones/boulders, surface level plates					
<b>Vegetation</b>	<i>Dodonaea pachyneura</i> and <i>Acacia aneura</i> var. <i>microcarpa</i> high open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> and mixed <i>Chenopodiaceae</i> low open heath.					
<b>Veg Condition</b>	Excellent (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Neg leaf and wood litter.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Dodonaea pachyneura</i> , <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Rhagodia eremaea</i> , <i>Scaevola spinescens</i>
<b>Shrubs &lt; 0.5m</b>	30 - 70%	<i>Atriplex semilunaris</i> , <i>Maireana platycarpa</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sclerolaena diacantha</i> , <i>Sclerolaena diacantha</i> , <i>Sclerolaena eriacantha</i> , <i>Sida ectogama</i>
<b>Tussock grasses</b>	< 2%	<i>Enneapogon cylindricus</i>
<b>Herbs</b>	< 2%	<i>Amaranthus mitchellii</i>

**722 WRE Site BPE12**

<b>Described by</b>	CG	<b>Date:</b>	07/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Mulga					
<b>MGA Zone</b>	50	504022	mE	7033223	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust, fine gravel, coarse gravel/pebbles					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>microcarpa</i> low woodland over <i>Acacia aneura</i> var. <i>microcarpa</i> open shrubland to high open shrubland over mixed <i>Eremophila</i> spp. open shrubland over <i>Ptilotus schwartzii</i> low scattered shrubs over <i>Eragrostis eriopoda</i> very open tussock grassland.					
<b>Veg Condition</b>	Excellent (grazing disturbance)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Moderate leaf litter mainly under shrubs, neg wood litter.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>microcarpa</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Eremophila forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>Latrobei</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus schwartzii</i>
<b>Tussock grasses</b>	2 - 10%	<i>Eragrostis eriopoda</i>

**722 WRE Site BPE14a**

<b>Described by</b>	SH	<b>Date:</b>	07/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Limestone Bore					
<b>MGA Zone</b>	50	585451	mE	7032503	mN	
<b>Habitat</b>	Undulating plain, granite, low relief					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Fine gravel (90%), coarse gravel/pebbles (5%), surface level plates (5%)					
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> low open woodland over <i>Acacia ramulosa</i> var. <i>ramulosa</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Thryptomene decussata</i> low shrubland and <i>Thryptomene decussata</i> , <i>Pluchea ? dentex</i> and <i>Micromyrtus sulphurea</i> low open shrubland over <i>Eriachne lanata</i> very open tussock grassland.					
<b>Veg Condition</b>	Excellent (minimal grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf litter, neg wood litter mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinocarpa</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Acacia ramulosa</i> var. <i>ramulosa</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Micromyrtus sulphurea</i> , <i>Pluchea ? dentex</i> , <i>Solanum ashbyae</i> , <i>Thryptomene decussata</i>
<b>Tussock grasses</b>	2 - 10%	<i>Eragrostis eriopoda</i> , <i>Eriachne lanata</i>

**722 WRE Site BPE14b**

<b>Described by</b>	CG	<b>Date:</b>	07/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Riparian					
<b>MGA Zone</b>	50	585471	mE	7033373	mN	
<b>Habitat</b>	Lake bank (riparian), base of granite outcrop, gentle slope					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust, coarse gravel/pebbles, stones/boulders					
<b>Vegetation</b>	<i>Acacia ramulosa</i> var. <i>linophylla</i> low woodland over <i>Acacia craspedocarpa</i> high open shrubland over <i>Aristida contorta</i> and <i>Tripogon loliiformis</i> open tussock grassland.					
<b>Veg Condition</b>	Excellent (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Neg leaf litter, sparse wood litter.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia craspedocarpa</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Sida ectogama</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Tripogon loliiformis</i>

**722 WRE Site BPE15**

<b>Described by</b>	SH	<b>Date:</b>	07/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Limestone Bore					
<b>MGA Zone</b>	50	585376	<b>mE</b>	7032971	<b>mN</b>	
<b>Habitat</b>	Flat/plain, salt lake					
<b>Soil</b>	Orange clay					
<b>Rock Type</b>	Salt surface crust (90%), fine gravel (10%)					
<b>Vegetation</b>	<i>Maireana glomerifolia</i> low shrubland over mixed <i>Chenopodiaceae</i> open herbs over numerous <i>Enneapogon cylindricus</i> and <i>Aristida contorta</i> tussock grassland.					
<b>Veg Condition</b>	Good (some grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Neg leaf and wood litter mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Atriplex semilunaris</i> , <i>Maireana glomerifolia</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Enneapogon cylindricus</i>
<b>Herbs</b>	10 - 30%	<i>Maireana appressa</i> , <i>Sclerolaena diacantha</i> , <i>Sclerolaena diacantha</i>

**722 WRE Site BPE16**

<b>Described by</b>	SH	<b>Date:</b>	07/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Limestone Bore					
<b>MGA Zone</b>	50	585521	mE	7033373	mN	
<b>Habitat</b>	Flat/plain, granite outcrop					
<b>Soil</b>	Orange sandy clay					
<b>Rock Type</b>	Fine gravel (30%), coarse gravel/pebbles (20%), stones/boulders (50%)					
<b>Vegetation</b>	<i>Acacia ramulosa</i> var. <i>linophylla</i> low woodland over <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> low open shrubland to open shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Solanum ashbyae</i> low open shrubland over <i>Abutilon oxycarpum</i> very open herbs over <i>Cymbopogon ambiguus</i> open tussock grassland.					
<b>Veg Condition</b>	Good (some grazing by roos)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Neg leaf litter, sparse wood litter mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Santalum spicatum</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila platycalyx</i> subsp. <i>platycalyx</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila platycalyx</i> subsp. <i>platycalyx</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Solanum ashbyae</i> , <i>Solanum ellipticum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon caerulescens</i>
<b>Herbs</b>	2 - 10%	<i>Abutilon oxycarpum</i> , <i>Amaranthus mitchellii</i> , <i>Boerhavia ?coccinea</i> , <i>Cheilanthes lasiophylla</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Phyllanthus erwinii</i>

**722 WRE Site BPW01**

<b>Described by</b>	SH	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Borrow Pit West					
<b>MGA Zone</b>	50	577071	<b>mE</b>	7032746	<b>mN</b>	
<b>Habitat</b>	Ridgetop, low relief ridge					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Loose soil (10%), coarse gravel/pebbles (90%)					
<b>Vegetation</b>	<i>Acacia cockertoniana</i> open shrubland to high shrubland over <i>Eremophila georgei</i> and <i>Eremophila forrestii</i> subsp. <i>forrestii</i> low open shrubland and <i>Hemigenia tysonii</i> low shrubland over <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260) very open herbs over <i>Eragrostis eriopoda</i> scattered tussock grassland.					
<b>Veg Condition</b>	Good (old drill lines adjacent)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Moderate leaf litter, sparse wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia cockertoniana</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia cockertoniana</i> , <i>Dodonaea rigida</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Acacia cockertoniana</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Hemigenia tysonii</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	< 2%	<i>Eragrostis eriopoda</i>
<b>Herbs</b>	2 - 10%	<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)

**722 WRE Site BPW02**

<b>Described by</b>	SH	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Borrow Pit West					
<b>MGA Zone</b>	50	577059	mE	7033032	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Fine gravel (10%), loose soil (90%)					
<b>Vegetation</b>	<i>Eucalyptus socialis</i> subsp. <i>eucentrica</i> open woodland over <i>Acacia aneura</i> var. <i>aneura</i> low low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Rhagodia eremaea</i> low open shrubland and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260) very open herbs over <i>Monachather paradoxus</i> open tussock grassland.					
<b>Veg Condition</b>	Good (little grazing)					
<b>Fire Age</b>	Not specified					
<b>Notes</b>	Moderate leaf litter, sparse wood litter, under EUC.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	2 - 10%	<i>Eucalyptus socialis</i> subsp. <i>eucentrica</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia aneura</i> var. <i>major</i> , <i>Dodonaea pachyneura</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Enchylaena tomentosa</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Rhagodia eremaea</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	10 - 30%	<i>Eriachne lanata</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	2 - 10%	<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)



**722 WRE Site BPW03**

<b>Described by</b>	SH	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Borrow Pit West					
<b>MGA Zone</b>	50	576626	mE	7032346	mN	
<b>Habitat</b>	Midslope, low relief, gentle slope					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Fine gravel (10%), coarse gravel/pebbles (80%), stones/boulders (10%)					
<b>Vegetation</b>	<i>Grevillea berryana</i> scattered low trees over <i>Acacia aneura</i> var. <i>aneura</i> and <i>Acacia cockertoniana</i> high open shrubland over <i>Senna glaucifolia</i> , <i>Thryptomene decussata</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low open shrubland over <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260) very open herbs over <i>Monachather paradoxus</i> very open tussock grassland.					
<b>Veg Condition</b>	Good					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf and wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia cockertoniana</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Dodonaea pachyneura</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna glaucifolia</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila glutinosa</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i>
<b>Tussock grasses</b>	2 - 10%	<i>Monachather paradoxus</i>
<b>Herbs</b>	2 - 10%	<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)

**722 WRE Site BPW04**

<b>Described by</b>	SH	<b>Date:</b>	10/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Borrow Pit West					
<b>MGA Zone</b>	50	573114	mE	7032129	mN	
<b>Habitat</b>	Upperslope, low relief ridge					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Loose soil (10%), coarse gravel/pebbles (10%), stones/boulders (80%)					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over <i>Acacia cockertoniana</i> and <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994) open shrubland to high shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila glutinosa</i> and <i>Ptilotus schwartzii</i> low open shrubland over <i>Sida cardiophylla</i> very open herbs.					
<b>Veg Condition</b>	Good (old drill line adjacent, 80 m away to the north)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf litter, moderate wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Grevillea berryana</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia cockertoniana</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Dodonaea rigida</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus schwartzii</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>
<b>Herbs</b>	2 - 10%	<i>Sida cardiophylla</i>

**722 WRE Site BPW05**

<b>Described by</b>	SH	<b>Date:</b>	10/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Burrow Pit West					
<b>MGA Zone</b>	50	573610	<b>mE</b>	7032003	<b>mN</b>	
<b>Habitat</b>	Gully base, minor channel					
<b>Soil</b>	Clay (colour not specified)					
<b>Rock Type</b>	Fine gravel (50%), loose soil (10%), coarse gravel/pebbles (30%), stones/boulders (10%)					
<b>Vegetation</b>	<i>Acacia cockertoniana</i> and <i>Acacia pruinocarpa</i> open woodland over <i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia cockertoniana</i> and <i>Acacia pruinocarpa</i> low woodland over <i>Acacia cockertoniana</i> and <i>Psyrax latifolia</i> open scrub over <i>Eremophila georgei</i> low open shrubland and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland.					
<b>Veg Condition</b>	Good					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf litter, wood litter (??), base of trees/rocks where water has deposited them.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia aneura</i> var. <i>major</i> , <i>Santalum spicatum</i>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia cockertoniana</i> , <i>Acacia pruinocarpa</i> , <i>Psyrax latifolia</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila glutinosa</i> , <i>Senna glaucifolia</i> , <i>Senna stricta</i> , <i>Solanum ashbyae</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Abutilon oxycarpum</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Climbers</b>	< 2%	<i>Duperreya commixta</i>
<b>Herbs</b>	< 2%	<i>Abutilon oxycarpum</i> , <i>Sida cardiophylla</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)

**722 WRE Site BPW06**

<b>Described by</b>	CG	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Burrow Pit West					
<b>MGA Zone</b>	50	575851	mE	7032724	mN	
<b>Habitat</b>	Ridgetop (slight)					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust, stones/boulders					
<b>Vegetation</b>	<i>Acacia cockertoniana</i> and <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994) open scrub.					
<b>Veg Condition</b>	Excellent (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf litter, sparse wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>aneura</i> , <i>Acacia cockertoniana</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	< 2%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Dodonaea rigida</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Ptilotus schwartzii</i> var. <i>georgei</i>

**722 WRE Site BPW07**

<b>Described by</b>	CG	<b>Date:</b>	09/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Burrow Pit West					
<b>MGA Zone</b>	50	575210	mE	7032660	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust, fine gravel, coarse gravel/pebbles, stones/boulders					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>aneura</i> low open woodland over mixed <i>Acacia</i> spp. scattered tall shrubs over <i>Thryptomene decusatta</i> and <i>Prostanthera petrophila</i> open shrubland over <i>Thryptomene decusatta</i> low open shrubland over <i>Aluta aspera</i> subsp. <i>hesperia</i> low shrubland over <i>Eragrostis setifolia</i> scattered tussock grassland.					
<b>Veg Condition</b>	Good (tracks, grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf and wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia aneura</i> var. <i>intermedia</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia cockertoniana</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Eremophila glutinosa</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Prostanthera petrophila</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Sida cardiophylla</i>
<b>Tussock grasses</b>	< 2%	<i>Eragrostis setifolia</i>

**722 WRE Site BPW08**

<b>Described by</b>	CG	<b>Date:</b>	10/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Borrow Pit West					
<b>MGA Zone</b>	50	574389	<b>mE</b>	7032529	<b>mN</b>	
<b>Habitat</b>	Ridgetop, shallow plateau					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust, fine gravel, coarse gravel/pebbles, stones/boulders					
<b>Vegetation</b>	<i>Acacia cockertoniana</i> and <i>Acacia aneura</i> var. <i>microcarpa</i> high open shrubland over <i>Aluta aspera</i> subsp. <i>hesperia</i> and <i>Hemigenia tysonii</i> low closed heath.					
<b>Veg Condition</b>	Excellent (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf litter, neg wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia cockertoniana</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila simulans</i> subsp. <i>simulans</i>
<b>Shrubs &lt; 0.5m</b>	> 70%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Hemigenia tysonii</i>

**722 WRE Site BPW09**

<b>Described by</b>	CG	<b>Date:</b>	10/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Burrow Pit West					
<b>MGA Zone</b>	50	574188	mE	7032469	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust, fine gravel					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>microcarpa</i> and <i>Acacia cockertoniana</i> low woodland over <i>Acacia aneura</i> var. <i>microcarpa</i> scattered tall shrubs over mixed <i>Eremophila</i> spp. shrubland over <i>Eragrostis setifolia</i> scattered tussock grassland.					
<b>Veg Condition</b>	Excellent (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf litter, neg wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia cockertoniana</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i>
<b>Tussock grasses</b>	< 2%	<i>Eragrostis setifolia</i>

**722 WRE Site BPW10**

<b>Described by</b>	CG	<b>Date:</b>	10/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Burrow Pit West					
<b>MGA Zone</b>	50	574714	mE	7032500	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust, fine gravel					
<b>Vegetation</b>	<i>Acacia cockertoniana</i> and <i>Acacia cockertoniana</i> high shrubland over mixed <i>Eremophila</i> spp. shrubland over <i>Sida cardiophylla</i> low scattered shrubs.					
<b>Veg Condition</b>	Excellent (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Mod leaf and wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia cockertoniana</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila forrestii</i> , <i>Eremophila glutinosa</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i> , <i>Prostanthera petrophila</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Sida cardiophylla</i>
<b>Herbs</b>	< 2%	<i>Goodenia berardiana</i>



**722 WRE Site BPW13**

<b>Described by</b>	SH	<b>Date:</b>	10/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Borrow Pit West					
<b>MGA Zone</b>	50	573979	mE	7032615	mN	
<b>Habitat</b>	Midslope, very low relief					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Fine gravel (60%), loose soil (10%), coarse gravel/pebbles (30%)					
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> scattered low trees over <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994) and <i>Acacia cockertoniana</i> high open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna glaucifolia</i> and <i>Ptilotus schwartzii</i> low open shrubland over <i>Goodenia tenuiloba</i> very open herbs over <i>Monachather paradoxus</i> very open tussock grassland.					
<b>Veg Condition</b>	Good (old drill lines all over)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf and wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia pruinocarpa</i> , <i>Psyrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia cockertoniana</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila glutinosa</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Ptilotus schwartzii</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	2 - 10%	<i>Eriachne pulchella</i> subsp. <i>pulchella</i> , <i>Monachather paradoxus</i> , <i>Tripogon loliiformis</i>
<b>Herbs</b>	2 - 10%	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Goodenia tenuiloba</i>

**Phase 3 Haul Road**

**722 WRE Site HR01**

**Described by** CG      **Date:** 03/07/08      **Type:** Q      20x20

**Location**

**MGA Zone** 50      563716 mE      7022514 mN

**Habitat** Plain/flat, minor channel

**Soil** Red-orange sandy clay

**Rock Type** Surface crust, fine gravel

**Vegetation** *Acacia aneura* var. *intermedia* low open forest over *Solanum ashbyae* low open shrubland over *Aristida contorta* and *Eragrostis eriopoda* tussock grassland.

**Veg Condition** Excellent (grazing)

**Fire Age** None evident

**Notes** Sparse leaf and wood litter mainly under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	<i>Acacia aneura</i> var. <i>intermedia</i> , <i>Psyrax latifolia</i> , <i>Psyrax rigidula</i>
Shrubs > 2m	< 2%	<i>Acacia craspedocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i>
Shrubs 1 - 2m	< 2%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs < 1m	< 2%	<i>Eremophila granitica</i>
Shrubs < 0.5m	2 - 10%	<i>Maireana planifolia</i> , <i>Maireana platycarpa</i> , <i>Ptilotus obovatus</i> , <i>Solanum ashbyae</i>
Tussock grasses	30 - 70%	<i>Aristida contorta</i> , <i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i>
Climbers	< 2%	<i>Marsdenia australis</i>

**722 WRE Site HR02**

**Described by** CG      **Date:** 03/07/08      **Type:** Q      20x20

**Location**

**MGA Zone** 50      504383 mE      7022943 mN

**Habitat** Plain/flat, creek bed, creek bank

**Soil** Red-orange sandy clay

**Rock Type** Surface crust, fine gravel, loose soil, coarse gravel/pebbles

**Vegetation** *Acacia aneura* var. *major* and *Acacia ramulosa* var. *linophylla* low open forest over *Eriachne pulchella* subsp. *pulchella* and *Aristida contorta* open tussock grassland.

**Veg Condition** Excellent (grazing)

**Fire Age** None evident

**Notes** Sparse leaf litter, neg wood litter, mainly under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	30 - 70%	<i>Acacia aneura</i> var. <i>major</i> , <i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs > 2m	< 2%	<i>Acacia craspedocarpa</i>
Shrubs 1 - 2m	< 2%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Mirbelia rhagodioides</i>
Shrubs < 1m	< 2%	<i>Eremophila georgei</i>
Shrubs < 0.5m	< 2%	<i>Harnieria kempeana</i> subsp. <i>muelleri</i>
Tussock grasses	10 - 30%	<i>Aristida contorta</i> , <i>Eragrostis eriopoda</i> , <i>Eriachne lanata</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>

**722 WRE Site HR03**

**Described by** CG      **Date:** 03/07/08      **Type:** Q      20x20

**Location**

**MGA Zone** 50      565967 mE      7024046 mN

**Habitat** Plain/flat

**Soil** Red-orange sandy clay

**Rock Type** Surface crust

**Vegetation** *Acacia aneura* var. *intermedia* and *Acacia ramulosa* var. *linophylla* low open forest over *Acacia ramulosa* var. *linophylla* open scrub over *Eremophila simulans* subsp. *simulans* open heath over *Ptilotus schwartzii* low scattered shrubs over *Eriachne lanata* very open tussock grassland.

**Veg Condition** Excellent (grazing)

**Fire Age** None evident

**Notes** Sparse leaf litter, neg wood litter, mainly under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	30 - 70%	<i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs > 2m	30 - 70%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs 1 - 2m	30 - 70%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i> , <i>Grevillea stenostachya</i>
Shrubs < 0.5m	< 2%	<i>Ptilotus schwartzii</i>
Tussock grasses	2 - 10%	<i>Eriachne lanata</i>

**722 WRE Site HR04**

**Described by** CG      **Date:** 03/07/08      **Type:** Q      20x20

**Location**

**MGA Zone** 50      571730 mE      7027665 mN

**Habitat** Flat/plain, creek bed, creek bank

**Soil** Red-orange sand/sandy clay

**Rock Type** Fine gravel, coarse gravel/pebbles, stones/boulders

**Vegetation** *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) high shrubland over *Various Senna* spp. scattered shrubs over *Calytrix desolata* low shrubland over *Duperreya commixta* climbers over *Cymbopogon ambiguus* very open tussock grassland.

**Veg Condition** Excellent (grazing)

**Fire Age** None evident

**Notes** Neg leaf and wood litter.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Grevillea berryana</i> , <i>Santalum spicatum</i>
Shrubs > 2m	10 - 30%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia tetragonophylla</i>
Shrubs 1 - 2m	< 2%	<i>Eremophila exilifolia</i> , <i>Grevillea inconspicua</i> , <i>Grevillea stenostachya</i> , <i>Hibiscus sturtii</i> var. <i>forrestii</i> , <i>Rulingia luteiflora</i> , <i>Senna artemisioides</i> subsp. <i>petiolaris</i> , <i>Senna artemisioides</i> subsp. x <i>artemisioides</i> , <i>Senna artemisioides</i> subsp. x <i>sturtii</i> , <i>Senna glaucifolia</i>
Shrubs < 1m	10 - 30%	<i>Calytrix desolata</i> , <i>Chorizema genistoides</i> , <i>Dodonaea amplisemina</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Heliotropium ovalifolium</i>
Shrubs < 0.5m	< 2%	<i>Indigofera monophylla</i>
Tussock grasses	2 - 10%	<i>Cymbopogon ambiguus</i>
Climbers	2 - 10%	<i>Duperreya commixta</i>

**722 WRE Site HR05**

**Described by** CG      **Date:** 04/07/08      **Type:** Q      20x20

**Location**

**MGA Zone** 50      571137 mE      7027349 mN

**Habitat** Flat/plain, creek bed

**Soil** Red-orange sandy clay

**Rock Type** Surface crust, fine gravel, loose soil, stones/boulders

**Vegetation** *Acacia ramulosa* var. *linophylla* low open woodland over *Acacia* sp. Weld Range (A. Markey & S. Dillon 2004), *Grevillea berryana* and *Acacia ramulosa* var. *linophylla* open scrub over mixed *Eremophila* spp. shrubland over *Goodenia tenuiloba* scattered herbs over *Eragrostis eriopoda* and *Eriachne lanata* scattered tussock grassland.

**Veg Condition** Excellent (grazing)

**Fire Age** None evident

**Notes** Sparse leaf litter, neg wood litter, mainly under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	<i>Acacia aneura</i> var. <i>major</i> , <i>Acacia cockertoniana</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs > 2m	30 - 70%	<i>Acacia pruinocarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia rhodophloia</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2004), <i>Grevillea berryana</i> , <i>Santalum spicatum</i>
Shrubs 1 - 2m	10 - 30%	<i>Eremophila forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Senna glaucifolia</i>
Shrubs < 0.5m	< 2%	<i>Solanum ashbyae</i>
Tussock grasses	< 2%	<i>Eragrostis eriopoda</i> , <i>Eriachne lanata</i>
Herbs	< 2%	<i>Goodenia tenuiloba</i>

**722 WRE Site HR06**

**Described by** CG      **Date:** 04/07/08      **Type:** Q      20x20

**Location**

**MGA Zone** 50      567092 mE      7024711 mN

**Habitat** Flat/plain

**Soil** Yellow sand

**Rock Type** Surface crust, coarse gravel/pebbles, stones/boulders

**Vegetation** *Acacia ramulosa* var. *linophylla* scattered low trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Ptilotus beardii* and *Ptilotus obovatus* low shrubland.

**Veg Condition** Excellent (grazing)

**Fire Age** None evident

**Notes** Neg leaf and wood litter.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	< 2%	<i>Acacia aneura</i> var. <i>argentea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs > 2m	< 2%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs 1 - 2m	2 - 10%	<i>Acacia grasbyi</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Rhagodia eremaea</i>
Shrubs < 1m	< 2%	<i>Eremophila fraseri</i> subsp. <i>fraseri</i>
Shrubs < 0.5m	10 - 30%	<i>Ptilotus beardii</i> , <i>Ptilotus obovatus</i> , <i>Sida ectogama</i> , <i>Solanum lasiophyllum</i>

**722 WRE Site HR07**

**Described by** CG      **Date:** 04/07/08      **Type:** Q      20x20

**Location**

**MGA Zone** 50      566302 mE      7024279 mN

**Habitat** Flat/plain, floodplain, creek bed

**Soil** Red-orange sandy clay

**Rock Type** Fine gravel, loose soil, coarse gravel/pebbles

**Vegetation** *Acacia aneura* var. *microcarpa* low woodland over, *Eremophila serrulata* and *Eremophila simulans* subsp. *simulans* open scrub over *Dodonaea petiolaris* and *Eremophila forrestii* shrubland over *Harnieria kempeana* low open shrubland.

**Veg Condition** Excellent (grazing)

**Fire Age** None evident

**Notes** Moderate leaf litter, neg wood litter, mainly under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	10 - 30%	<i>Acacia aneura</i> var. <i>microcarpa</i>
Shrubs > 2m	30 - 70%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Dodonaea petiolaris</i> , <i>Eremophila forrestii</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i>
Shrubs 1 - 2m	10 - 30%	<i>Dodonaea petiolaris</i> , <i>Eremophila forrestii</i> , <i>Eremophila glutinosa</i> , <i>Eremophila serrulata</i> , <i>Grevillea stenostachya</i>
Shrubs < 1m	2 - 10%	<i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
Shrubs < 0.5m	< 2%	<i>Hibiscus burtonii</i> , <i>Maireana platycarpa</i> , <i>Sida cardiophylla</i> , <i>Sida cardiophylla</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)



**722 WRE Site HR09**

<b>Described by</b>	SH	<b>Date:</b>	04/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road Centre					
<b>MGA Zone</b>	50	574743	mE	7028902	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sand/sandy clay					
<b>Rock Type</b>	Fine gravel (1%), loose soil (99%)					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>microcarpa</i> and <i>Acacia pruinocarpa</i> low open woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Eremophila granitica</i> low open shrubland and <i>Eremophila granitica</i> and <i>Solanum ashbyae</i> low shrubland over <i>Monachather paradoxus</i> and <i>Aristida holathera</i> var. <i>holathera</i> very open tussock grassland.					
<b>Veg Condition</b>	Not specified					
<b>Fire Age</b>	Not specified					
<b>Notes</b>	Sparse leaf litter, widespread - wood litter not specified.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia pruinocarpa</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia murrayana</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila granitica</i> , <i>Pimelea microcephala</i> subsp. <i>microcephala</i> , <i>Pimelea microcephala</i> subsp. <i>microcephala</i> , <i>Rhagodia eremaea</i> , <i>Senna artemisioides</i> subsp. <i>petiolaris</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Dodonaea petiolaris</i> , <i>Eremophila granitica</i> , <i>Ptilotus obovatus</i> , <i>Solanum ashbyae</i> , <i>Solanum ferocissimum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida holathera</i> var. <i>holathera</i> , <i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	< 2%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site HR10**

<b>Described by</b>	SH	<b>Date:</b>	04/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road East					
<b>MGA Zone</b>	50	575069	<b>mE</b>	7029011	<b>mN</b>	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sand/sandy clay					
<b>Rock Type</b>	Loose soil					
<b>Vegetation</b>	<i>Corymbia lenziana</i> open woodland over <i>Acacia aneura</i> var. <i>microcarpa</i> low open woodland over <i>Acacia aneura</i> var. <i>intermedia</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Eremophila granitica</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Ptilotus obovatus</i> and <i>Solanum ashbyae</i> low shrubland over <i>Sida ectogama</i> and <i>Abutilon oxycarpum</i> very open herbs over <i>Monachather paradoxus</i> open tussock grassland.					
<b>Veg Condition</b>	Not specified					
<b>Fire Age</b>	Not specified					
<b>Notes</b>	Plentiful leaf litter and sparse wood litter mainly under shrubs (under Corymbias).					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees 10 - 30m</b>	2 - 10%	<i>Corymbia lenziana</i>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Psydrax latifolia</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>intermedia</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila granitica</i> , <i>Pimelea microcephala</i> subsp. <i>microcephala</i> , <i>Rhagodia eremaea</i> , <i>Senna glaucifolia</i> , <i>Senna</i> sp. Austin (A. Strid 20210)
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Abutilon oxycarpum</i> , <i>Ptilotus obovatus</i> , <i>Solanum ashbyae</i> , <i>Solanum ferocissimum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Monachather paradoxus</i>
<b>Herbs</b>	2 - 10%	<i>Ptilotus ?clementii</i> , <i>Sida ectogama</i> , <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site HR11**

<b>Described by</b>	SH	<b>Date:</b>	03/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road West					
<b>MGA Zone</b>	50	561103	mE	7020074	mN	
<b>Habitat</b>	Flat/plain, minor channel					
<b>Soil</b>	Red-orange sand/sandy clay					
<b>Rock Type</b>	Fine gravel (80%), loose soil (10%), coarse gravel/pebbles (5%), stones/boulders (5%)					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>microcarpa</i> and <i>Acacia aneura</i> var. <i>major</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia aneura</i> var. <i>major</i> , <i>Dodonaea petiolaris</i> and <i>Solanum ashbyae</i> low open shrubland over <i>Sida cardiophylla</i> very open herbs over <i>Eriachne lanata</i> and <i>Monachather paradoxus</i> very open tussock grassland.					
<b>Veg Condition</b>	Good (grazing)					
<b>Fire Age</b>	Old (>5 yrs)					
<b>Notes</b>	Moderate leaf litter and sparse wood litter mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia pruinocarpa</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>major</i> , <i>Acacia aneura</i> var. <i>microcarpa</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia rhodophloia</i> , <i>Rhagodia eremaea</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Dodonaea petiolaris</i> , <i>Eremophila granitica</i> , <i>Ptilotus obovatus</i> , <i>Sida cardiophylla</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	2 - 10%	<i>Eriachne lanata</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	2 - 10%	<i>Swainsona affinis</i>

**722 WRE Site HR12**

<b>Described by</b>	SH	<b>Date:</b>	03/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road West					
<b>MGA Zone</b>	50	561671	mE	7020815	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Fine gravel (20%), loose soil (10%), coarse gravel/pebbles (70%)					
<b>Vegetation</b>	<i>Acacia pruinocarpa</i> low open woodland over <i>Acacia aneura</i> var. <i>microcarpa</i> and <i>Acacia aneura</i> var. <i>major</i> open shrubland to high open shrubland over <i>Solanum ashbyae</i> and <i>Ptilotus obovatus</i> low open shrubland over <i>Aristida contorta</i> open tussock grassland.					
<b>Veg Condition</b>	Good (grazing)					
<b>Fire Age</b>	Old (>5 yrs)					
<b>Notes</b>	Sparse leaf and wood litter - widespread.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinocarpa</i> , <i>Psyrdrax rigidula</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>major</i> , <i>Acacia aneura</i> var. <i>microcarpa</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia tetragonophylla</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Maireana villosa</i> , <i>Ptilotus obovatus</i> , <i>Ptilotus schwartzii</i> var. <i>georgei</i> , <i>Sida cardiophylla</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Eragrostis eriopoda</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
<b>Herbs</b>	< 2%	<i>Goodenia tenuiloba</i> , <i>Ptilotus roei</i> , <i>Sida ectogama</i>
<b>Sedges</b>	< 2%	<i>Cyperus squarrosus</i>

**722 WRE Site HR13**

<b>Described by</b>	SH	<b>Date:</b>	03/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road					
<b>MGA Zone</b>	50	562739	<b>mE</b>	7021607	<b>mN</b>	
<b>Habitat</b>	Flat/plain, minor channel					
<b>Soil</b>	Red-orange sand/sandy clay					
<b>Rock Type</b>	Fine gravel (10%), loose soil (70%), coarse gravel/pebbles (20%)					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>microcarpa</i> and <i>Acacia aneura</i> var. <i>microcarpa</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> (juvenile) and <i>Acacia aneura</i> var. <i>microcarpa</i> (juvenile) low shrubland and <i>Solanum ashbyae</i> low open shrubland over <i>Aristida contorta</i> open tussock grassland.					
<b>Veg Condition</b>	Good (grazing)					
<b>Fire Age</b>	Old (>5 yrs)					
<b>Notes</b>	Moderate leaf litter, sparse wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Psydrax suaveolens</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia aneura</i> var. <i>microcarpa</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Rhagodia eremaea</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Aluta aspera</i> subsp. <i>hesperia</i> , <i>Eremophila granitica</i> , <i>Psydrax rigidula</i> , <i>Ptilotus obovatus</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Enneapogon cylindricus</i> , <i>Eragrostis eriopoda</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
<b>Herbs</b>	< 2%	<i>Haloragis trigonocarpa</i>

**722 WRE Site HR14**

<b>Described by</b>	SH	<b>Date:</b>	03/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road West					
<b>MGA Zone</b>	50	571935	mE	7027743	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Fine gravel (10%), loose soil (60%), coarse gravel/pebbles (30%)					
<b>Vegetation</b>	<i>Acacia pruinoarpa</i> low open woodland over <i>Acacia aneura</i> var. <i>microcarpa</i> and <i>Acacia aneura</i> var. <i>intermedia</i> high shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Ptilotus obovatus</i> low shrubland over <i>Aristida contorta</i> open tussock grassland.					
<b>Veg Condition</b>	Good (grazing, tracks)					
<b>Fire Age</b>	Not specified					
<b>Notes</b>	Moderate leaf litter, sparse wood litter, mainly under shrubs. Mulga band - patchy					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia pruinoarpa</i> , <i>Psyrax latifolia</i> , <i>Psyrax rigidula</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>intermedia</i> , <i>Acacia aneura</i> var. <i>microcarpa</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila georgei</i> , <i>Eremophila glutinosa</i> , <i>Grevillea stenostachya</i> , <i>Senna glaucifolia</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Abutilon oxycarpum</i> , <i>Enchylaena tomentosa</i> , <i>Eremophila granitica</i> , <i>Ptilotus obovatus</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Enneapogon cylindricus</i> , <i>Eriachne lanata</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i> , <i>Monachather paradoxus</i>

**722 WRE Site HR15**

<b>Described by</b>	SH	<b>Date:</b>	03/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road West					
<b>MGA Zone</b>	50	572353	mE	7027955	mN	
<b>Habitat</b>	Flat/plain, minor channel					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Fien gravel (80%), loose soil (5%), coarse gravel/pebbles (15%)					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>microcarpa</i> low open woodland over <i>Acacia aneura</i> var. <i>argentea</i> and <i>Acacia aneura</i> var. <i>microcarpa</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> shrubland over <i>Dodonaea petiolaris</i> low open shrubland and <i>Harnieria kempeana</i> subsp. <i>muelleri</i> low shrubland over <i>Sida cardiophylla</i> and <i>Goodenia tenuiloba</i> open herbs over <i>Aristida contorta</i> , <i>Eriachne lanata</i> and <i>Monachather paradoxus</i> open tussock grassland.					
<b>Veg Condition</b>	Good (limited grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf litter, moderate wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Grevillea berryana</i> , <i>Psyrax latifolia</i> , <i>Psyrax rigidula</i>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>argentea</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Abutilon oxycarpum</i> , <i>Dodonaea petiolaris</i> , <i>Eremophila glutinosa</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Solanum ashbyae</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Abutilon oxycarpum</i> , <i>Eremophila georgei</i> , <i>Eremophila granitica</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Sida cardiophylla</i> , <i>Sida cardiophylla</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Eriachne lanata</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	10 - 30%	<i>Convolvulaceae</i> sp, <i>Goodenia tenuiloba</i> , <i>Hibiscus burtonii</i> , <i>Sida ectogama</i> , <i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>

**722 WRE Site HR16**

<b>Described by</b>	SH	<b>Date:</b>	05/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road East					
<b>MGA Zone</b>	50	576016	<b>mE</b>	7029468	<b>mN</b>	
<b>Habitat</b>	Fla/plain					
<b>Soil</b>	Red-orange clay					
<b>Rock Type</b>	Compacted clay (60%), fine gravel (35%), coarse gravel/pebbles (5%)					
<b>Vegetation</b>	<p><i>Acacia aneura</i> var. <i>microcarpa</i> scattered low trees over <i>Acacia aneura</i> var. <i>microcarpa</i> and <i>Acacia aneura</i> var. <i>intermedia</i> high open shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> low shrubland over <i>Goodenia tenuiloba</i> scattered herbs over <i>Monachather paradoxus</i> and <i>Eragrostis eriopoda</i> very open tussock grassland.</p>					
<b>Veg Condition</b>	Good (some grazing)					
<b>Fire Age</b>	Old (>5 yrs)					
<b>Notes</b>	<p>Sparse leaf litter, moderate wood litter, mainly under shrubs. Sparse Mulga between dense <i>Acacia ramulosa</i> var. <i>linophylla</i> patches.</p>					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>microcarpa</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>intermedia</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila georgei</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i> , <i>Psydrax suaveolens</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Enchylaena tomentosa</i> , <i>Hibiscus coatesii</i> , <i>Maireana villosa</i> , <i>Sida cardiophylla</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	2 - 10%	<i>Eragrostis eriopoda</i> , <i>Eriachne lanata</i> , <i>Eriachne mucronata</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	< 2%	<i>Goodenia tenuiloba</i> , <i>Sida ectogama</i>



**722 WRE Site HR17**

<b>Described by</b>	SH	<b>Date:</b>	05/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road East					
<b>MGA Zone</b>	50	576849	mE	7029667	mN	
<b>Habitat</b>	Undulating plain, very low relief hill					
<b>Soil</b>	Red-orange compacted clay					
<b>Rock Type</b>	Compacted clay (5%), fine gravel (95%)					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>microcarpa</i> high open shrubland to scattered low trees over <i>Thryptomene decussata</i> and <i>Acacia aneura</i> var. <i>microcarpa</i> shrubland over <i>Thryptomene decussata</i> and <i>Ptilotus schwartzii</i> var. <i>georgei</i> low open shrubland over <i>Goodenia tenuiloba</i> very open herbs over <i>Eriachne pulchella</i> subsp. <i>pulchella</i> and <i>Aristida contorta</i> very open tussock grassland.					
<b>Veg Condition</b>	Good (little grazing, old tracks)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Neg leaf litter, sparse wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	< 2%	<i>Acacia aneura</i> var. <i>microcarpa</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Thryptomene decussata</i>
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Thryptomene decussata</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Maireana georgei</i> , <i>Maireana thesioides</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Ptilotus schwartzii</i> var. <i>georgei</i> , <i>Sida ectogama</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Enneapogon cylindricus</i> , <i>Eragrostis eriopoda</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i> , <i>Monachather paradoxus</i>
<b>Herbs</b>	2 - 10%	<i>Goodenia tenuiloba</i>

**722 WRE Site HR18**

**Described by** CG      **Date:** 04/07/08      **Type:** Q      20x20

**Location** Haul Road West

**MGA Zone** 50      577286 mE      7029627 mN

**Habitat** Flat/plain

**Soil** Red-orange sandy clay

**Rock Type** Surface crust, fine gravel

**Vegetation** *Acacia ramulosa* var. *linophylla* and *Acacia aneura* var. *microcarpa* open scrub over *Eremophila forrestii* shrubland over *Solanum ashbyae*, *Sida cardiophylla* and *Hibiscus burtonii* low open shrubland over *Monachather paradoxus* and *Eriachne lanata* very open tussock grassland.

**Veg Condition** Excellent (grazing)

**Fire Age** None evident

**Notes** Sparse leaf litter, neg wood litter, mainly under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Shrubs > 2m	30 - 70%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs 1 - 2m	10 - 30%	<i>Eremophila forrestii</i> , <i>Rhagodia eremaea</i>
Shrubs < 0.5m	2 - 10%	<i>Hibiscus burtonii</i> , <i>Sida cardiophylla</i> , <i>Solanum ashbyae</i>
Tussock grasses	2 - 10%	<i>Enneapogon cylindricus</i> , <i>Eriachne lanata</i> , <i>Monachather paradoxus</i>

**722 WRE Site HR19**

<b>Described by</b>	CG	<b>Date:</b>	03/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road East					
<b>MGA Zone</b>	50	577838	<b>mE</b>	7029714	<b>mN</b>	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust, fine gravel					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>microcarpa</i> high shrubland over <i>Aristida contorta</i> open tussock grassland.					
<b>Veg Condition</b>	Good (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Leaf litter/wood litter not specified. Open Mulga.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Grevillea berryana</i>
<b>Shrubs 1 - 2m</b>	< 2%	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Eremophila clarkei</i> , <i>Maireana villosa</i> , <i>Ptilotus schwartzii</i> var. <i>georgei</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	10 - 30%	<i>Aristida contorta</i> , <i>Monachather paradoxus</i>

**722 WRE Site HR20**

<b>Described by</b>	CG	<b>Date:</b>	04/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road West					
<b>MGA Zone</b>	50	578621	mE	7029801	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust, fine gravel, coarse gravel/pebbles					
<b>Vegetation</b>	<i>Ptilotus schwartzii</i> var. <i>georgei</i> , <i>Solanum ashbyae</i> and <i>Maireana villosa</i> low scattered shrubs over <i>Eriachne pulchella</i> subsp. <i>pulchella</i> and <i>Aristida contorta</i> tussock grassland.					
<b>Veg Condition</b>	Good (tracks, grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Neg leaf and wood litter. Very open grass/shrub land.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Maireana villosa</i> , <i>Ptilotus schwartzii</i> var. <i>georgei</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	30 - 70%	<i>Aristida contorta</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
<b>Herbs</b>	< 2%	<i>Trianthema oxycalyptra</i> var. <i>oxycalyptra</i>

**722 WRE Site HR21**

<b>Described by</b>	CG	<b>Date:</b>	04/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Creekline					
<b>MGA Zone</b>	50	579184	<b>mE</b>	7029888	<b>mN</b>	
<b>Habitat</b>	Flat/plain, minor channel					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust, fine gravel					
<b>Vegetation</b>	<i>Acacia cuthbertsonii</i> subsp. <i>cuthbertsonii</i> and <i>Psydrax latifolia</i> low open forest over <i>Eremophila clarkei</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> open scrub over <i>Eremophila clarkei</i> shrubland over <i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32) and <i>Solanum lasiophyllum</i> open herbs over <i>Monachather paradoxus</i> and <i>Eriachne lanata</i> very open tussock grassland.					
<b>Veg Condition</b>	Excellent (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Plentiful leaf litter, moderate wood litter, mainly under shrubs. Dense creekline.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia cuthbertsonii</i> subsp. <i>cuthbertsonii</i> , <i>Psydrax latifolia</i>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Eremophila clarkei</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Ptilotus obovatus</i> var. <i>obovatus</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	< 2%	<i>Abutilon oxycarpum</i> , <i>Hibiscus coatesii</i> , <i>Maireana villosa</i> , <i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260), <i>Solanum ferocissimum</i> , <i>Solanum lasiophyllum</i>
<b>Tussock grasses</b>	2 - 10%	<i>Eriachne lanata</i> , <i>Monachather paradoxus</i>
<b>Climbers</b>	< 2%	<i>Marsdenia australis</i>
<b>Herbs</b>	10 - 30%	<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)

**722 WRE Site HR23a**

**Described by** CG      **Date:** 05/07/08      **Type:** Q      20x20

**Location**

**MGA Zone** 50      580496 mE      7029551 mN

**Habitat** Plain/flat

**Soil** Red-orange sandy clay

**Rock Type** Surface crust, fine gravel

**Vegetation** *Acacia ramulosa* var. *linophylla* low open woodland over *Eremophila jucunda* subsp. *jucunda* open scrub over *Eriachne lanata* open tussock grassland.

**Veg Condition** Good (grazing)

**Fire Age** None evident

**Notes** Mod leaf litter, neg wood litter, mainly under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs 1 - 2m	30 - 70%	<i>Eremophila jucunda</i> subsp. <i>jucunda</i>
Shrubs < 1m	< 2%	<i>Solanum ashbyae</i>
Shrubs < 0.5m	< 2%	<i>Maireana platycarpa</i>
Tussock grasses	10 - 30%	<i>Eragrostis eriopoda</i> , <i>Eriachne lanata</i>

**722 WRE Site HR23b**

**Described by** CG      **Date:** 05/07/08      **Type:** Q      20x20

**Location**

**MGA Zone** 50      580171 mE      7029992 mN

**Habitat** Flat/plain

**Soil** Red-orange sandy clay

**Rock Type** Surface crust, fine gravel, coarse gravel/pebbles

**Vegetation** *Acacia ramulosa* var. *linophylla* scattered tall shrubs over *Ptilotus schwartzii* var. *georgei* low open shrubland over *Aristida contorta*, *Monachather paradoxus* and *Eragrostis eriopoda* tussock grassland.

**Veg Condition** Excellent (grazing)

**Fire Age** None evident

**Notes** Neg leaf and wood litter.

**Species List:**

Stratum	Cover	Species within each stratum
Shrubs > 2m	< 2%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia tetragonophylla</i>
Shrubs < 1m	< 2%	<i>Eremophila forrestii</i>
Shrubs < 0.5m	2 - 10%	, <i>Ptilotus schwartzii</i> var. <i>georgei</i>
Tussock grasses	30 - 70%	<i>Aristida contorta</i> , <i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i>

**722 WRE Site HR25**

<b>Described by</b>	SH	<b>Date:</b>	03/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road W6					
<b>MGA Zone</b>	50	580826	mE	7029203	mN	
<b>Habitat</b>	Flat/plain					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Surface crust, fine gravel, coarse gravel/pebbles					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> high shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i> and <i>Maireana platycarpa</i> low shrubland over <i>Monachather paradoxus</i> very open tussock grassland.					
<b>Veg Condition</b>	Good (grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf litter, neg woodl litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Senna artemisioides</i> subsp. <i>petiolaris</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Maireana platycarpa</i> , <i>Maireana villosa</i> , <i>Ptilotus obovatus</i> var. <i>obovatus</i>
<b>Tussock grasses</b>	2 - 10%	<i>Monachather paradoxus</i>
<b>Herbs</b>	< 2%	<i>Ptilotus roei</i>



**722 WRE Site HR26**

**Described by** SH      **Date:** 03/07/08      **Type:** Q      20x20

**Location**

**MGA Zone** 50      570579 mE      7027118 mN

**Habitat** Flat/plain

**Soil** Red-orange sandy clay

**Rock Type** Loose soil (50%), coarse gravel/pebbles (50%)

**Vegetation** *Acacia pruinocarpa* and *Acacia aneura* var. *major* low open woodland over *Acacia ramulosa* var. *linophylla* and *Acacia aneura* var. *major* high shrubland over *Acacia ramulosa* var. *linophylla* and *Eremophila forrestii* subsp. *forrestii* shrubland over *Eremophila georgei* and *Solanum ashbyae* low open shrubland over *Eragrostis eriopoda*, *Monachather paradoxus* and *Eriachne lanata* very open tussock grassland.

**Veg Condition** Good (some grazing - litter - corrugated iron)

**Fire Age** Old (>5 yrs)

**Notes** Mod leaf litter, sparse wood litter, mainly under shrubs.

**Species List:**

Stratum	Cover	Species within each stratum
Trees < 10m	2 - 10%	<i>Acacia aneura</i> var. <i>major</i> , <i>Acacia pruinocarpa</i> , <i>Psyrax latifolia</i> , <i>Psyrax rigidula</i> , <i>Psyrax suaveolens</i> , <i>Santalum leptocladum</i>
Shrubs > 2m	10 - 30%	<i>Acacia aneura</i> var. <i>major</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
Shrubs 1 - 2m	10 - 30%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i>
Shrubs < 1m	2 - 10%	<i>Eremophila georgei</i> , <i>Eremophila granitica</i> , <i>Senna glaucifolia</i> , <i>Spartothamnella teucriflora</i>
Shrubs < 0.5m	2 - 10%	<i>Abutilon oxycarpum</i> , <i>Enchylaena tomentosa</i> , <i>Maireana villosa</i> , <i>Ptilotus obovatus</i> , <i>Solanum ashbyae</i>
Tussock grasses	2 - 10%	<i>Eragrostis eriopoda</i> , <i>Eriachne lanata</i> , <i>Monachather paradoxus</i>
Herbs	< 2%	<i>Goodenia tenuiloba</i> , <i>Sida ectogama</i>

**722 WRE Site HR27**

**Described by** SH      **Date:** 03/07/08      **Type:** Q      20x20

**Location**

**MGA Zone** 50      570335 mE      7026986 mN

**Habitat** Flat/plain

**Soil** Red-orange sandy clay

**Rock Type** Loose soil (10%), coarse gravel/pebbles (90%) scree

**Vegetation** *Acacia aneura* var. *microcarpa* and *Acacia ramulosa* var. *ramulosa* high open shrubland over *Acacia aneura* var. *microcarpa* open shrubland over *Ptilotus schwartzii* var. *georgei* low open shrubland over *Goodenia tenuiloba* very open herbs over *Aristida contorta* and *Eragrostis eriopoda* very open tussock grassland.

**Veg Condition**
**Fire Age**

**Notes** Leaf/wood litter not specified.

**Species List:**

Stratum	Cover	Species within each stratum
Shrubs > 2m	2 - 10%	<i>Acacia aneura</i> var. <i>microcarpa</i>
Shrubs 1 - 2m	2 - 10%	<i>Acacia ramulosa</i> var. <i>ramulosa</i>
Shrubs < 1m	< 2%	<i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glaucifolia</i>
Shrubs < 0.5m	2 - 10%	<i>Ptilotus rotundifolius</i> , <i>Ptilotus schwartzii</i> var. <i>georgei</i> , <i>Solanum ashbyae</i>
Tussock grasses	2 - 10%	<i>Aristida contorta</i> , <i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i>
Herbs	2 - 10%	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Goodenia tenuiloba</i> , <i>Goodenia tenuiloba</i>

**722 WRE Site HR28**

<b>Described by</b>	SH	<b>Date:</b>	03/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road W of W6					
<b>MGA Zone</b>	50	570265	mE	7026936	mN	
<b>Habitat</b>	Flat/plain, minor channel					
<b>Soil</b>	Red-orange sand/sandy clay					
<b>Rock Type</b>	Fine gravel (40%), loose soil (10%), coarse gravel/pebbles (50%)					
<b>Vegetation</b>	<p><i>Acacia aneura</i> var. <i>microcarpa</i> low open woodland over <i>Acacia</i> sp. Weld Range (A. Markey &amp; S. Dillon 2994) open scrub over <i>Acacia ramulosa</i> var. <i>linophylla</i> open heath over <i>Calytrix desolata</i> low shrubland over <i>Eremophila exilifolia</i> and <i>Grevillea inconspicua</i> low open shrubland over <i>Duperreya commixta</i> climbers over <i>Goodenia tenuiloba</i> very open herbs over <i>Cymbopogon ambiguus</i> very open tussock grassland.</p>					
<b>Veg Condition</b>	Good (some grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Mod leaf litter, sparse wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Psydrax latifolia</i> , <i>Santalum spicatum</i>
<b>Shrubs &gt; 2m</b>	30 - 70%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	30 - 70%	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia speckii</i> , <i>Acacia tetragonophylla</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Eremophila exilifolia</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Dodonaea pachyneura</i> , <i>Eremophila exilifolia</i> , <i>Eremophila phyllopoda</i> subsp. <i>phyllopoda</i> , <i>Hibiscus sturtii</i> var. <i>forrestii</i> , <i>Pimelea microcephala</i> subsp. <i>microcephala</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna glauciflora</i> , <i>Spartothamnella teucriflora</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Amyema maidenii</i> , <i>Chorizema genistoides</i> , <i>Dodonaea amplisemina</i> , <i>Grevillea inconspicua</i> , <i>Indigofera monophylla</i> , <i>Ptilotus obovatus</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Eragrostis eriopoda</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
<b>Climbers</b>	2 - 10%	<i>Duperreya commixta</i>
<b>Herbs</b>	2 - 10%	<i>Goodenia tenuiloba</i> , <i>Haloragis trigonocarpa</i> , <i>Ptilotus helipteroides</i> , <i>Sida ectogama</i>

**722 WRE Site HR29**

<b>Described by</b>	SH	<b>Date:</b>	03/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Haul Road Centre					
<b>MGA Zone</b>	50	569789	<b>mE</b>	7026655	<b>mN</b>	
<b>Habitat</b>	Footslope, low relief hill, gentle slope					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Coarse gravel/pebbles (60%), stones/boulders (40%), scree					
<b>Vegetation</b>	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994) high open shrubland over <i>Eremophila exilifolia</i> , <i>Eremophila macmillaniana</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i> low shrubland and <i>Ptilotus obovatus</i> low open shrubland over numerous <i>Eriachne pulchella</i> subsp. <i>pulchella</i> and <i>Aristida contorta</i> tussock grassland.					
<b>Veg Condition</b>	Excellent (No grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf and wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
<b>Shrubs 1 - 2m</b>	< 2%	<i>Calytrix desolata</i> , <i>Eremophila macmillaniana</i>
<b>Shrubs &lt; 1m</b>	10 - 30%	<i>Calytrix desolata</i> , <i>Eremophila exilifolia</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna artemisioides</i> subsp. <i>x sturtii</i> , <i>Senna glaucifolia</i>
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Dodonaea amplisemina</i> , <i>Ptilotus obovatus</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Enneapogon cylindricus</i> , <i>Eriachne pulchella</i> subsp. <i>pulchella</i>
<b>Herbs</b>	< 2%	<i>Sida ectogama</i>

**722 WRE Site HR30**

<b>Described by</b>	SH	<b>Date:</b>	03/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Madoonga WD					
<b>MGA Zone</b>	50	569357	mE	7026385	mN	
<b>Habitat</b>	Undulating plain, low relief scree slope					
<b>Soil</b>	Red-orange sandy clay					
<b>Rock Type</b>	Coarse gravel/pebbles (90%), stones/boulders (10%)					
<b>Vegetation</b>	<i>Acacia aneura</i> var. <i>microcarpa</i> low open woodland over <i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i> high open shrubland over <i>Acacia grasbyi</i> shrubland over <i>Senna</i> sp. Austin (A. Strid 20210) low open shrubland and <i>Maireana georgeii</i> low shrubland over <i>Goodenia tenuiloba</i> very open herbs over <i>Eragrostis eriopodai</i> and <i>Aristida contorta</i> ) very open tussock grassland.					
<b>Veg Condition</b>	Good (minimal grazing)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf and wood litter, mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	2 - 10%	<i>Acacia aneura</i> var. <i>microcarpa</i>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia grasbyi</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i> , <i>Senna</i> sp. Austin (A. Strid 20210)
<b>Shrubs &lt; 1m</b>	2 - 10%	<i>Eremophila macmillaniana</i> , <i>Maireana thesioides</i> , <i>Salsola tragus</i> , <i>Scaevola spinescens</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna</i> sp. Austin (A. Strid 20210), <i>Senna</i> sp. Meekatharra (E. Bailey 1-26), <i>Senna stricta</i>
<b>Shrubs &lt; 0.5m</b>	10 - 30%	<i>Eremophila exilifolia</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Maireana convexa</i> , <i>Maireana georgei</i> , <i>Ptilotus obovatus</i> , <i>Ptilotus schwartzii</i> var. <i>georgei</i> , <i>Sclerolaena diacantha</i> , <i>Sida ectogama</i> , <i>Solanum ashbyae</i>
<b>Tussock grasses</b>	2 - 10%	<i>Aristida contorta</i> , <i>Eragrostis eriopoda</i>
<b>Herbs</b>	2 - 10%	<i>Goodenia tenuiloba</i>

**722 WRE Site MWD01**

<b>Described by</b>	SH	<b>Date:</b>	03/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	HR Cent					
<b>MGA Zone</b>	50	558832	mE	7019504	50	
<b>Habitat</b>	Flat/plain, floodplain, wetland-ish					
<b>Soil</b>	Red-orange clay/sandy clay					
<b>Rock Type</b>	Cracked clay, surface crust					
<b>Vegetation</b>	<i>Grevillea striata</i> and <i>Acacia aneura</i> var. <i>conifera</i> low woodland over <i>Scaevola spinescens</i> open shrubland over <i>Peplidium</i> sp. C Evol. Fl. Fauna Arid Aust. (N.T. Burbidge & A. Kanis 8158) and <i>Marsilea drummondii</i> herbs over <i>Eragrostis</i> sp. and <i>Eriachne helmsii</i> scattered tussock grassland.					
<b>Veg Condition</b>	Good (tracks, grazing, weeds)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Moderate leaf and wood litter mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Trees &lt; 10m</b>	10 - 30%	<i>Acacia aneura</i> var. <i>conifera</i> , <i>Grevillea striata</i> , <i>Santalum spicatum</i>
<b>Shrubs &gt; 2m</b>	< 2%	<i>Acacia craspedocarpa</i> , <i>Senna glutinosa</i> subsp. <i>chatelainiana</i>
<b>Shrubs 1 - 2m</b>	2 - 10%	<i>Scaevola spinescens</i>
<b>Tussock grasses</b>	< 2%	<i>Eragrostis</i> sp., <i>Eriachne helmsii</i>
<b>Climbers</b>	< 2%	<i>Lysiana murrayi</i>
<b>Herbs</b>	30 - 70%	<i>Centipeda thespidioides</i> , <i>Marsilea drummondii</i> , <i>Peplidium</i> sp. C Evol. Fl. Fauna Arid Aust. (N.T. Burbidge & A. Kanis 8158)
<b>Sedges</b>	< 2%	<i>Austrostipa elegantissima</i>

**722 WRE Site MWD02**

<b>Described by</b>	SH	<b>Date:</b>	03/07/08	<b>Type:</b>	Q	20x20
<b>Location</b>	Madoonga WD					
<b>MGA Zone</b>	50	558804	mE	7019050	mN	
<b>Habitat</b>	Flat/plain, seasonally inundated wetland					
<b>Soil</b>	Orange clay					
<b>Rock Type</b>	Cracked clay (10%), fine gravel (10%), coarse gravel/pebbles (80%)					
<b>Vegetation</b>	<i>Melaleuca stereophloia</i> high open shrubland over <i>Eremophila arachnoides</i> subsp. <i>arachnoides</i> shrubland over <i>Senna stricta</i> and <i>Sclerolaena densiflora</i> low open shrubland over <i>Zygophyllum ? eremaeum</i> open herbs over <i>Enneapogon cylindricus</i> open tussock grassland.					
<b>Veg Condition</b>	Good (some grazing from cows)					
<b>Fire Age</b>	None evident					
<b>Notes</b>	Sparse leaf and wood litter mainly under shrubs.					

**Species List:**

<b>Stratum</b>	<b>Cover</b>	<b>Species within each stratum</b>
<b>Shrubs &gt; 2m</b>	2 - 10%	<i>Acacia burkittii</i>
<b>Shrubs 1 - 2m</b>	10 - 30%	<i>Acacia tetragonophylla</i> , <i>Acacia victoriae</i> , <i>Eremophila arachnoides</i> subsp. <i>arachnoides</i> , <i>Hakea preissii</i> , <i>Melaleuca stereophloia</i> , <i>Senna glutinosa</i> subsp. x <i>luerssenii</i>
<b>Shrubs &lt; 1m</b>	< 2%	<i>Eremophila maculata</i> subsp. <i>brevifolia</i> , <i>Lycium australe</i> , <i>Rhagodia eremaea</i> , <i>Senna glaucifolia</i> ,
<b>Shrubs &lt; 0.5m</b>	2 - 10%	<i>Lawrencia chrysoderma</i> , <i>Maireana carnosae</i> , <i>Maireana lobiflora</i> , <i>Maireana triptera</i> , <i>Ptilotus obovatus</i> , <i>Sclerolaena densiflora</i> , <i>Senna</i> sp. Meekatharra (E. Bailey 1-26), <i>Senna stricta</i> , <i>Solanum ashbyae</i> , <i>Zygophyllum aurantiacum</i>
<b>Tussock grasses</b>	10 - 30%	<i>Enneapogon cylindricus</i> , <i>Eragrostis dielsii</i>
<b>Herbs</b>	10 - 30%	<i>Boerhavia coccinea</i> , <i>Goodenia berardiana</i> , <i>Ptilotus exaltatus</i> , <i>Ptilotus helipteroides</i> , <i>Schoenia cassiniana</i> , <i>Zygophyllum ? eremaeum</i>

## **APPENDIX F            DENDOGRAM OF MULTVARIATE ANALYSIS**



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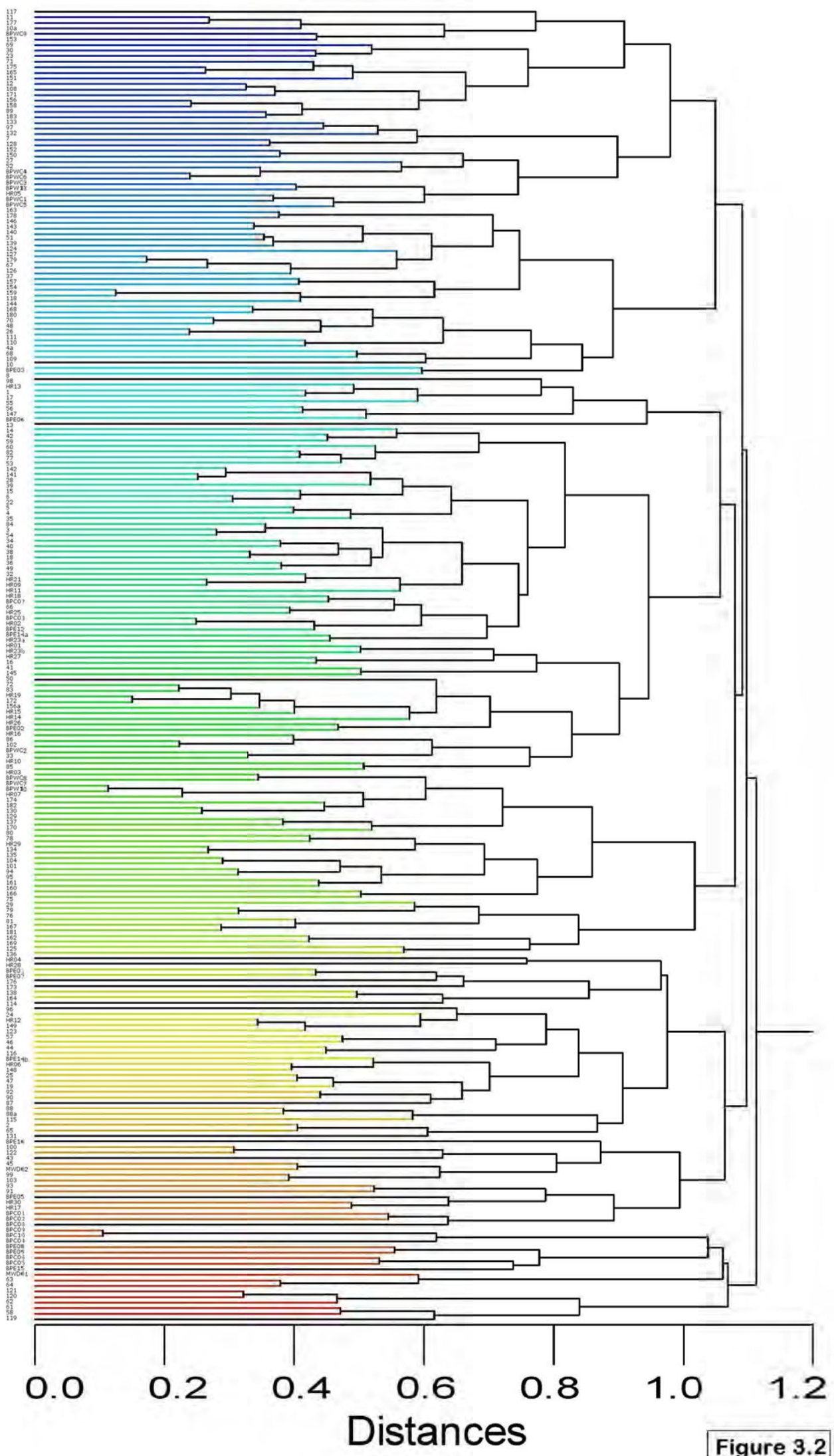


Figure 3.2

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## **APPENDIX G SPECIES BY SITE MATRIX**

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NAME	WREIA01	WREIA02	WREIA03	WREIA04	WREIA05	WREIA06	WREIA07	WREIA08	WREIA10	WREIA10C	WREIA10I	WREIA10J	WREIA10K	WREIA10L	WREIA10M	WREIA11	WREIA11C	WREIA11I	WREIA11J	WREIA11K	WREIA11L	WREIA12	WREIA13	WREIA14	WREIA15	WREIA16	WREIA17	WREIA18	WREIA19	WREIA22	WREIA23	WREIA24	WREIA25	WREIA26	WREIA27	WREIA28	WREIA29	WREIA30	WREIA32	WREIA33	WREIA34	WREIA35	WREIA36	WREIA37	WREIA38	WREIA39	WREIA40	WREIA41	WREIA42	WREIA43					
<i>Enneapogon cylindricus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Eragrostis australasica</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Eragrostis eriopoda</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Eragrostis setifolia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Eremophila arachnoides</i> subsp. <i>arachnoides</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Eremophila clarkei</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	1	0	0	0	1	0.1	1	0	0	0		
<i>Eremophila compacta</i> subsp. <i>compacta</i>	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Eremophila compacta</i> subsp. <i>fecunda</i>	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Eremophila exilifolia</i>	0	0	0	0	0	0	0	0	0	1	0	0	2	0.1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Eremophila falcata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Eremophila foliosissima</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0		
<i>Eremophila forrestii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	3	0.1	3	2	2	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	3	3	2	0	4	0	4	0	0	2	1	0	0	3	2	2	1	2	0	3	0	3	3	4	0	0	0			
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	0	0.1	0	0	0	0	0	0	0	0	0	0	2	0.1	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Eremophila galeata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Eremophila georgei</i>	0	0	0	0.1	1	0.1	0	0	1	0	1	0	0	0	0	0.1	1	3	0	0	2	1	1	0	0	0	1	1	1	0	0	1	1	0	0	1	2	4	2	1	0	1	0	0	0	0	0	3	1	0.1	2	1	0		
<i>Eremophila glabra</i> subsp. <i>glabra</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Eremophila glabra</i> subsp. <i>tomentosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Eremophila glutinosa</i>	0	0	0	0	0	0	0	3	1	0	0	1	0	0	3	4	1	0	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	
<i>Eremophila granitica</i>	1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0			
<i>Eremophila jucunda</i> subsp. <i>jucunda</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	0	0	0	0	0	0	3	1	2	1	0.1	0	0.1	0	1	1	0.1	2	1	0	2	0	1	0	0	0	0	0.1	0	1	0	0	2	1	2	2	1	0	0	0	0	0	0	0	0	0	2	0	0.1	1	0	0.1	0		
<i>Eremophila longifolia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Eremophila macmilliana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eremophila maculata</i> subsp. <i>brevifolia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eremophila margarethae</i>	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Eremophila pantonii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eremophila phyllopoda</i> subsp. <i>phyllopoda</i>	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eremophila platycalyx</i> subsp. <i>platycalyx</i>	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Eremophila punicea</i>	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eremophila simulans</i> subsp. <i>simulans</i>	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0	0	0.1	0	0	0																







NAME	WREIA44	WREIA45	WREIA46	WREIA47	WREIA48	WREIA49	WREIA50	WREIA51	WREIA52	WREIA53	WREIA54	WREIA55	WREIA56	WREIA57	WREIA58	WREIA59	WREIA60	WREIA61	WREIA62	WREIA63	WREIA64	WREIA65	WREIA66	WREIA67	WREIA68	WREIA69	WREIA70	WREIA71	WREIA72	WREIA75	WREIA76	WREIA77	WREIA78	WREIA79	WREIA80	WREIA81	WREIA82	WREIA83	WREIA84	WREIA85	WREIA86	WREIA87	WREIA88	WREIA89	WREIA90	WREIA91	WREIA92	WREIA93	WREIA94			
<i>Abutilon macrum</i>	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0.1	3	0	0.1	0	0	0	0	0	0	2	0	0
<i>Abutilon otocarpum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Abutilon oxycarpum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Abutilon oxycarpum</i> subsp. <i>prostratum</i>	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1		
<i>Acacia aff. quadrimarginea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia aneura</i> var. <i>aneura</i>	1	0	1	4	1	2	2	3	1	3	3	2	1	3	0	3	1	0	0	2	0	3	0	3	3	0.1	2	3	3	1	4	3	2	3	3	1	3	3	2	0	0.1	2	1	3	3	1	1	3	1			
<i>Acacia aneura</i> var. <i>argentea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Acacia aneura</i> var. <i>conifera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Acacia aneura</i> var. <i>fuliginea</i>	0	0	0	2	0	0	0	0	0	2	2	2	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	
<i>Acacia burkittii</i>	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	3	0	0	0		
<i>Acacia cockertoniana</i>	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia effusifolia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Acacia craspedocarpa</i>	1	0	0.1	2	0	0	0	0	0	0	0	0	0	2	0	0	0.1	0	0	3	1	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	1	2	3	0
<i>Acacia cuthbertsonii</i> subsp. <i>cuthbertsonii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Acacia exocarpoides</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Acacia grasbyi</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Acacia minyura</i>	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	
<i>Acacia murrayana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Acacia pruinocarpa</i>	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>Acacia quadrimarginea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Acacia ramulosa</i> var. <i>linophylla</i>	0	0	0	0	0	2	3	0	2	2	3	0	4	3	0	1	3	0	0	0	0	0	4	0	0	0	0	0	4	2	0	3	0	0	0	0	0	2	3	3	3	3	2	0	0	0	0	0	2	0	0	
<i>Acacia ramulosa</i> var. <i>ramulosa</i>	0	0	0	2	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0		
<i>Acacia rhodophloia</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	
<i>Acacia sibirica</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.1	0	3	0	0	
<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
<i>Acacia speckii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	
<i>Acacia tetragonophylla</i>	2	0	2	3	0	0	0	0	0	0	0	0	0	2	0	0	0.1	0	0	2	0.1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	2	1	3	1	1
<i>Acacia victoriae</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Allocastrum acutivalvis</i> subsp. <i>acutivalvis</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Aluta aspera</i> subsp. <i>hesperia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Atriplex bunburyana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Atriplex nummularia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Atriplex semilunaris</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Atriplex vesicaria</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Austrostipa elegantissima</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Austrostipa scabra</i>	0	4	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0																																		





NAME	WREIA44	WREIA45	WREIA46	WREIA47	WREIA48	WREIA49	WREIA50	WREIA51	WREIA52	WREIA53	WREIA54	WREIA55	WREIA56	WREIA57	WREIA58	WREIA59	WREIA60	WREIA61	WREIA62	WREIA63	WREIA64	WREIA65	WREIA66	WREIA67	WREIA68	WREIA69	WREIA70	WREIA71	WREIA72	WREIA75	WREIA76	WREIA77	WREIA78	WREIA79	WREIA80	WREIA81	WREIA82	WREIA83	WREIA84	WREIA85	WREIA86	WREIA87	WREIA88	WREIA89	WREIA90	WREIA91	WREIA92	WREIA93	WREIA94								
<i>Sclerolaena densiflora</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0					
<i>Sclerolaena diacantha</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
<i>Sclerolaena eriacantha</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Senna artemisioides</i> subsp. <i>filifolia</i>	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.1	3	2	1	2	4	1	0	0	0	0	0	0	0	0	0.1	0	1	1	3	0	0			
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Senna artemisioides</i> subsp. <i>petiolaris</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0			
<i>Senna artemisioides</i> subsp. <i>x artemisioides</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0				
<i>Senna artemisioides</i> subsp. <i>x sturtii</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Senna glaucifolia</i>	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0			
<i>Senna</i> sp. Austin (A. Strid 20210)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0	1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	2	2	3	0	0				
<i>Senna stricta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Sida calyxhymentia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2	0				
<i>Sida cardiophylla</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Sida ectogama</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Sida fibulifera</i>	0	0	0	0	0	2	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Sida</i> sp. dark green fruit (S. van Leeuwen 2260)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Sida</i> sp. Golden calyces pubescent (G.J. Leach 1966)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Sida spodochroma</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Solanum ashbyae</i>	1	1	1	1	1	2	1	1	0	1	1	1	0	1	0	1	2	0	0	0	0	1	2	1	1	0	1	0	2	0.1	1	1	1	2	1	0.1	1	2	1	0.1	0.1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
<i>Solanum centrale</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Solanum ellipticum</i>	0	0	0	0	0	0	0.1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
<i>Solanum ferocissimum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Spartothamnella teucriiflora</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Stenanthemum patens</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Stenanthemum petraeum</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Thryptomene decussata</i>	0	0	0	0	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Tribulus suberosus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Zygophyllum aurantiacum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0









NAME	WREIA95	WREIA96	WREIA97	WREIA98	WREIA99	WRE210a	WRE2115	WRE2116	WRE2117	WRE2118	WRE2119	WRE2120	WRE2121	WRE2122	WRE2123	WRE2124	WRE2125	WRE2126	WRE2127	WRE2128	WRE2129	WRE2130	WRE2131	WRE2132	WRE2133	WRE2134	WRE2135	WRE2136	WRE2137	WRE2138	WRE2139	WRE2140	WRE2141	WRE2142	WRE2143	WRE2144	WRE2145	WRE2146	WRE2147	WRE2148	WRE2149	WRE2150	WRE2151	WRE2152	WRE2153	WRE2154	WRE2156	WRE2157							
<i>Sclerolaena densiflora</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
<i>Sclerolaena diacantha</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Sclerolaena eriacantha</i>	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Senna artemisioides</i> subsp. <i>filifolia</i>	0	0	0	0	0	0	0	0	0	0	2	0.1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	1	0	0	0	0	0	2	0.1	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Senna artemisioides</i> subsp. <i>petiolaris</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Senna artemisioides</i> subsp. <i>x artemisioides</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Senna artemisioides</i> subsp. <i>x sturtii</i>	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Senna glaucifolia</i>	2	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	1	0.1	0.1	0	0	0	0	0.1	1	0	0	0	0.1	0	0	0	0	0.1	0	2	0	0	0	0	0	0	0			
<i>Senna</i> sp. Austin (A. Strid 20210)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0	0	0	0	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Senna stricta</i>	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Sida calyxhymentia</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Sida cardiophylla</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Sida ectogama</i>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Sida fibulifera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Sida</i> sp. dark green fruit (S. van Leeuwen 2260)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Sida</i> sp. Golden calyces glabrous (H.N. Foote 32)	0	0	0	0.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Sida</i> sp. Golden calyces pubescent (G.J. Leach 1966)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Sida spodochroma</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Solanum ashbyae</i>	1	0.1	0.1	0.1	1	0.1	2	0.1	0	1	0	0.1	0	1	0.1	0	0	0.1	1	1	0	0	2	1	0	0	0.1	1	0.1	1	1	0.1	1	1	0.1	0.1	0.1	2	1	0	1	0	0	0	0	0	2	1	1	0.1	0	0			
<i>Solanum centrale</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Solanum ellipticum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Solanum ferocissimum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Spartothamnella teucriiflora</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Stenanthemum patens</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Stenanthemum petraeum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Thryptomene decussata</i>	0	0	0	0.1	0	0.1	0	0	1	3	0	0	0	0	0	2	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Tribulus suberosus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Zygophyllum aurantiacum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0





NAME	WRE2158	WRE2159	WRE2160	WRE2161	WRE2162	WRE2163	WRE2164	WRE2165	WRE2166	WRE2167	WRE2168	WRE2169	WRE2170	WRE2171	WRE2172	WRE2173	WRE2174	WRE2175	WRE2176	WRE2177	WRE2178	WRE2179	WRE2180	WRE2181	WRE2182	WRE2183	HR01	HR02	HR03	HR04	HR05	HR06	HR07	HR09	HR10	HR11	HR12	HR13	HR14	HR15	HR16	HR17	HR18	HR19	HR21	HR23a	HR23b	HR25	HR26										
<i>Hakea preissii</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
<i>Hakea recurva</i> subsp. <i>arida</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
<i>Tecticornia doleiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
<i>Tecticornia indica</i> subsp. <i>bidens</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
<i>Tecticornia indica</i> subsp. <i>leiostrachya</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
<i>Harnieria kempeana</i> subsp. <i>muelleri</i>	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0						
<i>Heliotropium ovalifolium</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
<i>Hemigenia tysonii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
<i>Hibiscus burtonii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
<i>Hibiscus coatesii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Hibiscus sturtii</i> var. <i>forrestii</i>	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
<i>Indigofera monophylla</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
<i>Lawrenzia chrysoderma</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
<i>Lawrenzia densiflora</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
<i>Leptomeria preissiana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Maireana appressa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Maireana carnososa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Maireana georgei</i>	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Maireana glomerifolia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Maireana lobiflora</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Maireana melanocoma</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Maireana planifolia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Maireana platycarpa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Maireana thesioides</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Maireana tomentosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Maireana triptera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Maireana villosa</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Melaleuca stereophloia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Micromyrtus placoides</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Micromyrtus sulphurea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Mirbelia rhagodioides</i>	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Monachather paradoxus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Muehlenbeckia florulenta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Olearia plucheacea</i>	0																																																										



NAME	HR27	HR28	HR29	HR30	MWWD01	MWWD02	BPC01	BPC02	BPC03	BPC04	BPC05	BPC06	BPC07	BPC08	BPC09	BPC10	BPE01	BPE02	BPE03	BPE05	BPE06	BPE07	BPE08	BPE09	BPE12	BPE14a	BPE14b	BPE15	BPE16	BPW01	BPW02	BPW03	BPW04	BPW05	BPW06	BPW07	BPW08	BPW09	BPW10	BPW13					
<i>Abutilon macrum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Abutilon otocarpum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Abutilon oxycarpum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0		
<i>Abutilon oxycarpum</i> subsp. <i>prostratum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Acacia</i> aff. <i>oswaldii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia</i> aff. <i>quadrifurcata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia aneura</i> var. <i>aneura</i>	2	2	0	2	3	0	3	0	2	0	0	0	2	0	2	0	0	3	0	0	0	0	2	1	3	1	0	0	0	0.1	2	2	2	3	1	2	1	3	0	0	0	0			
<i>Acacia aneura</i> var. <i>argentea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Acacia aneura</i> var. <i>conifera</i>	0	0	0	0	3	0	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Acacia aneura</i> var. <i>fuliginea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Acacia burkittii</i>	0	0	0	0	0	0.1	0	0	2	4	0	0	0	0	2	3	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia cockertoniana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	0	2	3	3	4	1	2	3	3	2	0	0			
<i>Acacia effusifolia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia craspedocarpa</i>	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia cuthbertsonii</i> subsp. <i>cuthbertsonii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia exocarpoides</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia grasbyi</i>	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia minyura</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia murrayana</i>	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia pruinocarpa</i>	0	0	0	0	0	0	0	0	0	0	0	0	2	0.1	0	0	0	0.1	1	0	0	0	2	0	0	2	0	0	0	0.1	0	0	2	0	0	0	0	0	0	0	0	0	1	0	
<i>Acacia quadrifurcata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia ramulosa</i> var. <i>linophylla</i>	0	4	0	0	0	0	0	0	3	0	0	0	1	0.1	0	0	3	3	0	0	0	2	0	0	2	2	3	0	3	0	3	0	0	0	0	0	0	0	0	3	3	0	0		
<i>Acacia ramulosa</i> var. <i>ramulosa</i>	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia rhodophloia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia sibirica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	0	0	0	0	2	0			
<i>Acacia speckii</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia tetragonophylla</i>	0	2	0	1	0	0.1	0.1	2	0	0	0	0	0	0	0.1	0	2	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Acacia victoriae</i>	0	0	0	0	0	1	0.1	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Aluta aspera</i> subsp. <i>hesperia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	0	0		
<i>Atriplex bunburyana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Atriplex nummularia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Atriplex semilunaris</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Atriplex vesicaria</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Austrostipa elegantissima</i>	0	0	0	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Austrostipa scabra</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Baekkea</i> sp. Melita Station (H. Pringle 2738)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Bergia perennis</i> subsp. <i>exigua</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Brachychiton gregorii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Calytrix desolata</i>	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Cheilanthes lasiophylla</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0											







NAME	HR27	HR28	HR29	HR30	MWWD01	MWWD02	BPC01	BPC02	BPC03	BPC04	BPC05	BPC06	BPC07	BPC08	BPC09	BPC10	BPE01	BPE02	BPE03	BPE05	BPE06	BPE07	BPE08	BPE09	BPE12	BPE14a	BPE14b	BPE15	BPE16	BPW01	BPW02	BPW03	BPW04	BPW05	BPW06	BPW07	BPW08	BPW09	BPW10	BPW13					
<i>Sclerolaena densiflora</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>Sclerolaena diacantha</i>	0	0	0	0	0	0	0	0	0	0	0.1	2	0	1	0.1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Sclerolaena ericantha</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Senna artemisioides</i> subsp. <i>filifolia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.1	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1	0	0	2	0	2	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Senna artemisioides</i> subsp. <i>petiolaris</i>	0	0	0	0	0	0	1	3	1	2	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Senna artemisioides</i> subsp. <i>x artemisioides</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Senna artemisioides</i> subsp. <i>x sturtii</i>	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Senna glaucifolia</i>	0.1	2	1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0.1	0	2	0.1	0.1	0.1	0	0	0	0	0	0	2	0		
<i>Senna</i> sp. Austin (A. Strid 20210)	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0	0	0	1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Senna stricta</i>	0	0	0	1	0	2	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0		
<i>Sida calyxhymenia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Sida cardiophylla</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0.1	0	0	1	0	0			
<i>Sida ectogama</i>	0	1	0.1	1	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	1	0	0	3	0.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Sida fibulifera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Sida</i> sp. dark green fruit (S. van Leeuwen 2260)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>Sida</i> sp. golden calyces glabrous (H.N. Foote 32)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Sida</i> sp. Golden calyces pubescent (G.J. Leach 1966)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Sida spodochroma</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Solanum ashbyae</i>	2	0	1	1	0	2	0.1	0	0	0.1	0	0	2	1	1	1	0	1	0.1	1	0	0	0	0	0	0.1	1	0	2	0.1	1	0	0	1	0	0	0	0	0	0	0	0	0.1	0	
<i>Solanum centrale</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Solanum ellipticum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Solanum ferocissimum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Spartothamnella teucriiflora</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Stenanthemum patens</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Stenanthemum petraeum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Thryptomene decussata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0	
<i>Tribulus suberosus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Zygophyllum aurantiacum</i>	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

## **APPENDIX H      VEGETATION MAPS AT HIGHER RESOLUTION**



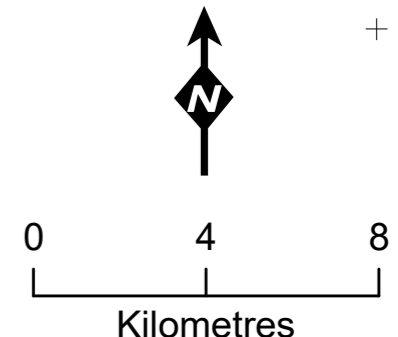
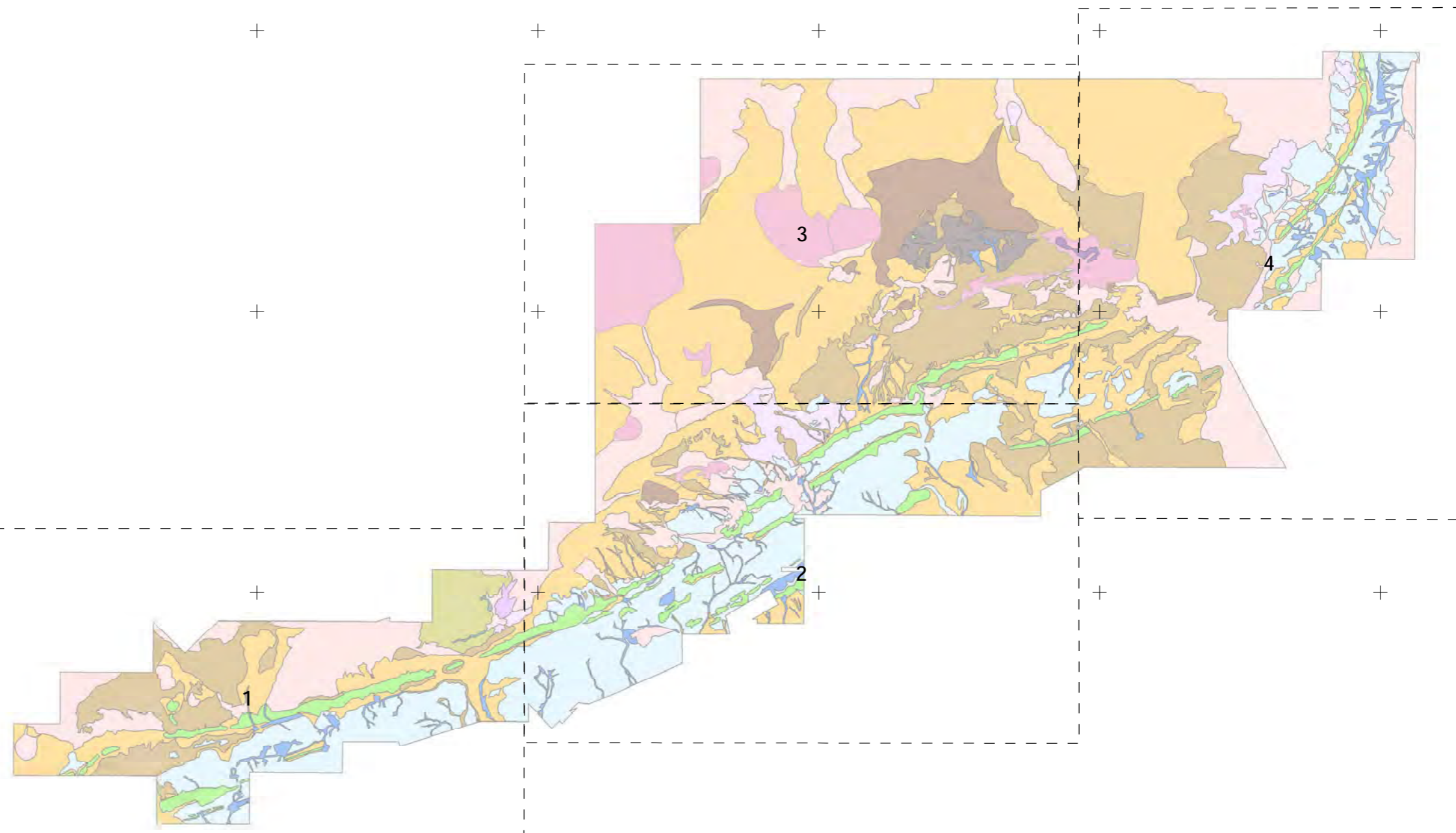
• **Figure G.1:** Legend for Vegetation Communities.

530000 540000 550000 560000 570000 580000 590000

7040000  
7030000  
7020000  
7010000

**Legend**

- 1 and 2 *Acacia aneura* low woodland over mixed open shrubs.
- 3a +/- *Corymbia lenziana* scattered medium trees over *Acacia ramulosa* var. *linophylla* and *Acacia aneura* sparse shrubland over mixed *Eremophila* spp. open shrubland over scattered low shrubs of *Ptilotus obovatus* over open tussock grasses.
- 3b +/- *Acacia pruinocarpa* scattered trees over *A. aneura* woodland over *A. ramulosa* var. *linophylla* and *A. aneura* shrubland over mixed *Eremophila* spp. closed shrubland over *Ptilotus obovatus* open low shrubland.
- 3c Scattered *Eucalyptus mallees* / trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Rhagodia eremaea*, *Eremophila forrestii* subsp. *forrestii* shrubland over *Ptilotus obovatus* open low shrubland.
- 3d *Acacia aneura* and *Acacia cockertoniana* open tall shrubland over *Eremophila simulans* subsp. *simulans* and *Aluta aspera* subsp. *hesperia* low open shrubland.
- 4a *Acacia* sp. Weld Range and *A. aneura* var. *microcarpa* open tall shrubland over *Eremophila macmillaniana* and mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* open low shrubland.
- 4b *Acacia* sp. Weld Range and *Acacia speckii* shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* and *Dodonaea amplisemina* open shrubland over *Cymbopogon ambiguus* sparse tussock grassland.
- 5a *Acacia craspedocarpa* tall shrubland over *Solanum ashbyae* / *lasiophyllum* and *Ptilotus obovatus* low shrubland over mixed low tussock grassland.
- 5b +/- *Grevillea striata* low isolated trees over *Acacia craspedocarpa* and *A. aneura* tall open shrubland over *Scaevola spinescens* sparse mid shrubland over *Austrostipa elegantissima* and *Eriachne flaccida* low open tussock grassland.
- 6a Scattered *Acacia* shrubs over mixed *Senna* spp. open mid shrubland over *Ptilotus obovatus* sparse shrubland over mixed *Maireana* spp. chenopod shrubland.
- 6b Scattered mixed *Acacia* spp. over *Rhagodia eremaea* and *Scaevola spinescens* sparse mid to low shrubland over *Ptilotus obovatus*, *Maireana georgei* and *Sclerolaena diacantha* low chenopod shrubland.
- 6c *Eremophila maculata* subsp. *brevifolia* low open shrubland over *Sclerolaena diacantha* low chenopod shrubland over *Enneapogon cylindricus* low tussock grassland.
- 7a *Melaleuca stereophloia* and *Cratystylis subspinescens* low shrubland over *Tecticornia* spp. low samphire shrubland over *Frankenia laxiflora* low shrubland.
- 7b *Eucalyptus carnei* and *Eucalyptus trivalva* woodland over *Cratystylis subspinescens* and *Muehlenbeckia florulenta* low sparse shrubland over mixed low tussock grasses.
- Map View Areas



Absolute Scale - 1:175,000



**Weld Range Vegetation Overview Map**

Figure: 4.2  
Project ID: 722

Drawn: SG  
Date: 04/11/09

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Unique Map ID: S055

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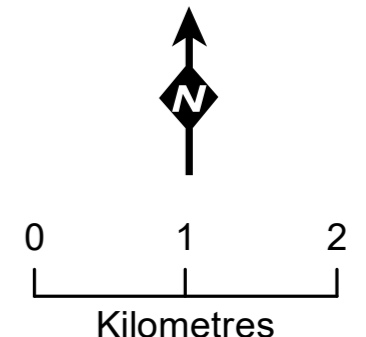
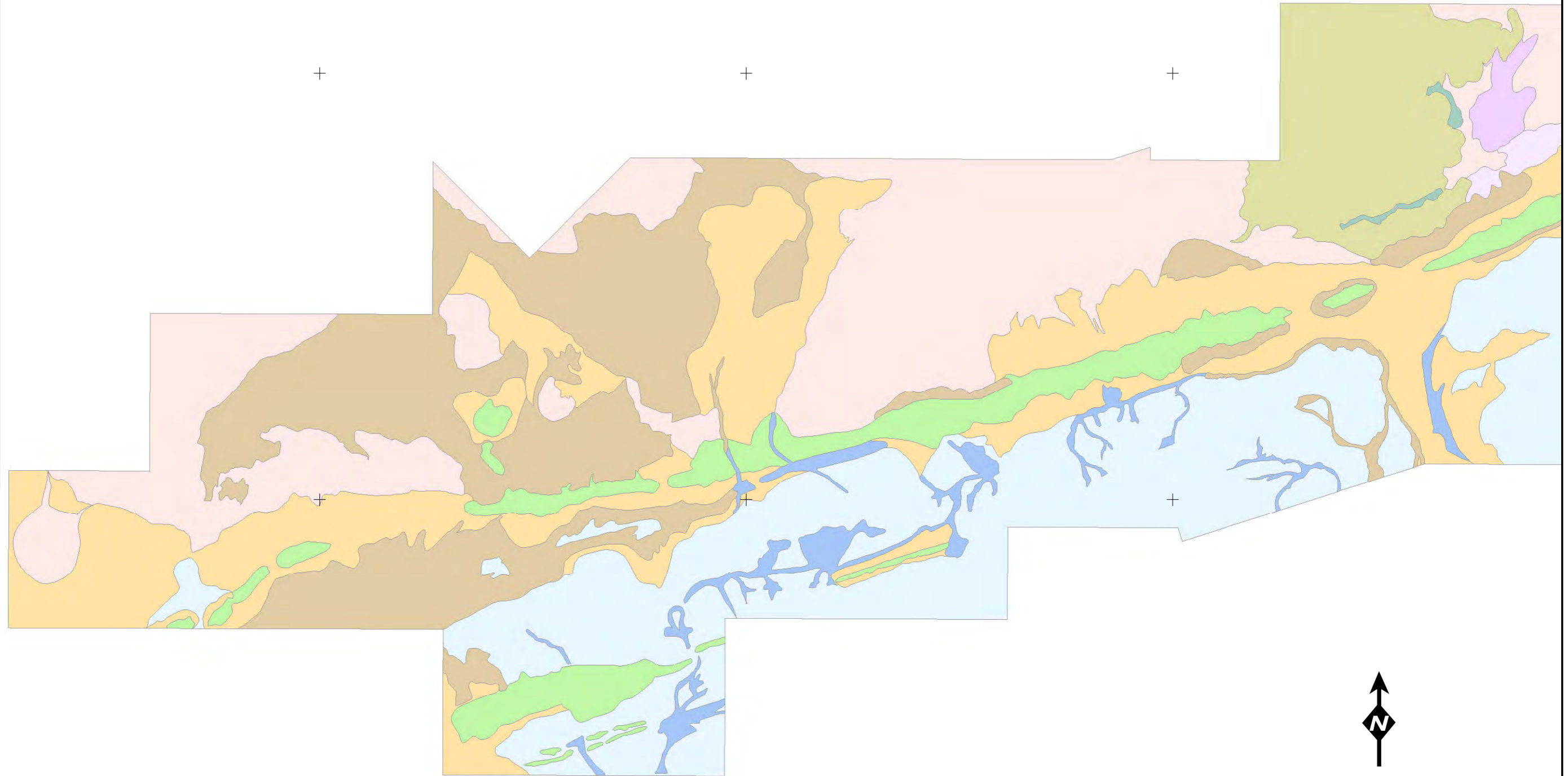
540000 545000 550000 555000

7020000

7015000

**Legend**

- 1 and 2
- 3a
- 3b
- 3c
- 3d
- 4a
- 4b
- 5a
- 5b
- 6a
- 6b
- 6c
- 7a
- 7b



Absolute Scale - 1:50,000



**Weld Range  
Vegetation Map 1**

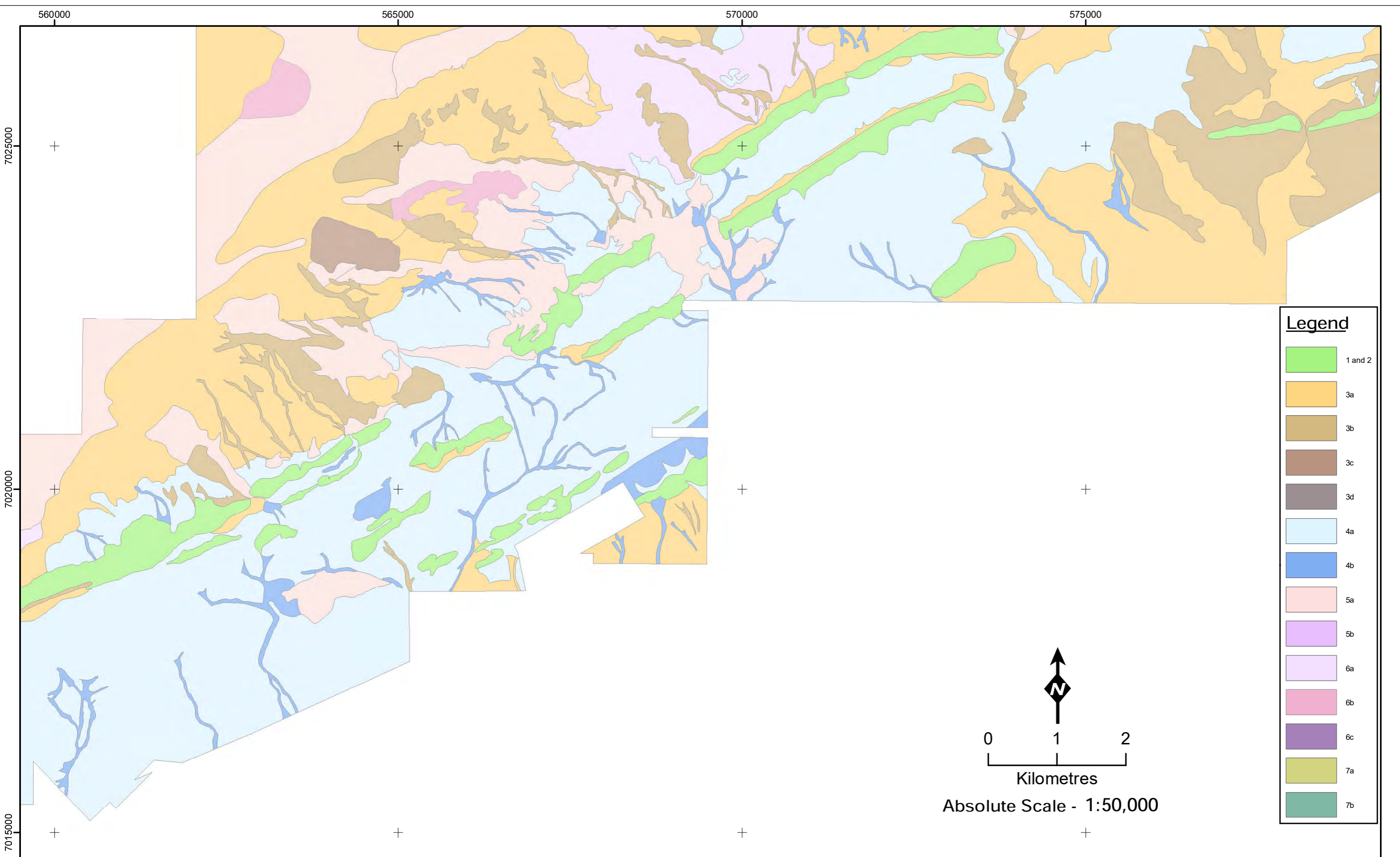
Figure: G.2  
Project ID: 722

Drawn: SG  
Date: 04/11/09

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994


Unique Map ID: S056

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**Legend**

- 1 and 2
- 3a
- 3b
- 3c
- 3d
- 4a
- 4b
- 5a
- 5b
- 6a
- 6b
- 6c
- 7a
- 7b

  
 0      1      2  
 Kilometres  
 Absolute Scale - 1:50,000



## Weld Range Vegetation Map 2

Figure: G.3  
Project ID: 722

Drawn: SG  
Date: 04/11/09

*Coordinate System*  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Unique Map ID: S057



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560000 565000 570000 575000

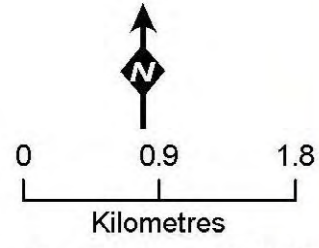
**Legend**

- 1 and 2
- 3a
- 3b
- 3c
- 3d
- 4a
- 4b
- 5a
- 5b
- 6a
- 6b
- 6c
- 7a
- 7b



7035000

7030000



Absolute Scale - 1:50,000



**Weld Range  
Vegetation Map 3**

Figure: G.4  
Project ID: 722

Drawn: SG  
Date: 04/11/09

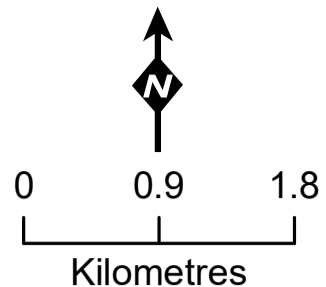
Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Unique Map ID: S058

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580000 585000 590000

7040000

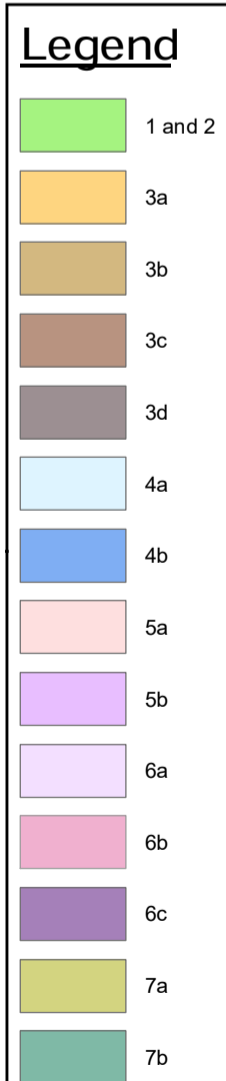
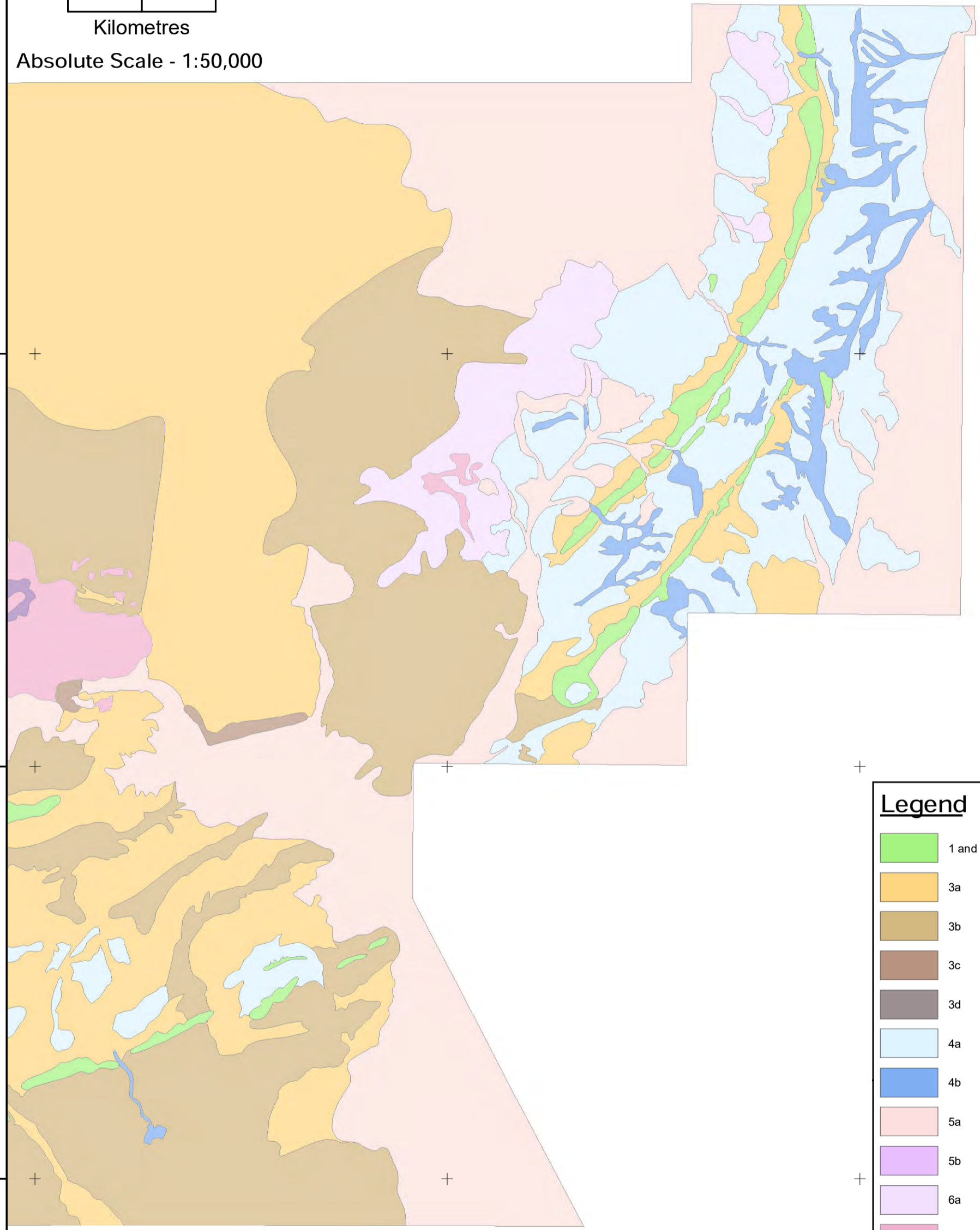


Absolute Scale - 1:50,000

7035000

7030000

7025000



**Weld Range  
Vegetation Map 4**

Figure: G.5  
Project ID: 722

Drawn: SG  
Date: 04/11/09

Coordinate System  
Name: GDA 1994 MGA Zone 50  
Projection: Transverse Mercator  
Datum: GDA 1994

Unique Map ID: S059

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## **APPENDIX I                    EXPLANATION OF CONSERVATION CODES**

**Table H.1:** Explanation of Codes for Threatened Ecological Communities (TEC).

Code	Definition
PD: Presumed Totally Destroyed	An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and one of two conditions (A or B) apply.
CR: Critically Endangered	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. An ecological community will be listed as <i>Critically Endangered</i> when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This is determined on the basis of the best available information and by it meeting one or more of three criteria (not included here).
EN: Endangered	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. An ecological community will be listed as <i>Endangered</i> when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This is determined on the basis of the best available information and by it meeting one or more of three criteria (not included here).
VU: Vulnerable	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range. An ecological community will be listed as <i>Vulnerable</i> when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This is determined on the basis of the best available information and by it meeting one or more of three criteria (not included here).

**Table H.2:** Explanation of Codes for Priority Ecological Communities (PEC).

Code	Definition
P1: Priority One	Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
P2: Priority Two	Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
P3: Priority Three	<p>(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:</p> <p>(ii) Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;</p> <p>(iii) Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.</p> <p>Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.</p>
P4: Priority Four	<p>Ecological communities that are adequately known, <i>Rare</i> but not threatened or meet criteria for <i>Near Threatened</i>, or that have been recently removed from the threatened list. These communities require regular monitoring.</p> <p>(a) <i>Rare</i>. Ecological communities known from few occurrences 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 communities are usually represented on conservation lands.</p> <p>(b) <i>Near Threatened</i>. Ecological communities that are considered to have been adequately surveyed and that do not qualify for <i>Conservation Dependent</i>, but that are close to qualifying for <i>Vulnerable</i>.</p> <p>(c) Ecological communities that have been removed from the list of threatened communities during the past five years.</p>
P5: Priority Five	Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.



**Table H.3:** Explanation of Codes for Flora Protected under the Commonwealth EPBC Act.

Conservation Category	Definition
Extinct	A species is extinct if there is no reasonable doubt that the last member of the species has died.
Extinct in the wild	A species is categorised as extinct in the wild if it is only known to survive in cultivation, in captivity or as a naturalised population well outside its past range; or if it has not been recorded in its known/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	The species is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered	The species is likely to become extinct unless the circumstances and factors threatening its abundance, survival or evolutionary development cease to operate; or its numbers have been reduced to such a critical level, or its habitats have been so drastically reduced, that it is in immediate danger of extinction.
Vulnerable	Within the next 25 years, the species is likely to become endangered unless the circumstances and factors threatening its abundance, survival or evolutionary development cease to operate.
Conservation Dependent	The species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of five years.

**Table H.4:** Definition of Declared Rare and Priority Flora Categories.

Code	Definition
DRF	Declared Rare Flora-Extant Taxa. Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.
P1: Priority One	Poorly Known Taxa. Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2: Priority Two	Poorly Known Taxa. Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P3: Priority Three	Poorly Known Taxa. Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.
P4: Priority Four	Rare Taxa. Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

Atkins, K.J., Declared Rare and Priority Flora List, Oct. 2010, DEC.

**APPENDIX J      SPECIES LIST**

Family	Species	P1	P2	P3	R	TFS
Acanthaceae	<i>Harnieria kempeana</i> subsp. <i>muelleri</i>	x	x	x		x
Adiantaceae	<i>Cheilanthes lasiophylla</i>	x	x	x		
	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	x	x	x		
Aizoaceae	<i>Trianthema oxycalyptra</i> var. <i>oxycalyptra</i>			x		
Amaranthaceae	<i>Alternanthera denticulata</i>	x		x		x
	<i>Amaranthus cuspidifolius</i>	x		x		
	<i>Ptilotus ?clementii</i>			x		
	<i>Ptilotus aevoides</i>	x				
	<b>☞ <i>Ptilotus luteolus</i> (P1)</b>		x			x
	<b>☞ <i>Ptilotus beardii</i> (P3)</b>	x	x	x	x	x
	<i>Ptilotus divaricatus</i> var. <i>divaricatus</i>	x	x			
	<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>	x		x		
	<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>	x				x
	<i>Ptilotus gomphrenoides</i>					x
	<i>Ptilotus helipteroides</i> var. <i>helipteroides</i>	x		x		
	<i>Ptilotus obovatus</i>	x	x	x	x	x
	<i>Ptilotus polystachyus</i> var. <i>polystachyus</i>	x	x			
	<i>Ptilotus roei</i>	x		x		x
	<i>Ptilotus rotundifolius</i>	x	x	x		x
	<i>Ptilotus schwartzii</i> var. <i>georgei</i>			x		x
	<i>Ptilotus schwartzii</i> var. <i>schwartzii</i>	x	x		x	x
Asclepiadaceae	<i>Marsdenia australis</i>	x	x	x	x	x
	<i>Rhyncharrhena linearis</i>	x				
Asparagaceae	<i>Thysanotus manglesianus</i>	x	x			
Asteraceae	<i>Angianthus tomentosus</i>	x				
	<i>Brachyscome ciliaris</i> var. <i>ciliaris</i>	x				
	<i>Calocephalus multiflorus</i>	x	x			
	<i>Centipeda thespidioides</i>			x		
	<i>Cratystylis subspinescens</i>	x	x	x		
	<i>Erymophyllum ramosum</i>	x				

Family	Species	P1	P2	P3	R	TFS
	<i>Gnephosis tenuissima</i>	x	x			
	<i>Minuria cunninghamii</i>	x				
	<i>Myriocephalus guerinae</i>	x				
	<i>Olearia humilis</i>	x				
	<i>Olearia plucheacea</i>	x	x			
	<i>Olearia stuartii</i>	x	x			
	<i>Pluchea dentex</i>	x		x		
	<i>Podolepis capillaris</i>	x	x		x	
	<i>Podolepis lessonii</i>	x				
	<i>Pogonolepis stricta</i>	x				
	<i>Pterocaulon sphacelatum</i>	x				
	<i>Rhodanthe citrina</i>	x				
Asteraceae	<i>Rhodanthe humboldtiana</i>	x				
	<i>Rhodanthe sterilescens</i>			x		
	<i>Schoenia cassiniana</i>	x		x		x
	<b>*<i>Sonchus oleraceus</i></b>	x				
	<i>Streptoglossa cylindriceps</i>	x				
	<i>Streptoglossa liatroides</i>			x		
	<i>Vittadinia ?sulcata</i>	x				
	<i>Waitzia acuminata</i> var. <i>acuminata</i>	x				
Boraginaceae	<i>Halgania cyanea</i> var. Allambi Stn (B.W. Strong 676)	x				x
	<i>Heliotropium inexplicitum</i>		x			
	<i>Heliotropium ovalifolium</i>	x		x		x
	<i>Heliotropium pachyphyllum</i>					x
	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	x				
Brassicaceae	<i>Lepidium phlebopetalum</i>					x
	<i>Lepidium platypetalum</i>	x				
Caesalpiniaceae	<i>Senna artemisioides</i> subsp. <i>artemisioides</i>	x		x		
	<i>Senna artemisioides</i> subsp. <i>filifolia</i>	x	x			x
	<i>Senna artemisioides</i> subsp. <i>helmsii</i>	x	x	x		x
	<i>Senna artemisioides</i> subsp. <i>oligophylla</i>		x			

Family	Species	P1	P2	P3	R	TFS
	<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>	x				
	<i>Senna artemisioides</i> subsp. <i>petiolaris</i>	x		x		x
	<i>Senna artemisioides</i> subsp. <i>sturtii</i> x <i>Senna</i> sp. Meekatharra					x
	<i>Senna artemisioides</i> subsp. x <i>artemisioides</i>	x	x	x		
	<i>Senna artemisioides</i> subsp. x <i>sturtii</i>	x	x	x		x
	<i>Senna charlesiana</i>				x	
	<i>Senna glaucifolia</i>	x	x	x	x	x
	<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>			x		x
	<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>			x	x	
	<i>Senna</i> sp. Austin (A. Strid 20210)		x	x		x
	<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	x	x	x	x	x
	<i>Senna</i> sp. Meekatharra x <i>artemisioides</i> subsp. x <i>sturtii</i>	x				
	<i>Senna stricta</i>	x		x		
Campanulaceae	<i>Wahlenbergia tumidifructa</i>		x	x		
Casuarinaceae	<i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>	x	x			
Chenopodiaceae	<i>Atriplex bunburyana</i>	x	x			
	<i>Atriplex cephalantha</i>		x			
	<i>Atriplex nummularia</i>	x	x			
	<i>Atriplex semilunaris</i>			x		
	<i>Atriplex vesicaria</i>	x	x			
	<i>Chenopodium gaudichaudianum</i>	x	x			
	<i>Dissocarpus paradoxus</i>	x	x	x		
Chenopodiaceae	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>			x	x	
	<i>Maireana appressa</i>			x		
	<i>Maireana carnosae</i>	x		x		
	<i>Maireana convexa</i>			x		
	<i>Maireana georgei</i>	x	x	x		x
	<i>Maireana glomerifolia</i>	x	x	x		
	<i>Maireana lobiflora</i>	x		x		
	<i>Maireana melanocoma</i>	x	x			

Family	Species	P1	P2	P3	R	TFS
	<i>Maireana planifolia</i>	x		x		x
	<i>Maireana platycarpa</i>			x	x	
	<i>Maireana pyramidata</i>			x		
	<i>Maireana thesioides</i>			x		
	<i>Maireana tomentosa</i>	x	x		x	x
	<i>Maireana trichoptera</i>	x				
	<i>Maireana triptera</i>	x	x	x		x
	<i>Maireana villosa</i>	x		x	x	x
	<i>Rhagodia eremaea</i>	x	x	x	x	x
	<i>Salsola australis</i>		x			
	<i>Salsola tragus</i>			x		
	<i>Sclerolaena convexula</i>	x				
	<i>Sclerolaena densiflora</i>	x		x	x	
	<i>Sclerolaena diacantha</i>			x	x	
	<i>Sclerolaena eriacantha</i>	x		x		
	<i>Sclerolaena fusiformis</i>		x			
	<i>Sclerolaena patenticuspis</i>	x				
	<i>Sclerolaena uniflora</i>	x				
	<b>☞ <i>Tecticornia cymbiformis</i> (P3)</b>		x			
	<i>Tecticornia doleiformis</i>	x				
	<i>Tecticornia indica</i> subsp. <i>bidens</i>		x			
	<i>Tecticornia indica</i> subsp. <i>leiostachya</i>	x				
Chloanthaceae	<i>Spartothamnella teucriflora</i>	x	x	x	x	
Colchicaceae	<i>Wurmbea densiflora</i>				x	x
Convolvulaceae	<i>Duperreya commixta</i>	x	x	x		
	<i>Duperreya sericea</i>	x				
Cuscutaceae	<b>*<i>Cuscuta epithymum</i></b>	x	x			
Cyperaceae	<i>Bulbostylis barbata</i>	x				
	<i>Cyperus iria</i>			x		x
	<i>Cyperus squarrosus</i>			x		
Droseraceae	<i>Drosera macrantha</i> subsp. <i>eremaea</i>			x		

Family	Species	P1	P2	P3	R	TFS
Elatinaceae	<i>Bergia perennis</i> subsp. <i>exigua</i>	x				
Euphorbiaceae	☞ <i>Beyeria lapidicola</i> (P1)		x	x		
	<i>Euphorbia boophthona</i>	x	x			
	<i>Euphorbia drummondii</i>	x				
Euphorbiaceae	☞ <i>Euphorbia sarcostemmoides</i> (P1)					x
	<i>Phyllanthus erwinii</i>	x		x		
	☞ <i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94) (P1)	x				x
Frankeniaceae	<i>Frankenia cinerea</i>					
	<i>Frankenia fecunda</i>					x
	<i>Frankenia laxiflora</i>	x	x	x		
	<i>Frankenia setosa</i>	x				
Gentianaceae	<i>Centaurium clementii</i>	x	x			
	<i>Centaurium spicatum</i>		x			
Geraniaceae	<i>Erodium cygnorum</i>				x	
Goodeniaceae	<i>Goodenia berardiana</i>			x		x
	☞ <i>Goodenia berringbinensis</i> (P4)	x		x		
	☞ <i>Goodenia lyrata</i> (P1)	x		x		x
	<i>Goodenia tenuiloba</i>	x	x	x		x
	<i>Goodenia triodiophila</i>					x
	<i>Lobelia heterophylla</i>	x				
	<i>Scaevola spinescens</i>	x	x	x		x
	<i>Scaevola tomentosa</i>	x				
Gyrostemonaceae	<i>Codonocarpus cotinifolius</i>			x		
Haloragaceae	<i>Haloragis odontocarpa</i> forma <i>rugosa</i>					x
	<i>Haloragis trigonocarpa</i>			x		
Lamiaceae	☞ <i>Hemigenia</i> sp. nov. (aff. <i>exilis</i> ) (SOI)		x			
	☞ <i>Hemigenia tysonii</i> (P3)	x	x	x		x
	<i>Prostanthera albiflora</i>	x	x	x		
	<i>Prostanthera althoferi</i> subsp. <i>althoferi</i>	x	x			x
	☞ <i>Prostanthera ferricola</i> (P3)		x			
	☞ <i>Prostanthera petrophila</i> (P3)	x	x	x		x

Family	Species	P1	P2	P3	R	TFS
	<i>Prostanthera wilkieana</i>					x
Lobeliaceae	<i>Lotus australis</i>					x
Loranthaceae	<i>Amyema fitzgeraldii</i>	x				
	<i>Amyema maidenii</i>			x		
	<i>Lysiana murrayi</i>	x	x	x		
Malvaceae	<i>Abutilon cryptopetalum</i>				x	
	<i>Abutilon leucopetalum</i>					x
	<i>Abutilon macrum</i>	x				
	<i>Abutilon otocarpum</i>	x	x			
	<i>Abutilon oxycarpum</i>		x	x	x	x
	<i>Abutilon oxycarpum</i> subsp. <i>prostratum</i>	x				
	<i>Hibiscus burtonii</i>	x	x	x	x	x
	<i>Hibiscus coatesii</i>	x		x	x	
	<i>Hibiscus garneri</i>			x		
	<i>Hibiscus sturtii</i> var. <i>forrestii</i>	x	x	x		x
	<i>Lawrenzia chrysoderma</i>	x	x			
Malvaceae	<i>Lawrenzia densiflora</i>			x		x
	<i>Sida ammophila</i>	x				
	<i>Sida calyxhymenia</i>	x	x			
	<i>Sida cardiophylla</i>			x		x
	<i>Sida ectogama</i>		x	x	x	x
	<i>Sida fibulifera</i>	x	x		x	
	<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	x	x	x	x	x
	<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	x				
	<i>Sida</i> sp. Golden calyces glabrous (H.N. Foote 32)	x	x	x	x	x
	<i>Sida</i> sp. Pindar (A. Mitchell 3585)					x
	<i>Sida spodochroma</i>	x				
Marsileaceae	<i>Marsilea drummondii</i>			x		
Mimosaceae	☞ <i>Acacia ?burrowsiana</i> (P3)			x		
	<i>Acacia</i> aff. <i>Oswaldii</i>			x		
	<i>Acacia</i> aff. <i>Quadrifarginea</i>	x	x			



Family	Species	P1	P2	P3	R	TFS
	<i>Acacia aneura</i> var. <i>aneura</i>	x	x	x	x	x
	<i>Acacia aneura</i> var. <i>argentea</i>	x		x		x
	<i>Acacia aneura</i> var. <i>conifera</i>		x	x	x	x
	<i>Acacia aneura</i> var. <i>fuliginea</i>	x	x		x	
	<i>Acacia aneura</i> var. <i>intermedia</i>	x	x	x	x	
	<i>Acacia aneura</i> var. <i>macrocarpa</i>					x
	<i>Acacia aneura</i> var. <i>major</i>	x	x	x	x	
	<i>Acacia aneura</i> var. <i>microcarpa</i>		x	x	x	
	<i>Acacia aneura</i> var. <i>tenuis</i>					x
	<i>Acacia aulacophylla</i>			x		
	<i>Acacia ayersiana</i>					x
	<i>Acacia burkittii</i>	x	x	x		
	<i>Acacia citrinoviridis</i>	x		x		
	<i>Acacia cockertoniana</i>	x	x	x		x
	<i>Acacia craspedocarpa</i>	x	x	x	x	x
	<i>Acacia craspedocarpa</i> x <i>aneura</i>				x	
	<i>Acacia cuthbertsonii</i> subsp. <i>Cuthbertsonii</i>	x		x		x
	<i>Acacia effusifolia</i>		x			
	<i>Acacia exocarpoides</i>	x	x			x
	<i>Acacia grasbyi</i>	x	x	x		x
	<i>Acacia kempeana</i>					x
	<i>Acacia ligulata</i>	x				
	<i>Acacia longispinea</i>	x				
	<i>Acacia masliniana</i>					x
	<i>Acacia minyura</i>	x	x			x
	<i>Acacia minyura</i> x <i>ayersiana</i>		x			
	<i>Acacia murrayana</i>	x	x	x	x	x
Mimosaceae	<i>Acacia paraneura</i>				x	x
	<i>Acacia pruinocarpa</i>	x	x	x	x	x
	<i>Acacia quadrimarginea</i>	x	x			
	<i>Acacia ramulosa</i> var. <i>linophylla</i>	x	x	x	x	x

Family	Species	P1	P2	P3	R	TFS
	<i>Acacia ramulosa</i> var. <i>ramulosa</i>	x	x	x		x
	<i>Acacia rhodophloia</i>	x	x	x		x
	<i>Acacia sclerosperma</i> subsp. <i>Sclerosperma</i>	x	x	x		
	<i>Acacia sibirica</i>	x	x			
	☞ <i>Acacia</i> sp. Nov. (aff <i>kochii</i> ) SOI					x
	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)	x	x	x		x
	☞ <i>Acacia speckii</i> (P3)	x	x	x		x
	<i>Acacia tetragonophylla</i>	x	x	x	x	x
	<i>Acacia victoriae</i>	x	x	x		
Myoporaceae	<i>Eremophila</i> aff. <i>Georgei</i>	x	x			
	☞ <i>Eremophila arachnoids</i> subsp. <i>arachnoids</i> (P3)		x	x		
	<i>Eremophila clarkei</i>	x	x	x	x	x
	<i>Eremophila compacta</i> subsp. <i>Compacta</i>	x	x			
	<i>Eremophila compacta</i> subsp. <i>Fecunda</i>	x				
	<i>Eremophila exilifolia</i>	x	x	x		x
	<i>Eremophila falcata</i>	x		x		
	<i>Eremophila foliosissima</i>	x	x		x	
	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	x	x	x	x	x
	<i>Eremophila fraseri</i> subsp. <i>fraseri</i>			x	x	
	<i>Eremophila fraseri</i> subsp. <i>parva</i>	x		x		x
	<i>Eremophila galeata</i>	x	x		x	
	<i>Eremophila georgei</i>	x	x	x	x	x
	<i>Eremophila gibsonii</i>				x	
	<i>Eremophila gilesii</i> subsp. <i>gilesii</i>			x		
	<i>Eremophila gilesii</i> subsp. <i>variabilis</i>		x	x		x
	<i>Eremophila glabra</i> subsp. <i>glabra</i>	x	x			
	<i>Eremophila glabra</i> subsp. <i>tomentosa</i>	x		x		
	<i>Eremophila glutinosa</i>	x	x	x	x	x
	<i>Eremophila granitica</i>	x		x		
	<i>Eremophila hughesii</i> subsp. <i>hughesii</i>		x		x	x
	<i>Eremophila jucunda</i> subsp. <i>jucunda</i>	x	x	x	x	x

Family	Species	P1	P2	P3	R	TFS
	<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	x				
	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	x	x	x	x	x
	<i>Eremophila longifolia</i>	x	x	x		
	<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>	x	x	x		
	<i>Eremophila macmillaniana</i>	x	x	x		x
	<i>Eremophila maculata</i> subsp. <i>brevifolia</i>	x		x		
	<i>Eremophila margarethae</i>	x	x			
Myoporaceae	<i>Eremophila oldfieldii</i> subsp. <i>angustifolia</i>	x				
	<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>	x		x		
	<i>Eremophila pantonii</i>	x	x			
	<i>Eremophila pendulina</i>					x
	<i>Eremophila phyllopoda</i> subsp. <i>phyllopoda</i>	x	x	x		
	<i>Eremophila platycalyx</i> subsp. <i>platycalyx</i>	x	x	x		
	<i>Eremophila punicea</i>	x	x		x	
	<i>Eremophila serrulata</i>			x	x	
	<i>Eremophila simulans</i> subsp. <i>simulans</i>	x	x	x	x	x
	<i>Eremophila spathulata</i>	x	x			
	<i>Eremophila spuria</i>	x			x	
	<i>Eremophila subfloccosa</i> subsp. <i>lanata</i>	x	x			
Myrtaceae	<i>Aluta aspera</i> subsp. <i>hesperia</i>	x	x	x		x
	☞ <i>Baeckea</i> sp. <b>Melita Station (H. Pringle 2738) (P3)</b>	x	x			x
	<i>Calytrix desolata</i>	x	x	x		x
	☞ <i>Calytrix erosipetala</i> (P3)			x		
	<i>Corymbia lenziana</i>	x	x	x	x	x
	<i>Eucalyptus carnei</i>	x	x			
	<i>Eucalyptus gypsophila</i>		x			
	<i>Eucalyptus leptopoda</i> subsp. <i>elevata</i>					x
	<i>Eucalyptus lucasii</i>	x	x			
	<i>Eucalyptus oleosa</i> subsp. <i>oleosa</i>					x
	<i>Eucalyptus socialis</i> subsp. <i>eucentrica</i>			x		
	<i>Eucalyptus striatocalyx</i>			x		


Family	Species	P1	P2	P3	R	TFS
	<i>Eucalyptus trivalva</i>	x	x			x
	☞ <i>Homalocalyx echinulatus</i> (P3)	x	x			x
	<i>Melaleuca stereophloia</i>	x	x	x		x
	☞ <i>Micromyrtus placoides</i> (P3)	x	x			x
	<i>Micromyrtus racemosa</i> var. <i>racemosa</i>					
	<i>Micromyrtus sulphurea</i>	x	x	x		x
	<i>Thryptomene costata</i>					x
	<i>Thryptomene decussata</i>	x	x	x		x
	☞ <i>Verticordia jamiesonii</i> (P3)					x
Nyctaginaceae	<i>Boerhavia coccinea</i>			x		
	<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>					x
Oxalidaceae	<i>Oxalis perennans</i>	x				
Fabaceae	<i>Chorizema genistoides</i>			x		x
	<i>Cullen cinereum</i>	x				x
	<i>Glycine canescens</i>	x				
	<i>Indigofera brevidens</i>	x				
	<i>Indigofera gilesii</i> subsp. <i>gilesii</i>					x
	<i>Indigofera monophylla</i>	x		x		x
	☞ <i>Mirbelia ?stipitata</i> (P3)	x	x			
	<i>Mirbelia rhagodioides</i>	x		x		x
Papilionaceae	<i>Swainsona affinis</i>			x		
	<i>Swainsona laciniata</i>	x				
Phormiaceae	<i>Dianella revoluta</i> var. <i>divaricata</i>	x	x			
Pittosporaceae	<i>Pittosporum angustifolium</i>	x	x	x		
Poaceae	<b>*<i>Cenchrus ciliaris</i></b>					x
	<i>Aristida contorta</i>	x	x	x	x	x
	<i>Aristida holathera</i> var. <i>holathera</i>	x	x	x	x	
	<i>Austrostipa elegantissima</i>	x		x		
	<i>Austrostipa scabra</i>	x				
	<i>Cymbopogon ambiguus</i>	x	x	x		
	<i>Digitaria brownii</i>	x				

Family	Species	P1	P2	P3	R	TFS
	<i>Enneapogon caerulescens</i>	x	x		x	
	<i>Enneapogon cylindricus</i>	x		x		
	<i>Eragrostis australasica</i>	x	x		x	
	<i>Eragrostis cumingii</i>	x		x		
	<i>Eragrostis dielsii</i>	x	x	x		
	<i>Eragrostis eriopoda</i>	x	x	x	x	x
	<i>Eragrostis kennedyae</i>	x				
	<i>Eragrostis lanipes</i>	x	x			x
	<i>Eragrostis leptocarpa</i>	x				
	<i>Eragrostis pergracilis</i>	x	x			
	<i>Eragrostis setifolia</i>			x		x
	<i>Eragrostis tenellula</i>			x		
	<i>Eriachne flaccida</i>	x				
	<i>Eriachne helmsii</i>	x	x	x	x	x
	<i>Eriachne lanata</i>			x		
	<i>Eriachne mucronata</i>	x	x	x		x
	<i>Eriachne pulchella</i> subsp. <i>dominii</i>	x		x		
	<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	x	x	x		
	<i>Iseilema membranaceum</i>	x				
	<i>Monachather paradoxus</i>	x	x	x	x	x
	<i>Sporobolus australasicus</i>			x		
	<i>Thyridolepis multiculmis</i>	x			x	x
	<i>Triodia melvillei</i>					x
	<i>Triodia schinzii</i>					x
	<i>Tripogon loliiformis</i>			x		
Polygonaceae	<i>Muehlenbeckia florulenta</i>	x	x			
Portulacaceae	<b>*Portulaca oleracea</b>	x				
	<i>Calandrinia</i> sp. The Pink Hills (F. Obbens FO 19/06)	x				
	<i>Calandrinia translucens</i>	x				
Primulaceae	<b>*Anagallis arvensis</b>					x
Proteaceae	<i>Grevillea berryana</i>	x	x	x		x

Family	Species	P1	P2	P3	R	TFS
	<i>Grevillea deflexa</i>	x		x		x
Proteaceae	<i>Grevillea eriostachya</i>					x
	<i>Grevillea extorris</i>		x			
	<b>Grevillea inconspicua (P4)</b>	x	x	x		x
	<i>Grevillea nematophylla</i> subsp. <i>supraplana</i>	x			x	x
	☞ <i>Grevillea stenostachya</i> (P3)	x	x	x	x	x
	<i>Grevillea striata</i>	x		x		
	<i>Hakea lorea</i> subsp. <i>lorea</i>	x	x			
	<i>Hakea preissii</i>		x	x	x	x
	<i>Hakea recurva</i> subsp. <i>arida</i>	x	x			
Rhamnaceae	☞ <i>Stenanthemum patens</i> (P1)		x			
	<i>Stenanthemum petraeum</i>	x	x	x		x
Rubiaceae	<i>Psydrax latifolia</i>	x	x	x	x	x
	<i>Psydrax rigidula</i>	x	x	x	x	x
	<i>Psydrax suaveolens</i>	x	x	x	x	x
	<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>			x		
Rutaceae	<i>Philotheca brucei</i> subsp. <i>brevifolia</i>	x				
	<i>Philotheca brucei</i> subsp. <i>brucei</i>	x	x	x		x
	<i>Philotheca sericea</i>					x
Santalaceae	<i>Exocarpos aphyllus</i>		x	x		x
	<i>Leptomeria preissiana</i>	x	x			
	<i>Santalum acuminatum</i>	x	x			x
	<i>Santalum lanceolatum</i>		x			
	<i>Santalum spicatum</i>	x	x	x		x
Sapindaceae	<i>Dodonaea adenophora</i>		x			
	☞ <i>Dodonaea amplisemina</i> (P3)	x	x	x		x
	<i>Dodonaea microzyga</i> var. <i>acrolobata</i>		x			x
	<i>Dodonaea pachyneura</i>	x	x	x		x
	<i>Dodonaea petiolaris</i>	x	x	x		x
	<i>Dodonaea rigida</i>	x		x		x
	<i>Dodonaea viscosa</i> subsp. <i>angustissima</i>		x			

Family	Species	P1	P2	P3	R	TFS
	<i>Dodonaea viscosa</i> subsp. <i>mucronata</i>		x			
	<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>					x
Scrophulariaceae	<i>Peplidium</i> sp. C Evol. Fl. Fauna Arid Aust. (N.T. Burbidge & A. Kanis 8158)			x		x
	<i>Stemodia florulenta</i>					x
	<i>Stemodia viscosa</i>		x			
Solanaceae	<b>*<i>Solanum nigrum</i></b>					x
	<i>Lycium australe</i>			x		
	<i>Solanum ashbyae</i>	x	x	x		
	<i>Solanum centrale</i>	x	x			
	<i>Solanum ellipticum</i>	x	x	x	x	x
	<i>Solanum ferocissimum</i>		x	x		
	<i>Solanum lachnophyllum</i>					x
	<i>Solanum lasiophyllum</i>	x	x	x	x	x
Sterculiaceae	<i>Brachychiton gregorii</i>	x				x
	<i>Keraudrenia velutina</i> subsp. <i>elliptica</i>					x
	<i>Rulingia luteiflora</i>			x		
Stylidiaceae	<i>Stylidium longibracteatum</i>		x			x
Thymelaeaceae	<i>Pimelea microcephala</i> subsp. <i>microcephala</i>	x	x	x		x
	<i>Pimelea trichostachya</i>					x
Urticaceae	<i>Parietaria cardiostegia</i>	x				
Zygophyllaceae	<i>Tribulus suberosus</i>	x	x			x
	<i>Zygophyllum aurantiacum</i>	x		x		
	<i>Zygophyllum eremaeum</i>	x	x	x		

Key:

 **bold font** indicates priority flora species (where P1, P2, P3, P4 = priority rank)

**Bold font plus SOI** indicates species of interest

- **\* bold font** indicates introduced / weed species
- Header row:
- P1 = phase 1, P2 = phase 2, and P3 = phase 3 surveys;
- R = rail corridor survey; and
- TFS = threatened flora survey

**APPENDIX K**

**PRIORITY FLORA AND SPECIES OF INTEREST  
LOCATIONS**



Priority	Species	Easting (mE)	Northing (mN)	Phase
1	<i>Acacia ?burrowsiana</i>	567084	7024726	3 phase
1	<i>Euphorbia sarcostemmoides</i>	575500	7027147	TFS
1	<i>Euphorbia sarcostemmoides</i>	575531	7027235	TFS
1	<i>Euphorbia sarcostemmoides</i>	587183	7033246	TFS
1	<i>Euphorbia sarcostemmoides</i>	582053	7029809	TFS
1	<i>Goodenia lyrata</i>	558162	7019250	3 phase
1	<i>Goodenia lyrata</i>	567084	7024726	3 phase
1	<i>Goodenia lyrata</i>	589471	7037203	3 phase
1	<i>Goodenia lyrata</i>	558712	7019585	TFS
1	<i>Ptilotus astrolasius</i> var. <i>luteolus</i>	588151	7033952	3 phase
1	<i>Ptilotus astrolasius</i> var. <i>luteolus</i>	588342	7034114	3 phase
1	<i>Ptilotus astrolasius</i> var. <i>luteolus</i>	589461	7036537	3 phase
1	<i>Ptilotus astrolasius</i> var. <i>luteolus</i>	589791	7037197	TFS
1	<i>Ptilotus astrolasius</i> var. <i>luteolus</i>	589858	7037769	TFS
1	<i>Stenanthemum patens</i>	550940	7015223	3 phase
1	<i>Stenanthemum patens</i>	562005	7019220	3 phase
1	<i>Stenanthemum patens</i>	564390	7019704	3 phase
1	<i>Stenanthemum patens</i>	561759	7018922	TFS
2	<i>Beyeria lapidicola</i>	547792	7014738	3 phase
2	<i>Beyeria lapidicola</i>	560531	7019104	TFS
2	<i>Beyeria lapidicola</i>	560587	7019462	TFS
2	<i>Beyeria lapidicola</i>	560950	7019723	TFS
2	<i>Beyeria lapidicola</i>	561117	7019765	TFS
2	<i>Beyeria lapidicola</i>	561460	7020313	TFS
2	<i>Beyeria lapidicola</i>	581417	7026880	TFS
2	<i>Beyeria lapidicola</i>	582628	7027320	TFS
2	<i>Beyeria lapidicola</i>	573604	7032170	TFS
3	<i>Acacia speckii</i>	550940	7015223	3 phase
3	<i>Acacia speckii</i>	560836	7016798	3 phase
3	<i>Acacia speckii</i>	563054	7019695	3 phase

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	<i>Acacia speckii</i>	563264	7018400	3 phase
3	<i>Acacia speckii</i>	563572	7018064	3 phase
3	<i>Acacia speckii</i>	563797	7018544	3 phase
3	<i>Acacia speckii</i>	564239	7018334	3 phase
3	<i>Acacia speckii</i>	564390	7019704	3 phase
3	<i>Acacia speckii</i>	570265	7026936	3 phase
3	<i>Acacia speckii</i>	574397	7025516	3 phase
3	<i>Acacia speckii</i>	587069	7034505	3 phase
3	<i>Acacia speckii</i>	588151	7033952	3 phase
3	<i>Acacia speckii</i>	588342	7034114	3 phase
3	<i>Acacia speckii</i>	589461	7036537	3 phase
3	<i>Acacia speckii</i>	589858	7037769	3 phase
3	<i>Acacia speckii</i>	558735	7017685	TFS
3	<i>Acacia speckii</i>	561319	7018699	TFS
3	<i>Acacia speckii</i>	561400	7018812	TFS
3	<i>Acacia speckii</i>	561509	7018970	TFS
3	<i>Acacia speckii</i>	561569	7018879	TFS
3	<i>Acacia speckii</i>	561632	7018846	TFS
3	<i>Acacia speckii</i>	561679	7018889	TFS
3	<i>Acacia speckii</i>	561754	7019035	TFS
3	<i>Acacia speckii</i>	561847	7019155	TFS
3	<i>Acacia speckii</i>	561898	7019125	TFS
3	<i>Acacia speckii</i>	561944	7019142	TFS
3	<i>Acacia speckii</i>	561953	7019275	TFS
3	<i>Acacia speckii</i>	562018	7019293	TFS
3	<i>Acacia speckii</i>	562093	7019330	TFS
3	<i>Acacia speckii</i>	562125	7019257	TFS
3	<i>Acacia speckii</i>	562213	7019279	TFS
3	<i>Acacia speckii</i>	562390	7019403	TFS
3	<i>Acacia speckii</i>	562493	7019440	TFS
3	<i>Acacia speckii</i>	562680	7019456	TFS

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	<i>Acacia speckii</i>	562857	7019609	TFS
3	<i>Acacia speckii</i>	570078	7022147	TFS
3	<i>Acacia speckii</i>	572303	7024012	TFS
3	<i>Acacia speckii</i>	577123	7025472	TFS
3	<i>Acacia speckii</i>	577241	7025506	TFS
3	<i>Acacia speckii</i>	577339	7025505	TFS
3	<i>Acacia speckii</i>	577372	7025476	TFS
3	<i>Acacia speckii</i>	577416	7025521	TFS
3	<i>Acacia speckii</i>	577553	7025405	TFS
3	<i>Acacia speckii</i>	577828	7025640	TFS
3	<i>Acacia speckii</i>	577941	7025554	TFS
3	<i>Acacia speckii</i>	578079	7025460	TFS
3	<i>Acacia speckii</i>	578275	7025532	TFS
3	<i>Acacia speckii</i>	578411	7025590	TFS
3	<i>Acacia speckii</i>	578503	7025440	TFS
3	<i>Acacia speckii</i>	578605	7025579	TFS
3	<i>Acacia speckii</i>	578993	7025556	TFS
3	<i>Acacia speckii</i>	579112	7025609	TFS
3	<i>Acacia speckii</i>	581198	7026759	TFS
3	<i>Acacia speckii</i>	581403	7026754	TFS
3	<i>Acacia speckii</i>	581492	7026870	TFS
3	<i>Acacia speckii</i>	581492	7026870	TFS
3	<i>Acacia speckii</i>	581492	7026870	TFS
3	<i>Acacia speckii</i>	582529	7026981	TFS
3	<i>Acacia speckii</i>	582547	7027157	TFS
3	<i>Acacia speckii</i>	582642	7027158	TFS
3	<i>Acacia speckii</i>	582735	7027237	TFS
3	<i>Acacia speckii</i>	581786	7026819	TFS
3	<i>Acacia speckii</i>	585997	7032081	TFS
3	<i>Acacia speckii</i>	586389	7034215	TFS
3	<i>Acacia speckii</i>	589791	7037197	TFS

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	<i>Calytrix erosipetala</i>	585158	7033155	3 phase
3	<i>Dodonaea amplisemina</i>	550940	7015223	3 phase
3	<i>Dodonaea amplisemina</i>	560839	7016798	3 phase
3	<i>Dodonaea amplisemina</i>	562005	7019220	3 phase
3	<i>Dodonaea amplisemina</i>	563054	7019695	3 phase
3	<i>Dodonaea amplisemina</i>	563264	7018400	3 phase
3	<i>Dodonaea amplisemina</i>	564239	7018334	3 phase
3	<i>Dodonaea amplisemina</i>	565757	7018550	3 phase
3	<i>Dodonaea amplisemina</i>	587841	7033527	3 phase
3	<i>Dodonaea amplisemina</i>	588151	7033952	3 phase
3	<i>Dodonaea amplisemina</i>	589791	7037197	3 phase
3	<i>Dodonaea amplisemina</i>	589858	7037769	3 phase
3	<i>Dodonaea amplisemina</i>	570265	7026936	3 phase
3	<i>Dodonaea amplisemina</i>	558401	7019440	TFS
3	<i>Dodonaea amplisemina</i>	558772	7019874	TFS
3	<i>Dodonaea amplisemina</i>	561172	7018782	TFS
3	<i>Dodonaea amplisemina</i>	561302	7018709	TFS
3	<i>Dodonaea amplisemina</i>	561509	7018970	TFS
3	<i>Dodonaea amplisemina</i>	561601	7018904	TFS
3	<i>Dodonaea amplisemina</i>	561701	7019159	TFS
3	<i>Dodonaea amplisemina</i>	561831	7019081	TFS
3	<i>Dodonaea amplisemina</i>	561922	7019264	TFS
3	<i>Dodonaea amplisemina</i>	562249	7019285	TFS
3	<i>Dodonaea amplisemina</i>	562448	7021001	TFS
3	<i>Dodonaea amplisemina</i>	562734	7020471	TFS
3	<i>Dodonaea amplisemina</i>	570103	7022057	TFS
3	<i>Eremophila arachnoides</i> subsp. <i>arachnoides</i>	558804	7019050	3 phase
3	<i>Eremophila arachnoides</i> subsp. <i>arachnoides</i>	563572	7018064	3 phase
3	<i>Grevillea stenostachya</i>	573904	7027138	3 phase
3	<i>Grevillea stenostachya</i>	566320	7030900	Rail
3	<i>Grevillea stenostachya</i>	571424	7031721	Rail

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	<i>Grevillea stenostachya</i>	569879	7034562	Rail
3	<i>Grevillea stenostachya</i>	560636	7019323	TFS
3	<i>Grevillea stenostachya</i>	566302	7024279	TFS
3	<i>Grevillea stenostachya</i>	571730	7027665	TFS
3	<i>Hemigenia tysonii</i>	562050	7019840	3 phase
3	<i>Hemigenia tysonii</i>	574122	7031020	3 phase
3	<i>Hemigenia tysonii</i>	556658	7017299	TFS
3	<i>Hemigenia tysonii</i>	558681	7018213	TFS
3	<i>Hemigenia tysonii</i>	558760	7018308	TFS
3	<i>Hemigenia tysonii</i>	559017	7018309	TFS
3	<i>Hemigenia tysonii</i>	559573	7018687	TFS
3	<i>Hemigenia tysonii</i>	559626	7019260	TFS
3	<i>Hemigenia tysonii</i>	559703	7018751	TFS
3	<i>Hemigenia tysonii</i>	560167	7019292	TFS
3	<i>Hemigenia tysonii</i>	560308	7019342	TFS
3	<i>Hemigenia tysonii</i>	560411	7019210	TFS
3	<i>Hemigenia tysonii</i>	560518	7019494	TFS
3	<i>Hemigenia tysonii</i>	560606	7019506	TFS
3	<i>Hemigenia tysonii</i>	560714	7019388	TFS
3	<i>Hemigenia tysonii</i>	561096	7019606	TFS
3	<i>Hemigenia tysonii</i>	561625	7019347	TFS
3	<i>Hemigenia tysonii</i>	562872	7020537	TFS
3	<i>Hemigenia tysonii</i>	564121	7021780	TFS
3	<i>Hemigenia tysonii</i>	564217	7021913	TFS
3	<i>Hemigenia tysonii</i>	564414	7021188	TFS
3	<i>Hemigenia tysonii</i>	565276	7023383	TFS
3	<i>Hemigenia tysonii</i>	566373	7024109	TFS
3	<i>Hemigenia tysonii</i>	566437	7023961	TFS
3	<i>Hemigenia tysonii</i>	566541	7024516	TFS
3	<i>Hemigenia tysonii</i>	566733	7024348	TFS
3	<i>Hemigenia tysonii</i>	567257	7025769	TFS

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	<i>Hemigenia tysonii</i>	567393	7025639	TFS
3	<i>Hemigenia tysonii</i>	567516	7025512	TFS
3	<i>Hemigenia tysonii</i>	568242	7024243	TFS
3	<i>Hemigenia tysonii</i>	568349	7024996	TFS
3	<i>Hemigenia tysonii</i>	568488	7024911	TFS
3	<i>Hemigenia tysonii</i>	568634	7024944	TFS
3	<i>Hemigenia tysonii</i>	568768	7024189	TFS
3	<i>Hemigenia tysonii</i>	568955	7024054	TFS
3	<i>Hemigenia tysonii</i>	569165	7024299	TFS
3	<i>Hemigenia tysonii</i>	569477	7024901	TFS
3	<i>Hemigenia tysonii</i>	570400	7025736	TFS
3	<i>Hemigenia tysonii</i>	570545	7025764	TFS
3	<i>Hemigenia tysonii</i>	570639	7025602	TFS
3	<i>Hemigenia tysonii</i>	570769	7030069	TFS
3	<i>Hemigenia tysonii</i>	570901	7029822	TFS
3	<i>Hemigenia tysonii</i>	571091	7029068	TFS
3	<i>Hemigenia tysonii</i>	571244	7027859	TFS
3	<i>Hemigenia tysonii</i>	571382	7028067	TFS
3	<i>Hemigenia tysonii</i>	571831	7026291	TFS
3	<i>Hemigenia tysonii</i>	571971	7026386	TFS
3	<i>Hemigenia tysonii</i>	574282	7034219	TFS
3	<i>Hemigenia tysonii</i>	574352	7034021	TFS
3	<i>Hemigenia tysonii</i>	567777	7025547	TFS
3	<i>Hemigenia tysonii</i>	574389	7032529	TFS
3	<i>Hemigenia tysonii</i>	577071	7032746	TFS
3	<i>Hemigenia tysonii</i>	584122	7031020	TFS
3	<i>Hemigenia tysonii</i>	569161	7026298	TFS
3	<i>Hemigenia tysonii</i>	561838	7021123	TFS
3	<i>Homalocalyx echinulatus</i>	574031	7027464	3 phase
3	<i>Homalocalyx echinulatus</i>	578730	7028969	3 phase
3	<i>Homalocalyx echinulatus</i>	558760	7018308	TFS

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	<i>Homalocalyx echinulatus</i>	558824	7018217	TFS
3	<i>Homalocalyx echinulatus</i>	559017	7018309	TFS
3	<i>Homalocalyx echinulatus</i>	559116	7018358	TFS
3	<i>Homalocalyx echinulatus</i>	559217	7018376	TFS
3	<i>Homalocalyx echinulatus</i>	559583	7018695	TFS
3	<i>Homalocalyx echinulatus</i>	560740	7019401	TFS
3	<i>Homalocalyx echinulatus</i>	561548	7019762	TFS
3	<i>Homalocalyx echinulatus</i>	561749	7019907	TFS
3	<i>Homalocalyx echinulatus</i>	562048	7019703	TFS
3	<i>Homalocalyx echinulatus</i>	562145	7019776	TFS
3	<i>Homalocalyx echinulatus</i>	564402	7020695	TFS
3	<i>Homalocalyx echinulatus</i>	568392	7023727	TFS
3	<i>Homalocalyx echinulatus</i>	570316	7025461	TFS
3	<i>Homalocalyx echinulatus</i>	570425	7025563	TFS
3	<i>Homalocalyx echinulatus</i>	570653	7025609	TFS
3	<i>Homalocalyx echinulatus</i>	570876	7025846	TFS
3	<i>Homalocalyx echinulatus</i>	570912	7025882	TFS
3	<i>Homalocalyx echinulatus</i>	577608	7025164	TFS
3	<i>Micromyrtus placoides</i>	548350	7015087	3 phase
3	<i>Micromyrtus placoides</i>	549405	7015196	3 phase
3	<i>Micromyrtus placoides</i>	563088	7020263	3 phase
3	<i>Micromyrtus placoides</i>	572647	7026444	3 phase
3	<i>Micromyrtus placoides</i>	558760	7018308	TFS
3	<i>Micromyrtus placoides</i>	559289	7018149	TFS
3	<i>Micromyrtus placoides</i>	559453	7018211	TFS
3	<i>Micromyrtus placoides</i>	561016	7019768	TFS
3	<i>Micromyrtus placoides</i>	561117	7019765	TFS
3	<i>Micromyrtus placoides</i>	561490	7019622	TFS
3	<i>Micromyrtus placoides</i>	561548	7019762	TFS
3	<i>Micromyrtus placoides</i>	561705	7019845	TFS
3	<i>Micromyrtus placoides</i>	561776	7019082	TFS

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	<i>Micromyrtus placoides</i>	561880	7020167	TFS
3	<i>Micromyrtus placoides</i>	562021	7019899	TFS
3	<i>Micromyrtus placoides</i>	562189	7020355	TFS
3	<i>Micromyrtus placoides</i>	562197	7020219	TFS
3	<i>Micromyrtus placoides</i>	562454	7020176	TFS
3	<i>Micromyrtus placoides</i>	562621	7020437	TFS
3	<i>Micromyrtus placoides</i>	562821	7020611	TFS
3	<i>Micromyrtus placoides</i>	577367	7025296	TFS
3	<i>Micromyrtus placoides</i>	577608	7025164	TFS
3	<i>Micromyrtus placoides</i>	578509	7025277	TFS
3	<i>Micromyrtus placoides</i>	579367	7025667	TFS
3	<i>Micromyrtus placoides</i>	579995	7026062	TFS
3	<i>Micromyrtus placoides</i>	580167	7026185	TFS
3	<i>Micromyrtus placoides</i>	580264	7026142	TFS
3	<i>Micromyrtus placoides</i>	581064	7026834	TFS
3	<i>Micromyrtus placoides</i>	581287	7027128	TFS
3	<i>Micromyrtus placoides</i>	581461	7026889	TFS
3	<i>Micromyrtus placoides</i>	581596	7026721	TFS
3	<i>Micromyrtus placoides</i>	581755	7026819	TFS
3	<i>Micromyrtus placoides</i>	581838	7026865	TFS
3	<i>Micromyrtus placoides</i>	581977	7027079	TFS
3	<i>Micromyrtus placoides</i>	582023	7026950	TFS
3	<i>Micromyrtus placoides</i>	582147	7026843	TFS
3	<i>Micromyrtus placoides</i>	582744	7027252	TFS
3	<i>Micromyrtus placoides</i>	582914	7027228	TFS
3	<i>Mirbelia ?stipitata</i>	560836	7016798	3 phase
3	<i>Mirbelia ?stipitata</i>	564390	7019704	3 phase
3	<i>Mirbelia ?stipitata</i>	585997	7032081	3 phase
3	<i>Mirbelia ?stipitata</i>	586292	7033420	3 phase
3	<i>Mirbelia ?stipitata</i>	589791	7037197	3 phase
3	<i>Prostanthera ferricola</i>	532005	7019220	3 phase



Priority	Species	Easting (mE)	Northing (mN)	Phase
3	<i>Prostanthera petrophila</i>	547755	7014970	3 phase
3	<i>Prostanthera petrophila</i>	548351	7015088	3 phase
3	<i>Prostanthera petrophila</i>	549405	7015196	3 phase
3	<i>Prostanthera petrophila</i>	562050	7019840	3 phase
3	<i>Prostanthera petrophila</i>	562938	7019075	3 phase
3	<i>Prostanthera petrophila</i>	563054	7019695	3 phase
3	<i>Prostanthera petrophila</i>	564237	7020615	3 phase
3	<i>Prostanthera petrophila</i>	572647	7026444	3 phase
3	<i>Prostanthera petrophila</i>	577572	7028469	3 phase
3	<i>Prostanthera petrophila</i>	581786	7026819	3 phase
3	<i>Prostanthera petrophila</i>	586292	7033420	3 phase
3	<i>Prostanthera petrophila</i>	557184	7017425	TFS
3	<i>Prostanthera petrophila</i>	558101	7018013	TFS
3	<i>Prostanthera petrophila</i>	558207	7019345	TFS
3	<i>Prostanthera petrophila</i>	558478	7018528	TFS
3	<i>Prostanthera petrophila</i>	558644	7018636	TFS
3	<i>Prostanthera petrophila</i>	558848	7019954	TFS
3	<i>Prostanthera petrophila</i>	558933	7018351	TFS
3	<i>Prostanthera petrophila</i>	559057	7020001	TFS
3	<i>Prostanthera petrophila</i>	559104	7019859	TFS
3	<i>Prostanthera petrophila</i>	559448	7018831	TFS
3	<i>Prostanthera petrophila</i>	559536	7018674	TFS
3	<i>Prostanthera petrophila</i>	559767	7019203	TFS
3	<i>Prostanthera petrophila</i>	559970	7019254	TFS
3	<i>Prostanthera petrophila</i>	560161	7019333	TFS
3	<i>Prostanthera petrophila</i>	560636	7019323	TFS
3	<i>Prostanthera petrophila</i>	560930	7018974	TFS
3	<i>Prostanthera petrophila</i>	560948	7019284	TFS
3	<i>Prostanthera petrophila</i>	561441	7019119	TFS
3	<i>Prostanthera petrophila</i>	561609	7019234	TFS
3	<i>Prostanthera petrophila</i>	561831	7019011	TFS

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	<i>Prostanthera petrophila</i>	562287	7021192	TFS
3	<i>Prostanthera petrophila</i>	563939	7020413	TFS
3	<i>Prostanthera petrophila</i>	564418	7020755	TFS
3	<i>Prostanthera petrophila</i>	568353	7023394	TFS
3	<i>Prostanthera petrophila</i>	568363	7023401	TFS
3	<i>Prostanthera petrophila</i>	568647	7030695	TFS
3	<i>Prostanthera petrophila</i>	568724	7024883	TFS
3	<i>Prostanthera petrophila</i>	569729	7024895	TFS
3	<i>Prostanthera petrophila</i>	569863	7024863	TFS
3	<i>Prostanthera petrophila</i>	569990	7022223	TFS
3	<i>Prostanthera petrophila</i>	570335	7025481	TFS
3	<i>Prostanthera petrophila</i>	570464	7025588	TFS
3	<i>Prostanthera petrophila</i>	570571	7025509	TFS
3	<i>Prostanthera petrophila</i>	570716	7026524	TFS
3	<i>Prostanthera petrophila</i>	572978	7022947	TFS
3	<i>Prostanthera petrophila</i>	573103	7023026	TFS
3	<i>Prostanthera petrophila</i>	576940	7025166	TFS
3	<i>Prostanthera petrophila</i>	577757	7025301	TFS
3	<i>Prostanthera petrophila</i>	579914	7026097	TFS
3	<i>Prostanthera petrophila</i>	580112	7026083	TFS
3	<i>Prostanthera petrophila</i>	580419	7026204	TFS
3	<i>Prostanthera petrophila</i>	581064	7026834	TFS
3	<i>Prostanthera petrophila</i>	582755	7027101	TFS
3	<i>Prostanthera petrophila</i>	582855	7027120	TFS
3	<i>Prostanthera petrophila</i>	583592	7027761	TFS
3	<i>Prostanthera petrophila</i>	583848	7027638	TFS
3	<i>Prostanthera petrophila</i>	583956	7027660	TFS
3	<i>Ptilotus beardii</i>	546935	7015506	3 phase
3	<i>Ptilotus beardii</i>	585672	7033112	3 phase
3	<i>Ptilotus beardii</i>	586714	7035414	3 phase
3	<i>Ptilotus beardii</i>	567491	7027591	Rail

Priority	Species	Easting (mE)	Northing (mN)	Phase
3	<i>Ptilotus beardii</i>	567092	7024711	TFS
3	<i>Ptilotus beardii</i>	587785	7036179	TFS
3	<i>Tecticornia cymbiformis</i>	558093	7018841	3 phase
3	<i>Tecticornia cymbiformis</i>	558160	7019242	3 phase
3	<i>Verticordia jamiesonii</i>	581918	7026848	TFS
3	<i>Verticordia jamiesonii</i>	581945	7026861	TFS
4	<i>Baeckea</i> sp. Melita Station	548351	7015088	3 phase
4	<i>Baeckea</i> sp. Melita Station	563088	7020263	3 phase
4	<i>Baeckea</i> sp. Melita Station	573975	7027033	3 phase
4	<i>Baeckea</i> sp. Melita Station	561940	7019839	TFS
4	<i>Baeckea</i> sp. Melita Station	562021	7019899	TFS
4	<i>Baeckea</i> sp. Melita Station	562117	7019984	TFS
4	<i>Baeckea</i> sp. Melita Station	562241	7020245	TFS
4	<i>Baeckea</i> sp. Melita Station	562592	7020430	TFS
4	<i>Baeckea</i> sp. Melita Station	562792	7020487	TFS
4	<i>Baeckea</i> sp. Melita Station	562818	7020495	TFS
4	<i>Baeckea</i> sp. Melita Station	577371	7025263	TFS
4	<i>Baeckea</i> sp. Melita Station	577409	7025262	TFS
4	<i>Baeckea</i> sp. Melita Station	577537	7025295	TFS
4	<i>Baeckea</i> sp. Melita Station	577917	7025362	TFS
4	<i>Baeckea</i> sp. Melita Station	578429	7025292	TFS
4	<i>Baeckea</i> sp. Melita Station	579183	7025537	TFS
4	<i>Baeckea</i> sp. Melita Station	579222	7025547	TFS
4	<i>Baeckea</i> sp. Melita Station	583848	7027638	TFS
4	<i>Baeckea</i> sp. Melita Station	583956	7027660	TFS
4	<i>Goodenia berringbinensis</i>	558712	7019585	TFS
4	<i>Goodenia berringbinensis</i>	558753	7019308	TFS
4	<i>Grevillea inconspicua</i>	562005	7019220	3 phase
4	<i>Grevillea inconspicua</i>	563054	7019695	3 phase
4	<i>Grevillea inconspicua</i>	563264	7018400	3 phase
4	<i>Grevillea inconspicua</i>	578288	7029509	3 phase

Priority	Species	Easting (mE)	Northing (mN)	Phase
4	<i>Grevillea inconspicua</i>	587841	7033527	3 phase
4	<i>Grevillea inconspicua</i>	588225	7035560	3 phase
4	<i>Grevillea inconspicua</i>	561445	7018951	TFS
4	<i>Grevillea inconspicua</i>	561766	7019078	TFS
4	<i>Grevillea inconspicua</i>	561832	7019153	TFS
4	<i>Grevillea inconspicua</i>	561921	7019142	TFS
4	<i>Grevillea inconspicua</i>	562437	7019414	TFS
4	<i>Grevillea inconspicua</i>	562621	7020437	TFS
4	<i>Grevillea inconspicua</i>	562749	7019509	TFS
4	<i>Grevillea inconspicua</i>	562803	7019561	TFS
4	<i>Grevillea inconspicua</i>	570193	7021897	TFS
4	<i>Grevillea inconspicua</i>	570265	7026936	TFS
4	<i>Grevillea inconspicua</i>	571730	7027665	TFS
SOI	<i>Acacia</i> sp. Nov. (aff. <i>kochii</i> )	559507	7019357	TFS
SOI	<i>Acacia</i> sp. Nov. (aff. <i>kochii</i> )	559650	7017115	TFS
SOI	<i>Acacia</i> sp. Nov. (aff. <i>kochii</i> )	560411	7019210	TFS
SOI	<i>Acacia</i> sp. Nov. (aff. <i>kochii</i> )	560436	7019236	TFS
SOI	<i>Acacia</i> sp. Nov. (aff. <i>kochii</i> )	561545	7018794	TFS
SOI	<i>Acacia</i> sp. Nov. (aff. <i>kochii</i> )	561549	7018868	TFS
SOI	<i>Acacia</i> sp. Nov. (aff. <i>kochii</i> )	561599	7018842	TFS
SOI	<i>Acacia</i> sp. Nov. (aff. <i>kochii</i> )	561632	7018846	TFS
SOI	<i>Acacia</i> sp. Nov. (aff. <i>kochii</i> )	561679	7018889	TFS
SOI	<i>Acacia</i> sp. Nov. (aff. <i>kochii</i> )	561710	7018900	TFS
SOI	<i>Acacia</i> sp. Nov. (aff. <i>kochii</i> )	561755	7018960	TFS
SOI	<i>Acacia</i> sp. Nov. (aff. <i>kochii</i> )	568817	7022763	TFS
SOI	<i>Hemigenia</i> sp. nov. (aff. <i>exilis</i> )	559931	7017810	TFS
SOI	<i>Hemigenia</i> sp. nov. (aff. <i>exilis</i> )	564207	7018599	TFS
SOI	<i>Hemigenia</i> sp. nov. (aff. <i>exilis</i> )	573642	7027151	TFS

Note: Datum = WGS84, Zone = 50J.  
 P1, P2, P3, P4 = Priority flora taxa, SOI = species of interest.

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**APPENDIX L      VOUCHER SPECIMENS LODGED WITH THE WA HERBARIUM**  
(included as a separate PDF)

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TAXON: *Acacia burrowsiana* Maslin DEFL POPULATION No.: \_\_\_\_\_  
 DRF  Priority Species: P1 Partial Survey  Full Survey  New Population   
 FROM: Joshua Gilovitz 722ph3-CG-09 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 04/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 567084 mE, 7024726 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_  
 ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_  
 ROCK FORM: Sheet  Boulder  Fluvialite Gravel  Concretionary Gravel   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Brown  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): \_\_\_\_\_  
 ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals   
 Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring   
 FENCING: Not Required  Fenced  Required  Replace/Repair   
 ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes   
 COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Joshua Gilovitz 722ph3-CG-09 (*ecologia* Environment) Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.



TAXON: *Amyema maidenii* (Blakely) Barlow  
 DRF  Range Extension  Partial Survey  Full Survey  New Population   
 DEF. POPULATION No.: \_\_\_\_\_  
 FROM: Scott Hitchcock 722ph3-SH-25 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 04/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J - 570265 mE, 7026936 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat/Plain  Drainage line  Lake Edge   
 Firebreak  Other  Specify: Minor channel

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: Ferrous  
 ROCK FORM: Sheet  Boulder  Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *microcarpa* low open woodland over *Acacia* sp. Weld Range open scrub over *Acacia ramulosa* var. *linophylla* open heath over *Calytrix desolata* low shrubland over *Eremophila exilifolia* and *Grevillea inconspicua* low open shrubland over *Duperreya commixta* climbers over *Goodenia tenuiloba* very open herbs over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
 CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph3-SH-25 (*ecologia* Environment) Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

TAXON: *Acacia aff. oswaldii*

DEFL POPULATION No.: \_\_\_\_\_

DRF

Species of Interest

Partial Survey

Full Survey

New Population

FROM: Scott Hitchcock 722ph3-SH-09 (*ecologia* Environment)

TITLE: Botanist

SURVEY DATE: 09/07/2008

REGION: Murchison

DISTRICT: \_\_\_\_\_

SHIRE: \_\_\_\_\_

LOCATION: Weld Range

GPS LOCATION: 50J - 579008 mE, 7032190 mN

GPS DATUM:

AGD84

GDA94

GDA94-Compatible (e.g. WGS84)

Unknown

None

LAND STATUS:

Nature Reserve

Private

Gravel Res. MRD

Rail Reserve

National Park

Pastoral Lease

Gravel Res. Shire

Rd. Verge Shire

State Forest

UCL

Other Shire Res.

Rd. Verge MRD

Water Reserve

Other

Specify: Mining Lease

Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:

Hilltop

Cliff

Slope

Valley

Swamp

Outcrop

Breakaway

Low Plain

Gully

Riverbank

Ridge

Sand Dune

Flat

Drainageline

Lake Edge

Firebreak

Other  Specify: \_\_\_\_\_

ROCK TYPE:

Laterite

Granite

Dolerite

Limestone

Other: \_\_\_\_\_

ROCK FORM:

Sheet

Boulder

Fluviatile Gravel

Concretionary Gravel

SOIL TYPE:

Sand

Loam

Clay

Peat

Gravel

SOIL COLOUR:

Red

Brown

Yellow

White

Grey

SOIL CONDITION:

Moist

Inundated

Dry

Saline

Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): \_\_\_\_\_

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS:

Mature: \_\_\_\_\_

Seedlings: \_\_\_\_\_

Dead: \_\_\_\_\_

Actual

Estimate

Area Occupied: \_\_\_\_\_

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE:

Clonal

Flower bud

Flower

Immat. fruit

Fruit

Old Fruit

Vegetative

POLLINATORS:

Native bees

Honey bees

Other insects

Birds

Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION:

Healthy

Moderate

Poor

Disturbed

Comment: \_\_\_\_\_

POTENTIAL THREATS:

Firebreaks

Mining

Recreation

Roadworks

Grazing

Weeds

Salinity

Disease

Prescribed Burning

Other

Comment: \_\_\_\_\_

FIRE HISTORY:

Not known

Burnt in 19 \_\_\_\_\_

Summer

Autumn

Winter

Spring

FENCING:

Not Required

Fenced

Required

Replace/Repair

ROADSIDE MARKERS:

Not Required

Present

Required

Replace

Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN:

Regional Herb.

District Herb.

WA Herb.

Other

ATTACHED:

Map

Mudmap

Illustration

Photo

Field Notes

COPY SENT TO:

Regional Office

District Office

Other

Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph3-SH-09 (*ecologia* Environment)

Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Acacia speckii* R.S.Cowan & Maslin  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 DEFL POPULATION No.: \_\_\_\_\_  
 FROM: Amy Capobianco 722ph2-AC-03 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 17/04/2007  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J – 588342 mE, 7034114 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Ridgetop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: BIF  
 ROCK FORM: Sheet  Stones  Coarse Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia* sp. Weld Range and *Acacia speckii* shrubland over *Eremophila macmillaniana* and *Ptilotus astrolasius* var. *luteolus* low open shrubland over *Aristida contorta* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Amy Capobianco 722ph2-AC-03 (*ecologia* Environment) Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Acacia speckii* R.S.Cowan & Maslin  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 FROM: Scott Hitchcock 722ph2-SH-11 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 20/04/2007  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J – 563572 mE, 7018064 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Midslope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: Ferrous  
 ROCK FORM: Sheet  Stones/Boulders  Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range and *Acacia speckii* high shrubland over *Senna glaucifolia* low open shrubland to shrubland over *Maireana georgei* low open heath over *Aristida contorta* open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
 CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair   
 ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes   
 COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph2-SH-11 (*ecologia* Environment) Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Acacia speckii* R.S.Cowan & Maslin  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 FROM: Scott Hitchcock 722ph3-SH-07 (ecologia Environment) TITLE: Botanist SURVEY DATE: 04/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J - 570265 mE, 7026936 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

LANDFORM: Minor Channel  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_  
 ROCK FORM: Sheet  Boulder  Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *microcarpa* low open woodland over *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) open scrub over *Acacia ramulosa* var. *linophylla* open heath over *Calytrix desolata* low shrubland over *Eremophila exilifolia* and *Grevillea inconspicua* low open shrubland over *Duperreya commixta* climbers over *Goodenia tenuiloba* very open herbs over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals   
 Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph3-SH-07 (ecologia Environment) Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Acacia speckii* R.S.Cowan & Maslin DEFLECTION POPULATION No.: \_\_\_\_\_  
DRF  Priority Species: P3 Partial Survey  Full Survey  New Population

FROM: Joshua Gilovitz 722ph3-CG-03 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 04/07/2008

REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J - 567863 mE, 7025267 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
Outcrop  Breakaway  Low Plain  Gully  Riverbank   
Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_

ROCK FORM: Sheet  Boulder  Fluvial Gravel  Concretionary Gravel

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Brown  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): \_\_\_\_\_

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Joshua Gilovitz 722ph3-CG-03 (*ecologia* Environment) Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

Species	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)
Collector	Scott Hitchcock 722ph3-SH-28 ( <i>ecologia</i> Environment)
Date	04/07/2008
Determinavit	Peter Jobson
Nearest Named Location	Weld Range, proposed Haul Road
Coordinates	570265 mE, 7026936 mN (Zone = 50J, Datum = WGS84)
Associated Species	<i>Acacia aneura</i> var. <i>microcarpa</i> , <i>Acacia</i> sp. Weld Range, <i>Acacia ramulosa</i> var. <i>limphylla</i> , <i>Calytrix desolata</i> , <i>Eremophila exilifolia</i> , <i>Grevillea inconspicua</i> , <i>Duperreya commixta</i> , <i>Goodenia tenuiloba</i> , <i>Cymbopogon ambiguus</i> .

# RARE FLORA REPORT FORM

TAXON: *Baeckea* sp. Melita Station (H. Pringle 2738)

DEFL POPULATION No.: \_\_\_\_\_

DRF

Priority Species: P3

Partial Survey

Full Survey

New Population

FROM: Amy Capobianco 722ph2-AC-01 (*ecologia* Environment)

TITLE: Botanist

SURVEY DATE: 20/04/2007

REGION: Murchison

DISTRICT: \_\_\_\_\_

SHIRE: \_\_\_\_\_

LOCATION: Weld Range

GPS LOCATION: 50J – 563088 mE, 7020263 mN

GPS DATUM:

AGD84

GDA94

GDA94-Compatible (e.g. WGS84)

Unknown

None

LAND STATUS:

Nature Reserve

Private

Gravel Res. MRD

Rail Reserve

National Park

Pastoral Lease

Gravel Res. Shire

Rd. Verge Shire

State Forest

UCL

Other Shire Res.

Rd. Verge MRD

Water Reserve

Other

Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM:

Footslope

Cliff

Slope

Valley

Swamp

Outcrop

Breakaway

Low Plain

Gully

Riverbank

Ridge

Sand Dune

Flat

Drainageline

Lake Edge

Firebreak

Other  Specify: \_\_\_\_\_

ROCK TYPE:

Laterite

Granite

Dolerite

Limestone

Other: Ferrous

ROCK FORM:

Sheet

Boulder

Gravel

Pebbles

SOIL TYPE:

Sand

Loam

Clay

Peat

Gravel

SOIL COLOUR:

Red

Orange

Yellow

White

Grey

SOIL CONDITION:

Moist

Inundated

Dry

Saline

Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* high open shrubland over *Baeckea* sp. Melita Station shrubland over *Micromyrtus placoides* low shrubland over *Eriachne helmsii* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds

Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19 \_\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Amy Capobianco 722ph2-AC-01 (*ecologia* Environment)

Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH



# RARE FLORA REPORT FORM

TAXON: *Baeckea* sp. Melita Station (H. Pringle 2738)

DEFL POPULATION No.: \_\_\_\_\_

DRF

Priority Species: P3

Partial Survey

Full Survey

New Population

FROM: Jeremy Naaykens 722ph2-JN-02 (ecologia Environment)

TITLE: Botanist

SURVEY DATE: 18/04/2007

REGION: Murchison

DISTRICT: \_\_\_\_\_

SHIRE: \_\_\_\_\_

LOCATION: Weld Range

GPS LOCATION: 50J – 573888 mE, 7027108 mN

GPS DATUM:

AGD84

GDA94

GDA94-Compatible (e.g. WGS84)

Unknown

None

LAND STATUS:

Nature Reserve

Private

Gravel Res. MRD

Rail Reserve

National Park

Pastoral Lease

Gravel Res. Shire

Rd. Verge Shire

State Forest

UCL

Other Shire Res.

Rd. Verge MRD

Water Reserve

Other

Specify: Mining Lease

Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:

Hilltop

Cliff

Slope

Valley

Swamp

Outcrop

Breakaway

Low Plain

Gully

Riverbank

Ridge

Sand Dune

Flat

Drainageline

Lake Edge

Firebreak

Other  Specify: \_\_\_\_\_

ROCK TYPE:

Laterite

Granite

Dolerite

Limestone

Other: \_\_\_\_\_

ROCK FORM:

Sheet

Boulder

Fluviatile Gravel

Concretionary Gravel

SOIL TYPE:

Sand

Loam

Clay

Peat

Gravel

SOIL COLOUR:

Red

Brown

Yellow

White

Grey

SOIL CONDITION:

Moist

Inundated

Dry

Saline

Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): \_\_\_\_\_

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS:

Mature: \_\_\_\_\_

Seedlings: \_\_\_\_\_

Dead: \_\_\_\_\_

Actual

Estimate

Area Occupied: \_\_\_\_\_

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE:

Clonal

Flower bud

Flower

Immat. fruit

Fruit

Old Fruit

Vegetative

POLLINATORS:

Native bees

Honey bees

Other insects

Birds

Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION:

Healthy

Moderate

Poor

Disturbed

Comment: \_\_\_\_\_

POTENTIAL THREATS:

Firebreaks

Mining

Recreation

Roadworks

Grazing

Weeds

Salinity

Disease

Prescribed Burning

Other

Comment: \_\_\_\_\_

FIRE HISTORY:

Not known

Burnt in 19 \_\_\_\_\_

Summer

Autumn

Winter

Spring

FENCING:

Not Required

Fenced

Required

Replace/Repair

ROADSIDE MARKERS:

Not Required

Present

Required

Replace

Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN:

Regional Herb.

District Herb.

WA Herb.

Other

ATTACHED:

Map

Mudmap

Illustration

Photo

Field Notes

COPY SENT TO:

Regional Office

District Office

Other

Specify: \_\_\_\_\_

Signed: Jeremy Naaykens 722ph2-JN-02 (ecologia Environment)

Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

TAXON: *Baeckea* sp. Melita Station (H. Pringle 2738)

DEFL POPULATION No.: \_\_\_\_\_

DRF

Priority Species: P3

Partial Survey

Full Survey

New Population

FROM: Scott Hitchcock 722ph1-SH-13 (*ecologia* Environment)

TITLE: Botanist

SURVEY DATE: 09/11/2006

REGION: Murchison

DISTRICT: \_\_\_\_\_

SHIRE: \_\_\_\_\_

LOCATION: Weld Range

GPS LOCATION: 50J – 548351 mE, 7015088 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Hill crest  Cliff  Hill slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: BIF, non-banded Ferrous

ROCK FORM: Sheet  Stones/Boulders  Coarse Gravel

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Orange  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* scattered low trees over *Acacia aneura* var. *aneura* and *Acacia sibirica* high open shrubland over *Thryptomene decussata* shrubland over *Calytrix desolata* and *Micromyrtus sulphurea* low shrubland over *Goodenia tenuiloba* herbs over *Monachather paradoxus* scattered tussock grasses.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph1-SH-13 (*ecologia* Environment)

Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

**TAXON:** *Baeckea* sp. Melita Station (H. Pringle 2738)  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
**FROM:** Scott Hitchcock 722ph1-SH-12 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 12/11/2006  
**REGION:** Murchison **DISTRICT:** \_\_\_\_\_ **SHIRE:** \_\_\_\_\_  
**LOCATION:** Weld Range

**GPS LOCATION:** 50J – 562050 mE, 7019840 mN  
**GPS DATUM:** AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

**LAND STATUS:** Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**  
 Landowner/manager present during inspection:

**LANDFORM:** Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Minor Channel  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

**ROCK TYPE:** Laterite  Granite  Dolerite  Limestone  Other: **Ferrous, ?Calcrete**  
**ROCK FORM:** Sheet  Boulder  Fine Gravel  Coarse Gravel   
**SOIL TYPE:** Sand  Loam  Clay  Peat  Gravel   
**SOIL COLOUR:** Red  Orange  Yellow  White  Grey   
**SOIL CONDITION:** Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

**VEGETATION CLASSIFICATION (Muir's):** *Acacia aneura* var. *aneura* scattered low trees over *Acacia rhodophloia* and *Thryptomene decussata* scattered tall shrubs over *Baeckea* sp. Melita Station and *Acacia rhodophloia* scattered shrubs over *Micromyrtus placoides*, *Baeckea* sp. Melita Station and *Aluta aspera* subsp. *hesperia* low shrubland over *Goodenia tenuiloba* scattered herbs over scattered tussock grasses.

**ASSOCIATED SPECIES:** \_\_\_\_\_

**No. of PLANTS:** Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

**REPRODUCTIVE STATE:** Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
**POLLINATORS:** Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
**CONDITION OF POPULATION:** Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

**POTENTIAL THREATS:** Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

**FIRE HISTORY:** Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

**FENCING:** Not Required  Fenced  Required  Replace/Repair

**ROADSIDE MARKERS:** Not Required  Present  Required  Replace  Reposition

**OTHER COMMENTS (include action taken/required):** \_\_\_\_\_

**VOUCHER SPECIMEN:** Regional Herb.  District Herb.  WA Herb.  Other

**ATTACHED:** Map  Mudmap  Illustration  Photo  Field Notes   
**COPY SENT TO:** Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph1-SH-12 (*ecologia* Environment) Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Beyeria lapidicola* Halford & R.J.F.Hend.

DEFL POPULATION No.: \_\_\_\_\_

DRF

Priority Species: P2

Partial Survey

Full Survey

New Population

FROM: Scott Hitchcock 722ph3-SH-05 (*ecologia* Environment)

TITLE: Botanist

SURVEY DATE: 10/07/2008

REGION: Murchison

DISTRICT: \_\_\_\_\_

SHIRE: \_\_\_\_\_

LOCATION: Weld Range, proposed Borrow Pits

GPS LOCATION: 50J – 573604 mE, 7032170 mN

GPS DATUM:

AGD84

GDA94

GDA94-Compatible (e.g. WGS84)

Unknown

None

LAND STATUS:

Nature Reserve

Private

Gravel Res. MRD

Rail Reserve

National Park

Pastoral Lease

Gravel Res. Shire

Rd. Verge Shire

State Forest

UCL

Other Shire Res.

Rd. Verge MRD

Water Reserve

Other

Specify: Mining Lease

Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:

Hilltop

Cliff

Slope

Valley

Swamp

Outcrop

Breakaway

Low Plain

Gully

Riverbank

Ridge

Sand Dune

Flat

Drainage line

Lake Edge

Firebreak

Other  Specify: \_\_\_\_\_

ROCK TYPE:

Laterite

Granite

Dolerite

Limestone

Other: \_\_\_\_\_

ROCK FORM:

Sheet

Boulder

Fluviatile Gravel

Concretionary Gravel

SOIL TYPE:

Sand

Loam

Clay

Peat

Gravel

SOIL COLOUR:

Red

Brown

Yellow

White

Grey

SOIL CONDITION:

Moist

Inundated

Dry

Saline

Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): \_\_\_\_\_

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS:

Mature: \_\_\_\_\_

Seedlings: \_\_\_\_\_

Dead: \_\_\_\_\_

Actual

Estimate

Area Occupied: \_\_\_\_\_

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE:

Clonal

Flower bud

Flower

Immat. fruit

Fruit

Old Fruit

Vegetative

POLLINATORS:

Native bees

Honey bees

Other insects

Birds

Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION:

Healthy

Moderate

Poor

Disturbed

Comment: \_\_\_\_\_

POTENTIAL THREATS:

Firebreaks

Mining

Recreation

Roadworks

Grazing

Weeds

Salinity

Disease

Prescribed Burning

Other

Comment: \_\_\_\_\_

FIRE HISTORY:

Not known

Burnt in 19 \_\_\_\_\_

Summer

Autumn

Winter

Spring

FENCING:

Not Required

Fenced

Required

Replace/Repair

ROADSIDE MARKERS:

Not Required

Present

Required

Replace

Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN:

Regional Herb.

District Herb.

WA Herb.

Other

ATTACHED:

Map

Mudmap

Illustration

Photo

Field Notes

COPY SENT TO:

Regional Office

District Office

Other

Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph3-SH-05 (*ecologia* Environment)

Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

TAXON: *Beyeria lapidicola* Halford & R.J.F.Hend.

DEFL POPULATION No.: \_\_\_\_\_

DRF

Priority Species: P2

Partial Survey

Full Survey

New Population

FROM: Scott Hitchcock 722ph2-SH-22 (*ecologia* Environment)

TITLE: Botanist SURVEY DATE: 15/04/2007

REGION: Murchison

DISTRICT: \_\_\_\_\_

SHIRE: \_\_\_\_\_

LOCATION: Weld Range

GPS LOCATION: 50J - 547792 mE, 7014738 mN

GPS DATUM:

AGD84

GDA94

GDA94-Compatible (e.g. WGS84)

Unknown

None

LAND STATUS:

Nature Reserve

Private

Gravel Res. MRD

Rail Reserve

National Park

Pastoral Lease

Gravel Res. Shire

Rd. Verge Shire

State Forest

UCL

Other Shire Res.

Rd. Verge MRD

Water Reserve

Other

Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM:

Hilltop

Cliff

Footslope

Valley

Swamp

Outcrop

Breakaway

Low Plain

Gully

Riverbank

Ridge

Sand Dune

Flat/Plain

Drainageline

Lake Edge

Firebreak

Other

Specify: \_\_\_\_\_

ROCK TYPE:

Laterite

Granite

Dolerite

Limestone

Other: Ferrous

ROCK FORM:

Sheet

Boulder

Fluviatile Gravel

Concretionary Gravel

SOIL TYPE:

Sand

Loam

Clay

Peat

Gravel

SOIL COLOUR:

Red

Orange

Yellow

White

Grey

SOIL CONDITION:

Moist

Inundated

Dry

Saline

Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* low open woodland over *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* subsp. *forrestii* low open shrubland to shrubland over *Aristida contorta* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds

Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph2-SH-22 (*ecologia* Environment)

Date: 05/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Calytrix erosipetala* Craven  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 FROM: Joshua Gilovitz 722ph3-CG-13 (ecologia Environment) TITLE: Botanist SURVEY DATE: 07/07/2008  
 REGION: Murchison DISTRICT: SHIRE:  
 LOCATION: Weld Range, proposed Borrow Pits East

GPS LOCATION: 50J - 585158 mE, 7033155 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

LANDFORM: Ridgetop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: Plateau above breakaway

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other:  
 ROCK FORM: Sheet  Stones/Boulders  Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other:

VEGETATION CLASSIFICATION (Muir's): *Acacia ramulosa* var. *ramulosa* and *Acacia burkittii* shrubland over *Eremophila latrobei* subsp. *latrobei* low open shrubland over *Calytrix erosipetala* low shrubland over *Tripogon loliiformis* very open tussock grassland.

ASSOCIATED SPECIES:

No. of PLANTS: Mature: Seedlings: Dead: Actual  Estimate  Area Occupied:  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals   
 Other observations:

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment:

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment:

FIRE HISTORY: Not known  Burnt in 19 Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required):

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify:

Signed: Joshua Gilovitz 722ph3-CG-13 (ecologia Environment) Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Dodonaea amplisemina* K.A.Sheph. & Rye DEF. POPULATION No.: \_\_\_\_\_  
DRF  Priority Species: P3 Partial Survey  Full Survey  New Population

FROM: Scott Hitchcock 722ph1-SH-16 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 11/11/2006

REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_

LOCATION: Weld Range

GPS LOCATION: 50J - 565758 mE, 7018550 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
Outcrop  Breakaway  Low Plain  Gully  Riverbank   
Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_

ROCK FORM: Sheet  Boulder  Fluvial Gravel  Concretionary Gravel

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Brown  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): \_\_\_\_\_

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph1-SH-16 (*ecologia* Environment)

Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

**TAXON:** *Dodonaea amplisemina* K.A.Sheph. & Rye  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
**DEFL POPULATION No.:** \_\_\_\_\_  
**FROM:** Joshua Gilovitz 722ph3-CG-06 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 03/07/2008  
**REGION:** Murchison **DISTRICT:** \_\_\_\_\_ **SHIRE:** \_\_\_\_\_  
**LOCATION:** Weld Range, proposed Haul Road

**GPS Location:** 50J – 571730 mE, 7027665 mN  
**GPS DATUM:** AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

**LAND STATUS:** Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**  
 Landowner/manager present during inspection:

**LANDFORM:** Creek bed/bank  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

**ROCK TYPE:** Laterite  Granite  Dolerite  Limestone  Other: **BIF, Ferrous**  
**ROCK FORM:** Sheet  Stones/Boulders  Gravel  Pebbles   
**SOIL TYPE:** Sand  Loam  Clay  Peat  Gravel   
**SOIL COLOUR:** Red  Orange  Yellow  White  Grey   
**SOIL CONDITION:** Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

**VEGETATION CLASSIFICATION** (Muir's): *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) high shrubland over *Senna* spp. scattered shrubs over *Calytrix desolata* low shrubland over *Duperreya commixta* climbers over *Cymbopogon ambiguus* very open tussock grassland.

**ASSOCIATED SPECIES:** \_\_\_\_\_  
**No. of PLANTS:** Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

**REPRODUCTIVE STATE:** Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
**POLLINATORS:** Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
**CONDITION OF POPULATION:** Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

**POTENTIAL THREATS:** Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

**FIRE HISTORY:** Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

**FENCING:** Not Required  Fenced  Required  Replace/Repair

**ROADSIDE MARKERS:** Not Required  Present  Required  Replace  Reposition

**OTHER COMMENTS** (include action taken/required): \_\_\_\_\_

**VOUCHER SPECIMEN:** Regional Herb.  District Herb.  WA Herb.  Other

**ATTACHED:** Map  Mudmap  Illustration  Photo  Field Notes

**COPY SENT TO:** Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Joshua Gilovitz 722ph3-CG-06 (*ecologia* Environment) Date: 25/02/2009

*NOTE: Map or further information may be attached or given on the back of this form.*

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH**



TAXON: *Dodonaea amplisemina* K.A.Sheph. & Rye  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 FROM: Scott Hitchcock 722ph3-SH-03 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 04/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J - 570265 mE, 7026936 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Minor Channel  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_  
 ROCK FORM: Sheet  Boulder  Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *microcarpa* low open woodland over *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) open scrub over *Acacia ramulosa* var. *linophylla* open heath over *Calytrix desolata* low shrubland over *Eremophila exilifolia* and *Grevillea inconspicua* low open shrubland over *Duperreya commixta* climbers over *Goodenia tenuiloba* very open herbs over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph3-SH-03 (*ecologia* Environment)

Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

TAXON: *Drosera macrantha* subsp. *eremaea* N.G. Marchant & Lowrie      DEFL POPULATION No.: \_\_\_\_\_  
 DRF       Range Extension       Partial Survey       Full Survey       New Population   
 FROM: Scott Hitchcock 722ph3-SH-21(ecologia Environment)      TITLE: Botanist      SURVEY DATE: 07/07/2008  
 REGION: Murchison      DISTRICT: \_\_\_\_\_      SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range, proposed Borrow Pits East

GPS LOCATION: 50J – 585632 mE, 7033848 mN

GPS DATUM: AGD84       GDA94       GDA94-Compatible (e.g. WGS84)       Unknown       None

LAND STATUS: Nature Reserve       Private       Gravel Res. MRD       Rail Reserve   
 National Park       Pastoral Lease       Gravel Res. Shire       Rd. Verge Shire   
 State Forest       UCL       Other Shire Res.       Rd. Verge MRD   
 Water Reserve       Other       Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Hilltop       Cliff       Slope       Valley       Swamp   
 Outcrop       Breakaway       Low Plain       Gully       Riverbank   
 Ridge       Sand Dune       Flat       Drainageline       Lake Edge   
 Firebreak       Other  Specify: Base of Granite dome

ROCK TYPE: Laterite       Granite       Dolerite       Limestone       Other: Quartz

ROCK FORM: Sheet       Boulder       Fine Gravel       Concretionary Gravel

SOIL TYPE: Sand       Loam       Clay       Peat       Gravel

SOIL COLOUR: Red       Orange       Yellow       White       Grey

SOIL CONDITION: Moist       Inundated       Dry       Saline       Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia rhodophloia* shrubland to high shrubland over *Prostanthera albiflora* low open shrubland over *Drosera macrantha* subsp. *eremaea* open herbs over *Tripogon loliiformis*, *Eragrostis tenellula* and *Aristida contorta* tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Salinity  Disease  Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph3-SH-21(ecologia Environment)      Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

TAXON: *Eremophila arachnoides* Chinnock subsp. *arachnoides* DEFL POPULATION No.: \_\_\_\_\_  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 FROM: Scott Hitchcock 722ph2-SH-19 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 20/04/2007  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J - 563572 mE, 7018064 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Midslope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: Ferrous  
 ROCK FORM: Sheet  Stones/Boulders  Coarse Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range and *Acacia speckii* high shrubland over *Senna glaucifolia* low open shrubland to shrubland over *Maireana georgei* low open heath over *Aristida contorta* open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19 \_\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph2-SH-19 (*ecologia* Environment)

Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

TAXON: *Eriachne lanata* Lazarides  
 DRF  Range Extension  Partial Survey  Full Survey  New Population   
 DEFPL POPULATION No.: \_\_\_\_\_  
 FROM: Scott Hitchcock 722ph3-SH-24 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 07/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range, proposed Borrow Pits East

GPS LOCATION: 50J – 585451 mE, 7032503 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Undulating Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_

ROCK FORM: Sheet  Boulders  Gravel  Pebbles

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Orange  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia pruinocarpa* low open woodland over *Acacia ramulosa* var. *ramulosa* high shrubland over *Acacia ramulosa* var. *linophylla* open shrubland over *Thryptomene decussata* low shrubland and *Thryptomene decussata*, *Pluchea ?dentex* and *Micromyrtus sulphurea* low open shrubland over *Eriachne lanata* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph3-SH-24 (*ecologia* Environment) Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Euphorbia sarcostemmoides* DEFL POPULATION No.: \_\_\_\_\_  
 DRF  Priority Species: P1 Partial Survey  Full Survey  New Population   
 FROM: Melissa Hay MH-956-01 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 10/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range.

GPS LOCATION: 50J – 582053 mE, 7029809 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_  
 ROCK FORM: Sheet  Boulder  Fluvial Gravel  Concretionary Gravel   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Brown  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): Sparse to open *A. aneura* var. *microcarpa* and/or *A. pruinocarpa* trees over sparse to medium mixed *Acacia* spp. tall shrubs over sparse to open mixed *Ptilotus* spp., *Senna* spp., and *Eremophila* spp. medium shrubs over sparse *Ptilotus obovatus* or other small shrubs often over sparse *Aristida contorta* tussock grasses.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
 CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes   
 COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Melissa Hay MH-956-01 (*ecologia* Environment) Date: 19/10/2009

TAXON: *Eucalyptus socialis* subsp. *eucentrica* (L.A.S.Johnson & K.D.Hill) D.Nicolle DEFL POPULATION No.: \_\_\_\_\_  
 DRF  Range Extension  Partial Survey  Full Survey  New Population   
 FROM: Scott Hitchcock 722ph3-SH-26 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 09/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J - 577619 mE, 7033024 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_  
 ROCK FORM: Sheet  Boulder  Fluvialite Gravel  Concretionary Gravel   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Brown  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): \_\_\_\_\_

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals   
 Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph3-SH-26 (*ecologia* Environment) Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

TAXON: *Grevillea inconspicua* Diels DEFLE POPULATION No.: \_\_\_\_\_  
 DRF  Priority Species: P4 Partial Survey  Full Survey  New Population   
 FROM: Scott Hitchcock 722ph3-SH-01 (ecologia Environment) TITLE: Botanist SURVEY DATE: 04/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J - 570265 mE, 7026936 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Minor Channel  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_

ROCK FORM: Sheet  Boulder  Gravel  Pebbles

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Orange  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *microcarpa* low open woodland over *Acacia* sp. Weld Range (A. Markey & S. Dillon 1994) open scrub over *Acacia ramulosa* var. *linophylla* open heath over *Calytrix desolata* low shrubland over *Eremophila exilifolia* and *Grevillea inconspicua* low open shrubland over *Duperreya commixta* climbers over *Goodenia tenuiloba* very open herbs over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph3-SH-01 (ecologia Environment) Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH



# RARE FLORA REPORT FORM

TAXON: *Grevillea inconspicua* Diels DEFLE POPULATION No.: \_\_\_\_\_  
 DRF  Priority Species: P4 Partial Survey  Full Survey  New Population   
 FROM: Joshua Gilovitz 722ph3-CG-10 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 03/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range, proposed Haul Road

GPS Location: 50J - 571730 mE, 7027665 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

LANDFORM: Creek bed/bank  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: BIF, Ferrous  
 ROCK FORM: Sheet  Stones/Boulders  Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia* sp. Weld Range (A. Markey & S. Dillon 1994) high shrubland over *Senna* spp. scattered shrubs over *Calytrix desolata* low shrubland over *Duperreya commixta* climbers over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Joshua Gilovitz 722ph3-CG-10 (*ecologia* Environment) Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH





# RARE FLORA REPORT FORM

TAXON: *Grevillea inconspicua* Diels  
 DRF  Priority Species: P4 Partial Survey  Full Survey  New Population   
 FROM: Scott Hitchcock 722ph1-SH-15 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 03/11/2006  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J – 588225 mE, 7035560 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Creek bed/bank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: BIF, non-banded Ferrous  
 ROCK FORM: Sheet  Stones/Boulders  Coarse Gravel   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia pruinoarpa* and *Acacia ramulosa* var. *ramulosa* open woodland over *Acacia aneura* var. *aneura* low open woodland over *Acacia quadrimarginea* and *Acacia aneura* var. *aneura* high shrubland over *Senna artemisioides* subsp. *sturtii* low open shrubland to open shrubland over *Ptilotus obovatus* var. *obovatus* and *Grevillea inconspicua* low shrubland over *Abutilon macrum* herbs over *Cymbopogon ambiguus* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
 CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19 \_\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes   
 COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph1-SH-15 (*ecologia* Environment) Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Goodenia berringbinensis* Carolin  
DRF  Priority Species: P4 Partial Survey  Full Survey  New Population   
FROM: Jeremy Naaykens 722ph1-JN-01 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 10/11/2006  
REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
LOCATION: Weld Range

GPS LOCATION: 50J – 558753 mE, 7019308 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Floodplain  Cliff  Slope  Valley  Swamp   
Outcrop  Breakaway  Low Plain  Gully  Riverbank   
Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_

ROCK FORM: Sheet  Boulder  Fluvialite Gravel  Concretionary Gravel

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Orange  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *fuliginea* and *Grevillea striata* low open woodland to open woodland over *Acacia craspedocarpa* and *Acacia tetragonophylla* high shrubland over *Melaleuca stereophloia* shrubland over *Melaleuca stereophloia* and *Scaevola spinescens* low open shrubland over *Goodenia* sp. Weld Range open herbs over *Eragrostis pergracilis* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19 \_\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Jeremy Naaykens 722ph1-JN-01 (*ecologia* Environment) Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Goodenia berringbinensis* Carolin  
DRF  Priority Species: P4 Partial Survey  Full Survey  New Population   
FROM: Joshua Gilovitz 722ph3-CG-14 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 10/07/2008  
REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
LOCATION: Weld Range, Madoonga Waste Dumps

GPS LOCATION: 50J – 558712 mE, 7019585 mN  
GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
Water Reserve  Other  Specify: Mining Lease  
Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
Outcrop  Breakaway  Low Plain  Gully  Riverbank   
Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_  
ROCK FORM: Sheet  Boulder  Fluvialite Gravel  Concretionary Gravel   
SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
SOIL COLOUR: Red  Brown  Yellow  White  Grey   
SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): \_\_\_\_\_  
ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals   
Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Joshua Gilovitz 722ph3-CG-14 (*ecologia* Environment) Date: 05/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Goodenia lyrata* Carolin  
 DRF  Priority Species: P1 Partial Survey  Full Survey  New Population   
 FROM: Joshua Gilovitz 722ph3-CG-12 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 10/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range, Madoonga Waste Dumps

GPS LOCATION: 50J – 558712 mE, 7019585 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_

ROCK FORM: Sheet  Boulder  Fluvial Gravel  Concretionary Gravel

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Brown  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): \_\_\_\_\_

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds

Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Joshua Gilovitz 722ph3-CG-12 (*ecologia* Environment)

Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

TAXON: *Grevillea stenostachya* C.A.Gardner  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 DEF. POPULATION No.: \_\_\_\_\_  
 FROM: Scott Hitchcock 722ph3-SH-02 (ecologia Environment) TITLE: Botanist SURVEY DATE: 03/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J - 571935 mE, 7027743 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: Ferrous  
 ROCK FORM: Sheet  Boulder  Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia pruinocarpa* low open woodland over *Acacia aneura* var. *microcarpa* and *Acacia aneura* var. *intermedia* high shrubland over *Eremophila forrestii* subsp. *forrestii* and *Acacia ramulosa* var. *linophylla* shrubland over *Ptilotus obovatus* low shrubland over *Aristida contorta* open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
 CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring   
 FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes   
 COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph3-SH-02 (ecologia Environment) Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983  
 RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Grevillea stenostachya* C.A.Gardner

DEFL POPULATION No.: \_\_\_\_\_

DRF

Priority Species: P3

Partial Survey

Full Survey

New Population

FROM: Joshua Gilovitz 722ph3-CG-05 (*ecologia* Environment)

TITLE: Botanist

SURVEY DATE: 03/07/2008

REGION: Murchison

DISTRICT: \_\_\_\_\_

SHIRE: \_\_\_\_\_

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J - 565967 mE, 7024046 mN

GPS DATUM:

AGD84

GDA94

GDA94-Compatible (e.g. WGS84)

Unknown

None

LAND STATUS:

Nature Reserve

Private

Gravel Res. MRD

Rail Reserve

National Park

Pastoral Lease

Gravel Res. Shire

Rd. Verge Shire

State Forest

UCL

Other Shire Res.

Rd. Verge MRD

Water Reserve

Other

Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM:

Hilltop

Cliff

Slope

Valley

Swamp

Outcrop

Breakaway

Low Plain

Gully

Riverbank

Ridge

Sand Dune

Flat Plain

Drainageline

Lake Edge

Firebreak

Other

Specify: \_\_\_\_\_

ROCK TYPE:

Laterite

Granite

Dolerite

Limestone

Other: \_\_\_\_\_

ROCK FORM:

Sheet

Boulder

Fluviatile Gravel

Concretionary Gravel

SOIL TYPE:

Sand

Loam

Clay

Peat

Gravel

SOIL COLOUR:

Red

Orange

Yellow

White

Grey

SOIL CONDITION:

Moist

Inundated

Dry

Saline

Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *intermedia* and *Acacia ramulosa* var. *linophylla* low open forest over *Acacia ramulosa* var. *linophylla* open scrub over *Eremophila simulans* subsp. *simulans* open heath over *Ptilotus schwartzii* low scattered shrubs over *Eriachne lanata* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Joshua Gilovitz 722ph3-CG-05 (*ecologia* Environment)

Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Grevillea stenostachya* C.A.Gardner DEFL POPULATION No.: \_\_\_\_\_  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 FROM: Joshua Gilovitz 722ph3-CG-02 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 04/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J – 566302 mE, 7024279 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

LANDFORM: Floodplain  Creek bed  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: Ferrous  
 ROCK FORM: Sheet  Boulder  Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *microcarpa* low woodland over *Eremophila serrulata* and *Eremophila simulans* subsp. *simulans* open scrub over *Dodonaea petiolaris* and *Eremophila forrestii* shrubland over *Harnieria kempeana* subsp. *muelleri* low open shrubland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
 CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Joshua Gilovitz 722ph3-CG-02 (*ecologia* Environment) Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

**TAXON:** *Grevillea stenostachya* C.A.Gardner **DEFL POPULATION No.:** \_\_\_\_\_  
 DRF  Priority Species: **P3** Partial Survey  Full Survey  New Population   
**FROM:** Joshua Gilovitz 722ph3-CG-04 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 03/07/2008  
**REGION:** Murchison **DISTRICT:** \_\_\_\_\_ **SHIRE:** \_\_\_\_\_  
**LOCATION:** Weld Range, proposed Haul Road

**GPS Location:** 50J – 571730 mE, 7027665 mN  
**GPS DATUM:** AGD84  GDA94  GDA94-Compatible (e.g. **WGS84**)  Unknown  None   
**LAND STATUS:** Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**  
 Landowner/manager present during inspection:

**LANDFORM:** Creek bed/bank  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

**ROCK TYPE:** Laterite  Granite  Dolerite  Limestone  Other: **BIF, Ferrous**  
**ROCK FORM:** Sheet  Stones/Boulders  Gravel  Pebbles   
**SOIL TYPE:** Sand  Loam  Clay  Peat  Gravel   
**SOIL COLOUR:** Red  Orange  Yellow  White  Grey   
**SOIL CONDITION:** Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

**VEGETATION CLASSIFICATION** (Muir's): *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) high shrubland over *Senna* spp. scattered shrubs over *Calytrix desolata* low shrubland over *Duperreya commixta* climbers over *Cymbopogon ambiguus* very open tussock grassland.

**ASSOCIATED SPECIES:** \_\_\_\_\_

**No. of PLANTS:** Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

**REPRODUCTIVE STATE:** Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
**POLLINATORS:** Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
**CONDITION OF POPULATION:** Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

**POTENTIAL THREATS:** Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

**FIRE HISTORY:** Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

**FENCING:** Not Required  Fenced  Required  Replace/Repair

**ROADSIDE MARKERS:** Not Required  Present  Required  Replace  Reposition

**OTHER COMMENTS** (include action taken/required): \_\_\_\_\_

**VOUCHER SPECIMEN:** Regional Herb.  District Herb.  WA Herb.  Other

**ATTACHED:** Map  Mudmap  Illustration  Photo  Field Notes

**COPY SENT TO:** Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Joshua Gilovitz 722ph3-CG-04 (*ecologia* Environment) Date: 25/02/2009

*NOTE: Map or further information may be attached or given on the back of this form.*

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH**



TAXON: *Hemigenia* sp. nov (aff. *exilis*)  
 DRF  Species of Interest:  Partial Survey  Full Survey  New Population   
 DEF. POPULATION No.: \_\_\_\_\_  
 FROM: Jeremy Naaykens 722ph2-JN-10 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 21/04/2007  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J – 559931 mE, 7017810 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:   
 LANDFORM: Hilltop  Cliff  Midslope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: BIF  
 ROCK FORM: Sheet  Stones/Boulders  Coarse Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* high shrubland to low open woodland over *Acacia* sp. Weld Range shrubland over *Senna glaucifolia* low shrubland over *Aristida contorta* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
 CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19 \_\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Jeremy Naaykens 722ph2-JN-10 (*ecologia* Environment) Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

**TAXON:** *Homalocalyx echinulatus* Craven **DEFL POPULATION No.:** \_\_\_\_\_  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
**FROM:** Jeremy Naaykens 722ph1-JN-05 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 07/11/2006  
**REGION:** Murchison **DISTRICT:** \_\_\_\_\_ **SHIRE:** \_\_\_\_\_  
**LOCATION:** Weld Range

**GPS LOCATION:** 50J – 578730 mE, 7028969 mN

**GPS DATUM:** AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

**LAND STATUS:** Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**

Landowner/manager present during inspection:

**PLEASE NOTE: Opportunistic collection therefore certain information unavailable**

**LANDFORM:** Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

**ROCK TYPE:** Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_

**ROCK FORM:** Sheet  Boulder  Fluvial Gravel  Concretionary Gravel

**SOIL TYPE:** Sand  Loam  Clay  Peat  Gravel

**SOIL COLOUR:** Red  Brown  Yellow  White  Grey

**SOIL CONDITION:** Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

**VEGETATION CLASSIFICATION (Muir's):** \_\_\_\_\_

**ASSOCIATED SPECIES:** \_\_\_\_\_

**No. of PLANTS:** Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

**REPRODUCTIVE STATE:** Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

**POLLINATORS:** Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

**CONDITION OF POPULATION:** Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

**POTENTIAL THREATS:** Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds

Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

**FIRE HISTORY:** Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

**FENCING:** Not Required  Fenced  Required  Replace/Repair

**ROADSIDE MARKERS:** Not Required  Present  Required  Replace  Reposition

**OTHER COMMENTS (include action taken/required):** \_\_\_\_\_

**VOUCHER SPECIMEN:** Regional Herb.  District Herb.  WA Herb.  Other

**ATTACHED:** Map  Mudmap  Illustration  Photo  Field Notes

**COPY SENT TO:** Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Jeremy Naaykens 722ph1-JN-05 (*ecologia* Environment) Date: 26/02/2009

*NOTE: Map or further information may be attached or given on the back of this form.*

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH**

T TAXON: Hemigenia tysonii F.Muell. DEFL POPULATION No.:
DRF Priority Species: P3 Partial Survey Full Survey New Population
FROM: Joshua Gilovitz 722ph3-CG-11 (ecologia Environment) TITLE: Botanist SURVEY DATE: 04/07/2008
REGION: Murchison DISTRICT: SHIRE:
LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J - 567777 mE, 7025547 mN
GPS DATUM: AGD84 GDA94 GDA94-Compatible (e.g. WGS84) Unknown None
LAND STATUS: Nature Reserve Private Gravel Res. MRD Rail Reserve
National Park Pastoral Lease Gravel Res. Shire Rd. Verge Shire
State Forest UCL Other Shire Res. Rd. Verge MRD
Water Reserve Other Specify: Mining Lease
Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM: Hilltop Cliff Slope Valley Swamp
Outcrop Breakaway Low Plain Gully Riverbank
Ridge Sand Dune Flat Drainageline Lake Edge
Firebreak Other Specify:
ROCK TYPE: Laterite Granite Dolerite Limestone Other:
ROCK FORM: Sheet Boulder Fluvatile Gravel Concretionary Gravel
SOIL TYPE: Sand Loam Clay Peat Gravel
SOIL COLOUR: Red Brown Yellow White Grey
SOIL CONDITION: Moist Inundated Dry Saline Other:

VEGETATION CLASSIFICATION (Muir's):
ASSOCIATED SPECIES:

No. of PLANTS: Mature: Seedlings: Dead: Actual Estimate Area Occupied:
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal Flower bud Flower Immat. fruit Fruit Old Fruit Vegetative
POLLINATORS: Native bees Honey bees Other insects Birds Mammals

Other observations:
CONDITION OF POPULATION: Healthy Moderate Poor Disturbed Comment:

POTENTIAL THREATS: Firebreaks Mining Recreation Roadworks Grazing Weeds
Salinity Disease Prescribed Burning Other Comment:

FIRE HISTORY: Not known Burnt in 19 Summer Autumn Winter Spring

FENCING: Not Required Fenced Required Replace/Repair

ROADSIDE MARKERS: Not Required Present Required Replace Reposition

OTHER COMMENTS (include action taken/required):

VOUCHER SPECIMEN: Regional Herb. District Herb. WA Herb. Other

ATTACHED: Map Mudmap Illustration Photo Field Notes
COPY SENT TO: Regional Office District Office Other Specify:

Signed: Joshua Gilovitz 722ph3-CG-11 (ecologia Environment) Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

TAXON: *Hemigenia tysonii* F.Muell. DEFL POPULATION No.: \_\_\_\_\_  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 FROM: Scott Hitchcock 722ph3-SH-04 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 04/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J – 569161 mE, 7026298 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Undulating Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: Ferrous  
 ROCK FORM: Sheet  Boulder  Fluvialite Gravel  Concretionary Gravel   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Brown  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): \_\_\_\_\_

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph3-SH-04 (*ecologia* Environment) Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Hemigenia tysonii* F.Muell. DEFL POPULATION No.: \_\_\_\_\_  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 FROM: Scott Hitchcock 722ph3-SH-08 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 09/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range, proposed Borrow Pits West

GPS LOCATION: 50J - 577071 mE, 7032746 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridgetop  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: Ferrous  
 ROCK FORM: Sheet  Boulder  Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia cockertoniana* open shrubland to high shrubland over *Eremophila georgei* and *Eremophila forrestii* subsp. *forrestii* low open shrubland and *Hemigenia tysonii* low shrubland over *Sida* sp. dark green fruits (S. van Leeuwen 2260) very open herbs over *Eragrostis eriopoda* scattered tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_  
 No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)  
 REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals   
 Other observations: \_\_\_\_\_  
 CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_  
 FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring   
 FENCING: Not Required  Fenced  Required  Replace/Repair   
 ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other   
 ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes   
 COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph3-SH-08 (*ecologia* Environment) Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

**TAXON:** *Micromyrtus placoides* Rye **DEFL POPULATION No.:** \_\_\_\_\_  
 DRF  Priority Species: **PI** Partial Survey  Full Survey  New Population   
**FROM:** Jeremy Naaykens 722ph1-JN-06 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 07/11/2006  
**REGION:** Murchison **DISTRICT:** \_\_\_\_\_ **SHIRE:** \_\_\_\_\_  
**LOCATION:** Weld Range

**GPS LOCATION:** 50J – 572381 mE, 7026342 mN

**GPS DATUM:** AGD84  GDA94  GDA94-Compatible (e.g. **WGS84**)  Unknown  None

**LAND STATUS:** Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**

Landowner/manager present during inspection:

**LANDFORM:** Hilltop  Cliff  Hill slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

**ROCK TYPE:** Laterite  Granite  Dolerite  Limestone  Other: **BIF, non-banded Ferrous**

**ROCK FORM:** Sheet  Stones/Boulders  Fluvialite Gravel  Concretionary Gravel

**SOIL TYPE:** Sand  Loam  Clay  Peat  Gravel

**SOIL COLOUR:** Red  Orange  Yellow  White  Grey

**SOIL CONDITION:** Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

**VEGETATION CLASSIFICATION (Muir's):** *Acacia aneura* var. *aneura* high open shrubland to low open woodland over *Acacia aneura* var. *aneura* and *Prostanthera petrophila* shrubland over *Aluta aspera* subsp. *hesperia* low open heath.

**ASSOCIATED SPECIES:** \_\_\_\_\_

**No. of PLANTS:** Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

**REPRODUCTIVE STATE:** Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

**POLLINATORS:** Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

**CONDITION OF POPULATION:** Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

**POTENTIAL THREATS:** Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

**FIRE HISTORY:** Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

**FENCING:** Not Required  Fenced  Required  Replace/Repair

**ROADSIDE MARKERS:** Not Required  Present  Required  Replace  Reposition

**OTHER COMMENTS (include action taken/required):** \_\_\_\_\_

**VOUCHER SPECIMEN:** Regional Herb.  District Herb.  WA Herb.  Other

**ATTACHED:** Map  Mudmap  Illustration  Photo  Field Notes

**COPY SENT TO:** Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Jeremy Naaykens 722ph1-JN-06 (*ecologia* Environment) Date: 26/02/2009

*NOTE: Map or further information may be attached or given on the back of this form.*

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH**

**TAXON:** *Micromyrtus placoides* Rye  
 DRF  Priority Species: **PI** Partial Survey  Full Survey  New Population   
**DEFL POPULATION No.:** \_\_\_\_\_  
**FROM:** Scott Hitchcock 722ph1-SH-18 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 09/11/2006  
**REGION:** Murchison **DISTRICT:** \_\_\_\_\_ **SHIRE:** \_\_\_\_\_  
**LOCATION:** Weld Range

**GPS LOCATION:** 50J – 548351 mE, 7015088 mN  
**GPS DATUM:** AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
**LAND STATUS:** Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**

Landowner/manager present during inspection:

**LANDFORM:** Hill crest  Cliff  Hill slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

**ROCK TYPE:** Laterite  Granite  Dolerite  Limestone  Other: **BIF, non-banded Ferrous**

**ROCK FORM:** Sheet  Stones/Boulders  Coarse Gravel

**SOIL TYPE:** Sand  Loam  Clay  Peat  Gravel

**SOIL COLOUR:** Red  Orange  Yellow  White  Grey

**SOIL CONDITION:** Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

**VEGETATION CLASSIFICATION** (Muir's): *Acacia aneura* var. *aneura* scattered low trees over *Acacia aneura* var. *aneura* and *Acacia sibirica* high open shrubland over *Thryptomene decussata* shrubland over *Calytrix desolata* and *Micromyrtus sulphurea* low shrubland over *Goodenia tenuiloba* herbs over *Monachather paradoxus* scattered tussock grasses.

**ASSOCIATED SPECIES:** \_\_\_\_\_

**No. of PLANTS:** Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

**REPRODUCTIVE STATE:** Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

**POLLINATORS:** Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

**CONDITION OF POPULATION:** Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

**POTENTIAL THREATS:** Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

**FIRE HISTORY:** Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

**FENCING:** Not Required  Fenced  Required  Replace/Repair

**ROADSIDE MARKERS:** Not Required  Present  Required  Replace  Reposition

**OTHER COMMENTS** (include action taken/required): \_\_\_\_\_

**VOUCHER SPECIMEN:** Regional Herb.  District Herb.  WA Herb.  Other

**ATTACHED:** Map  Mudmap  Illustration  Photo  Field Notes

**COPY SENT TO:** Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph1-SH-18 (*ecologia* Environment) Date: 26/02/2009

*NOTE: Map or further information may be attached or given on the back of this form.*

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH**

# RARE FLORA REPORT FORM

TAXON: *Micromyrtus placoides* Rye  
 DRF  Priority Species: **PI** DEFL POPULATION No.: \_\_\_\_\_  
 Partial Survey  Full Survey  New Population   
 FROM: Amy Capobianco 722ph2-AC-02 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 20/04/2007  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J – 563088 mE, 7020263 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. **WGS84**)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**  
 Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Foothlope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: **Ferrous**  
 ROCK FORM: Sheet  Boulder  Coarse Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* high open shrubland over *Baeckea* sp. Melita Station shrubland over *Micromyrtus placoides* low shrubland over *Eriachne helmsii* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
 CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring   
 FENCING: Not Required  Fenced  Required  Replace/Repair   
 ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes   
 COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Amy Capobianco 722ph2-AC-02 (*ecologia* Environment) Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH



# RARE FLORA REPORT FORM

**TAXON:** *Micromyrtus placoides* Rye  
 DRF  Priority Species: P1 Partial Survey  Full Survey  New Population   
**DEFL POPULATION No.:** \_\_\_\_\_  
**FROM:** Scott Hitchcock 722ph1-SH-17 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 12/11/2006  
**REGION:** Murchison **DISTRICT:** \_\_\_\_\_ **SHIRE:** \_\_\_\_\_  
**LOCATION:** Weld Range

**GPS LOCATION:** 50J – 562050 mE, 7019840 mN  
**GPS DATUM:** AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
**LAND STATUS:** Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**

Landowner/manager present during inspection:

**LANDFORM:** Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Minor channel  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

**ROCK TYPE:** Laterite  Granite  Dolerite  Limestone  Other: **Ferrous, ?Calcrete**  
**ROCK FORM:** Sheet  Boulder  Fine Gravel  Coarse Gravel   
**SOIL TYPE:** Sand  Loam  Clay  Peat  Gravel   
**SOIL COLOUR:** Red  Orange  Yellow  White  Grey   
**SOIL CONDITION:** Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

**VEGETATION CLASSIFICATION (Muir's):** *Acacia aneura* var. *aneura* scattered low trees over *Acacia rhodophloia* and *Thryptomene decussata* scattered tall shrubs over *Baeckea* sp. Melita Station and *Acacia rhodophloia* scattered shrubs over *Micromyrtus placoides*, *Baeckea* sp. Melita Station and *Aluta aspera* subsp. *hesperia* low shrubland over *Goodenia tenuiloba* scattered herbs over scattered tussock grasses.

**ASSOCIATED SPECIES:** \_\_\_\_\_

**No. of PLANTS:** Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

**REPRODUCTIVE STATE:** Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
**POLLINATORS:** Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

**CONDITION OF POPULATION:** Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

**POTENTIAL THREATS:** Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

**FIRE HISTORY:** Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

**FENCING:** Not Required  Fenced  Required  Replace/Repair

**ROADSIDE MARKERS:** Not Required  Present  Required  Replace  Reposition

**OTHER COMMENTS (include action taken/required):** \_\_\_\_\_

**VOUCHER SPECIMEN:** Regional Herb.  District Herb.  WA Herb.  Other

**ATTACHED:** Map  Mudmap  Illustration  Photo  Field Notes

**COPY SENT TO:** Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph1-SH-17 (*ecologia* Environment)

Date: 26/02/2009

*NOTE: Map or further information may be attached or given on the back of this form.*

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH**



# RARE FLORA REPORT FORM

TAXON: *Mirbelia ?stipitata* Crisp & J.M.Taylor  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 FROM: Jeremy Naaykens 722ph1-JN-08 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 04/11/2006  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J – 585997 mE, 7032081 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainage line  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: BIF, non-banded Ferrous

ROCK FORM: Sheet  Stones/Boulders  Fluvialite Gravel  Concretionary Gravel

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Orange  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* scattered trees over *Acacia aneura* var. *aneura* and *Acacia burkittii* low woodland over *Acacia aneura* var. *aneura* and *Acacia tetragonophylla* highh shrubland over *Acacia jamesiana* open shrubland over *Calytrix desolata* and *Grevillea deflexa* low open shrubland over *Aristida contorta* open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Jeremy Naaykens 722ph1-JN-08 (*ecologia* Environment)

Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

TAXON: *Ptilotus astrolasius* var. *luteolus* Benl & H.Eichler  
 DRF  Priority Species: P1 Partial Survey  Full Survey  New Population   
 DEF L POPULATION No.: \_\_\_\_\_  
 FROM: Scott Hitchcock 722ph2-SH-14 (ecologia Environment) TITLE: Botanist SURVEY DATE: 17/04/2007  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J - 588151 mE, 7033952 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Midslope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainage line  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: Ferrous  
 ROCK FORM: Sheet  Stones/Boulders  Coarse Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* low open woodland over *Acacia* sp. Weld Range high shrubland over *Eremophila macmillaniana* open shrubland over *Eremophila exilifolia* and *Dodonaea amplisemina* low shrubland over *Enneapogon caerulescens* and *Aristida contorta* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
 CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

\_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19 \_\_\_\_\_ Summer  Autumn  Winter  Spring   
 FENCING: Not Required  Fenced  Required  Replace/Repair   
 ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes   
 COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph2-SH-14 (ecologia Environment) Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Ptilotus beardii* Benl

DEFL POPULATION No.: \_\_\_\_\_

DRF

Priority Species: P3

Partial Survey

Full Survey

New Population

FROM: Scott Hitchcock 722ph1-SH-23 (*ecologia* Environment)

TITLE: Botanist

SURVEY DATE: 03/11/2006

REGION: Murchison

DISTRICT: \_\_\_\_\_

SHIRE: \_\_\_\_\_

LOCATION: Weld Range

GPS LOCATION: 50J - 587785 mE, 7036179 mN

GPS DATUM:

AGD84

GDA94

GDA94-Compatible (e.g. WGS84)

Unknown

None

LAND STATUS:

Nature Reserve

Private

Gravel Res. MRD

Rail Reserve

National Park

Pastoral Lease

Gravel Res. Shire

Rd. Verge Shire

State Forest

UCL

Other Shire Res.

Rd. Verge MRD

Water Reserve

Other

Specify: Mining Lease

Landowner/manager present during inspection:

PLEASE NOTE: Opportunistic collection therefore certain information unavailable

LANDFORM:

Hilltop

Cliff

Slope

Valley

Swamp

Outcrop

Breakaway

Low Plain

Gully

Riverbank

Ridge

Sand Dune

Flat

Drainageline

Lake Edge

Firebreak

Other  Specify: \_\_\_\_\_

ROCK TYPE:

Laterite

Granite

Dolerite

Limestone

Other: \_\_\_\_\_

ROCK FORM:

Sheet

Boulder

Fluviatile Gravel

Concretionary Gravel

SOIL TYPE:

Sand

Loam

Clay

Peat

Gravel

SOIL COLOUR:

Red

Brown

Yellow

White

Grey

SOIL CONDITION:

Moist

Inundated

Dry

Saline

Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): \_\_\_\_\_

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS:

Mature: \_\_\_\_\_

Seedlings: \_\_\_\_\_

Dead: \_\_\_\_\_

Actual

Estimate

Area Occupied: \_\_\_\_\_

(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE:

Clonal

Flower bud

Flower

Immat. fruit

Fruit

Old Fruit

Vegetative

POLLINATORS:

Native bees

Honey bees

Other insects

Birds

Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION:

Healthy

Moderate

Poor

Disturbed

Comment: \_\_\_\_\_

POTENTIAL THREATS:

Firebreaks

Mining

Recreation

Roadworks

Grazing

Weeds

Salinity

Disease

Prescribed Burning

Other

Comment: \_\_\_\_\_

FIRE HISTORY:

Not known

Burnt in 19\_\_\_\_\_

Summer

Autumn

Winter

Spring

FENCING:

Not Required

Fenced

Required

Replace/Repair

ROADSIDE MARKERS:

Not Required

Present

Required

Replace

Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN:

Regional Herb.

District Herb.

WA Herb.

Other

ATTACHED:

Map

Mudmap

Illustration

Photo

Field Notes

COPY SENT TO:

Regional Office

District Office

Other

Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph1-SH-23 (*ecologia* Environment)

Date: 05/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Ptilotus beardii* Benl DEFL POPULATION No.: \_\_\_\_\_  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 FROM: Joshua Gilovitz 722ph3-CG-01 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 04/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_

LOCATION: Weld Range, proposed Haul Road

GPS LOCATION: 50J - 567092 mE, 7024711 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: Ferrous

ROCK FORM: Sheet  Stones/Boulders  Gravel  Pebbles

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Brown  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia ramulosa* var. *linophylla* scattered low trees over *Acacia ramulosa* var. *linophylla* open shrubland over *Ptilotus beardii* and *Ptilotus obovatus* low shrubland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Joshua Gilovitz 722ph3-CG-01 (*ecologia* Environment)

Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Prostanthera ferricola* B.J.Conn & K.A.Sheph.

DEFL POPULATION No.: \_\_\_\_\_

DRF

Priority Species: P3

Partial Survey

Full Survey

New Population

FROM: Jeremy Naaykens 722ph2-JN-09 (*ecologia* Environment)

TITLE: Botanist

SURVEY DATE: 21/04/2007

REGION: Murchison

DISTRICT: \_\_\_\_\_

SHIRE: \_\_\_\_\_

LOCATION: Weld Range

GPS LOCATION: 50J – 562005 mE, 7019220 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Midslope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: BIF, Ferrous

ROCK FORM: Sheet  Stones/Boulders  Coarse Gravel  Pebbles

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Orange  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia* sp. Weld Range high shrubland over *Acacia* sp. Weld Range and *Eremophila macmillaniana* shrubland over *Eremophila macmillaniana* and *Calytrix desolata* low shrubland over *Aristida contorta* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Jeremy Naaykens 722ph2-JN-09 (*ecologia* Environment)

Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Prostanthera petrophila* B.J.Conn  
 DRF  Priority Species: P1 Partial Survey  Full Survey  New Population   
 DEF. POPULATION No.: \_\_\_\_\_  
 FROM: Jeremy Naaykens 722ph1-JN-04 (ecologia Environment) TITLE: Botanist SURVEY DATE: 07/11/2006  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J – 572381 mE, 7026342 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**

Landowner/manager present during inspection:   
 LANDFORM: Hilltop  Cliff  Hill slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: **BIF, non-banded Ferrous**  
 ROCK FORM: Sheet  Stones/Boulders  Fluvial Gravel  Concretionary Gravel   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* high open shrubland to low open woodland over *Acacia aneura* var. *aneura* and *Prostanthera petrophila* shrubland over *Aluta aspera* subsp. *hesperia* low open heath.  
 ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals   
 Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring   
 FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition   
 OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes   
 COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Jeremy Naaykens 722ph1-JN-04 (ecologia Environment) Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983  
 RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Prostanthera petrophila* B.J.Conn DEF L POPULATION No.: \_\_\_\_\_  
 DRF  Priority Species: P1 Partial Survey  Full Survey  New Population   
 FROM: Joshua Gilovitz 722ph3-CG-08 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 09/07/2008  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range, proposed Borrow Pits West

GPS LOCATION: 50J – 575210 mE, 7032660 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**

Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: **Ferrous**  
 ROCK FORM: Sheet  Stones/Boulders  Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *intermedia* low open woodland over *Acacia* spp. scattered tall shrubs over *Thryptomene decussata* and *Prostanthera petrophila* open shrubland over *Thryptomene decussata* low open shrubland over *Aluta aspera* subsp. *hesperia* low shrubland over *Eragrostis setifolia* scattered tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Joshua Gilovitz 722ph3-CG-08 (*ecologia* Environment)

Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH



TAXON: *Prostanthera petrophila* B.J.Conn

DEFL POPULATION No.: \_\_\_\_\_

DRF

Priority Species: P1

Partial Survey

Full Survey

New Population

FROM: Joshua Gilovitz 722ph3-CG-07 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 10/07/2008

REGION: Murchison

DISTRICT: \_\_\_\_\_

SHIRE: \_\_\_\_\_

LOCATION: Weld Range, proposed Borrow Pits

GPS LOCATION: 50J – 574714 mE, 7032500 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_

ROCK FORM: Sheet  Boulder  Fine Gravel  Concretionary Gravel

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Orange  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia ramulosa* var. *linophylla* and *Acacia cockertoniana* high shrubland over *Eremophila* spp. shrubland over *Sida cardiophylla* low scattered shrubs.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION:  Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Joshua Gilovitz 722ph3-CG-07 (*ecologia* Environment)

Date: 25/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

TAXON: *Prostanthera petrophila* B.J.Conn  
 DRF  Priority Species: P1 Partial Survey  Full Survey  New Population   
 FROM: Scott Hitchcock 722ph2-SH-10 (ecologia Environment) TITLE: Botanist SURVEY DATE: 20/04/2007  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J – 562094 mE, 7019416 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Midslope  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: BIF, Ferrous

ROCK FORM: Sheet  Stones/Boulders  Fluvialite Gravel  Concretionary Gravel

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Orange  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* open scrub over *Eremophila glutinosa* shrubland over *Dodonaea pachyneura* and *Ptilotus obovatus* var. *obovatus* low scattered shrubs over *Aristida holathera* scattered tussock grasses.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph2-SH-10 (ecologia Environment)

Date: 26/02/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

**TAXON:** *Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94) **DEFL POPULATION No.:** \_\_\_\_\_  
 DRF  Priority Species: **P1** Partial Survey  Full Survey  New Population   
**FROM:** Scott Hitchcock 722ph1-SH-20 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 06/11/2006  
**REGION:** Murchison **DISTRICT:** \_\_\_\_\_ **SHIRE:** \_\_\_\_\_  
**LOCATION:** Weld Range

**GPS LOCATION:** 50J – 578433 mE, 7029011 mN  
**GPS DATUM:** AGD84  GDA94  GDA94-Compatible (e.g. **WGS84**)  Unknown  None   
**LAND STATUS:** Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**  
 Landowner/manager present during inspection:

**LANDFORM:** Hill crest  Cliff  Hill slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

**ROCK TYPE:** Laterite  Granite  Dolerite  Limestone  Other: **BIF, non-banded Ferrous**  
**ROCK FORM:** Sheet  Boulder  Fluvatile Gravel  Concretionary Gravel   
**SOIL TYPE:** Sand  Loam  Clay  Peat  Gravel   
**SOIL COLOUR:** Red  Orange  Yellow  White  Grey   
**SOIL CONDITION:** Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

**VEGETATION CLASSIFICATION (Muir's):** *Acacia aneura* var. *aneura* and *Acacia* aff. *quadrimarginea* low open woodland over *Acacia aneura* var. *aneura* and *Thryptomene decussata* scattered tall shrubs over *Eremophila latrobei* subsp. *latrobei* and *Philotheca brucei* subsp. *brucei* open shrubland over *Eremophila latrobei* subsp. *latrobei*, *Philotheca brucei* subsp. *brucei* and *Ptilotus obovatus* var. *obovatus* low shrubland over *Goodenia tenuiloba* very open herbs over *Eriachne mucronata* (desert form) open tussock grassland.

**ASSOCIATED SPECIES:** \_\_\_\_\_

**No. of PLANTS:** Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

**REPRODUCTIVE STATE:** Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
**POLLINATORS:** Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
**CONDITION OF POPULATION:** Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

**POTENTIAL THREATS:** Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

**FIRE HISTORY:** Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

**FENCING:** Not Required  Fenced  Required  Replace/Repair

**ROADSIDE MARKERS:** Not Required  Present  Required  Replace  Reposition

**OTHER COMMENTS (include action taken/required):** \_\_\_\_\_

**VOUCHER SPECIMEN:** Regional Herb.  District Herb.  WA Herb.  Other

**ATTACHED:** Map  Mudmap  Illustration  Photo  Field Notes

**COPY SENT TO:** Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph1-SH-20 (*ecologia* Environment) Date: 03/03/2009

*NOTE: Map or further information may be attached or given on the back of this form.*

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH**

# RARE FLORA REPORT FORM

TAXON: *Stenanthemum patens* Rye  
 DRF  Priority Species: P1 Partial Survey  Full Survey  New Population   
 DEFL POPULATION No.: \_\_\_\_\_  
 FROM: Jeremy Naaykens 722ph2-JN-07 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 20/04/2007  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J - 562005 mE, 7019220 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
 LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease  
 Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Midslope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: BIF, Ferrous  
 ROCK FORM: Sheet  Stones/Boulders  Coarse Gravel  Pebbles   
 SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
 SOIL COLOUR: Red  Orange  Yellow  White  Grey   
 SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia* sp. Weld Range high shrubland over *Acacia* sp. Weld Range and *Eremophila macmillaniana* shrubland over *Eremophila macmillaniana* and *Calytrix desolata* low shrubland over *Aristida contorta* very open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
 POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
 CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19 \_\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Jeremy Naaykens 722ph2-JN-07 (*ecologia* Environment) Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

# RARE FLORA REPORT FORM

**TAXON:** *Scerolaena uniflora* R.Br. **DEFL POPULATION No.:** \_\_\_\_\_  
 DRF  Range Extension  Partial Survey  Full Survey  New Population   
**FROM:** Jeremy Naaykens 722ph1-JN-11 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 08/11/2006  
**REGION:** Murchison **DISTRICT:** \_\_\_\_\_ **SHIRE:** \_\_\_\_\_  
**LOCATION:** Weld Range

**GPS LOCATION:** 50J – 549879 mE, 7017184 mN

**GPS DATUM:** AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

**LAND STATUS:** Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

**LANDFORM:** Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Undulating Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

**ROCK TYPE:** Laterite  Granite  Dolerite  Limestone  Other: non-banded Ferrous

**ROCK FORM:** Sheet  Rocks  Fluvialite Gravel  Concretionary Gravel

**SOIL TYPE:** Sand  Loam  Clay  Peat  Gravel

**SOIL COLOUR:** Red  Orange  Yellow  White  Grey

**SOIL CONDITION:** Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

**VEGETATION CLASSIFICATION** (Muir's): *Acacia aneura* var. ?*intermedia* scattered low trees over *Acacia aneura* var. ?*intermedia* and *Acacia ramulosa* var. *linophylla* high shrubland over *Eremophila forrestii* and *Acacia ramulosa* var. *linophylla* shrubland over *Eremophila forrestii*, *Eremophila granitica*, *Ptilotus obovatus* var. *obovatus* and *Solanum lasiophyllum* low shrubland over *Aristida contorta* tussock grassland.

**ASSOCIATED SPECIES:** \_\_\_\_\_

**No. of PLANTS:** Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

**REPRODUCTIVE STATE:** Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

**POLLINATORS:** Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

**CONDITION OF POPULATION:** Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

**POTENTIAL THREATS:** Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

**FIRE HISTORY:** Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

**FENCING:** Not Required  Fenced  Required  Replace/Repair

**ROADSIDE MARKERS:** Not Required  Present  Required  Replace  Reposition

**OTHER COMMENTS** (include action taken/required): \_\_\_\_\_

**VOUCHER SPECIMEN:** Regional Herb.  District Herb.  WA Herb.  Other

**ATTACHED:** Map  Mudmap  Illustration  Photo  Field Notes

**COPY SENT TO:** Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Jeremy Naaykens 722ph1-JN-11 (*ecologia* Environment) Date: 03/03/2009

*NOTE: Map or further information may be attached or given on the back of this form.*

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH**

# RARE FLORA REPORT FORM

TAXON: *Tecticornia cymbiformis* K.A.Sheph. & Paul G.Wilson DEFPL POPULATION No.: \_\_\_\_\_  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
 FROM: Amy Capobianco 722ph2-AC-04 (ecologia Environment) TITLE: Botanist SURVEY DATE: 15/04/2007  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J – 558093 mE, 7018841 mN  
 GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**

Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat/Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_

ROCK FORM: Sheet  Boulder  Fluvialite Gravel  Concretionary Gravel

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Orange  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Eucalyptus carnei* woodland over *Eremophila pantonii* scattered shrubs over *Atriplex* sp. and *Tecticornia cymbiformis* low open shrubland over *Eragrostis pergracilis* open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Amy Capobianco 722ph2-AC-04 (ecologia Environment) Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Triodia schinzii* (Henrard) Lazarides  
DRF  Range Extension  Partial Survey  Full Survey  New Population   
DEFL POPULATION No.: \_\_\_\_\_  
FROM: Melissa Hay 906-MH-01 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 11/11/2006  
REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
LOCATION: Weld Range

GPS LOCATION: 50J – 580188 mE, 7034566 mN  
GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None   
LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
Water Reserve  Other  Specify: Mining Lease  
Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
Outcrop  Breakaway  Low Plain  Gully  Riverbank   
Ridge  Sand Dune  Flat/Plain  Drainageline  Lake Edge   
Firebreak  Other  Specify: \_\_\_\_\_

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: \_\_\_\_\_  
ROCK FORM: Sheet  Boulder  Coarse Gravel  Pebbles   
SOIL TYPE: Sand  Loam  Clay  Peat  Gravel   
SOIL COLOUR: Red  Orange  Yellow  White  Grey   
SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): +/- *Corymbia lenziana* scattered medium trees over *Acacia. ramulosa* var. *linophylla* and *A. aneura* sparse tall shrubland over mixed *Eremophila* spp. open mid shrubland over scattered low shrubs of *Ptilotus obovatus* var. *obovatus* over mixed open tussock grassland with small patches of *Triodia schinzii*.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
(Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative   
POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_  
CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Melissa Hay 906-MH-01 (*ecologia* Environment) Date: 19/10/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH

TAXON: *Trichodesma zeylanicum* (Burm.f.) R.Br. var. *zeylanicum* DEFL POPULATION No.: \_\_\_\_\_  
 DRF  Range Extension  Partial Survey  Full Survey  New Population   
 FROM: Scott Hitchcock 722ph1-SH-27 (*ecologia* Environment) TITLE: Botanist SURVEY DATE: 11/11/2006  
 REGION: Murchison DISTRICT: \_\_\_\_\_ SHIRE: \_\_\_\_\_  
 LOCATION: Weld Range

GPS LOCATION: 50J – 560383 mE, 7016704 mN

GPS DATUM: AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

LAND STATUS: Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: Mining Lease

Landowner/manager present during inspection:

LANDFORM: Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat/Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: Creek bed and bank

ROCK TYPE: Laterite  Granite  Dolerite  Limestone  Other: non-banded Ferrous, quartz

ROCK FORM: Sheet  Boulder  Coarse Gravel  Pebbles

SOIL TYPE: Sand  Loam  Clay  Peat  Gravel

SOIL COLOUR: Red  Orange  Yellow  White  Grey

SOIL CONDITION: Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

VEGETATION CLASSIFICATION (Muir's): *Acacia aneura* var. *aneura* and *Acacia aneura* var. *intermedia* woodland to low open forest over *Acacia ramulosa* var. *linophylla* high shrubland over *Senna artemisioides* subsp. *helmsii* and *Senna* sp. Meekatharra low open shrubland to shrubland over *Ptilotus obovatus* var. *obovatus* low open shrubland over *Marsdenia australis* climbers over *Abutilon macrum* and *Sida fibulifera* open herbs over *Aristida contorta* and *Austrostipa scabra* open tussock grassland.

ASSOCIATED SPECIES: \_\_\_\_\_

No. of PLANTS: Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

REPRODUCTIVE STATE: Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

POLLINATORS: Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

CONDITION OF POPULATION: Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

POTENTIAL THREATS: Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

FIRE HISTORY: Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

FENCING: Not Required  Fenced  Required  Replace/Repair

ROADSIDE MARKERS: Not Required  Present  Required  Replace  Reposition

OTHER COMMENTS (include action taken/required): \_\_\_\_\_

VOUCHER SPECIMEN: Regional Herb.  District Herb.  WA Herb.  Other

ATTACHED: Map  Mudmap  Illustration  Photo  Field Notes

COPY SENT TO: Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Scott Hitchcock 722ph1-SH-27 (*ecologia* Environment)

Date: 03/03/2009

NOTE: Map or further information may be attached or given on the back of this form.

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH



**TAXON:** *Verticordia jamiesonii* **DEFL POPULATION No.:** \_\_\_\_\_  
 DRF  Priority Species: P3 Partial Survey  Full Survey  New Population   
**FROM:** Jeremy Naaykens JN-702-13 (*ecologia* Environment) **TITLE:** Botanist **SURVEY DATE:** 20/07/2006  
**REGION:** Murchison **DISTRICT:** \_\_\_\_\_ **SHIRE:** \_\_\_\_\_  
**LOCATION:** Weld Range

**GPS LOCATION:** 50J – 581946 mE, 7026862 mN

**GPS DATUM:** AGD84  GDA94  GDA94-Compatible (e.g. WGS84)  Unknown  None

**LAND STATUS:** Nature Reserve  Private  Gravel Res. MRD  Rail Reserve   
 National Park  Pastoral Lease  Gravel Res. Shire  Rd. Verge Shire   
 State Forest  UCL  Other Shire Res.  Rd. Verge MRD   
 Water Reserve  Other  Specify: **Mining Lease**

Landowner/manager present during inspection:

**LANDFORM:** Hilltop  Cliff  Slope  Valley  Swamp   
 Outcrop  Breakaway  Low Plain  Gully  Riverbank   
 Ridge  Sand Dune  Flat/Plain  Drainageline  Lake Edge   
 Firebreak  Other  Specify: \_\_\_\_\_

**ROCK TYPE:** Laterite  Granite  Dolerite  Limestone  Other: Ferrous

**ROCK FORM:** Sheet  Boulder  Fluvialite Gravel  Concretionary Gravel

**SOIL TYPE:** Sand  Loam  Clay  Peat  Gravel

**SOIL COLOUR:** Red  Orange  Yellow  White  Grey

**SOIL CONDITION:** Moist  Inundated  Dry  Saline  Other: \_\_\_\_\_

**VEGETATION CLASSIFICATION (Muir's):** *Acacia aneura* var. *aneura* scrub, over *Eremophila glutinosa*/*Eremophila latrobei* subsp. *latrobei* low shrubs, over *Philotheca brucei* subsp. *brucei* dwarf shrubs.

**ASSOCIATED SPECIES:** \_\_\_\_\_

**No. of PLANTS:** Mature: \_\_\_\_\_ Seedlings: \_\_\_\_\_ Dead: \_\_\_\_\_ Actual  Estimate  Area Occupied: \_\_\_\_\_  
 (Leave blank if unable to observe, or no attempt made to count plants)

**REPRODUCTIVE STATE:** Clonal  Flower bud  Flower  Immat. fruit  Fruit  Old Fruit  Vegetative

**POLLINATORS:** Native bees  Honey bees  Other insects  Birds  Mammals

Other observations: \_\_\_\_\_

**CONDITION OF POPULATION:** Healthy  Moderate  Poor  Disturbed  Comment: \_\_\_\_\_

**POTENTIAL THREATS:** Firebreaks  Mining  Recreation  Roadworks  Grazing  Weeds   
 Salinity  Disease  Prescribed Burning  Other  Comment: \_\_\_\_\_

**FIRE HISTORY:** Not known  Burnt in 19\_\_\_\_ Summer  Autumn  Winter  Spring

**FENCING:** Not Required  Fenced  Required  Replace/Repair

**ROADSIDE MARKERS:** Not Required  Present  Required  Replace  Reposition

**OTHER COMMENTS (include action taken/required):** \_\_\_\_\_

**VOUCHER SPECIMEN:** Regional Herb.  District Herb.  WA Herb.  Other

**ATTACHED:** Map  Mudmap  Illustration  Photo  Field Notes

**COPY SENT TO:** Regional Office  District Office  Other  Specify: \_\_\_\_\_

Signed: Jeremy Naaykens JN-702-13 (*ecologia* Environment)

Date: 19/10/2009

*NOTE: Map or further information may be attached or given on the back of this form.*

Please return completed form to Director General, DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, SPECIES AND COMMUNITIES BRANCH**

## **APPENDIX M      EXPLANATION OF DECLARED PLANT CODES**

Priority	Requirements
P1 Prohibits movement	The movement of plants or their seeds is prohibited within the State. This prohibits the movement of contaminated machinery and produce, including livestock and fodder.
P2 Aims to eradicate infestation	Treat all plants to destroy and prevent propagation each year until no plants remain. The infested area must be managed in such a way that prevents the spread of seed or plant parts on or in livestock, fodder, grain, vehicles and/or machinery.
P3 Aims to control infestation by reducing area and/or density of infestation	<p>The infested area must be managed in such a way that prevents the spread of seed or plant parts within and from the property, on or in livestock, fodder, grain, vehicles and/or machinery.</p> <p>Treat to destroy and prevent seed set for all plants:</p> <ul style="list-style-type: none"> <li>• Within 100 metres inside of the boundaries of the infestation.</li> <li>• Within 50 metres of roads and high-water marks on waterways.</li> <li>• Within 50 metres of sheds, stock yards and houses.</li> </ul> <p>Treatment must be done prior to seed set each year.</p> <p>Of the remaining infested area:</p> <ul style="list-style-type: none"> <li>• Where plant density is 1-10 per hectare, treat 100% of infestation.</li> <li>• Where plant density is 11-100 per hectare, treat 50% of infestation.</li> <li>• Where plant density is 101-1000 per hectare, treat 10% of infestation.</li> </ul> <p>Properties with less than two hectares of infestation must treat the entire infestation.</p> <p>Additional areas may be ordered to be treated.</p>
P4 Aims to prevent infestation spreading beyond existing boundaries of infestation	<p>The infested area must be managed in such a way that prevents the spread of seed or plant parts within and from the property, on or in livestock, fodder, grain, vehicles and/or machinery.</p> <p>Treat to destroy and prevent seed set for all plants:</p> <ul style="list-style-type: none"> <li>• Within 100 metres inside of the boundaries of the infested property.</li> <li>• Within 50 metres of roads and high-water marks on waterways.</li> <li>• Within 50 metres of sheds, stock yards and houses.</li> </ul> <p>Treatment must be done prior to seed set each year. Properties with less than two hectares of infestation must treat the entire infestation.</p> <p>Additional areas may be ordered to be treated.</p> <p>Special considerations:</p> <p>In the case of P4 infestations where they continue across property boundaries, there is no requirement to treat the relevant part of the property boundaries as long as the boundaries of the infestation as a whole are treated. There must be agreement between neighbours in relation to the treatment of these areas.</p>
P5	Infestations on public lands must be controlled.

**APPENDIX N**

**DEC VEGETATION COMMUNITIES DESCRIBED FOR  
SELECTED BIF RANGES LYING NORTH OF MOUNT  
MAGNET**

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Range	Landform Code	Associated Landforms	Vegetation Description	Veg Type
WNT	BIF	Ironstone hills.	Sparse to open woodlands and shrublands of <i>Acacia aneura</i> and other <i>Acacia</i> spp. ( <i>A. citrinoviridis</i> , <i>A. tetragonophylla</i> , <i>A. quadrimarginea</i> , <i>A. pruinocarpa</i> , <i>A. demissa</i> and <i>A. rhodophloia</i> ), <i>Hake preissii</i> , <i>Grevillea berryana</i> and <i>Eremophila macmillaniana</i> over sparse to open shrublands of <i>Eremophila</i> spp. ( <i>E. phyllopoda</i> , <i>E. spathulata</i> , <i>E. glutinosa</i> , <i>E. jucunda</i> subsp. <i>jucunda</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> and <i>E. galeata</i> ), <i>Senna</i> spp. ( <i>S. artemisioides</i> subsp. <i>petiolaris</i> , <i>S. artemisioides</i> subsp. <i>helmsii</i> , <i>S. sp.</i> Meekatharra and <i>S. glaucifolia</i> ), <i>Acacia craspedocarpa</i> and <i>Dodonaea viscosa</i> subsp. <i>mucronata</i> over isolated grasslands of <i>Cymbopogon ambiguus</i> .	4
PERS	BIF	Crests and slopes of BIF and iron rich chert, or on basalt and felsic rocks.	Open to sparse shrubland of <i>Acacia aneura</i> and <i>A. quadrimarginea</i> over isolated to sparse shrubland of <i>Eremophila</i> spp. ( <i>E. latrobei</i> , <i>E. foliosissima</i> and <i>E. galeata</i> ) and <i>Thryptomene decussata</i> over isolated to sparse shrubland of <i>P. schwartzii</i> .	2
PERS	BIF	Crests and slopes of BIF and iron rich chert.	Open to sparse shrubland of <i>Acacia aneura</i> , <i>Grevillea berryana</i> , and <i>Acacia</i> spp. ( <i>A. quadrimarginea</i> , <i>A. tetragonophylla</i> and <i>Acacia</i> cf. <i>resinimarginea</i> ) over open to sparse shrubland of <i>Scaevola spinescens</i> and <i>Eremophila latrobei</i> and <i>Senna</i> sp. Meekatharra over isolated to sparse shrublands of <i>Ptilotus</i> spp. ( <i>P. obovatus</i> and <i>P. schwartzii</i> ) and <i>Maireana georgii</i> .	3
WR	BIFMID	1a) Moderate hill slopes, very rocky terrain and outcrops of BIF. 1b) Rocky, gentle to moderate inclines.	1a) <i>Acacia aneura</i> , <i>A. ramulosa</i> and / or <i>Acacia</i> sp. Weld Range (A. Markey and S. Dillon 2994), over sparse <i>Eremophila</i> spp. 1b) Open to sparse shrubland of <i>Acacia aneura</i> (var. <i>microphylla</i> , <i>aneura</i> and <i>argentea</i> ), <i>Acacia</i> sp. Weld Range & <i>Grevillea berryana</i> , over <i>Eremophila</i> spp. low shrubs.	1a and 1b
LEEST	BIFMID	Mid-slopes of BIF with a gentle to moderate gradient.	Tall open <i>Acacia</i> shrubland, particularly <i>Acacia quadrimarginea</i> , over sparse to open mid-stratum of <i>Eremophila margarethae</i> and <i>Senna glaucifolia</i> shrubs with open hummock grasslands of <i>Triodia melvillei</i> .	1
WR	BIFOUT	Massive rocky outcrops of BIF, moderate to steep hill slopes.	Sparse to open shrubland of <i>Acacia aneura</i> var. <i>microcarpa</i> and / or <i>A. aneura</i> var. <i>aneura</i> , over mid stratum shrub layer of <i>Thryptomene decussata</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , and <i>Eremophila</i> spp.	2
JFH	BIFOUT	Midslope quadrats on south-eastern ridge of massive, haematite enriched outcrops.	<i>Acacia aneura</i> cf. var. <i>microcarpa</i> and occasional <i>Acacia pruinocarpa</i> over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Dodonaea petiolaris</i> , <i>Eremophila flabellata</i> , <i>Sida</i> sp. (Markey and Dillon 4126) and, less frequently, <i>Ptilotus rootundifolius</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> .	6
MR	CRELOW	Crests to the lower slopes of the range.	Tall shrubs of <i>Acacia aneura</i> var. <i>microcarpa</i> and <i>A. quadrimarginea</i> , mid-stratum shrubs <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>E. jucunda</i> and sparse <i>Ptilotus schwartzii</i> .	4

JH	CREMID	Along the entire range mainly on crests and midslopes.	Woodlands and shrublands of <i>A. aneura</i> cf. var. <i>aneura</i> or <i>A. aneura</i> cf. var. <i>tenuis</i> occasionally associated with <i>A. rhodophloia</i> woodlands over shrublands of <i>Ptilotus obovatus</i> and <i>Dodonaea petiolaris</i> .	2
JH	CREMID	On crests and midslopes of rocky outcrops on the entire range.	Open woodlands, woodlands and shrublands of <i>A. aneura</i> cf. var. <i>aneura</i> and <i>A. citrinoviridis</i> over <i>Ptilotus obovatus</i> .	3
LEEST	CREMID	Midslopes to crests with coarse weathered ironstone fragments.	Open shrubland of <i>Acacia aneura</i> var. <i>microcarpa</i> over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> with sparse cover of <i>Ptilotus obovatus</i> , <i>P. schwartzii</i> and <i>Tribulus suberosus</i> .	2
PERS	CREMID	Crests and midslopes of ultramafic and metabasalt derived hills.	Open to sparse shrubland of <i>Acacia</i> cf. <i>resinimarginea</i> and <i>A. grasbyi</i> over open to sparse shrubland of <i>Senna</i> spp. ( <i>S. artemisioides</i> subsp. <i>helmsii</i> and <i>Senna</i> sp. Meekatharra) over isolated to open shrubland of <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Calytrix desolata</i> or <i>Harnieria kempeana</i> subsp. <i>muelleri</i> .	1
RR&MG	CRESLOPE	Slopes and crests of banded ironstone on Robinson Range.	Open to sparse shrubland of <i>Acacia aneura</i> over open to isolated shrubland of <i>Aluta maisonneuvei</i> subsp. <i>auriculata</i> , <i>Eremophila</i> spp. ( <i>E. punctata</i> , <i>E. exilifolia</i> , <i>E. jucunda</i> subsp. <i>jucunda</i> , <i>E. spectabilis</i> subsp. <i>spectabilis</i> and <i>E. forrestii</i> subsp. <i>forrestii</i> ) over forbland and grassland of <i>Eriachne pulchella</i> , <i>Paspalidium basicladum</i> , <i>Ptilotus polystachyus</i> and <i>Sida chrysocalyx</i> .	4
RR&MG	CRESLOPE	Crests and slopes with slightly rocky to very rocky outcrops on Robinson Range.	Open to sparse shrubland of <i>Acacia aneura</i> , <i>A. citrinoviridis</i> , <i>Corymbia ferritcola</i> subsp. <i>ferritcola</i> over <i>Eremophila</i> spp. ( <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>E. exilifolia</i> , <i>E. punctata</i> , <i>E. jucunda</i> subsp. <i>jucunda</i> , <i>E. pendulina</i> and <i>E. forrestii</i> subsp. <i>forrestii</i> ), <i>Ptilotus obovatus</i> , <i>P. schwartzii</i> , <i>Sida chrysocalyx</i> over grasslands of <i>Paspalidium basicladum</i> and <i>Eriachne pulchella</i> .	5
RR&MG	CRESLOPE	Rocky to slightly rocky crests and midslopes of banded ironstone on the Robinson Range.	Open to sparse shrubland of <i>Acacia aneura</i> , <i>A. citrinoviridis</i> over open to sparse shrubland of <i>Eremophila</i> spp. ( <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>E. exilifolia</i> and <i>E. jucunda</i> subsp. <i>jucunda</i> ), <i>Senna glaucifolia</i> and <i>Sida chrysocalyx</i> over grassland of <i>Eriachne pulchella</i> and <i>Paspalidium basicladum</i> .	6
WNT	CRESLOPE	Upper slopes and crests with low cover of rock outcrop.	Open shrublands of <i>Acacia aneura</i> and <i>Grevillea berryana</i> over shrublands of <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>E. glutinosa</i> over sparse grassland of <i>Monachather paradoxus</i> .	2
WNT	CRESLOPE	Slopes and summits of laterised ironstone breakaways.	Sparse to open woodlands and shrublands of <i>Acacia aneura</i> , <i>A. citrinoviridis</i> and <i>A. pruinocarpa</i> over sparse to open shrublands of <i>Eremophila phyllopoda</i> , <i>Dodonaea viscosa</i> subsp. <i>mucronata</i> , <i>Micromyrtus sulphurea</i> , <i>Calytrix erosipetala</i> , <i>Philotheca citrina</i> , <i>P. brucei</i> subsp. <i>cinerea</i> , <i>Eremophila georgei</i> , <i>Thryptomene decussata</i> and <i>Ptilotus obovatus</i> .	3

B&TP	CRESLOPE	Crest and upper slopes of both ranges	Isolated to sparse shrublands of <i>Acacia aneura</i> and <i>A. ramulosa</i> over open to sparse shrublands of <i>Thryptomene decussata</i> , <i>Eremophila latrobei</i> , <i>E. glutinosa</i> and <i>A. scleroclada</i> over open to sparse shrublands and grasslands of <i>Sida</i> sp. Golden calyces glabrous, <i>Ptilotus obovatus</i> , <i>P. schwartzii</i> , <i>Eriachne pulchella</i> and <i>Aristida contorta</i> .	1
MR	CRESLOPE	Upper portion of the lanscape.	Tall open shrubland of <i>Acacia aneura</i> over sparse shrubs of <i>Ptilotus obovatus</i> , <i>Scaevola spinescens</i> , <i>Lepidium platypetalum</i> and <i>Maireana triptera</i> .	1
LAKMA	CRESLOPE	Upper slopes and rocky crests.	Tall shrubs of <i>Acacia aneura</i> var. <i>microcarpa</i> over mid-stratum of <i>Eremophila latrobei</i> subsp. <i>latrobei</i> with sparse cover of <i>Ptilotus schwartzii</i> .	2
JFH	CRESLOPE	Crests and steeper upper slopes.	Sparse open tall shrubland of <i>Acacia aneura</i> var. cf. <i>microcarpa</i> , <i>Grevillea berryana</i> , and (less commonly, <i>Acacia aneura</i> cf. var. <i>argentea</i> , <i>Acacia quadrimarginea</i> ) over mid story shrub stratum of <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Prostanthera campbellii</i> (occasionally <i>Dodonaea petiolaris</i> and <i>Baeckea</i> sp. Melita Station, <i>Eremophila punctata</i> and <i>E. flabellata</i> ), over common sub shrubs <i>Ptilotus obovatus</i> , <i>Sida chrysocalyx</i> , <i>Sida excedentifolia</i> , the perennial herb, <i>Ptilotus schwartzii</i> , the geophyte, <i>Cheilanthes brownii</i> , and the perannial grasses, <i>Eriachne helmsii</i> , <i>E. mucronata</i> and <i>Monachather paradoxus</i> .	1
LEEST	CRESLOPE	Crests and upper slopes of ironstone formations.	Sparse tall shrubs of <i>Acacia aneura</i> var. <i>microcarpa</i> and <i>A. citrinoviridis</i> over isolated to sparse shrubland of <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>E. margarethae</i> with isolated <i>Ptilotus schwartzii</i> .	3
BOO	CRESLOPE	1a) Gentle to moderately steep hill slopes and crests of BIF. 1b) Gently to moderately inclined mid-upper hill slopes and crests of weathered BIF.	1a) Tall open to sparse <i>Acacia aneura</i> shrubland where <i>A. aneura</i> cf. <i>microcarpa</i> is a significant indicator species, and often with additional <i>Acacia</i> spp. such as <i>A. quadrimarginea</i> or <i>A. thoma</i> . The sparse mid-stratum consists of various shrubs, including <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Solanum ashbyae</i> and <i>Sida chrysocalyx</i> . Other common sub-shrubs include <i>Ptilotus schwartzii</i> which co-occurs with perennial grasses such as <i>Cymbopogon ambiguus</i> and <i>Eriachne helmsii</i> . 1b) <i>Acacia aneura</i> cf. <i>microcarpa</i> and <i>Thryptomene decussata</i> tall open - sparse shrubland, less frequently with <i>Acacia ramulosa</i> var. <i>ramulosa</i> as a co-dominant, over sparse mid-stratum shrubs including <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Solanum ashbyae</i> and <i>Eremophila georgii</i> , <i>Dodonaea rigida</i> and <i>Sida chrysocalyx</i> , <i>Dodonaea petolaris</i> , <i>Ptilotus obovatus</i> , <i>Cheilanthes sieberi</i> , <i>Ptilotus schwartzii</i> and less frequently, <i>Scaevola spinescens</i> . The perennial grass <i>Thyridolepis multiculmis</i> is an indicator species in the ground layer.	1a and 1b
BOO	CRESLOPE	Steeper, rocky crests and upper slopes of BIF.	Sparse shrublands of <i>Acacia aneura</i> and <i>Thryptomene decussata</i> over mid-stratum shrubs of <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Prostanthera campbellii</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Eremophila georgei</i> , <i>Olearia humilis</i> , <i>Sida chrysocalyx</i> and <i>Dodonaea petiolaris</i> over a ground layer that includes <i>Cheilanthes brownii</i> and perennial grasses such as <i>Eragrostis lacunaria</i> .	2
MR	CREST	South, south east facing crest.	Open shrubland of <i>Acacia aneura</i> and <i>A. rhodophloia</i> over sparse shrubs of <i>Eremophila forrestii</i> and <i>E. punctata</i> with isolated <i>E. jucunda</i> .	2



WR	DOLER	Associated with dolerite substrates	Open shrubland of <i>Acacia</i> sp. Weld Range (A. Markey and S. Dillon 2994), <i>Acacia aneura</i> and <i>Acacia speckii</i> , over sparse mid stratum of <i>Eremophila macmillaniana</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> and <i>Heliotropium ovalifolium</i>	6
BOO	GULLIES	Downslope from outcropping ridges of BIF in shallow gullies where there was some influence of associated ultramafics, mafics, cherts, shale and other metasediments.	Tall shrublands of <i>Acacia aneura</i> and <i>A. ramulosa</i> var. <i>ramulosa</i> , over various shrubs, including <i>Grevillea inconspicua</i> , <i>Senna manicula</i> , and <i>Eremophila platycalyx</i> subsp. <i>platycalyx</i> .	6
B&TP	LATBREAK	Laterite breakaways surrounding Mount Barloweerie.	Open to sparse shrublands of <i>Acacia aneura</i> and <i>A. aulacophylla</i> over open to sparse shrublands of <i>Philotheca sericea</i> over sparse shrublands and forblands of <i>Ptilotus schwartzii</i> and <i>Stylidium longibracteatum</i> .	3
RR&MG	LOW	Lower slopes of Robinson Range and Mount Gould	Open to sparse shrublands of <i>Acacia aneura</i> over open to isolated shrublands of <i>Eremophila</i> spp. ( <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>E. jucunda</i> subsp. <i>jucunda</i> , <i>E. forrestii</i> subsp. <i>forrestii</i> ), <i>Ptilotus obovatus</i> and <i>P. polystachyus</i> over forbland and grassland of <i>Dysphania rhadinostachya</i> , <i>Aristida contorta</i> , <i>Eriachne pulchella</i> and <i>Goodenia tenuiloba</i> .	1
RR&MG	LOW	Simple and lower slopes of Robinson Range.	Sparse shrubland and woodlands of <i>Acacia aneura</i> and <i>A. pruinocarpa</i> over shrubland of <i>A. aneura</i> (juvenile), <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Eremophila fraseri</i> , <i>E. spectabilis</i> subsp. <i>spectabilis</i> and <i>Senna glaucifolia</i> over forbland and grassland of <i>Ptilotus polystachyus</i> , <i>Eriachne pulchella</i> and <i>Paspalidium basicladum</i> .	3
B&TP	LOW	Lower slopes and footslopes of the Twin Peaks greenstone belt.	Open to sparse shrublands of <i>Acacia aneura</i> and <i>A. ramulosa</i> over open to sparse shrublands of <i>A. tetragonophylla</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Senna</i> sp. Meekatharra, <i>Eremophila</i> spp. ( <i>E. macmillaniana</i> , <i>E. simulans</i> and <i>E. glutinosa</i> ) over mid-dense to open forbland and grassland of <i>Ptilotus obovatus</i> , <i>Aristida contorta</i> and <i>Eriachne pulchella</i> .	2
JH	LOWCREEK	Along the entire range but mainly on creeklines and lower slopes.	Open woodlands and woodlands of <i>Acacia</i> spp. (dominants – <i>Acacia aneura</i> cf. var. <i>aneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>A. rhodophloia</i> ) over shrublands of <i>Ptilotus obovatus</i> or <i>Eremophila</i> spp.	1

WR	LOWOUT	5a) Moderately inclined lower hillslopes and outwash plains. 5b) Moderately inclined lower hillslopes and outwash plains.	5a) Isolated emergent trees of <i>Acacia pruinocarpa</i> over <i>Acacia aneura</i> / <i>Acacia ramulosa</i> , over an open mid-stratum of shrubs. 5b) Sparse to open <i>Acacia</i> spp. shrubland ( <i>A. aneura</i> cf. var. <i>tenuis</i> or <i>aneura</i> and / or <i>Acacia effusifolia</i> ), over sparse <i>Senna</i> spp. and <i>Tribulus suberosus</i> low shrubs.	5a and 5b
JH	LOWOUT	Colluvial outwashes and a low crest.	Open woodlands, woodlands and isolated trees of <i>A. aneura</i> cf. var. <i>aneura</i> over shrublands of <i>Eremophila</i> spp.	5
LEEST	LOWPED	Mid to lower slopes and pediments; occasionally further upslope.	Tall to sparse open shrublands of <i>Acacia aneura</i> var. <i>microcarpa</i> with sparse mid-stratum of <i>Eremophila latrobei</i> subsp. <i>latrobei</i> over isolated hummock grassland of <i>Triodia melvillei</i> and isolated grasses of <i>Eragrostis eriopoda</i> complex.	4
JFH	LOWPED	Pediments, lower slopes and slightly low outcrops of weathered BIF and other metasediments, quartz and ultramafic lithologies, usually obscured by colluvium.	<i>Acacia aneura</i> (notably <i>A. aneura</i> var. cf. <i>tenuis</i> ), and less frequently <i>Acacia balsamea</i> and <i>A. cuthbertsonii</i> subsp. <i>cuthbertsonii</i> tall open shrublands over shrubs such as <i>Scaevola spinescens</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Eremophila flabellata</i> , over sparse low shrubs such as <i>Maireana convexa</i> , <i>M. georgei</i> , <i>Ptilotus obovatus</i> and less frequently <i>Eremophila jucunda</i> subsp. <i>jucunda</i> and <i>Sida</i> sp. unisexual.	3
JFH	LOWPEDPLAIN	Lower slopes, pediments and valley flats	Tall shrubland or open tall shrubland of <i>Acacia aneura</i> (often var. cf. <i>microcarpa</i> and occasionally var. cf. <i>tenuis</i> ), often with a canopy of <i>A. pruinocarpa</i> , over a typical mid stratum of <i>Eremophila forrestii</i> , <i>E. latrobei</i> , <i>Senna</i> spp., <i>Rhagodia eremaea</i> , <i>Eremophila flabellata</i> , <i>Sida</i> sp. unisexual and <i>Ptilotus obovatus</i> , usually over <i>P. schwartzii</i> , <i>Sida excedentifolia</i> and the perennial grass <i>Monachather paradoxa</i> .	5
BOO	LOWPEDPLAIN	Lower slopes, pediments, valley flats or plains adjacent to BIF landforms.	Shrublands of <i>Acacia aneura</i> (var. cf. <i>microcarpa</i> and var. cf. <i>tenuis</i> ) often with <i>A. ramulosa</i> var. <i>ramulosa</i> as co-dominant, over a shrub stratum of <i>Senna</i> spp. (particularly <i>S. glaucifolia</i> ), <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Solanum lasiophyllum</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Eremophila galeata</i> , <i>Ptilotus obovatus</i> and <i>P. schwartzii</i> .	3
LAKMA	LOWPLAIN	Lower slopes to outwash plains.	Open shrubland of <i>Acacia aneura</i> over sparse to open shrubs of <i>Eremophila galeata</i> , <i>Ptilotus obovatus</i> and <i>Solanum lasiophyllum</i> .	6
LEEST	LOWPLAIN	Lower footslopes and adjacent colluvium.	Sparse shrubland of <i>Acacia tetragonophylla</i> with isolated shrubs of <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Ptilotus obovatus</i> . Other taxa in this community include sparse or open woodlands of <i>A. pruinocarpa</i> and isolated <i>Rhagodia eremaea</i> .	5

BOO	LOWULTBAS	Mafic bedrock and colluvium in the basalt hills adjacent to the BIF ridges.	Tall, sparse-open shrublands of <i>Acacia xanthocarpa</i> and <i>A. ramulosa</i> subsp. <i>ramulosa</i> over a sparse shrub layer which includes, to varying degrees, <i>Dodonaea rigida</i> , <i>Eremophila exilifolia</i> , <i>Senna manicula</i> , <i>Eremophila granitica</i> , <i>E. forrestii</i> , <i>Grevillea inconspicua</i> , <i>Solanum ashbyae</i> and <i>Cheilanthes lasiphylla</i> .	5
PERS	LOWULTBAS	Lower slopes and colluvium derived from metabasalt and ultramafic rocks.	Open to sparse <i>Acacia aneura</i> and <i>Acacia</i> spp. ( <i>A. pruinocarpa</i> , <i>A. kempeana</i> and <i>A. grasbyi</i> ) over open to sparse shrublands of <i>Sida ectogama</i> , <i>S. sp.</i> Meekatharra and <i>Eremophila pantonii</i> over open to sparse shrubland of <i>Maireana georgei</i> and <i>M. triptera</i> .	4
WR	MIDLOW	Mid and low to moderate hillslopes. Loose ironstone gravel and scree.	Open shrubland of <i>Acacia aneura</i> over isolated <i>Solanum ashbyae</i> and <i>Tribulus suberosus</i> low shrubs.	3
WNT	MIDLOW	Lower slopes and midslope	Open shrublands of <i>Acacia aneura</i> over shrublands of <i>Eremophila phyllopoda</i> .	1
MR	MIDLOW	Mid to lower slopes, pediments and colluvial plains adjacent to the range.	Sparse to open tall shrubland of <i>Acacia aneura</i> var. <i>microcarpa</i> over open shrubland of <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>E. jucunda</i> .	6
LAKMA	MIDLOW	Mid to lower slopes, with more gentle slopes than other communities.	Tall shrubs of <i>Acacia aneura</i> var. <i>microcarpa</i> and the ubiquitous shrub species <i>Eremophila latrobei</i> subsp. <i>latrobei</i> in the mid-stratum.	3
LAKMA	MIDPED	Mid slopes and pediments	Open shrubland of <i>Acacia burkittii</i> and <i>A. xanthocarpa</i> over sparse shrubland of <i>Grevillea inconspicua</i> , <i>Prostanthera althoferi</i> , <i>Ptilotus obovatus</i> and <i>Senna aretemisioides</i> subsp. <i>x. artemisioides</i> with isolated cover of the perennial grass <i>Austrostipa elegantissima</i> .	4
JH	OUTCREST	Colluvial outwash and small ironstone crest.	Isolated trees of <i>Acacia stowardii</i> or woodlands of <i>A. aneura</i> cf. var. <i>tenuis</i> , <i>A. stowardii</i> and <i>A. kempeana</i> over sparse shrublands.	4
LAKMA	OUTCREST	From crests to the colluvial outwash plains.	Open shrubland of <i>Senna</i> sp. Meekatharra over isolated shrubs of <i>Scaevola spinescens</i> and <i>Ptilotus obovatus</i> .	5
MR	PEDIMENT	Steeper upper slopes to the pediments at the base of the range.	Sparse to open shrubland of <i>Acacia aneura</i> var. <i>microcarpa</i> over isolated <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Psyrax suaveolens</i> with isolated <i>Sida</i> sp. golden calyces glabrous.	3

BOO	PEDIMENT	Pediments of valley flats at the base of the range.	Tall, sparse to open shrublands of <i>Acacia aneura</i> , <i>A. ramulosa</i> var. <i>ramulosa</i> and <i>A. craspedocarpa</i> , with isolated trees of <i>Brachychiton gregorii</i> , over a sparse or open shrubland of <i>Solanum lasiophyllum</i> , <i>Senna glaucifolia</i> , <i>Senna</i> sp. Meekatharra, <i>S artemisioides</i> subsp. <i>helmsii</i> , <i>Eremophila galeata</i> and <i>Ptilotus obovatus</i> over perennial grasses such as <i>Enneapogon caeruleascens</i> and <i>Monachather paradoxus</i> .	4
MR	PLAIN	On an east, north east flat.	Open tall shrubland of <i>Acacia aneura</i> with isolated mallees of <i>Eucalyptus lucasii</i> over isolated shrubland of <i>Eremophila galeata</i> , <i>E. jucunda</i> and <i>Sida ectogama</i> .	5
LAKMA	PLAIN	Outwash plains away from footslopes.	Sparse tall shrubland of <i>Acacia aneura</i> var. <i>microcarpa</i> with open mid-stratum of <i>Eremophila forrestii</i> and <i>Acacia ramulosa</i> var. <i>ramulosa</i> over sparse cover of grasses including <i>Austrostipa elegantissima</i> , <i>Aristida</i> sp. and <i>Eragrostis eriopoda</i> .	1
JFH	PLAIN	Outwash plains	Tall open shrubland of <i>Acacia aneura</i> and <i>A. tetragonophylla</i> , occasionally with isolated emergent trees of <i>A. pruinocarpa</i> , over a mosaic of shrubland and chenopods. The shrubland is dominated by <i>Sida</i> sp. unisexual, <i>Rhagodia eremaea</i> , <i>Eremophila flabellata</i> , <i>E. galeata</i> and <i>Ptilotus obovatus</i> which then grades into more open low chenopod shrubland and succulent geophytes, which is dominated by <i>Halosarcia</i> , <i>Maireana</i> and <i>Sclerolaena</i> .	4
JFH	RIDGEPED	Flat summit surfaces on ridge tops, and on the undulating pediments and valley floors off the main ridges.	Sparse open shrublands of emergent tall shrubs of <i>Acacia aneura</i> var. cf. <i>microcarpa</i> , <i>Acacia aneura</i> var. cf. <i>aneura</i> , <i>Grevillea berryana</i> and <i>Acacia rhodophloia</i> (less frequently <i>Acacia quadrimarginea</i> ), over mid shrub stratum of <i>Eremophila punctata</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>E. jucunda</i> subsp. <i>jucunda</i> (less commonly, <i>E. forrestii</i> ), sub shrubs <i>Ptilotus obovatus</i> , <i>Sida chrysocalyx</i> , (less commonly <i>Ptilotus schwartzii</i> ) and <i>Monachather paradoxus</i> . Hummocks - open grasslands of <i>Triodia melvillei</i> are a distinctive layer in this community type. Where <i>T. melvillei</i> is absent or of low abundance, low shrubs such as <i>Homalocalyx echinulatus</i> , <i>Eremophila forrestii</i> and <i>E. jucunda</i> are far more conspicuous, as are perennial grasses such as <i>Thyridolepis multiculmis</i> .	2
WR	STEEP	Steep rocky hillslopes with relatively high levels of exposed bedrock	Open shrubs of <i>Acacia aneura</i> and emergent trees of <i>Acacia pruinocarpa</i> , over <i>Philothea brucei</i> subsp. <i>brucei</i> and <i>Eremophila</i> spp.	4
JH	STEEP	<b>Restricted</b> to the slopes of Mounts Matthew and Hale.	Shrubland of <i>Acacia</i> sp. Jack Hills, <i>Philothea brucei</i> subsp. <i>cinerea</i> , <i>Eremophila</i> spp. over hummock grasslands of <i>Triodia melvillei</i> . Isolated trees of <i>A. citrinoviridis</i> , <i>A. pruinocarpa</i> and <i>Grevillea berryana</i> are occasionally present.	6
RR&MG	STEEP	<b>Restricted</b> to upper slopes and crests of Mount Gould	Isolated shrubland of <i>Acacia aneura</i> or <i>Grevillea berryana</i> over sparse to open shrubland of <i>Philothea brucei</i> subsp. <i>cinerea</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> over hummock grassland of <i>Triodia melvillei</i> .	2

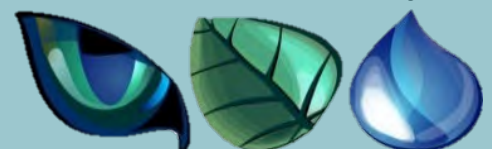
RR&MG	STEEP	<b>Restricted</b> to upper slopes and crest of Mount Fraser.	Sparse to open shrubland of <i>Acacia aneura</i> and <i>A. citrinoviridis</i> over sparse to open shrubland of <i>Philotheca brucei</i> subsp. <i>cinerea</i> , <i>Eremophila pendulina</i> , <i>Prostanthera ferricola</i> , <i>Pityrodia iphthima</i> over shrubland and hummock grassland of <i>Triodia melvillei</i> , <i>Amphipogon sericeus</i> and <i>Ptilotus obovatus</i> .	7
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**Beebyn 11**  
**Weld Range**  
**Biological Survey**  
**Murchison, Western Australia**

Prepared for  
Sinosteel Midwest Corporation Limited by  
Animal Plant Mineral Pty Ltd.



February 2024

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## EXECUTIVE SUMMARY

Animal Plant Mineral Pty Ltd (**APM**) was commissioned by Sinosteel Midwest Corporation Limited (**SMC**) to undertake a Detailed flora and vegetation and Basic terrestrial fauna survey for a section of the Weld Range Iron Ore Project, located 72 kilometres (**km**) west southwest of Meekatharra and 60 km northwest of Cue in the Midwest region of Western Australia. The area under investigation is referred to herein as Beebyn 11 or as the Survey Area. The Survey Area totals 1056 hectares (**ha**) and is within Mining Lease (**ML**) 51/869.

The field survey was conducted between the 15<sup>th</sup> and 17<sup>th</sup> of November 2023. Winter rainfall in the season preceding the survey was below average, however annual rainfall was above average, with high falls in March and April 2023. The low rainfall preceding survey and the survey timing was a minor constraint to the completeness of the flora survey.

The flora and vegetation of the Weld Range have been well surveyed with studies conducted by Markey and Dillon (2008) and Ecologia (2009a) across the range.

Three vegetation types are described for the Survey Area. Vegetation of conservation significance was recorded as vegetation that occurs within the Weld Range Priority Ecological Community (**PEC**), excluding Disturbed areas, which totals 201 ha or 1.0% of the Weld Range PEC. The current extent of regional vegetation units present in the Survey Area is close to pre-European extent. Vegetation is in Good condition with the main disturbances being high intensity grazing leading to soil degradation and vegetation clearing for station roads and mining exploration activities. Completely Degraded areas comprise 31 ha or 3% of the Survey Area.

No Threatened (**T**) flora was recorded in the Survey Area or is known to occur in the local area. One specimen that may be a Priority (**P**) species *Hibiscus ?krichauffianus* was recorded but insufficient material was available to definitively determine the species. If confirmed, this would represent a significant range extension for the poorly known species. An additional three species were determined as present based upon historic survey records and 11 assessed as Likely to occur based upon the proximity of known locations and the availability of suitable habitat. Targeted search for these species would be required to determine the currency and abundance of presence within the Survey Area. Periods of fertility for these species, and therefore suitable timing for targeted search is in winter and early spring.

No Declared weeds or Weeds of National Significance were recorded or are known to occur in the local area.

Four fauna habitats are described for the Survey Area. Acacia Sand Plain is the most common habitat present covering 500 ha (47%) of the Survey Area. Mulga Woodland on Hill Slope is the next most common covering 333 ha (32%) of the Survey Area. Drainage Line and Banded Ironstone Ridge habitats are also present which cover 186 ha (18%) and 6 ha (0.6%) of the Survey Area respectively.

The literature review identified 22 species of conservation significant fauna that were assessed for likelihood of occurrence within the Survey Area. Of these, one is present, four are likely to occur and four are possibly occurring, with the remainder considered unlikely to occur due to lack of suitable habitat and/or age of record.



Conservation significant fauna that have previously been recorded within the Survey Area are:

- Northern shield-backed trapdoor spider (P3) is known to occur in the Weld Range, including within the Survey Area. Suitable habitat occurs in the Mulga Woodland on Hill Slope habitat.

Conservation significant fauna that were assessed as Likely to occur include:

- Southern whiteface has recently been listed as T under the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (**EPBC Act**) but remains unlisted under Western Australian (**WA**) legislation. The species has been recorded commonly in the Weld Range and surrounding local habitats. It is unknown whether the sedentary species occurs within the Survey Area and the habitats are of poor quality due to a degraded understory and litter layer. Confirmation of species presence through targeted survey is required to unequivocally determine the presence of critical habitat;
- The Fork-tailed swift is a Migratory (**Mi**) species and due to the proximity of local records and the broad use of habitats, is considered likely to occur. The species rarely comes to land however and the Survey Area is not expected to be important habitat for the species;
- The West Coast mulga slider has been recorded in the Weld Range including in locations close to the Survey Area. The fossorial species is most likely to be found in areas where litter is prevalent and whilst the Survey Area is likely to be within the species broader area of occupation, the habitats within the Survey Area are generally of poor quality. Leaf litter is scarce within the Survey Area, and soils are degraded and likely poor for burrowing. Higher quality microhabitats occur in the Drainage Line habitat however soils may be too stony to be suitable.
- The Long-tailed dunnart is known from the Weld Range recorded on exposed rock and stony soils with hummock grasses and shrubs, flat-topped hills, lateritic plateaus, sandstone ranges and breakaways, generally with a vegetation of sparse mulga over spinifex Ecologia (2009b). In the Survey Area, suitable habitat is in the Banded Ironstone Ridge habitats, and rocky Drainage Lines between ridges.

Conservation significant fauna assessed as Possibly occurring include Grey falcon (T), Western spiny-tailed skink (T), Malleefowl (T) and Peregrine falcon (other specially protected).

## CONTENTS

<b>1</b>	<b>INTRODUCTION .....</b>	<b>9</b>
1.1	Project and Location.....	9
1.2	Scope of Work .....	11
1.2.1	Flora and Vegetation .....	11
1.2.2	Terrestrial Fauna.....	11
<b>2</b>	<b>Background and Supporting Information .....</b>	<b>12</b>
2.1	Relevant Legislation and Guidance .....	12
2.1.1	Commonwealth Government EPBC Act.....	12
2.1.2	Western Australia BC Act.....	12
2.1.3	Western Australia Priority species and communities .....	12
2.1.4	BAM Act.....	13
2.1.5	Weeds of National Significance .....	13
2.1.6	Guidelines .....	13
2.2	Land Use.....	13
2.3	Climate.....	14
2.4	Biogeographic Regionalisation .....	15
2.5	Land Systems, Geology and Soils.....	15
2.6	Regional Vegetation .....	18
2.7	Environmentally Significant Areas.....	20
2.7.1	Conservation Estate .....	20
2.7.2	Environmentally Sensitive Areas .....	20
<b>3</b>	<b>Methodology.....</b>	<b>21</b>
3.1	Desktop Study.....	21
3.1.1	Database Searches.....	21
3.1.2	Literature Review.....	22
3.1.3	Likelihood of Occurrence.....	24
3.2	Field Survey.....	24
3.2.1	Survey Personnel and Timing and Conditions .....	24
3.2.2	Flora and Vegetation .....	24
3.2.3	Fauna.....	27
3.2.4	Constraints.....	27
<b>4</b>	<b>Flora and Vegetation Results .....</b>	<b>29</b>

4.1	Desktop Study.....	29
4.1.1	Significant Flora .....	29
4.1.2	Significant Vegetation.....	33
4.1.3	Introduced Flora Species.....	40
4.2	Field Survey .....	40
4.2.1	Flora.....	40
4.2.2	Vegetation Types .....	41
4.2.3	Vegetation Condition .....	47
4.2.4	Significant Flora .....	49
4.2.5	Significant Vegetation.....	51
4.2.6	Introduced Flora .....	51
<b>5</b>	<b>Terrestrial Vertebrate Fauna Results .....</b>	<b>52</b>
5.1	Desktop Study.....	52
5.1.1	Significant Fauna .....	52
5.1.2	Introduced Fauna .....	52
5.2	Field Survey .....	56
5.2.1	Fauna Habitats .....	56
5.2.2	Conservation Significant Fauna.....	60
<b>6</b>	<b>Conclusions.....</b>	<b>64</b>
6.1	Flora .....	64
6.2	Flora of Conservation Significance .....	64
6.3	Introduced Flora.....	64
6.4	Vegetation of Conservation Significance .....	64
6.5	Fauna of Conservation Significance .....	65
<b>7</b>	<b>References .....</b>	<b>67</b>
	<b>Appendices.....</b>	<b>71</b>

## FIGURES

Figure 1-1. Project Location .....	10
Figure 2-1. Temperature and rainfall averages for Meekatharra Airport weather station .....	14
Figure 2-2. Land Systems .....	17
Figure 2-3. Pre-European Vegetation.....	19
Figure 3-1. Flora Survey Sites .....	25
Figure 4-1. Threatened and Priority Flora Records .....	30
Figure 4-2. Threatened and Priority Ecological Communities .....	34
Figure 4-3. Vegetation Types.....	42
Figure 4-4. Vegetation Condition .....	48
Figure 5-1. Significant Fauna Database Records .....	53
Figure 5-2. Fauna Habitats.....	59

## TABLES

Table 2-1. Land Systems .....	15
Table 2-2 Pre-European Beard Vegetation Associations.....	18
Table 3-1. Database Searches.....	21
Table 3-2. Weld Range biological surveys and reports.....	23
Table 3-3. Likelihood of occurrence criteria .....	24
Table 3-4. Parameters recorded at each Detailed site.....	26
Table 3-5. Vegetation Condition Scale .....	27
Table 3-6. Survey Constraints.....	28
Table 4-1. Threatened and Priority Flora Likelihood of Occurrence .....	31
Table 4-2. Characteristics of vegetation described for the Weld Range.....	35
Table 4-3. Introduced Flora Records within 30 km of the Survey Area .....	40
Table 4-4. Vegetation Types .....	41
Table 4-5. Vegetation condition within the Survey Area.....	47
Table 4-6. Known periods of fertility .....	49
Table 4-7. Proportion of Survey Area in PEC.....	51
Table 5-1. Significant fauna database records and likelihood of occurrence .....	54
Table 5-2. Fauna Habitats within the Survey Area .....	56

## PLATES

Plate 4-1. 2a BIF Outcrops .....	43
Plate 4-2. 3b Sandy outwash plains .....	46

## APPENDICES

Appendix A: Conservation and Declared Categories
Appendix B: PMST Search Results
Appendix C: Detailed flora and vegetation survey sites
Appendix D: Species by Site Matrix – Flora
Appendix E: Fauna Likelihood of Occurrence Assessment – Fauna

## PROJECT TERMS

Abbreviation	Meaning
The Project	Beebyn 11 deposit at the Weld Range Iron Ore Project
Survey Area	The 1056 ha area that is the subject of this survey, also called Beebyn 11 and is a section of the Weld Range Project.

## UNITS OF MEASURE

Unit	Measure
%	Percentage
°C	Degrees Celsius
ha	Hectare
km	Kilometre
m	Metre
mm	Millimetre

## LIST OF ABBREVIATIONS

Abbreviation	Meaning
APM	Animal Plant Mineral Pty Ltd
BAM Act	<i>Biosecurity and Agriculture Management Act 2007</i>
BC Act	<i>Biodiversity Conservation Act 2016</i>
BIF	Banded Iron Formation
BoM	Bureau of Meteorology
CD	Conservation Dependent
DBCA	Department of Biological Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEE	Department of Energy and the Environment
DWER	Department of Water and Environment Regulation
DPIRD	Department of Primary Industries and Regional Development
EN	Endangered
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESA	Environmentally Sensitive Areas
GDE	Groundwater Dependent Ecosystems

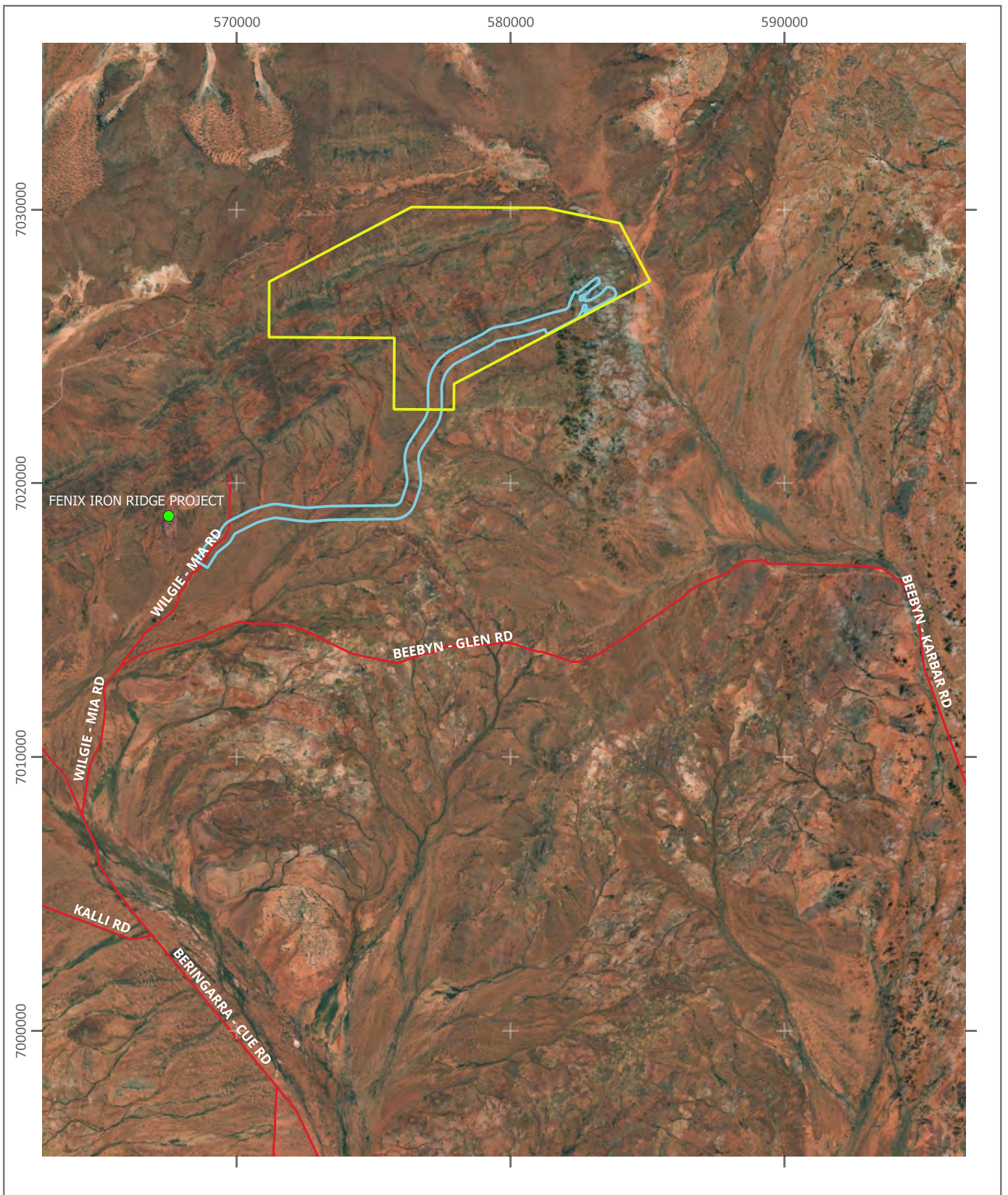
Abbreviation	Meaning
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
IBSA	Index of Biodiversity Surveys for Assessment
MI	Migratory
MNES	Matters of National Environmental Significance
NDVI	Normalised Difference Vegetation Index
OS	Other Specifically Protected
PEC	Priority Ecological Community
P	Priority
PMST	Protected Matters Search Tool
SMC	Sinosteel Midwest Corporation Limited
TEC	Threatened Ecological Community
T	Threatened
VU	Vulnerable
WA	Western Australia
WONS	Weeds of National Significance

# 1 INTRODUCTION

---

## 1.1 PROJECT AND LOCATION

Animal Plant Mineral Pty Ltd (**APM**) was commissioned by Sinosteel Midwest Corporation Limited (**SMC**) to undertake a Detailed flora and vegetation and Basic terrestrial fauna survey for the Beebyn 11 deposit within the Weld Range Iron Ore Project, located 72 kilometres (**km**) west southwest of Meekatharra and 60 km northwest of Cue in the Midwest region of Western Australia (**WA**). The area under investigation is referred to herein as Beebyn 11 or as the Survey Area. The Survey Area totals 1056 hectares (**ha**) and occurs partially within M 51/869 (Figure 1-1).



Author: VM    Approved: EH    Date: 26/03/2024

## Project Location

Prepared for:



## Figure 1-1

Scale: @ A4    1: 200,000



0    2    4 km

Coordinate System: GDA 2020  
Zone 50 Projection: Transverse Mercator



### Legend

- Survey Area
- Tenement M51/869-1
- Main Roads





## 1.2 SCOPE OF WORK

The scope of work includes a Detailed flora and vegetation and Basic terrestrial fauna survey. Survey data accompanies this report in a format suitable for submission to the Index of Biodiversity Surveys for Assessment (**IBSA**) online portal.

### 1.2.1 Flora and Vegetation

The flora and vegetation survey was conducted in accordance with the Environmental Protection Authority's (**EPA**) *Technical Guidance – Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment* (2016) at a Detailed level of assessment.

The aims of the desktop study were to:

- Establish vegetation associations previously determined for the site;
- Identify threatened (**T**) and priority (**P**) flora and ecological communities (**PECs** and **TECs**) previously recorded on site;
- Identify weed species previously determined as present on site, in particular any Declared weeds; and
- Identify potentially suitable habitat for conservation significant flora known from the region, using publicly available regional datasets such as geological, land system, surface water and Groundwater Dependent Ecosystems (**GDE**) mapping products.

The aims of the field survey were to:

- Describe and map the vegetation types present and provide comparisons to locally described types;
- Compile an inventory of flora taxa encountered; and
- Identify conservation significant features of the flora and vegetation.

### 1.2.2 Terrestrial Fauna

The scope of work was to conduct a basic terrestrial fauna survey in accordance with the EPA's fauna guidelines: *Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (2020).

The aims of the desktop study were to:

- Identify T and P Fauna species previously determined as present on-site;
- Identify habitat types previously determined as present on-site regarded as suitable for T and P fauna; and
- Identify introduced species previously determined as present on-site.

The aims of the field survey were to describe habitat availability for Conservation Significant fauna and the quality or condition of available habitats.

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## 2 BACKGROUND AND SUPPORTING INFORMATION

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### 2.1 RELEVANT LEGISLATION AND GUIDANCE

#### 2.1.1 Commonwealth Government EPBC Act

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) is administered by the Department of Climate Change, Energy, the Environment and Water (**DCCEEW**). It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, defined in the EPBC Act as Matters of National Environmental Significance (**MNES**).

If a project has the potential to significantly impact on MNES it is to be referred to the DCCEEW for determination on whether the matter is a 'controlled action' and therefore requiring assessment.

The EPBC Act provides for the identification and listing of species under several categories listed in Appendix A. The EPBC Act also provides for the development of conservation advice and recovery plans, development of a register of critical habitat, recognition of key threatening processes and the development of threat abatement plans.

#### 2.1.2 Western Australia BC Act

The *Biodiversity Conservation Act 2016* (**BC Act**) provides a statutory basis for the listing of T species, specially protected species, extinct species, TECs, collapsed ecological communities, critical habitat and key threatening processes in WA. The BC Act provides for the listing of T flora and fauna species and ecological communities under specified conservation categories listed in Appendix A. Species and communities listed under the BC Act are protected and require authorisation by the Minister to take or disturb.

Species may also be listed as being of special conservation interest if they have a naturally low population, restricted natural range, are subject to or recovering from a significant population decline or reduction of range or are of special interest to science. Species of special conservation interest, migratory species and species subject to international agreements are known as Specially Protected Species in the BC Act.

#### 2.1.3 Western Australia Priority species and communities

Flora and fauna species and communities are listed by the Department of Biodiversity, Conservation and Attractions (**DBCA**) as P when they are considered to have a greater level of significance than other native species and communities. This generally occurs where populations are geographically restricted or threatened by local processes, or where there is insufficient information to formally assign them to T species and communities categories. Whilst P species and communities are not specifically listed in the BC Act, all flora and fauna are protected in WA following the provisions in Part 10 of the BC Act. This protection applies even when a species is not listed as T or specially protected. The categories covering P species and communities are listed in Appendix A.

### 2.1.4 BAM Act

Plants may be ‘Declared’ by the Agriculture Protection Board under the *Biosecurity and Agriculture Management Act 2007* (WA) (**BAM Act**). Declared Plants are gazetted under three categories (C1-C3) which define the action required. Details of the definitions of these categories are provided in Appendix A. A declaration may apply to the whole State, to districts, individual properties or even to single paddocks. If a plant is ‘Declared’, landholders are obliged to control that plant on their properties.

### 2.1.5 Weeds of National Significance

The DCCEEW, along with the State and Territory governments, has endorsed 32 Weeds of National Significance (**WONS**). Four major criteria were used in determining WONS:

- The invasiveness of a weed species;
- A weed’s impact;
- The potential for spread of a weed; and
- Socio-economic and environmental values.

Each WONS has a national strategy and a national coordinator, responsible for implementing the strategy. WONS are regarded as the worst weeds in Australia because of their invasiveness, potential for spread, and economic and environmental impacts (DAWE 2020).

### 2.1.6 Guidelines

The terrestrial biological assessment was conducted in accordance with the above Commonwealth and State legislation, as well as EPA requirements for environmental surveys as outlined below:

- *Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA 2020); and
- *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016).

Relevant guidance for the preparation of spatial datasets to accompany this report are:

- Guidelines for biological survey and mapped data (Department of the Environment and Energy (**DEE**) 2018); and
- Instructions for the preparation of data packages for IBSA (EPA 2021).

## 2.2 LAND USE

The Survey Area lies within the Beebyn pastoral lease (N049894).

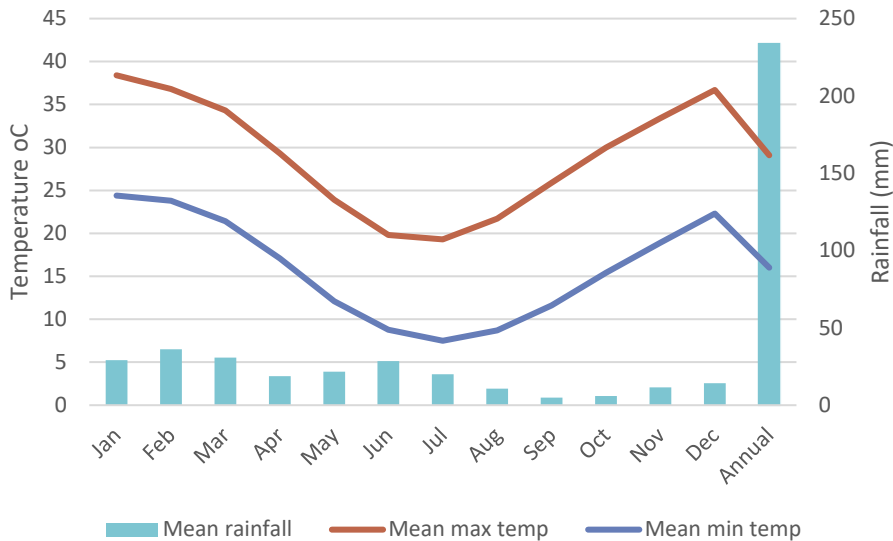
Active mining operations occur within the Fenix Iron Ridge Project, with the main mining and processing area 16 km to the southwest.

Exploration activity occurs at Mount Ridley’s Weld Range West Project Madoonga and Wilgie Mia Formations 40 km to the southwest.

The Wilgie Mia Aboriginal Ochre Mine lies north of the road alignment included in the Survey Area. A 2000 ha area including the Ochre Mine was included on the National Heritage List on the 24 February 2011.

### 2.3 CLIMATE

The Weld Range is in the Midwest Region of WA, approximately 72 km west south-west of Meekatharra. The region experiences hot, dry summers and mild winters. Rainfall occurs predominantly between January and July. The nearest Bureau of Meteorology (**BoM**) weather station with a long historical record is at Meekatharra Airport (BoM Site Number: 007045), approximately 77 km east northeast of the Survey Area. Meekatharra Airport has recorded rainfall from 1944 (80 years), and temperature from 1950 (74 years). The average climate data recorded for the region over these periods is shown in Figure 2-1. Monthly mean maximum temperature ranges from 38.4°C in January to 19.3°C in July. Monthly mean rainfall ranges from 36.1 mm in February to 4.9 mm in September, with a mean annual rainfall of 233.8 mm (BoM 2023).



**Figure 2-1. Temperature and rainfall averages for Meekatharra Airport weather station (Station No. 007045) (BoM 2023)**

## 2.4 BIOGEOGRAPHIC REGIONALISATION

The Interim Biogeographic Regionalisation for Australia (**IBRA**, version 7) classifies the Australian continent into regions (bioregions) of similar geology, landform, vegetation, fauna, and climate characteristics (Thackway and Cresswell 1995). The mapping completed by Beard (1975) provides the basis for the IBRA bioregions. IBRA mapping (Version 7), places the Project within the Murchison Bioregion.

The Murchison Bioregion has low hills and mesas separated by flat colluvium and alluvial plains. Vegetation is predominantly low mulga woodlands. Other vegetation types include saltbush shrubland on calcareous soils, saline areas with samphire, and hummock grassland on red sandplain (Bastin *et al.* 2008).

The Murchison Bioregion is further subdivided into the Eastern Murchison (MUR1) and Western Murchison (MUR2) Sub-regions. The Project lies entirely within the Western Murchison Sub-region of the Murchison Bioregion.

The Western Murchison is the Murchison Terrains part of the Yilgarn Craton, and contains the headwaters of the Murchison and Wooramel Rivers, which drain the subregion westwards to the coast. The region is made up of mulga low woodlands (usually with bunch grasses and often rich in ephemerals) on outcrop, and fine textured Quaternary alluvial and eluvial surfaces (extensive hardpan washplains that dominate and characterise the subregion) mantling granitic and greenstone strata. Surfaces associated with the occluded drainage occur throughout, with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and halosarcia low shrublands on saline alluvia.

## 2.5 LAND SYSTEMS, GEOLOGY AND SOILS

Land Systems of the Murchison region are described by Curry *et al.* (1994). Mapping of Land Systems is available from Department of Primary Industry and Regional Development (**DPIRD**, 2022). The Survey Area falls within five soil landscape systems, as listed in Table 2-1 and illustrated in Figure 2-2.

**Table 2-1. Land Systems**

Land System	Geology	Description
Jundee	Cemented Quaternary alluvium derived mainly from greenstone	Hardpan plains with variable gravelly mantles and minor sandy banks supporting weakly groved mulga shrublands.
Violet	Archaean greenstone, Upper Proterozoic basalt, Tertiary laterite and veneers of Quaternary alluvium and colluvium.	Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supporting groved mulga and bowgada shrublands and occasionally chenopod shrublands.
Weld	Archaean metamorphic rocks, mainly metasedimentary types; hematitic jaspilite, banded ironstone with quartzite wacke and schistose hornblende.	Rugged ranges and ridges of banded ironstone and quartzite, supporting acacia shrublands.

Wiluna	Archaean amphibolite, basalt and schistose rocks with Tertiary laterite capping; Quaternary colluvium on slopes and Quaternary alluvium on lowlands.	Low greenstone hills with occasional lateritic breakaways and broad stony slopes, lower saline stony plains and broad drainage tracts; supporting sparse mulga and other acacia shrublands with patches of halophytic shrubs.
Yarrameedie	Archaean metamorphic rocks with Quaternary colluvium	Undulating stony interfluves, drainage floors and pediment (foothill) plains below major ranges of crystalline rocks (mainly Weld land system) supporting sparse mulga shrublands.

The topography of the area is dominated by the Weld Range – a long band of steep ridges that run southwest to northeast and extend for 60 km and are 3-5 km wide. The range rises up to 250 metres (**m**) above the surrounding plains. The slope angles around the Weld Range vary from less than 5% to greater than 90%. Away from the ridges the topography is very flat.

There are some deeply incised valleys with drainage channels within Weld Range, however the land to the north has only a few well-defined channels and is characterised by numerous mud flats and salt pans.

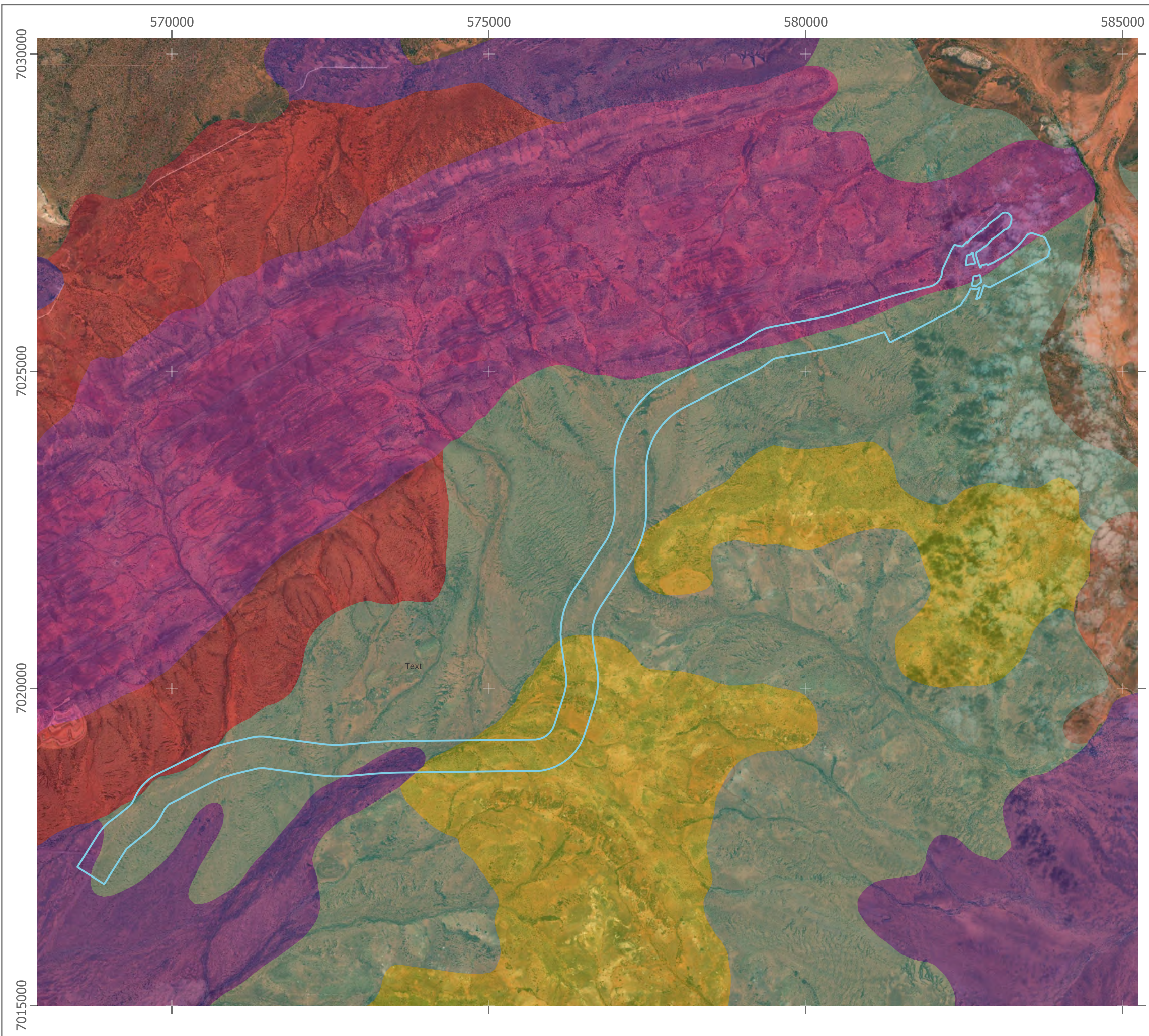
The Weld Range greenstone belt is predominantly composed of metabasites showing mainly doleritic and minor basaltic and gabbroic textures (Duuring *et al.* 2012). Exposures of these lithologies occur between the ridges which are defined by weathered, steeply dipping beds of resistant banded iron formation (**BIF**) which form less than 10% of the thickness of the sequence. Poorly exposed, very fine-grained clastic metasediments are only a very minor part of the sequence. Metamorphism is relatively low grade, varying from lowermost greenschist facies in the north to approximately greenschist-amphibolite transition facies in the south.

High grade iron mineralisation in the Weld Range area occurs as a series of outcrops of massive goethite-haematite lodes.

Geomorphology of the Weld Land System is of erosional surfaces; mountain ranges of strike belts and ridges with peaks 200 m or more above the new plateau plains; lower, rounded hill spurs flanking major ranges; steep hillslopes with extensive loose mantling and rock outcrop; lateritised ridges with caves; valley floors and undulating interfluves often intensely dissected by narrow rectangular drainage tracts with incised channels; sheds most colluvium and drainage to pediment Yarrameedie land system.

Geomorphology of the Violet system is of erosional surfaces; remnants of old plateau as gravelly sand plains above gently undulating outcrops of laterite and weathered greenstones; broad, lower stony plains on greenstone or red-brown hardpan, often densely mantled by pebbles of mixed lithology and with sluggish, occasionally channelled, drainage floors; relief mostly < 10 m.

Soil landscapes are mapped by Tille (2006) with the Survey Area occurring in the Upper Murchinson zone. These soils are described as hardpan wash plains (with stony plains, sandplains, hills and mesas) on granite and gneiss of the Yilgarn Craton (Narryer Terrane and Murchison Domain). Red-brown hardpan shallow loams and Red shallow loams with Red loamy earths and Red deep and some Red shallow sands and Red deep sandy duplexes. Vegetation is of Mulga shrublands (with some halophytic shrublands).



**Legend**

Land Systems

- Jundee Land System
- Violet Land System
- Weld Land System
- Wiluna Land System
- Yarrameedie Land System

Scale: @ A3 0 1 2 km  
 1: 60,000  
 Coordinate System: GDA 2020 MGA 50  
 Projection: Transverse Mercator  
 Author: VM Approved: EH Date: 26/03/2024

**Land Systems**

Prepared for:



Figure: 2-2

## 2.6 REGIONAL VEGETATION

Vegetation communities and land systems of the Weld Range were described by Speck and Mabbut *et al.* (1963) respectively as part of a regional survey of the Wiluna to Meekatharra area.

The vegetation communities of the area were mapped by Beard (1976) in his regional survey of the Murchison at a scale of 1: 1 000 000, describing the region as providing optimum conditions for the presence of mulga (*Acacia aneura*) woodlands. The Survey Area is located within the Murchison Botanical District of the Eremaean Botanical Province and contains two pre-European Beard vegetation associations of the Upper Murchison System as shown in Figure 2-3 (DPIRD 2019). The remaining extent of these vegetation associations is outlined in the most recent DBCA Statewide Vegetation Statistics table dated 2018 and summarised in Table 2-2 below.

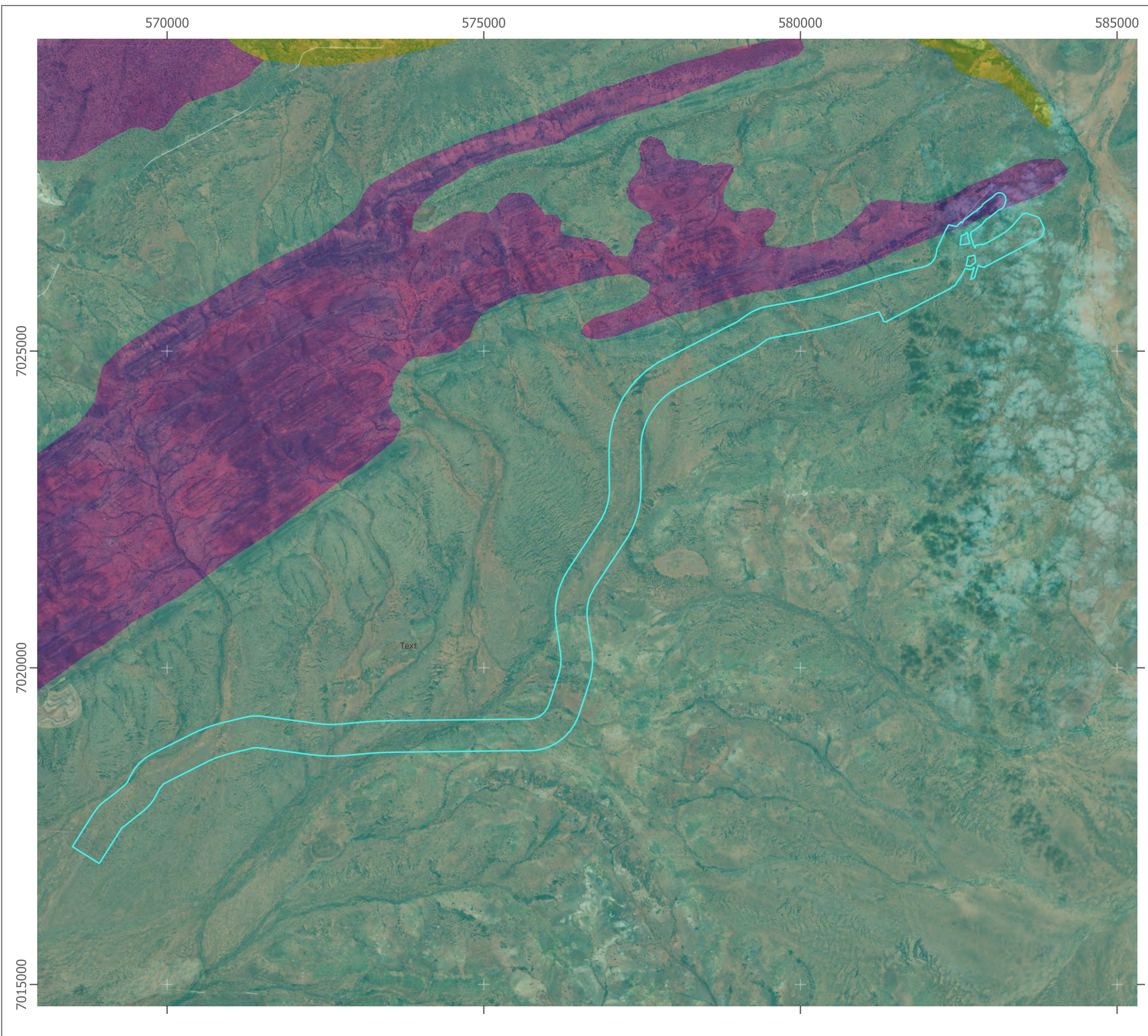
**Table 2-2 Pre-European Beard Vegetation Associations**

Unit	Vegetation Description	Pre-European Extent (ha)	Current Extent (ha)	Pre-European Extent Remaining (%)	Current Extent within DBCA Managed Lands (%)
18	Low woodland, open low woodland or sparse woodland of <i>Acacia aneura</i> (Mulga) and associated species.	19,890,667	19,842,830	99.76	2.13
202	Scrub, open scrub or sparse scrub of <i>Acacia</i> spp. <i>Melaleuca</i> spp.	448,529	448,344	99.96	0.39

Beard vegetation associations that occur within the Survey Area have over 99% pre-European Vegetation extent remaining.

A finer-scale survey of the vegetation was undertaken by Curry *et al.* (1994), using the land systems of Mabbut *et al.* as part of their regional survey of rangelands within the Murchison River Catchment. The vegetation communities of the greenstone ranges of Weld Range (the Weld Land System) were surveyed between 1985 and 1988 and were reported to be dominated by *Acacia* species and rocky hill mixed shrublands, stony mulga mixed shrublands, and creekline shrublands.





**Legend**

- Survey Area
- Pre-European Beard Vegetation Associations
- 8
- 15
- 48

Scale: @ A3 0 1 2 km  
 1: 60,000  
 Coordinate System: GDA 2020 MGA Zone 50  
 Projection: Transverse Mercator

Author: VM Approved: EH Date: 26/03/2024

**Pre-European  
 Beard Vegetation  
 Associations**

Prepared for:



Figure: **2-3**

## 2.7 SIGNIFICANT AREAS

### 2.7.1 Conservation Estate

The Western Australian Conservation Estate includes land and waters vested in the Conservation and Parks Commission under the *Conservation and Land Management Act 1984*. The Conservation Estate is managed by the Parks and Wildlife Service of DBCA to protect WA's biodiversity, and includes National Parks, Nature Reserves, Conservation Reserves, and other areas managed primarily for biodiversity conservation (DEE 2016).

A search of the Collaborative Australian Protected Area Database returned no conservation estates located within 50 km of the Survey Area. The nearest gazetted terrestrial conservation estate is Lakeside National Park and Lakeside Conservation Park 82 km and 75 km south of the Survey Area respectively.

### 2.7.2 Environmentally Sensitive Areas

Environmentally Sensitive Areas (**ESA**) are areas that are defined by the Department of Water and Environment Regulation (**DWER**) (2019) as:

- A declared World Heritage property as defined in s.13 of the EPBC Act;
- An area that is included on the Register of the National Estate, because of its natural heritage value under the *Australian Heritage Council Act 2003*;
- A defined wetland and the area within 50 m of the wetland;
- The area covered by vegetation within 50 m of T flora, to the extent to which the vegetation is continuous with the vegetation in which the T flora is located;
- The area covered by a TEC;
- A Bush Forever site;
- Areas covered by the Gngangara Mound Crown Land Policy and Western Swamp Tortoise Policy;
- Areas covered by lakes, wetlands, and fringing vegetation of the Swan Coastal Plain Lakes Policy, including Southwest Agricultural Zone Wetlands Policy and Swan and Canning Rivers Policy; and
- Protected wetlands as defined in the *Environmental Protection (Southwest Agricultural Zone Wetlands) Policy 1998*.

Environmentally Sensitive Areas are available on the DWER (2021) clearing regulations spatial layer. There are no ESAs within the Survey Area.

The Australian Wetlands Database includes nationally significant wetlands (as listed in the directory of important wetlands), wetlands listed under the Ramsar convention, wetlands that are representative, rare or unique, or wetlands that are considered of international importance (DEE 2021). The nearest wetlands listed in the Directory of Important Wetlands to the Survey Area is Lake Annean, 35 km east. Lake Annean is a large saline brackish lake and marsh with numerous islands and peninsulas which is a significant breeding area for gull-billed terns and whiskered terns and other waterbirds.

### 2.7.3 National Heritage List

Wilgie Mia, a 2000 ha area immediately north of the road alignment, is listed under the EPBC Act as a National Heritage Place.

### 3 METHODOLOGY

#### 3.1 DESKTOP STUDY

The desktop study provides background information on the known attributes of flora, vegetation, and fauna of the Survey Area, and in the local surrounding area.

##### 3.1.1 Database Searches

A search for EPBC Act MNES was undertaken using the DCCEE Protected Matters Search Tool (**PMST**). The PMST identifies EPBC listed flora and fauna species and communities based on predicted distributions of the species and/or their habitat, in conjunction with species records. The PMST may predict the occurrence of a species or community in an area where there are no documented records, or documented records are historic. For this search, the Survey Area was imported into the PMST viewer as the feature area and a buffer of 30 km applied. The conservation codes are described in Appendix A. The results of the PMST search are included in Appendix B.

The DBCA maintains databases for records of T and P species and communities. A request was made for a search of DBCA databases for T and P flora and fauna and the presence of TECs or PECs. A 30 km buffer was applied to the search results.

Flora and Fauna Inventory, including records for Introduced flora and fauna from within 30 km, were obtained from the Dandjoo Biodiversity Data Repository hosted by the DBCA Biodiversity Office (DBCA 2023a).

Table 3-1 lists the database searches conducted for the desktop study.

Attribute	Search Area	Database	Location
Threatened and Priority Ecological Communities	30 km radius	DBCA	Figure 4-2; Section 4.1.1
	30 km radius	PMST	Appendix B
Significant Communities	Feature Area	GDE Atlas	Section 4.1.2
Threatened Flora	30 km radius	DBCA	Figure 4-1; Section 4.1.1
	30 km radius	PMST	Appendix B
Introduced Flora	30 km radius	Dandjoo	Section 4.1.3
Threatened Fauna	30 km radius	DBCA	Figure 5-1; Section 5.1.1
	30 km radius	PMST	Appendix B
Introduced Fauna	30 km radius	Dandjoo	Section 5.1.2

### 3.1.2 Literature Review

The Weld Range Project has been assessed by the EPA at the level of Public Environmental Review. A Scoping Document was agreed on the 4<sup>th</sup> November 2008, the EPA report on Assessment published on the 18<sup>th</sup> June 2012 and the project approved through Ministerial Statement 908 on 29<sup>th</sup> August 2012.

The project as approved in 2012 had a land disturbance area of 3589 ha, so baseline studies performed for the Project included the extent of tenement M 51/869-I and a much larger surrounding area, covering 53 km length of the Weld Range at up to 15 km width. Within this area flora, vegetation and fauna surveys were conducted to describe baseline conditions.

Table 3-2 describes the studies and reports generated for the Weld Range Project, and a summary of the findings.

**Table 3-2. Weld Range biological surveys and reports**

Reference	Description	Outcomes
Markey and Dillon 2008	Conducted in late August 2005. Flora and vegetation survey with assessment of distribution in relation to environmental factors.	Eight floristic community types (six types, two of these subdivided into two subtypes each) were identified and described for the Weld Range, with the primary division in the classification separating a dolerite-associated floristic community from those on BIF. Floristic communities occurring on BIF were found to be associated with topographic relief, underlying geology and soil chemistry. There did not appear to be any restricted communities within the landform, but some communities may be geographically restricted to the Weld Range, and all communities on the Weld Range are closely associated with topography and substrate.
Ecologia (2009a)	Summarises the 22 flora surveys conducted in three seasons: <ul style="list-style-type: none"> <li>• Spring phase – November 2006;</li> <li>• Autumn phase – April 2007; and</li> <li>• Winter phases – July 2008 and June 2009</li> </ul>	Quadrat based survey established 239 sites and transect based survey conducted 1053 traverses. Resulted in the description of 17 vegetation types and mapping of 14 units as units 1a, 1b, 2a and 2b were unable to be clearly distinguished on the ground or on aerial imagery. Vegetation was primarily in Good condition (77%), with 14% in Very Good condition and 9% in Poor condition. Disturbances were heavy grazing pressure by livestock and feral goats, clearing for pastoral and mining exploration activity, and low weeds. 25 Conservation significant flora.
Ecologia (2009b)	Level 2 Survey conducted in four phases: <ul style="list-style-type: none"> <li>• Spring – September 2006</li> <li>• Autumn – March 2007</li> <li>• Autumn – April 2007</li> <li>• Spring – September 2007</li> </ul> Infrastructure area Level 1 survey: <ul style="list-style-type: none"> <li>• September 2008</li> <li>• August 2009</li> </ul>	Total survey effort consisted of 231 person days. Ten main fauna habitats were identified within the Project area. These include acacia sandplain, banded ironstone ridge, drainage lines, eucalypt sandplain, granite outcrops, lateritic breakaway, mulga drainage line, mulga woodland on hill slopes, rocky rise (ironstone) and rocky rise (quartz).  Seven additional habitats of low spatial extent were also described as large rocky breakaway, massive breakaway complex, chenopod floodplain, dense eucalypt woodland, mulga woodlands and soft wandrie country, limestone bore and spinifex.
Ecologia (2009c)	Summarises studies conducted for Short Range Endemic (SRE) and T and P invertebrates. Madoonga, Beebyn and Hampton Hill were surveyed from August 2006 to November 2006, while Weld Range North was surveyed five months later from April 2007 to August 2007.	Systematic pitfall trapping and opportunistic foraging at 29 sites at Weld Range South and a further 15 sites were selected at Weld Range North (i.e. total 44 sites).

### 3.1.3 Likelihood of Occurrence

Threatened and Priority flora, fauna and communities returned from the database searches and literature review were assessed for their likelihood of occurrence within the Survey Area using the likelihood of occurrence criteria listed in Table 3-3.

**Table 3-3. Likelihood of occurrence criteria**

Likelihood of occurrence	Criteria
Present	Identified from database records or field survey as occurring within the Survey Area, and conditions are remain suitable for persistence.
Likely	Suitable habitat is present in the Survey Area and the species has previously been recorded within 15 km within recent times.
Possible	Suitable habitat is present within the Survey Area and the species has previously been recorded between 15 – 30 km of the Survey Area
Unlikely	No suitable habitat is present in the Survey Area, or records are historic and the species is no longer considered to occur in the region.

## 3.2 FIELD SURVEY

### 3.2.1 Survey Personnel and Timing and Conditions

The survey was carried out from the 15<sup>th</sup> to 17<sup>th</sup> of November by Dr Eleanor Hoy with the assistance of a field technician. Dr Hoy has 15 years industry experience and is the Biological Sciences Manager at APM.

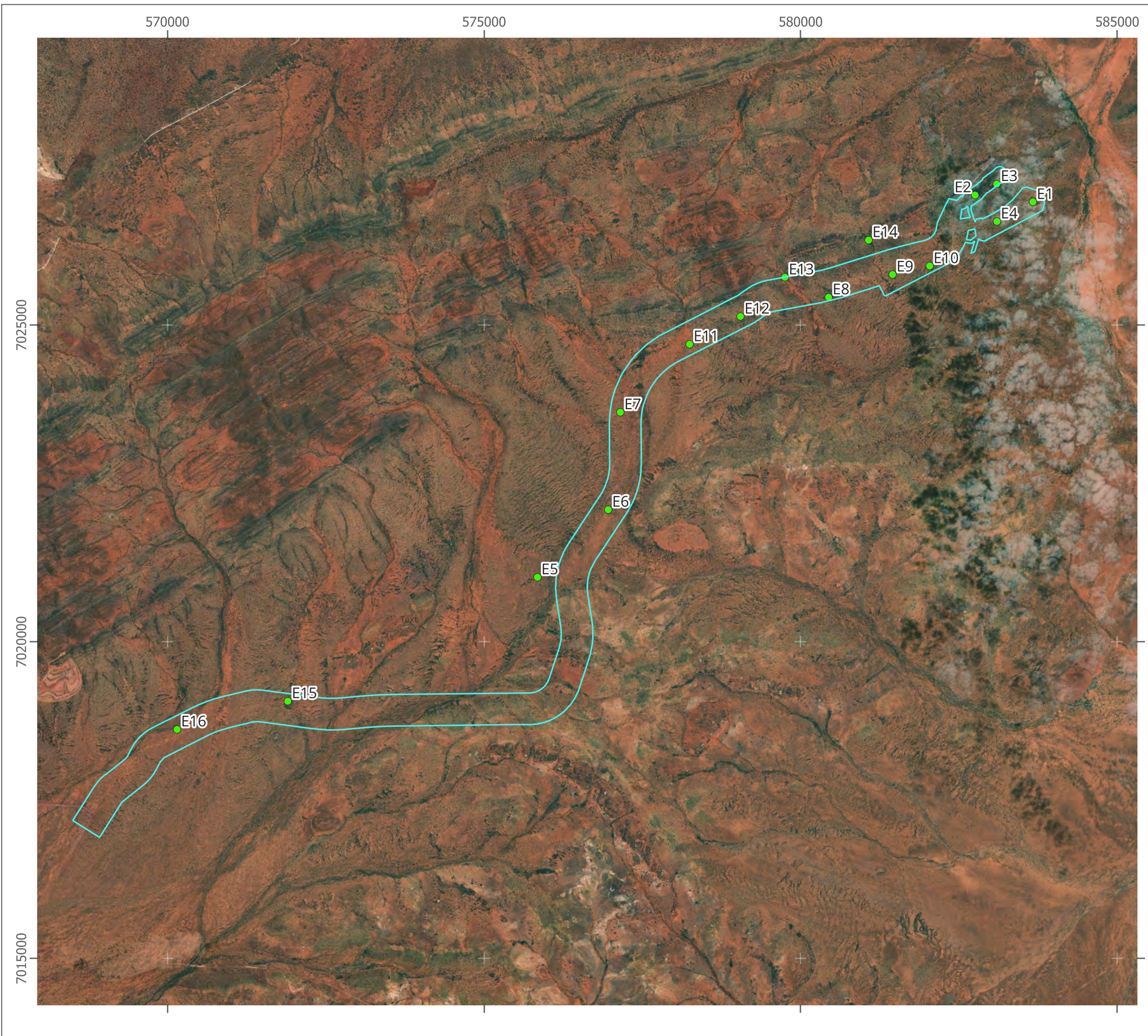
The total annual rainfall prior to survey (1<sup>st</sup> January 2023 to 15<sup>th</sup> November 2023) averaged at 213.8 mm compared to the long-term average of 206.4 mm (BoM 2023). This is due to a very large rainfall in March 2023, with a monthly total of 124.4 mm. Winter and spring rainfall was very low with 14.2 mm falling between May and October, compared to a long-term average of 91.5 mm for the same period.

The Survey Area is within the Eremaean botanical province. Recommended timing for flora and vegetation survey is 6-8 weeks post wet season (March – June) for Primary survey, and a Dry season survey (after winter rainfall if available) for Supplementary survey (EPA 2016). The timing of the field survey is outside of the period recommended for flora and vegetation survey in the region.

Due to the large rainfall in March, survey conditions were good. The Normalised Difference Vegetation Index (**NDVI**) for Beebyn Station, which shows how green the property is at any given time, is reported by DPIRD (2023a). In November 2023 the value was near to the 90<sup>th</sup> percentile for the property. Whilst soils were dry, the vegetation was in good condition, and annual/herbaceous flora contributed 29% of the total species richness.

### 3.2.2 Flora and Vegetation

A Detailed survey was conducted for flora and vegetation. Vegetation was sampled using 16 quadrats of 20 x 20 m (Figure 3-1). Quadrats are vegetation survey plots which are accurately measured out as 20 x 20 m (or an area equivalent to 2500 m<sup>2</sup>) and marked at each corner using a handheld Global Positioning System (**GPS**) unit.



**Legend**

- Survey Area
- Flora quadrats

Scale: @ A3 0 1 2 km  
 1: 60000

Coordinate System: GDA 2020 MGA Zone 50  
 Projection: Transverse Mercator

Author: VM Approved: EH Date: 26/03/2024

**Flora Survey Sites**

Prepared for:



Figure: **3-1**

Field data at each survey site was recorded on a pro-forma data sheet and included the parameters listed in Table 3-4. The attributes of Detailed survey sites are provided in Appendix C.

**Table 3-4. Parameters recorded at each Detailed site**

Variable	Parameters
Collection attributes	Personnel/recorder; date, quadrat dimensions and marking method, site code and georeferenced photographs of the quadrat.
Physical features	Landform, slope, aspect, soil attributes, ground surface cover, litter, rock type and physical attributes.
Location	Coordinates recorded using a hand-held GPS (Garmin) to accuracy approximately $\pm 5$ m.
Vegetation	Dominant growth form, height, cover, and species for the three traditional strata (upper, mid and ground) compatible with NVIS Level V (ESCAVI 2003).
Vegetation condition	Vegetation condition was assessed using the condition rating scale devised by Trudgen (1988).
Disturbance	Level and nature of disturbances ( <i>e.g.</i> weed presence, fire, and time since last fire, impacts from grazing, vegetation clearing, erosion).
Flora	List of all species within the quadrat including weeds and listing species average height and cover.

A flora inventory was compiled from taxa listed in Detailed survey sites and from opportunistic floristic collections throughout the Survey Area, with at least one collection made for every taxon encountered. Specimens were identified by an experienced botanical taxonomist in the Western Australia Herbarium (**WAH**) using published reference material. The nomenclature applied is consistent with Florabase (WAH 1998-).

The conservation status of all recorded flora was determined from the T and P Flora List (DBCA 2023c), and the EPBC Act List of T Flora (DCCEEW 2023a). The Western Australian Organisms List database was consulted to determine if any are BAM Act Declared Plants (DPIRD 2023b), and the Weeds of National Significance list to determine any WONS (DAWE 2020).

The vegetation types were described based on their structure and species composition, as defined by quadrat data, and field observations. Vegetation was mapped in the field using handheld GPS units and aerial photographs, then digitised using GIS software. Vegetation is described at the association level (ESCAVI 2003) and referred to as Vegetation Types (EPA 2016).

Vegetation Condition was assigned using the scale developed for the Eremaean and Northern Botanical Provinces adapted from Trudgen (1988) as recommended in EPA (2016). Table 3-5 lists the six potential categories.



**Table 3-5. Vegetation Condition Scale**

Vegetation Condition	Eremaean and Northern Botanical Provinces adapted from Trudgen (1988)
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; <i>i.e.</i> areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs

Data analysis was applied through the preparation of a species by site matrix using the complete suite of species recorded. The Primer 7 (Clarke and Gorley, 2015), software was used to perform floristic composition vegetation classification. Two transformation types were applied, a presence/absence and a square root transformation applied to the projected foliage cover value. Resemblance matrices were constructed for each transformed data set using the Bray Curtis similarity measure. Cluster analysis was performed for each transformed data set using group averages. The SIMPROF routine was used to test the hypothesis that the species and/or abundances are different at each group of sites using 999 permutations and a significance level of 5%.

The analysis applying the square root transformation was found to be more consistent with the previous survey conducted by Ecologia (2009a) where the main vegetation community was subdivided into subcommunities based upon vegetation density.

The completeness of the survey was tested using a species accumulation curve and applying the Michaelis-Menton model to estimate the species richness of the Survey Area.

### 3.2.3 Fauna

Fauna habitat assessments were performed at flora quadrat locations. Descriptive data was recorded including soil type, landform, presence of microhabitats, disturbances and images were recorded.

### 3.2.4 Constraints

Several limitations may arise during field survey EPA (2016). These potential survey limitations are listed below in Table 3-6 with comments on the constraint to the outcomes of the survey.

**Table 3-6. Survey Constraints**

Factor	Impact of survey outcomes
Access problems	<p>Moderate constraint.</p> <p>A 5 km section (25%) of the Access Road is not along existing tracks and was not visited. This area has not previously been surveyed.</p>
Experience levels	<p>Not a constraint.</p> <p>The personnel were suitably qualified.</p>
Scope: Flora and vegetation	<p>Not a constraint.</p> <p>Survey was carried out at a Detailed level of assessment. No Targeted searches for conservation significant flora were conducted.</p>
Scope: Fauna	<p>Not a constraint.</p> <p>The survey was carried out at a Basic level of assessment. With the large survey effort conducted in 2007/08 this level of assessment is suitable to assess habitat availability and quality and inform any requirements for further Targeted survey.</p>
Timing, weather, season, cycle	<p>Minor constraint.</p> <p>The Survey Area is within the Eremaean Botanical district. Rainfall in the calendar year prior to survey was average, however winter and spring rainfall was below average. The Flora and Vegetation survey was conducted outside of the recommended survey period (EPA 2016). The large rainfall in March was sufficient to provide stored soil water into the late spring as seen by NDVI values near the 90<sup>th</sup> percentile (DPIRD 2023a).</p>
Sources of information	<p>Not a constraint.</p> <p>Previous biological reports and database records are available for the locality and region.</p>
Completeness: Flora and vegetation	<p>Minor constraint.</p> <p>Due to low rainfall preceding the survey, the presence of annual species was restricted to areas receiving runoff and/or with higher moisture retention, and modelling indicated the survey captured 77% of the species richness of the area. Nine specimens were unable to be identified to species level, including one specimen that may constitute a significant range extension for a P3 species.</p> <p>Compared to previous survey conducted by Markey and Dillon (2008) the richness per quadrat was lower than expected, however it was within the range recorded by Ecologia (2009a) for the same vegetation types. Annual/herbaceous species contributed 29% of the total species richness and the NDVI was in the 90<sup>th</sup> percentile for the property.</p> <p>No species of conservation significant flora that have been previously recorded or are considered likely to occur are annual/herbaceous species.</p>
Completeness: Fauna	<p>Not a constraint.</p> <p>The scope was completed.</p>

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## 4 FLORA AND VEGETATION RESULTS

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### 4.1 DESKTOP STUDY

#### 4.1.1 Significant Flora

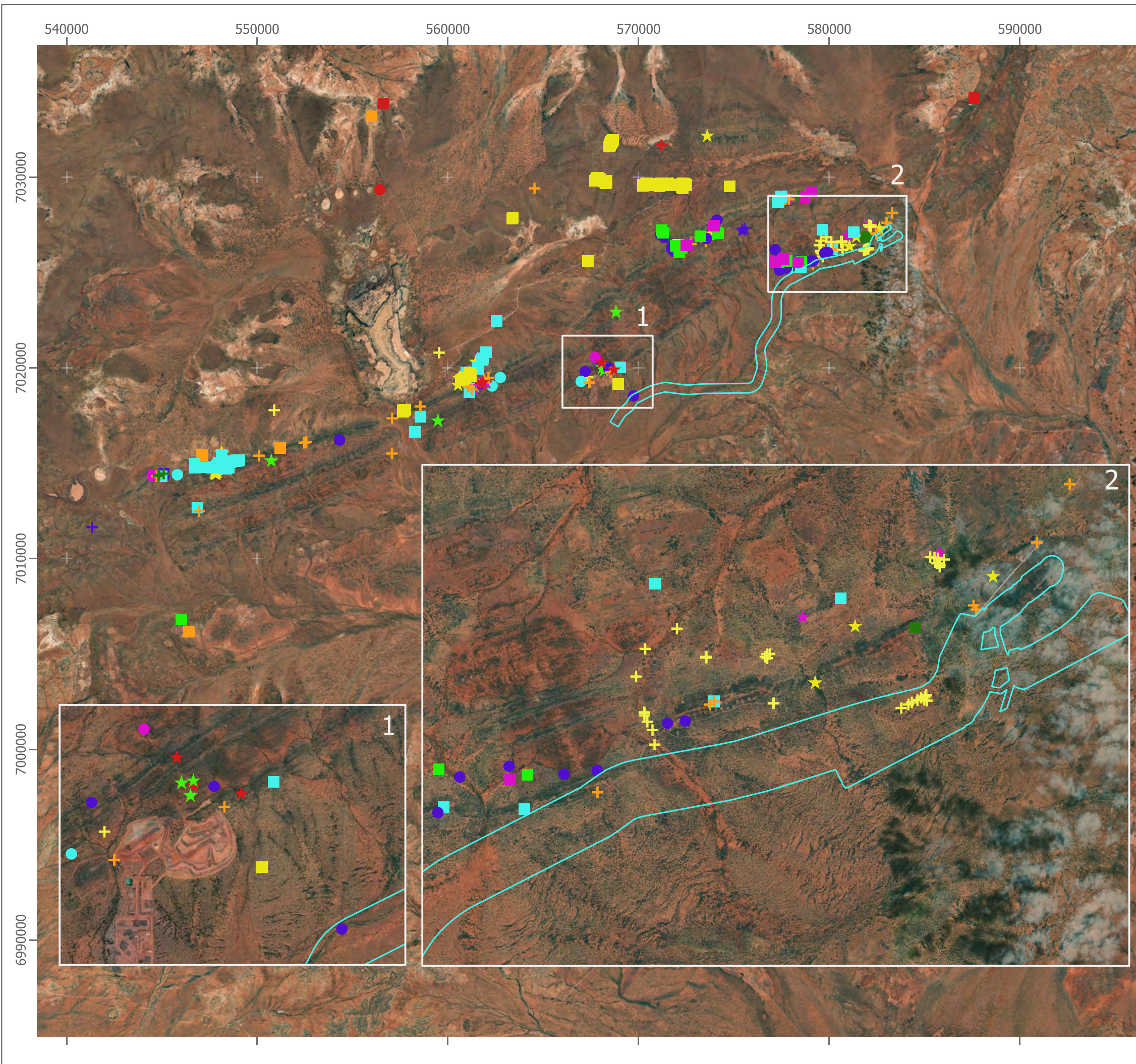
No T Flora listed under the BC Act and/or EPBC Act have been previously recorded within the Survey Area, or within 30 km. No T species were returned from the PMST or literature review.

The DBCA database contained two P species that have previously been recorded in the Survey Area. The P3 *Prostanthera petrophila* and P4 *Dodonaea amplisemina* have been recorded within the Fenix Access Road. Additionally, five P1, seventeen P3, and four P4 species have records within 30 km of the Survey Area.

The Literature review identified one additional P species occurring within the Survey Area – *Acacia speckii* (P4); and seven additional P species that have been recorded at the Weld Range. These are *Indigofera gilesii* P3, *Euphorbia sarcostemmoides* P1, *Goodenia lyrata* P3, *Eremophila arachnoides* subsp. *Arachnoides* P3, *Mirbelia stipitata* P3, *Ptilotus luteolus* P3, and *Tecticornia cymbiformis* P3.

P flora returned from the DBCA database with records within 30 km of the Survey Area are shown in Figure 4-1. Records identified in the literature review are also shown.

An assessment of the likelihood of occurrence of these 34 species within the Survey Area was performed using the criteria listed in Table 3-3. The results of the assessment are listed in Table 4-1.



### Legend

Survey Area

#### Priority 1

- ★ *Acacia dilloniorum*
- ★ *Beyeria lapidicola*
- ★ *Eremophila rhegos*
- ★ *Euphorbia sarcostemmoides*
- ★ *Stenanthemum mediale*
- ★ *Stenanthemum patens*

#### Priority 3

- ★ *Acacia burrowsiana*
- ★ *Acacia speckii*
- ★ *Calytrix verruculosa*
- ★ *Drosera eremaea*
- ★ *Eremophila fasciata*
- ★ *Eremophila shonae* subsp. *diffusa*
- ★ *Eremophila simulans* subsp. *megacalyx*
- ★ *Hemigenia tysonii*
- ★ *Hemigenia virescens*
- ★ *Homalocalyx echinulatus*
- ★ *Lysiandra baeckeoides*
- ★ *Micromyrtus placoides*
- ★ *Petrophile pauciflora*
- ★ *Prostanthera ferricola*
- ★ *Prostanthera petrophila*
- ★ *Ptilotus beardii*
- ★ *Sauropus* sp. *Woolgorong* (M. Officer s.n. 10/8/94)
- ★ *Verticordia jamiesonii*

#### Priority 4

- *Dodonaea amplisemina*
- *Goodenia berringbinensis*
- *Grevillea inconspicua*
- *Hemigenia exilis*

Scale: 1: 200000 @ A3 0 5 10 km

Coordinate System: GDA 2020 MGA Zone 50  
Projection: Transverse Mercator



Author: VM Approved: EH Date: 26/03/2024

## Threatened and Priority Flora Records

Prepared for:



Figure: 4-1

**Table 4-1. Threatened and Priority Flora Likelihood of Occurrence**

Species	P	Preferred Habitat	Likelihood of Occurrence
<i>Acacia burrowsiana</i>	3	Red-brown loams with ironstone rubble on surface, calcrete soils, laterite, quartz. Flats adjacent to watercourses, crests of low rises, breakaways.	Likely. Suitable habitat present in 3a and 3b
<i>Acacia dilloniorum</i>	1	Foot slopes and gullies of dolerite hills and mid-slopes of the Weld Range on red-brown silty clay loam.	Likely. Suitable habitat in the upper 3b areas
<i>Acacia speckii</i>	4	Rocky soils over granite, basalt or dolerite. Rocky hills or rises. It has been observed to occur across the mid-sloped rocky hills and near drainage lines of Weld Range.	Present. Suitable habitat in the upper 3b areas
<i>Beyeria lapidicola</i>	1	Callitris-Acacia woodlands or mulga woodland in sandy loams or on banded ironstone hills.	Likely. Suitable habitat in 2a and 3b.
<i>Calytrix verruculosa</i>	3	Sandy clay. Plains.	Possible. Suitable habitat in 3b.
<i>Dodonea amplisemina</i>	4	Open shrublands with Acacia, Eremophila and other low shrubs on red-brown sandy clay soils over basalt or banded ironstone.	Present. Suitable habitat in 3b.
<i>Drosera eremaea</i>	3	Heavy red loam. Seepage areas amongst granite outcrops.	Unlikely. No suitable habitat.
<i>Eremophila arachnoides</i> subsp. <i>Arachnoides</i>	3	Open shrublands or mulga woodland in shallow loams over limestone, but locally on gently undulating terrain, low in the landscape, on red-brown loamy soil with some calcrete pebbles or on calcrete outcrops.	Possible. Some small calcrete patches in the easternmost extent of 3b.
<i>Eremophila fasciata</i>	3	Hillside, gullies. Brown / red ironstone gravel.	Possible. Suitable habitat 3b
<i>Eremophila rhegos</i>	1	Skeletal stony loam over granite.	Unlikely. No suitable habitat.
<i>Eremophila shonae</i> subsp. <i>Diffusa</i>	3	Stony yellow or red sandy soils.	Possible. Suitable habitat in 3b.
<i>Eremophila simulans</i> subsp. <i>Megacalyx</i>	3	Rangeland plain. Road verge with red, sandy gravel laterite.	Possible. Suitable habitat in 3a.
<i>Euphorbia sarcostemmoides</i>	1	Sandstone ridges, quartzite hills, and banded ironstone with red brown shallow sandy loam soils. However, at Weld range it has been observed on flat plains.	Likely. Suitable habitat in 2a, 3a and 3b.
<i>Goodenia berringbinensis</i>	4	Red sandy loam along watercourses, lakes, drainage lines, dams and claypans.	Unlikely. Drainage limited to rocky gullies.
<i>Goodenia lyrata</i>	3	Mulga woodlands on red sandy loam often in or near claypans	Unlikely. No claypans present.
<i>Grevillea inconspicua</i>	4	Drainage lines and on rocky outcrops tending to favour loamy soils. It is also found to occur on moderately inclined midslopes with fragments of banded ironstone and chert.	Likely. Suitable habitat in 2a and 3b.
<i>Hemigenia exilis</i>	4	Laterite. Breakaways, slopes.	Unlikely. No suitable habitat.
<i>Hemigenia tysonii</i>	3	Red sand, sandy clay and lateritic sand on flats, as well as on sand dunes and hills. It is also found on ridgelines with laterite, dolerite, conglomerate and chert.	Unlikely. No suitable habitat.
<i>Hemigenia virescens</i>	3	Hillsides, in rangelands, in low and high shrublands and on sandy banks. Soil types are commonly yellow-red sandy clay, brown ironstone gravel and brown rocky sand.	Likely. Suitable habitat in 3b.

<i>Homalocalyx echinulatus</i>	3	Gently inclined slopes with fragments of banded ironstone. It has also been recorded to occur on stony plateaus, breakaways and rangelands.	Likely. Suitable habitat in 3b.
<i>Indigofera gilesii</i> subsp. <i>Gilesi</i>	3	Pebbly loams and hill slopes amongst boulders and outcrops, banded iron hills, granite and sandstone, creeklines and sand plains. The substrate is often ironstone gravel amongst brown/red loam.	Possible. Suitable habitat in 2a, 3a and 3b.
<i>Lysiandra baeckeoides</i>	3	Ironstone ridges/ breakaways with dry, orange sandy clay soils. At Weld Range it has been recorded on gently inclined lower hillslopes to flats of banded ironstone with red brown soils.	Possible. Suitable habitat in 2a and upper 3b.
<i>Micromyrtus placoides</i>	3	Red-orange or orange-yellow sandy clay, coarse gravel, banded ironstone, laterite, quartz and basalt. Landforms can be gently undulating plains, dry creek beds, hillcrests or ridges of brown loam, dolerite, ironstone or granite.	Likely. Broad habitat suitability. All habitats suitable.
<i>Mirbelia stipitata</i>	3	Plains on red sandy loam.	Possible. Plains suitable.
<i>Petrophile pauciflora</i>	3	Decaying and dissected granite breakaways.	Unlikely. No suitable habitat.
<i>Prostanthera ferricola</i>	3	Sparse <i>Acacia aneura</i> shrublands on gently inclined upper slopes and crests of banded ironstone formations. It is occasionally found in gullies or on quartz.	Possible. Suitable habitat in 2a
<i>Prostanthera petrophila</i>	3	Lateritic soils, ironstone slopes and foothills on red-orange sandy clay with ferrous stones and boulders.	Present. Suitable habitat in 2a and upper 3a and 3b
<i>Ptilotus beardii</i>	3	Red/orange/brown sandy-clayey soils, saline flats, flood plains and low breakaways.	Possible. Suitable habitat in 3a and 3b.
<i>Ptilotus luteolus</i>	3	Rocky hill slopes and crests, often in red sandy soils. It has also been found on low sandstone (sandy siltstone) and rises in red powdery loam.	Possible. Suitable habitat in 2a.
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)	3	Red sand plains in open Acacia – Eremophila woodlands but has been found on moderately rocky hill crests and slopes on the Weld Range.	Likely. Suitable habitat in 2a.
<i>Stenanthemum mediale</i>	1	Red clayey sand.	Likely. Suitable habitat in 3 and 3b.
<i>Stenanthemum patens</i>	1	Rocky basalt and banded ironstone hillsides as well as on sandy loam and clay slopes	Possible. Suitable habitat in 3a and 3b.
<i>Tecticornia cymbiformis</i>	3	Saline areas along floodplains, creeklines, lakes or sloping areas leading to saline habitats. It can be found on red-brown sandy clays	Unlikely. No suitable habitat.
<i>Verticordia jamiesonii</i>	3	Quartzite or laterite breakaways, hill slopes, ridgelines, or on weathered granite within pockets of small sandy clay in depressions	Likely. Suitable habitat in 2a and 3b.

### 4.1.2 Significant Vegetation

There are no TECs listed under the BC Act or EPBC Act known to occur within the Survey Area. The Survey Area is partially within the Weld Range P1 Ecological Community (Figure 4-2).

The Weld Range and other Banded Iron Formation Ranges are important landforms in the Murchison region. Although representing a very small proportion of the total area of the Murchison Bioregion, their unique geology, soils and relative isolation have produced distinctive vegetation communities, many of which have restricted distributions in the region. Many of the BIF ranges support threatened, and in some instances locally endemic, species. Consequently, they are considered to have very significant biodiversity values.

Vegetation types of the Weld Range have been described by Dillon and Markey (2006) and Ecologia (2009a). Community characteristics are listed in Table 4-2.



Author: VM    Approved: EH    Date: 26/03/2024

## Threatened and Priority Ecological Communities

Prepared for:



Figure 4-2

Scale: @ A4    0    2.5    5 km  
1: 150,000

Coordinate System: GDA 2020 MGA Zone 50

Projection: Transverse Mercator



### Legend

Weld Range BIF Priority 1





**Table 4-2. Characteristics of vegetation described for the Weld Range**

Landscape position	Code	Description	Species richness
Dillon and Markey (2006)			
Hillslopes with moderately inclined gradients, very rocky terrain and outcropping of BIF. This vegetation type occurred across the topographical profile of the range, from the lower slopes to hill tops, but was located mostly on the mid – upper slopes.	1a	Open shrubland of <i>Acacia aneura</i> , <i>A. ramulosa</i> var <i>linophylla</i> , and / or <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2006) over a sparse shrub cover of <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Santalum spicatum</i>	All taxa 32.7±1.0  Annuals 19.3±2.7
This community occurs mostly on rocky, gentle – moderate inclines, on higher slopes than type 1a.	1b	Open shrublands and sparse shrublands of <i>Acacia aneura</i> , <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2006), and <i>Grevillea berryana</i> over <i>Eremophila georgei</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>E. glutinosa</i> and, <i>Thryptomene decussata</i> . <i>Ptilotus schwartzii</i> , <i>Ptilotus obovatus</i> , <i>Grevillea berryana</i> , <i>Eremophila georgei</i> and <i>Thysanotus manglesianus</i> , <i>Prostanthera petrophila</i> and <i>Cheilanthes sieberi</i> subsp. <i>Sieberi</i>	All taxa 39.2±5.9  Annuals 23.6±5.0
Outcrops and rocklands of BIF on moderate – steep hillslopes. Crevices and fissures formed in exposed outcrops of bedrock	2	Sparse to open shrublands of <i>Acacia aneura</i> and <i>A. incurvaneura</i> over <i>Thryptomene decussata</i> , <i>Philotheca brucei</i> subsp. <i>Brucei</i> , <i>Eremophila</i> spp. <i>Micromyrtus sulphurea</i> , and <i>Dodonaea pachyneura</i> over <i>Cheilanthes adiantoides</i> , <i>Stylidium longibracteatum</i> , <i>Ptilotus obovatus</i> subsp. <i>Obovatus</i> and <i>Harnieria kempeana</i> subsp. <i>Muelleri</i>	All taxa 43.9±6.4  Annuals 25.4±7.2
Lower hillslopes	3	Open shrubland of <i>Acacia aneura</i> over isolated shrub species such as <i>Solanum ashbyae</i> and <i>Tribulus suberosus</i> and <i>Cheilanthes sieberi</i> subsp. <i>Pseudovellea</i>	All taxa 20.5±3.5  Annuals 15.0±2.8
Upper slope on steep, rocky hillslopes with relatively high levels of exposed bedrock with fractured rocky substrates	4	Scattered <i>Acacia pruinocarpa</i> over open shrublands of <i>Acacia aneura</i> with <i>Philotheca brucei</i> subsp. <i>Brucei</i> and <i>Eremophila</i> spp, and <i>Abutilon oxycarpum</i> , <i>Dodonaea pachyneura</i> and <i>Enneapogon caerulescens</i>	All taxa 32.7±7.2  Annuals 22.0±6.9

Landscape position	Code	Description	Species richness
Mostly on lower slopes and outwashes of ironstone colluvium	5a	Open tall shrublands of <i>Acacia pruinocarpa</i> , <i>Acacia aptaneura</i> and <i>Acacia ramulosa</i> var. <i>linophylla</i> with <i>Acacia ceasaneura</i> .	All taxa 27.9±5.2
			Annuals 17.2±4.5
Moderately inclined lower hillslopes and outwash plains.	5b	Sparse open shrubland of <i>Acacia aneura</i> , <i>Acacia aptaneura</i> , <i>A. effusifolia</i> over sparse shrubs of <i>Senna glaucifolia</i> and <i>Tribulus suberosus</i> . With <i>Hibiscus sturtii</i> , <i>Enneapogon caerulescens</i> and <i>Sida</i> sp. Dark green fruits (S. van Leeuwen 2260).	All taxa 36.2±3.4
			Annuals 21.8±5.1
Dolerite substrates including a hillcrest of exposed volcanic rocks, mid –lower slopes, footslopes and a colluvial fan	6	Sparse to open shrubland of <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia aneura</i> and <i>Acacia speckii</i> over sparse mid-stratum of <i>Eremophila macmillaniana</i> , <i>Eremophila mackinlayi</i> subsp. <i>Spathulata</i> and <i>Senna glaucifolia</i> with <i>Sida</i> sp. Dark green fruits (S. van Leeuwen 2260), <i>Maireana georgei</i> and <i>Euploca ovalifolium</i>	All taxa 49.8±3.7
			Annuals 30.3±4.2
Ecologia (2009a)			
BIF mid to upper slopes and outcropping	1a	<i>Acacia aneura</i> low open woodland over <i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>A. ramulosa</i> var. <i>linophylla</i> and <i>Thryptomene decussata</i> open mid shrubland over mixed <i>Eremophila</i> spp. Low shrubland.	13±3.52
	1b	<i>Acacia aneura</i> low open woodland over <i>Acacia cockertoniana</i> open mid shrubland over mixed mid shrubland over <i>Ptilotus obovatus</i> low shrubland.	14±2.89
Ridge tops of BIF ranges	2a	Scattered <i>Acacia pruinocarpa</i> trees over <i>A. aneura</i> mid sparse shrubland / scattered shrubs over <i>Ptilotus obovatus</i> low shrubland with <i>Cymbopogon ambiguus</i> tussock grasses.	11±3.30
Mid to upper slopes and broad ridge tops of BIF ranges and ridge tops of breakaways	2b	<i>Acacia aneura</i> sparse shrubland over mixed sparse mid shrubland over <i>Micromyrtus sulphurea</i> and <i>Ptilotus obovatus</i> low open shrubland	17±3.86

Landscape position	Code	Description	Species richness
Sandy outwash and gravelly plains and footslopes of BIF ranges	3a	+/- <i>Corymbia lenziana</i> scattered medium trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> sparse tall shrubland over mixed <i>Eremophila</i> spp. Open mid shrubland over scattered low shrubs of <i>Ptilotus obovatus</i> over mixed open tussock grassland.	16±3.42
Drainage lines and low-lying areas on sandy outwash plains	3b	+/- <i>Acacia pruinocarpa</i> scattered trees over <i>A. aneura</i> woodland over <i>A. ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> shrubland over mixed <i>Eremophila</i> spp. Closed shrubland over <i>Ptilotus obovatus</i> open low shrubland.	17±5.26
Sandy plains	3c	Scattered <i>Eucalyptus</i> mallees / trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> open shrubland over <i>Rhagodia eremaea</i> , <i>Eremophila forrestii</i> subsp. <i>Forrestii</i> shrubland over <i>Ptilotus obovatus</i> open low shrubland.	19±1.26
Gravelly plains and low hills	3d	<i>Acacia aneura</i> and <i>A. cockertoniana</i> open moderate shrubland over <i>Eremophila simulans</i> subsp. <i>Simulans</i> and <i>Aluta aspera</i> subsp. <i>Hesperia</i> low open shrubland.	9±2.65
Undulating scree plains and mid to low slopes of granite and dolerite	4a	<i>Acacia</i> sp. Weld Range and <i>A. incurvaneura</i> open tall shrubland over <i>Eremophila macmillaniana</i> and mixed <i>Senna</i> spp. Open mid shrubland over <i>Ptilotus obovatus</i> open low shrubland.	15±3.75
Minor drainage areas, creek lines and midslope of low dolerite and granite hills	4b	<i>Acacia</i> sp. Weld Range and <i>Acacia speckii</i> (P4) shrubland over mixed <i>Senna</i> spp sparse shrubland over <i>Grevillea inconspicua</i> (P4) and <i>Dodonaea amplisemina</i> . (P4) open shrubland over <i>Cymbopogon ambiguus</i> sparse tussock grassland	17±5.77
Ridge tops and upper slopes of BIF ridges, low lying semi-saline flats, riparian areas and ironstone scree flat plains.	5a	<i>Acacia craspedocarpa</i> open tall shrubland over <i>Solanum ashbyae</i> / <i>lasiophyllum</i> and <i>Ptilotus obovatus</i> low shrubland over mixed low tussock grassland.	16±5.56
Flat plain adjoining seasonally inundated wetland	5b	+/- <i>Grevillea striata</i> low isolated trees over <i>Acacia craspedocarpa</i> and <i>A. aneura</i> tall open shrubland over <i>Scaevola spinescens</i> sparse mid shrubland over <i>Austrostipa elegantissima</i> and <i>Eriachne flaccida</i> low open tussock grassland.	16±3.61
Mainly occurring in and around seasonally inundated areas and salt affected drainage lines	6a	Scattered <i>Acacia</i> spp. Shrubs over mixed <i>Senna</i> spp. Open mid shrubland over <i>Ptilotus obovatus</i> sparse shrubland over mixed <i>Maireana</i> spp. Chenopod shrubland	20±4.43

Landscape position	Code	Description	Species richness
Undulating plains with a surface layer of gypsum and calcrete	6b	Scattered mixed <i>Acacia</i> spp. Over <i>Rhagodia eremaea</i> and <i>Scaevola spinescens</i> sparse mid to low shrubland over <i>Ptilotus obovatus</i> , <i>Maireana georgei</i> and <i>Sclerolaena diacantha</i> low chenopod shrubland.	13±3.12
Seasonally inundated salt pan	6c	<i>Eremophila maculata</i> subsp. <i>Brevifolia</i> low open shrubland over <i>Sclerolaena diacantha</i> low chenopod shrubland over <i>Enneapogon cylindricus</i> low tussock grassland.	6.0±1.0
Seasonally inundated claypan	7a	<i>Melaleuca stereophloia</i> and <i>Cratystylis subspinescens</i> low shrubland over <i>Tecticornia</i> spp. low samphire shrubland over <i>Frankenia laxiflora</i> low shrubland.	18±2.08
Fringe of seasonally inundated wetland	7b	<i>Eucalyptus carnei</i> and <i>Eucalyptus trivalva</i> woodland over <i>Cratystylis subspinescens</i> and <i>Duma florulenta</i> low sparse shrubland over mixed low tussock grasses.	19±2.89

Other significant vegetation that has the potential to occur in the Survey Area is GDE.

The Bureau of Meteorology (**BoM**) GDE Atlas provides information to support the recognition and identification of GDEs in natural resource management, including water planning and environmental impact assessment. It indicates where ecosystems potentially interact with groundwater, and some of the characteristics of those ecosystems that may be useful in determining water requirements.

The GDE Atlas shows general areas where groundwater interaction may occur. It does not imply that an entire mapped ecosystem is using groundwater, but rather groundwater interaction may be occurring somewhere within the mapped ecosystem.

For WA, the Atlas contains information about two types of ecosystems:

- Aquatic ecosystems that rely on the surface expression of groundwater—this includes surface water ecosystems which may have a groundwater component, such as rivers, wetlands and springs; and
- The terrestrial GDE layer expresses the potential for groundwater and mapped vegetation communities across Australia to interact. It shows the vegetation communities that interact with groundwater from the water table or in the capillary zone.

The closest aquatic system is Lake Annean, 35 km east of the Survey Area. The Atlas identifies moderate potential terrestrial GDE intersecting the Survey Area. The feature is described as 'Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains, supporting groved mulga and bowgada; within Sandplains and hardpan wash plains with outgoing drainage and salt lakes, broken by ridges of metamorphic rocks and granite'.

Ecologia (2009a) assessed the likelihood of GDE at Weld Range and identified vegetation types 7a and 7b as potentially groundwater dependent. Communities 7a and 7b do not occur within the Beebyn deposit area and reported that no species known to be phreatophytic have been recorded in the communities present within the Beebyn deposit area.

### 4.1.3 Introduced Flora Species

Dandjoo returned nine introduced flora species. Six introduced flora species have been recorded locally by previous surveys. Table 4-3 lists these introduced flora species.

**Table 4-3. Introduced Flora Records within 30 km of the Survey Area**

Species	Common Name
<i>Cenchrus ciliaris</i>	Buffel grass
<i>Cleretum papulosum</i> subsp. <i>papulosum</i>	-
<i>Cucumis myriocarpus</i>	Prickly paddy-melon
<i>Cuscuta epithymum</i>	Lesser dodder
<i>Hypochaeris glabra</i>	Smooth Cats-ear
<i>Lysimachia arvensis</i>	Pimpernel
<i>Pentameris airoides</i> subsp. <i>airoides</i>	False hairgrass
<i>Rostraria pumila</i>	Tiny bristle-grass
<i>Sisymbrium erysimoides</i>	Smooth mustard
<i>Solanum nigrum</i>	Black berry nightshade
<i>Sonchus oleraceus</i>	Common sowthistle

No Declared pests under the BAM Act or WONS have been recorded within 30 km of the Survey Area.

## 4.2 FIELD SURVEY

### 4.2.1 Flora

A total of 77 species of flora were recorded within the Survey Area, comprising all native species. Nine specimens were unable to be identified to species level due to a lack of diagnostic material.

The *Fabaceae* (pea family, 15 species), *Poaceae* (grass family, 10 species) and *Scrophulariaceae* (figwort family, 10 species) were the most species-rich families recorded. Twenty-one families represented by 40 genera were recorded across the Survey Area.

The complete list of plant species recorded within the Survey Area is presented in Appendix D. The mean species richness was 14.75 species per quadrat. The average species diversity recorded per quadrat is lower than other surveys conducted in the nearby area. Dillon and Markey (2008) recorded a floristic richness of between 20.5 and 49.8, with the proportion of annual flora ranging from 58-73% of total species richness (Section 4.1.2). Ecologia (2009a) reported 19.7% annuals and 80.4% perennials.

The number of annuals present at the time of survey was 22 or 29%, which is higher than recorded by Ecologia (2009a) but lower than recorded by Markey and Dillon (2008).

A species accumulation curve (Appendix D) was performed, returning a modelled Michaelis-Menton species richness of 100, indicating that the floristic survey was approximately 77% complete.

Floristic groups identified in the cluster analysis (Appendix D) were organised into vegetation types and are discussed in the following section.

#### 4.2.2 Vegetation Types

Three vegetation types are described for the Survey Area, as summarised in Table 4-4 and detailed below.

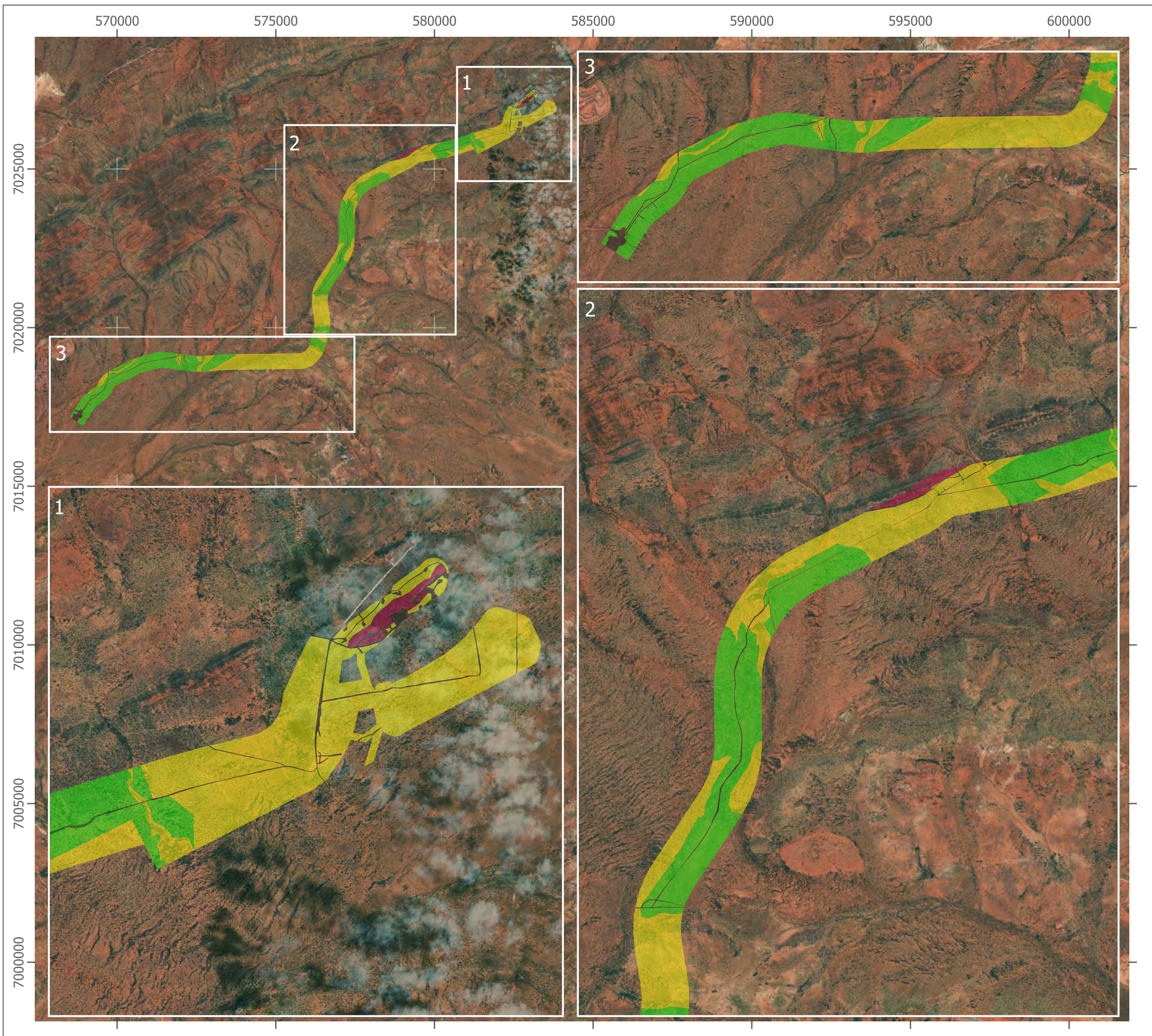
**Table 4-4. Vegetation Types**

Code	Landform	Vegetation Description	ha	%
2a	BIF outcrops	Scattered low <i>Acacia aneura</i> , <i>Psyrdrax latifolia</i> and <i>Acacia pruinoarpa</i> over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Thryptomene decussata</i> and <i>Philotheca brucei</i> mid sparse shrubland with <i>Ptilotus obovatus</i> <i>Dodonaea pachyneura</i> and <i>Dysphania rhadinostachya</i> low sparse shrubland.	14.6	1.4
3a	Gravelly plains	<i>Acacia aneura</i> , <i>A. ramulosa</i> subsp. <i>linophylla</i> and <i>Acacia mulganeura</i> tall sparse shrubland over <i>Eremophila punicea</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Eremophila margarethae</i> mid sparse shrubland with <i>Ptilotus obovatus</i> , <i>Eragrostis eriopoda</i> and <i>?Swainsona purpurea</i> scattered low groundcover.	469.3	44.4
3b	Sandy outwash plains	<i>Acacia aneura</i> , <i>Acacia pruinoarpa</i> and <i>Acacia ramulosa</i> var <i>linophylla</i> low open woodland over <i>Eremophila forrestii</i> ssp <i>forrestii</i> , <i>Eremophila latrobei</i> and <i>Grevillea obliquistigma</i> mid open shrubland and <i>Ptilotus obovatus</i> , <i>Sida calyxhymenia</i> and <i>Abutilon cryptopetalum</i> sparse low shrubs.	541.8	51.2
D	-	Disturbed – clear of vegetation	30.4	3.0

Vegetation types are described below and are compared to those previously recorded for the Weld Range using structural comparison and common species assemblages. Where communities share a high level of similarity, the vegetation code previously applied has been used here and a discussion of similarity presented.

Disturbed areas constitute 3% of the Survey Area. These areas are composed of two types of areas, those maintained in a state that is clear of vegetation for exploration and station tracks; and drill pads for exploration activities, some of which have been rehabilitated but for which regeneration has not yet successfully established.

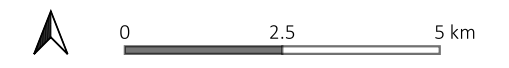
Distribution of vegetation types at a scale of 1:30,000 (inset 1), 1:40,000 (inset 2) and 1:60,000 (inset 3) is shown in Figure 4-3. The dendrogram resulting from the cluster analysis is shown in Appendix C, followed by the site data sheets and photos.



### Legend

- Vegetation Types
- 2a
  - 3a
  - 3b
  - Disturbed

Scale: @ A3 1: 120,000  
 Inset 1 scale 1:25,000  
 Inset 2 scale 1:40,000  
 Inset 3 scale 1: 60,000



Coordinate System: GDA 2020 MGA Zone 50  
 Projection: Transverse Mercator



Author: VM      Approved: EH      Date: 26/03/2024

## Vegetation Types

Prepared for:

Figure: **4-3**



**Landform: BIF Outcrops****Vegetation Type: 2a**

Scattered low *Acacia aneura*, *Psyrdrax latifolia* and *Acacia pruinocarpa* over *Eremophila latrobei* subsp. *latrobei*, *Thryptomene decussata* and *Philotheca brucei* mid sparse shrubland with *Ptilotus obovatus* *Dodonaea pachyneura* and *Dysphania rhadinostachya* low sparse shrubland.

This vegetation type occurs on outcrops and rocklands of BIF on moderate to steep hillslopes. Crevices and fissures formed in exposed outcrops of bedrock are present. Soil is a light red sandy clay loam occurring in crevices and cracks.

This vegetation type has been allocated the numeral 2 to reflect the synonymy with vegetation types described by Markey and Dillon (2008), who identified the presence of *Dodonaea pachyneura* and *Philotheca brucei* to be important indicators in determining this vegetation type and *Ptilotus obovatus* as also being common. It is also the same as Ecologia (2009a) vegetation type 2a that has *Acacia pruinocarpa* in the upper strata.

This vegetation type was not differentiated in the cluster analysis (Appendix C) but has been distinguished here in line with the previous vegetation surveys and the suitability of habitat features for specific conservation significant flora.



**Plate 4-1. 2a BIF Outcrops**

Detailed sites: E2      Total richness: 16 species.      Introduced/exotic flora: None recorded

Condition: Good. Species richness is roughly one third of that recorded by Markey and Dillon (2008) who recorded  $43.9 \pm 6.4$  species per quadrat, of which  $25.4 \pm 7.2$  were annuals. Ecologia (2009a) recorded  $11 \pm 3.3$  species in this vegetation type. Evidence of moderate grazing is present (predominantly goats and euro) and frequent clearing for mining exploration activities is present. The low species count is in some part due to seasonal timing however 18% of recorded species were annuals and therefore season

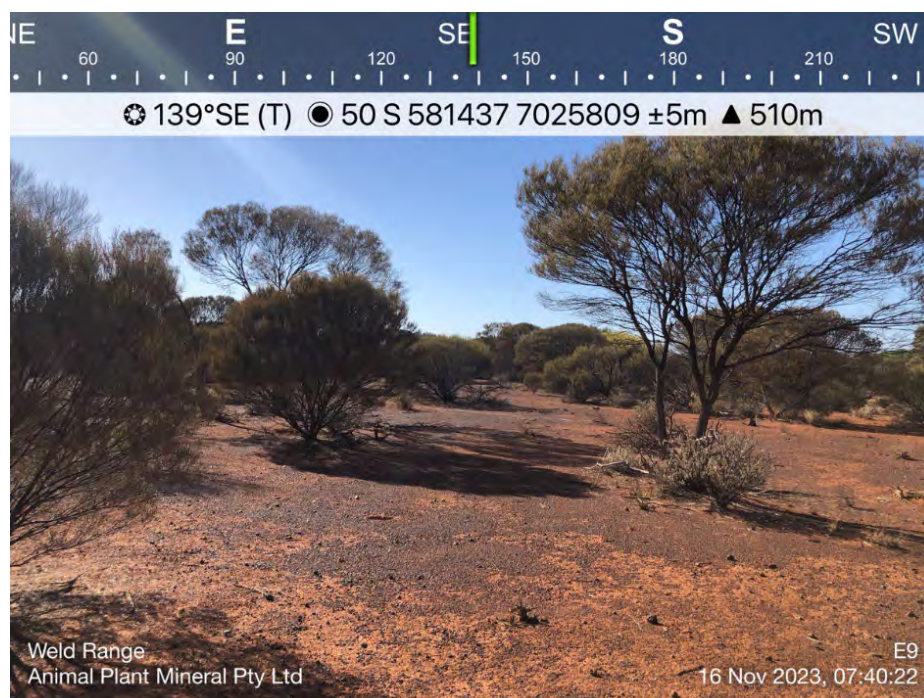
is unlikely to be the sole explanation. This part of the range is low and, on the periphery of the BIF outcropping and of very narrow and limited extent.

Conservation significant flora: none recorded in current survey. *Verticordia jamiesonii* (P3) recorded within this vegetation in DBCA database, in a location that is currently disturbed.

**Landform: Gravelly plains****Vegetation Type: 3a**

*Acacia aneura*, *A. ramulosa* subsp. *linophylla* and *Acacia mulganeura* tall sparse shrubland over *Eremophila punicea*, *Eremophila forrestii* subsp. *forrestii* and *Eremophila margarethae* mid sparse shrubland with *Ptilotus obovatus*, *Eragrostis eriopoda* and *?Swainsona purpurea* scattered low groundcover.

Occurs on sandy outwash and gravelly plains and footslopes of BIF ranges, on gentle mid and lower slopes on soils of red to red-brown clay loam to sandy clay loam with ironstone gravel to small stones at the surface. This vegetation type is labelled 3a by Ecologia (2009a). Vegetation types 3a and 3b have similar floristic assemblages, but the density of vegetation in 3b is higher. This is a component of the vegetation type 5a described by Markey and Dillon (2008).



**Plate 4-3. 3a Gravelly plains**

Detailed sites: E5, E6, E7, E9, E11 and E16.

Total species richness: 34      Average species richness: 11.8

Introduced/exotic flora: None recorded

Conservation significant flora: None recorded in current survey, or in previous surveys.

Condition: Good. Species richness in community 5a described by Markey and Dillon (2008) was  $27.9 \pm 5.2$  for all species, of which annuals were  $17.2 \pm 4.5$ . Ecologia (2009a) recorded an average species richness of  $16 \pm 3.42$  in community 3a. During the current survey species richness was lower than expected, in part due to seasonal conditions. However, there is also evidence of grazing and of historic overgrazing leading to soil compaction and sheetwash erosion and a vegetation cover lower than expected in many areas of this vegetation type.

**Landform: Sandy outwash plains**

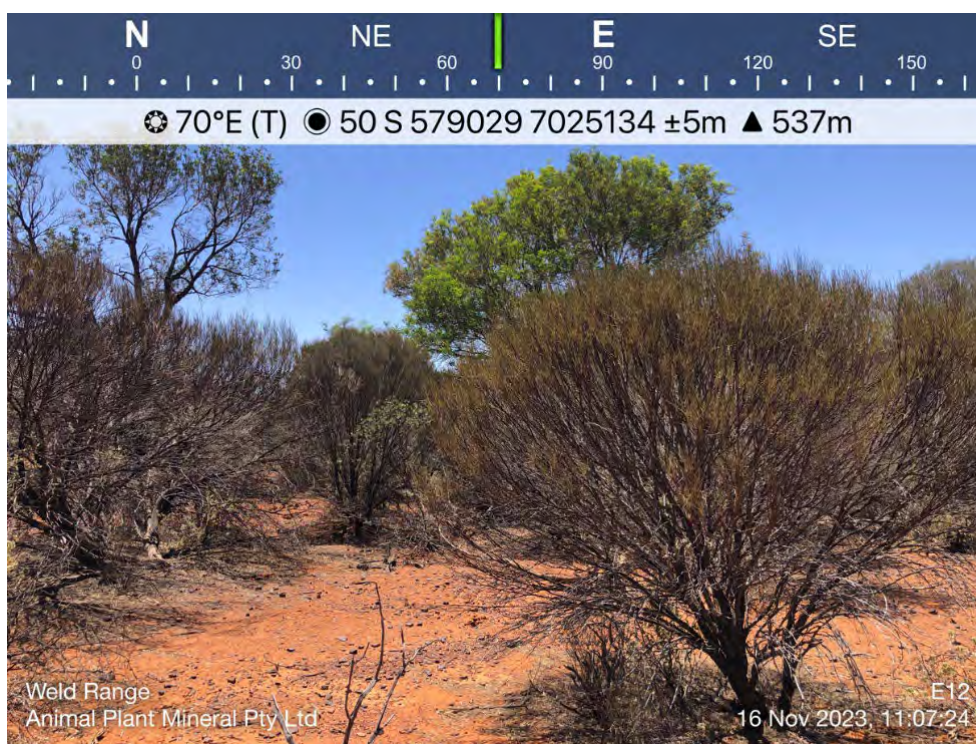
**Vegetation Type: 3b**

*Acacia aneura*, *Acacia pruinocarpa* and *Acacia ramulosa* var *linophylla* tall sparse shrubs over *Eremophila forrestii* ssp *forrestii*, *Eremophila latrobei* and *Grevillea obliquistigma* mid open shrubland and *Ptilotus obovatus*, *Sida calyxhymenia* and *Abutilon cryptopetalum* sparse low shrubs.

This vegetation type occurs on the lower slopes and outwashes of ironstone colluvium. Drainage lines and low-lying areas on sandy outwash plains.

This vegetation type is the same as Ecologia (2009a) vegetation type 3b that has *Acacia pruinocarpa* in the upper strata. This is a component of the vegetation type 5a described by Markey and Dillon (2008). The species composition is similar to 3a but with a denser upper and mid shrub layer.

Quadrats E04 and E08 were separated on the cluster analysis. This is due to the similarity with 3a and the density of vegetation in these sites being somewhere midway between the 3a and 3b types. They have been included here as aerial imagery identifies them to have greater similarity to 3b. E03 was also separated however the difference is as a result of poor condition in this location.



**Plate 4-2. 3b Sandy outwash plains**

Detailed sites: E01, E03, E04, E08, E10, E12, E13, E14, E15.

Total richness: 58 species. Average richness: 16.5 species      Introduced/exotic taxa: none recorded

Condition: Good. Species richness is 84% of that recorded by Markey and Dillon (2008) who recorded 20.5±3.5 species per quadrat, of which 15.0±2.8 were annuals. Species richness is within the range reported by Ecologia (2009a), who reported a species richness of 17±5.26. Evidence of heavy grazing is

present (predominantly goats and euro) and frequent clearing for pastoral station and mining exploration activities is present. Evidence of soil compaction and sheet erosion is present.

Conservation significant species: A single individual was recorded that has the potential to be *Hibiscus krichauffianus* (P1), however definitive determination was not possible from the material available. *Prostanthera petrophila* (P3) and *Acacia speckii* (P3) were recorded in this vegetation type by Ecologia (2009a). *Beyeria lapidicola* (P1) was recorded in this vegetation type on the DBCA database in a location that is currently cleared.

#### 4.2.3 Vegetation Condition

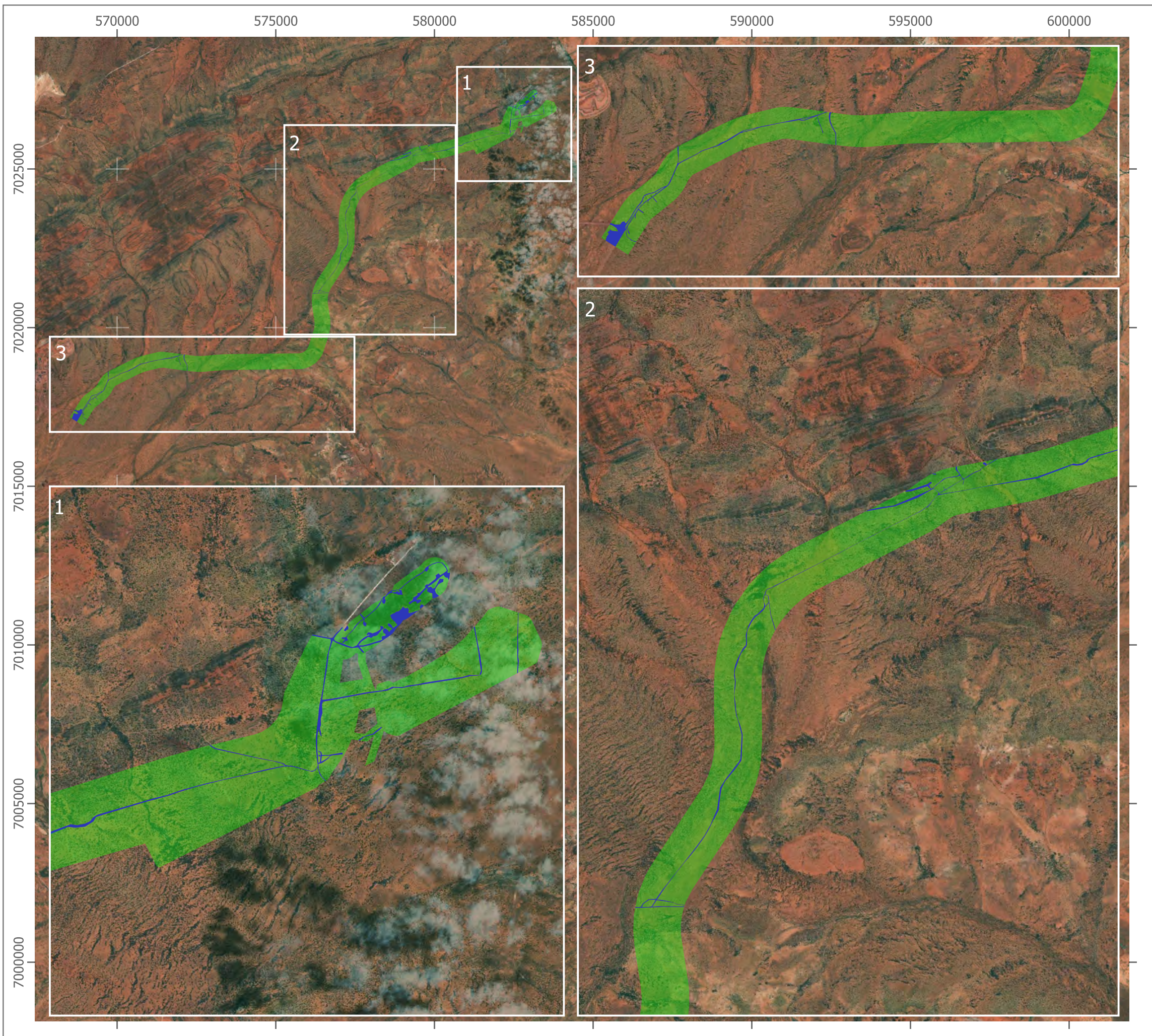
Vegetation condition across the Survey Area was within the categories Good and Completely Degraded, with most of the Survey Area in Good condition (Table 4-5; Figure 4-4).

**Table 4-5. Vegetation condition within the Survey Area**

Vegetation Condition	Area (ha)	Area (%)
Good	1024.6	97.0
Completely Degraded	31.2	3.0

The primary sources of disturbance on-site are moderate to heavy grazing impact from goats and euro but historically heavy grazing by sheep that has degraded the land and made it compacted and susceptible to sheet erosion. A lower vegetation cover than expected is present, particularly in the groundcover. Whilst seasonal conditions were not optimal for annual and ephemeral species, the large rainfall in March should have promoted high growth and the senesced plants would still be visible. No sheep were seen to be currently stocked on Beebyn Station, however they may have been present earlier in the year, or the poor condition may be a consequence of historic grazing that has not yet recovered due to the degradation of the soil profile.

The other major disturbance is the clearing of vegetation for station tracks, exploration tracks and drill pads. Some of these areas have been rehabilitated or regrowth has occurred due to long periods without use. Regeneration is limited to a few shrubs of a few species and therefore remains in a degraded condition.



**Legend**

- Vegetation Condition
- Good
  - Completely Degraded

Scale: @ A3 1: 120,000      0      2.5      5 km

Inset 1 - 1:25,000

Inset 2 - 1:40,000

Inset 3 - 1:60,000

Coordinate System: GDA 2020 MGA Zone 50  
Projection: Transverse Mercator

Author: VM      Approved: EH      Date: 26/03/2024



**Vegetation  
Condition**

Prepared for:

Figure: **4-4**

#### 4.2.4 Significant Flora

No species listed as T under the EPBC Act or BC Act were recorded during the survey.

One specimen that has the potential to be the P3 *Hibiscus krichauffianus* was recorded during the survey. Insufficient material was available to definitively determine the species, due to seasonal conditions.

*Hibiscus krichauffianus* is a low or ascending shrub, 0.2-0.7 m high. Flowers are purple-pink and occur in March or October. Preferred habitat is red sandy soils.

The species is common in the central parts of Australia and the Queensland mid coast. Distribution within WA is sparse (ALA 2024), with the closest record in the Talling Subregion, and most records are from the Pilbara. The species has not previously been recorded in the Murchison Region.

Four P flora have previously been recorded in the Survey Area, and another ten are considered Likely to occur based on the location of known populations and the availability of suitable habitat. Targeted search to confirm the presence and abundance of these species was not conducted throughout the Survey Area due to the seasonal conditions. Table 4-6 lists the species known or likely to occur and the known periods of fertility.

**Table 4-6. Known periods of fertility**

Species	P	Likelihood of Occurrence	Period of fertility
<i>Acacia burrowsiana</i>	3	Likely. Suitable habitat present in 3a and 3b	Flowering Oct - Nov
<i>Acacia dilloniorum</i>	1	Likely. Suitable habitat in the upper 3b areas	Flowers Aug.; mature pods late Oct.
<i>Acacia speckii</i>	4	Present. Suitable habitat in the upper 3b areas	Mature pods present on a specimen collected in September
<i>Beyeria lapidicola</i>	1	Likely. Suitable habitat in 2a and 3b.	Fruits present on holotype collected in August
<i>Dodonaea amplisemina</i>	4	Present. Suitable habitat in 3b.	Flowers recorded in August. Fruits begin to mature from late August to October.
<i>Euphorbia sarcostemmoides</i>	1	Likely. Suitable habitat in 2a, 3a and 3b.	Not available for WA. Fruits present on holotype collected in August in Northern Territory.
<i>Grevillea inconspicua</i>	4	Likely. Suitable habitat in 2a and 3b.	Flowers June to August
<i>Hemigenia virescens</i>	3	Likely. Suitable habitat in 3b.	Flowers recorded July and August
<i>Hibiscus krichauffianus</i>	3	Possible. Suitable habitat in 3b.	Flowers in March or October
<i>Homalocalyx echinulatus</i>	3	Likely. Suitable habitat in 3b.	Flowers June to September
<i>Micromyrtus placoides</i>	3	Likely. Broad habitat suitability. All habitats suitable.	Flowers recorded in August and September
<i>Prostanthera petrophila</i>	3	Present. Suitable habitat in 2a and upper 3a and 3b	Flowers in August

Species	P	Likelihood of Occurrence	Period of fertility
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)	3	Likely. Suitable habitat in 2a.	Flowers in June
<i>Stenanthemum mediale</i>	1	Likely. Suitable habitat in 3 and 3b.	Flowers April to August
<i>Verticordia jamiesonii</i>	3	Likely. Suitable habitat in 2a and 3b.	Flowers September to October



#### 4.2.5 Significant Vegetation

Approximately half the Survey Area is within the Weld Range PEC. Vegetation types recorded during the survey are consistent with vegetation types described previously for the Weld Range PEC by Markey and Dillon (2008) and Ecologia (2009a). Markey and Dillon (2008) did not map the extent of each vegetation type. Ecologia (2009a) mapped vegetation types across a large area, both within and outside of the PEC, but not containing the entire PEC.

The proportion of these vegetation types within the Survey Area compared to that mapped over the broader Weld Range PEC as surveyed by Ecologia (2009a) is listed in Table 4-7.

**Table 4-7. Proportion of Survey Area in PEC**

Veg Type	Survey Area in PEC (ha)	Total mapped by Ecologia (2009a) in PEC	Proportion (%)
2a	14.6	1360.0	1.1
3a	51.6	462.0	11.2
3b	135.2	666.0	20.3
<b>Total</b>	<b>201.4</b>	<b>2488.0</b>	

The Survey Area contains less than 20% of the mapped distribution of these vegetation types within the Weld Range PEC. The Weld Range PEC is 20,073 ha and therefore the undisturbed parts of the Survey Area constitute 1.0% of the Weld Range PEC.

#### 4.2.6 Introduced Flora

No introduced flora were recorded in the Survey Area.

## 5 TERRESTRIAL VERTEBRATE FAUNA RESULTS

### 5.1 DESKTOP STUDY

#### 5.1.1 Significant Fauna

The DBCA database returned nine species of significant fauna that have previously been recorded within 30 km of the Survey Area. Of these, one is Conservation Dependent (**CD**), one is listed as Endangered (**EN**), three are listed as Vulnerable (**VU**), three are considered P in WA and one as Other Specifically Protected (**OS**). This includes five species that are known only from fossil records at Wilgie Mia and the locality is no longer within the current known range of the species. Record locations of significant fauna in relation to the Survey Area are shown in Figure 5-1.

Database records for one species of P fauna occurs within the Survey Area. Ten records of *Idiosoma clypeatum* recorded in 2010 are within the pit boundary and haul road. Another 38 records of this species occur within 500 m of the Survey Area, predominantly north of the Haul Road to the Fenix Iron Ridge Project.

The PMST returned 13 additional species, six T, five MI and two that are both T and MI. These are species that do not have DBCA records within 30 km but where modelling has identified that suitable habitat is known to occur or may occur.

The literature review returned one additional conservation significant species recorded during the Ecologia (2009b) survey of the greater Weld Range area *Antechinomys longicaudata* (Long-tailed Dunnart) P4, additional locations of *Lerista eupoda* (West Coast mulga slider) P1, and a nearby long inactive malleefowl mound. These record locations are outside the Survey Area.

Database search results of T, P and MI fauna within 30 km of the Survey Area are listed in Table 5-1, with the outcome of the likelihood of occurrence assessment. The complete assessment including the preferred habitat relative to those available in the Survey Area and a summary of records in the local area is included in Appendix E. Seven T and P species are assessed as present, likely to occur or possibly occurring. These species are discussed in detail in relation to the Survey Area in section 5.2.2.

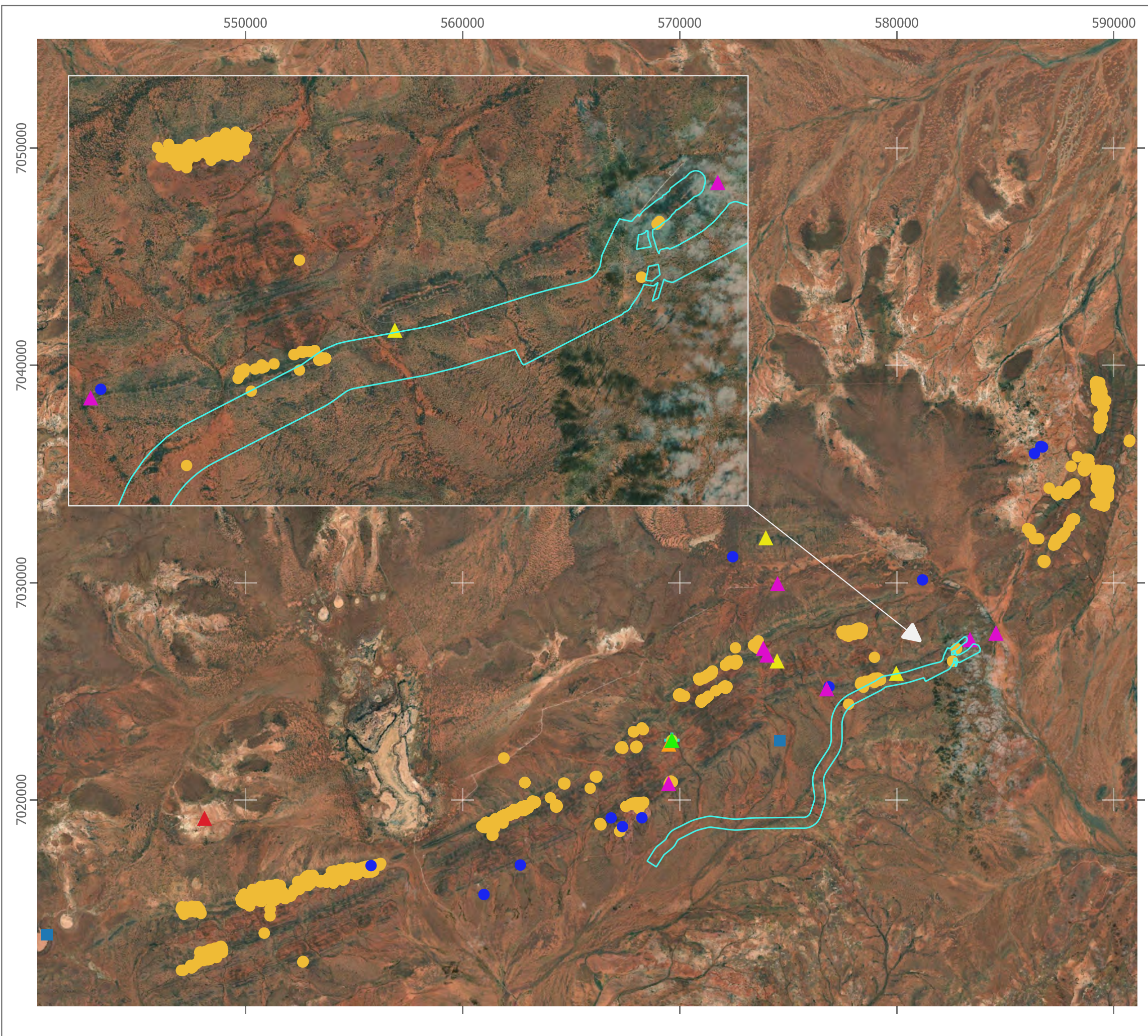
#### 5.1.2 Introduced Fauna

No introduced fauna were returned from the Dandjoo database.

Seven species of introduced mammal were recorded at Weld Range by Ecologia (2009b), being:

- Dog (*Canis lupus familiaris*);
- European Red Fox (*Vulpes vulpes*);
- Feral Cat (*Felis catus*);
- Rabbit (*Oryctolagus cuniculus*);
- House Mouse (*Mus musculus*);
- Goat (*Capra hircus*); and
- Cow (*Bos taurus*).

Large numbers of feral goats were observed across the range, with high grazing pressure evident on the native vegetation.



### Legend

- Survey Area
- Threatened**
- ▲ *Aphelocephala leucopsis* (VU)
- ▲ *Leporillus conditor* (VU)
- ▲ *Macroderma gigas* (VU)
- ▲ *Macrotis lagotis* (VU)
- ▲ Malleefowl mound (VU)
- + *Petrogale lateralis lateralis* (EN)
- ▲ *Pseudomys gouldii* (VU)
- Priority**
- *Dasyercus blythi* (P4)
- *Idiosoma clypeatum* (P3)
- *Lerista eupoda* (P1)
- *Sminthopsis longicaudata* (P4)
- Migratory and Other**
- *Falco peregrinus* (OS)

Scale: @ A3 0 5 10 km  
 1: 175,000

Coordinate System: GDA 2020 MGA Zone 50  
 Projection: Transverse Mercator

Author: VM      Approved: EH      Date: 26/03/2024

## Significant Fauna Database Records

Prepared for:



Figure: **5-1**

**Table 5-1. Significant fauna database records and likelihood of occurrence**

	Species	Common Name	Cons. Code		Assessment of Occurrence
			BC Act	EPBC Act	
birds	<i>Aphelocephala leucopsis</i>	Southern whiteface	-	VU	Likely. All habitats are suitable.
	<i>Apus pacificus</i>	Fork-tailed swift	MI	MI	Likely. All habitats are suitable.
	<i>Calidris acuminata</i>	Sharp-tailed sandpiper	MI	VU, MI	Unlikely. No suitable habitat.
	<i>Calidris ferruginea</i>	Curlew sandpiper	CR	CR, MI	Unlikely. No suitable habitat.
	<i>Calidris melanotos</i>	Pectoral sandpiper	MI	MI	Unlikely. No suitable habitat.
	<i>Falco hypoleucos</i>	Grey falcon	VU	VU	Possible. Suitable foraging habitat. No suitable nesting habitat.
	<i>Falco peregrinus</i>	Peregrine falcon	OS	-	Possible. Foraging habitat present.
	<i>Leipoa ocellata</i>	Malleefowl	VU	VU	Possible. Inactive mounds have been recorded.
	<i>Motacilla cinerea</i>	Grey wagtail	MI	MI	Unlikely. No suitable habitat.
	<i>Motacilla flava</i>	Yellow wagtail	MI	MI	Unlikely. No suitable habitat.
	<i>Pezoporus occidentalis</i>	Night parrot	CR	EN	Unlikely. No suitable habitat.
mammals	<i>Antechinomys longicaudata</i>	Long-tailed dunnart	P4		Likely. Suitable habitat in the Banded Ironstone Formation.
	<i>Dasyercus blythi</i>	Brush-tailed mulgara	P4	-	Unlikely. The local record is a fossilised specimen.
	<i>Leporillus conditor</i>	Greater stick-nest rat	CD	VU	Unlikely. The local record is a fossilised specimen.
	<i>Macroderma gigas</i>	Ghost bat	VU	VU	Unlikely. The local record is a fossilised specimen.
	<i>Macrotis lagotis</i>	Bilby	VU	VU	Unlikely. The local record has a low level of certainty and was recorded in 1984.
	<i>Petrogale lateralis</i>	Black-flanked rock-wallaby	EN	EN	Unlikely. The local record is a fossilised specimen.

Species	Common Name	Cons. Code		Assessment of Occurrence	
		BC Act	EPBC Act		
<i>Pseudomys gouldii</i>	Gould's mouse, Shark Bay mouse	VU	VU	Unlikely. The local record is a fossilised specimen.	
reptiles	<i>Egernia stokesii badia</i>	Western spiny-tailed skink	VU	EN	Possible. No granite outcrops are present but suitable habitat may be present in the BIF outcrops.
	<i>Lerista eupoda</i>	West Coast mulga slider	P1		Likely. Suitable habitat is present in the Mulga Woodland on Hill Slope habitat.
invertebrates	<i>Idiosoma clypeatum</i>	Northern shield-backed trapdoor spider	P3	-	Present. Suitable habitat in the Mulga Woodland on Hill Slope habitat.
	<i>Idiosoma nigrum</i>	Shield-backed trapdoor spider	EN	VU	Unlikely. All specimens in the Murchison region determined to be <i>I. clypeatum</i>

## 5.2 FIELD SURVEY

### 5.2.1 Fauna Habitats


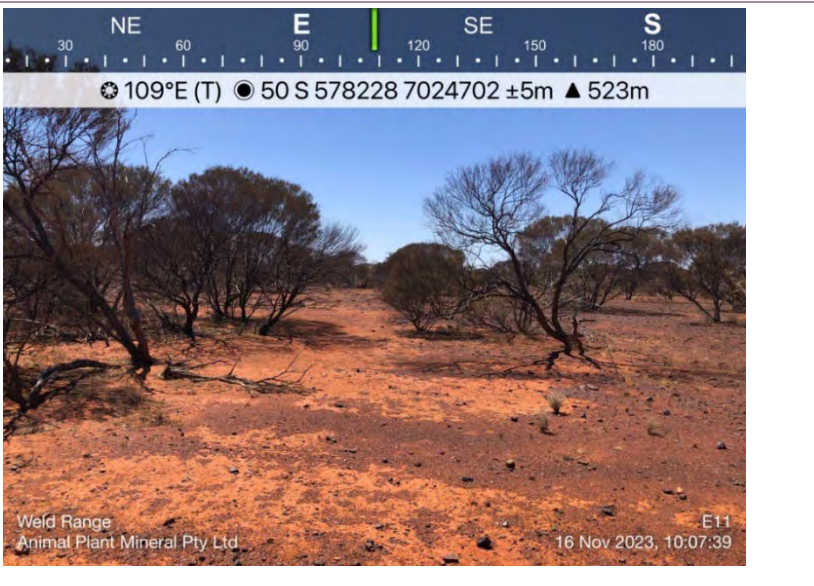
Four fauna habitats are described for the Survey Area and are summarised in Table 5-2 and described below.

**Table 5-2. Fauna Habitats within the Survey Area**

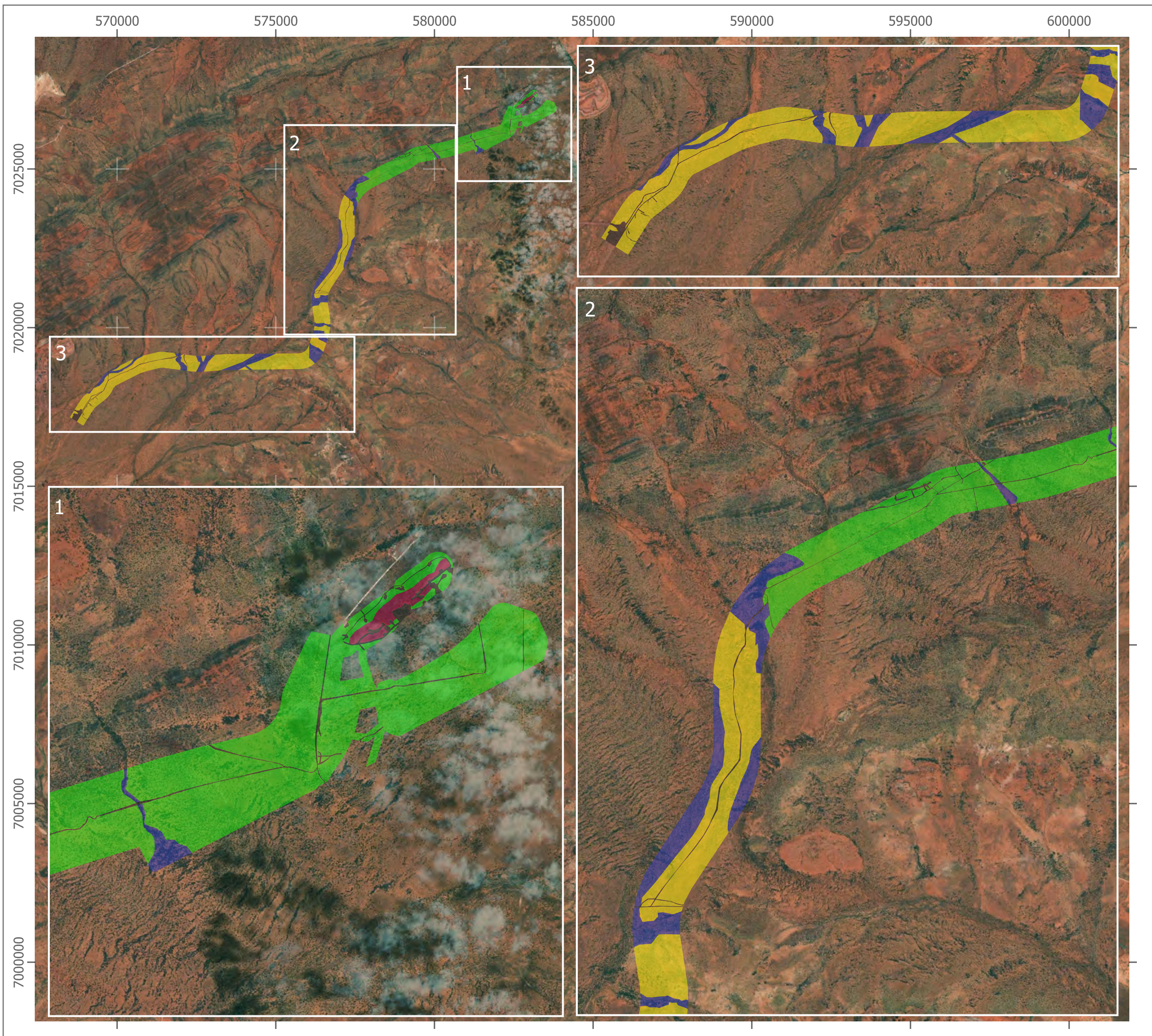
Name	Area (ha)	Proportion (%)
Acacia Sand Plains	500.5	47.4
Banded Ironstone Ridge	6.1	0.6
Drainage Line	186.1	17.6
Mulga Woodland on Hill Slope	333.0	31.5
Disturbed	30.5	2.9

The distribution of fauna habitats is shown in Figure 5-2.

<p><b>Acacia sand plains</b></p>	<p>Occasional <i>Acacia pruinoarpa</i> low trees with <i>A. aneura</i> (mulga) and <i>Acacia ramulosa</i> var. <i>linopylla</i> tall shrubs, over medium to low mixed shrubs predominantly of <i>Eremophila</i> spp., over sparse grasses and perennial herbs, on a sandy to lightly rocky clay loam.</p>	<p>Weld Range Animal Plant Mineral Pty Ltd 15 Nov 2023, 11:18:31 E4</p>
<p><b>Banded Ironstone Ridge</b></p>	<p>Occasional <i>Acacia pruinoarpa</i> low trees and/or <i>Acacia aneura</i> (mulga) tall shrubs, over medium to low mixed shrubs, over sparse grasses, on an ironstone and clayey loam.</p>	<p>Weld Range Animal Plant Mineral Pty Ltd 15 Nov 2023, 09:00:35 E2</p>

<p><b>Drainage line</b></p>	<p>Open <i>Acacia pruinocarpa</i> and <i>Acacia aneura</i> low trees over low to medium mixed shrubs, over sparse to dense grasses on a stony sandy and clayey soil.</p>	
<p><b>Mulga woodland on hill slope</b></p>	<p>Open <i>Acacia pruinocarpa</i> low trees over <i>Acacia aneura</i> high shrubs, over mixed medium shrubs, over sparse grasses and herbs on a sandy or stony clay loam.</p>	





### Legend

- Fauna Habitat
- Acacia Sand Plains
  - Banded Ironstone Ridge
  - Disturbed
  - Drainage Line
  - Mulga Woodland on Hill Slope

Scale: @ A3 0 2.5 5 km  
 1: 120,000  
 Coordinate System: GDA 2020 MGA Zone 50  
 Projection: Transverse Mercator  
 Author: VM Approved: EH Date: 26/03/2024

## Fauna Habitat

Prepared for:  


Figure: 5-2

## 5.2.2 Conservation Significant Fauna

### 5.2.2.1 Southern whiteface

Southern whiteface occur across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range (Schodde and Mason 1999). Two subspecies are recognised under the 2023 EPBC Act listing: *A. l. leucopsis* (South-east southern whiteface), the nominate subspecies found throughout south-eastern and central Australia; and *A. l. castaneiventris* (South-west southern whiteface) found in central and southern WA.

As the species is not listed as T in WA, no location records were included in the DBCA database search. Record locations shown in Figure 5-1 were extracted from the Atlas of Living Australia (ALA 2024), originating from the Birds Australia database. Ecologia (2009b) recorded the species at the Weld Range project, however as the species was not listed as conservation significant at the time, the specific location is not reported, and may not have been within the current Survey Area.

Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains (Higgins and Peter 2002). Southern whitefaces are considered sedentary; however, atlas records indicate that individuals may move into wetter areas outside of their normal range during drought years (Higgins and Peter 2002). Southern whiteface forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover. Birds mainly feed on insects, spiders, and seeds, largely gleaned from the bare ground or leaf litter (Higgins and Peter 2002). Although the species typically forages in small groups of 2–8 individuals, birds may congregate in larger flocks during the non-breeding season, with as many as 70 birds recorded in foraging parties in winter (Higgins and Peter 2002). The species often participates in mixed species feeding flocks, particularly with other whiteface and thornbill species.

Breeding takes place from July to October throughout most of the species' range, however, the timing of breeding can be affected by rainfall in arid regions (Higgins and Peter 2002). Birds may breed outside of their usual season following sufficient rainfall or may not breed at all during drought. Birds build large bulky domed nest of grass, bark and roots, usually in a hollow or crevice, although sometimes in low bushes (Higgins and Peter 2002).

Habitat critical to the survival of the Southern whiteface (DCCEEW 2023) includes areas of:

- relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both;
- habitat with low tree densities and an herbaceous understorey litter cover which provides essential foraging habitat;
- living and dead trees with hollows and crevices which are essential for roosting and nesting.

The Survey Area contains some large trees that may be suitable for development of hollows, however the area is previously disturbed with grazing impacts from both the Beebyn Station and feral goats and clearing for mining exploration activity. The understorey is sparse and the litter layer sparse to absent, but thicker in narrow bands around the Drainage Lines. Due to the poor condition of the understorey, the Survey Area is unlikely to host habitat critical to the survival of the Southern whiteface, however, this would need to be confirmed by targeted survey for the presence of birds.

### 5.2.2.2 Grey falcon

The Grey falcon occurs in most of the drier parts of Australia (Schoenjahn 2018). Its distribution is centred on inland drainage systems where there is an average annual rainfall of less than 500 mm. Its main habitat is timbered lowland plains, particularly Acacia shrublands that are crossed by tree-lined watercourses. It generally occurs at low densities across inland Australia (BirdLife International 2019).

The Grey falcon hunts far out into tussock grassland and open woodland. It nests in old nests made by other birds, usually in the tallest trees along watercourses, particularly river red gum (TSSC 2020). Prey species include doves, pigeons, small parrots and cockatoos, and finches, but a variety of other bird prey species have been recorded, as well as mammals and lizards (TSSC 2020).

Local records are more than 50 km away. All habitats in the Survey Area are suitable foraging habitat for this species. No trees suitable for nesting are present in the Survey Area, however there may be occasional tall trees of species other than red gum present in the drainage features within foraging range of the Survey Area.

### 5.2.2.3 Malleefowl

The Survey Area is on the northernmost extent of Malleefowl distribution at this longitude in WA, and the ALA lists the closest records over 50 km to the south. Ecologia (2009b) reported the presence of old, inactive mounds within the Weld Range habitats, but noted that better, unburnt habitat was present in areas outside of their study boundaries, and conclude it was not expected to be resident at Weld Range but may persist in surrounding areas.

Malleefowl are generalist feeders consisting of the seeds, flowers and fruits of shrubs (especially legumes), herbs, invertebrates, tubers and fungi. Malleefowl diet is characteristically variable and different foods are important at different times and locations (Benshemesh 2007). A sandy substrate and abundance of leaf litter are clear requirements for the construction of the birds' incubator-nests (Benshemesh 2007). Soils in the Survey Area have a reasonably high clay content and litter was sparse to absent, except in the narrow Drainage Lines. The quality of the habitat for foraging and nest building are generally low, however there is a possibility of Malleefowl occurring in small patches of higher quality habitat in or near the larger drainage features low in the plains.

### 5.2.2.4 Long-tailed dunnart

Long-tailed dunnart is known from remote and disparate locations throughout the arid zone and in association with rocky habitats. While records of this species are few and far between, it has been found to be reasonably abundant when a known population is sampled. Due to the highly patchy nature of Long-tailed dunnart records and the distance between populations the dispersal ability of this species is potentially very poor.

Its long tail is muscular at the base and is highly mobile, allowing the dunnart to move with agility in rocky habitats utilising the long tail and striated foot-pads to assist with climbing. They feed on a variety of invertebrates.

Breeding occurs in October and November and the female can bear up to six young. Young disperse in March-April in the Murchison area (Western Australian Museum Collections 2023).

At the Weld Range the species has been recorded on exposed rock and stony soils with hummock grasses and shrubs, flat-topped hills, lateritic plateaus, sandstone ranges and breakaways, generally with a vegetation of sparse mulga over spinifex Ecologia (2009b). In the Survey Area, suitable habitat is in the Banded Ironstone Ridge habitats, and rocky Drainage Lines between ridges.

#### 5.2.2.5 Western spiny-tailed skink

*Egernia stokesii badia* was widely distributed up until the 1960s through semi-arid areas of southwestern WA from Minnivale (150 km ENE of Perth) north to Mullewa and east to Perenjori and south of Yalgoo but excluding coastal areas. There are two forms of *E. stokesii badia*: a reddish-brown form in the northern and central wheatbelt; and a wholly black form in the Murchison Region (Ecologia 2010). Surveys for the black form between 2006 and 2009 identified 96 locations in the Murchison Region (Ecologia 2010) and the area of occupancy is approximately 4,000 km<sup>2</sup> in extent (Department of Environment and Conservation 2012).

The Survey Areas occur in the Murchison Region where the wholly black form is distributed. Habitat differences are apparent between the forms, where the Wheatbelt reddish-brown form inhabits hollow logs and the Murchison wholly black form inhabits crevices, predominantly in areas of granite outcropping. Whilst there is no granite outcropping in the Survey Area, habitat suitability is poorly known (Department of Sustainability, Environment, Water, Population and Communities [DSEWPAC] 2011) and may be present in the BIF outcropping.

*E. stokesii badia* is one of the larger subspecies of *Egernia stokesii*, growing to 194 mm (snout to vent length). Its skin is coloured with heavily keeled scales. It has a short, flattish, distinctively spiny tail (Chapple 2003; Wilson and Swan 2023) which it uses as anchorage within crevices when defending itself (Chapple 2003).

*E. stokesii badia* live in spatially and temporally stable groups of up to 17 individuals and has a distinctive behaviour of depositing faecal droppings outside of refuges in a pile or cluster (How *et al.* 2003) referred to as a communal toilet area, scat piling, or latrine.

Whilst granite outcropping with crevices is generally the observed habitat, it is possible the Banded Ironstone Ridge contains suitable crevices.

#### 5.2.2.6 West Coast mulga slider

The West Coast mulga slider is restricted to the arid southern interior between Cue and Meekatharra. Suitable habitat has been described as occurring in open mulga on red loams and sandy loams (Smith 1996).

Local records are in lower slopes/upper plain habitats, often near drainage lines.

The *Lerista* genus are burrowing species that thrive in arid conditions. More commonly, and as is the case for *L. eupoda*, they are unspecialised inhabitants of leaf litter. In the case of *L. eupoda*, the species appears more restricted to the open mulga areas on loamy soils (Wilson and Swan 2023).

They tend to be most easily located in groves of Acacia where they emerge from just under the surface to fossick in the leaf litter for invertebrate prey. In cooler months they are most easily located in the more exposed litter layers close to the surface, retreating deeper under the soil within thicker Acacia groves as temperatures increase and humidity decreases. They are prone to desiccation, hence their

fossorial / semi-subterranean habit. In addition to leaf litter habitat, they are often found in the detrital layers of rotting logs, in abandoned termitaria and in abandoned stick-ant nests (Bush *et al.*, 2007).

Suitability of habitat within the Survey Area is limited by the sparse presence of litter. Higher litter loads are present near to and within drainage features but are of limited extent.

#### 5.2.2.7 Northern shield-backed trapdoor spider

Northern shield-backed trapdoor spider has a widespread distribution in WA's inland arid zone, principally throughout the Yalgoo and Murchison Bioregions where it is the only known species in the *nigrum*-group (excluding a population of *I. formosum* from the southern Yalgoo). It extends from near Paynes Find, the Blue Hill Range, Kadji Kadji Nature Reserve, and Karara in the south, north and north-east to at least Coolcalalaya Homestead, Jack Hills, Albion Downs, Yakabindie, and Yeelirrie.

This distribution seems to be strongly correlated with annual rainfall of less than 250 mm (Rix *et al.* 2018).

*Idiosoma clypeatum* was for a long time misidentified as *I. nigrum*, and the 2013 threatened species assessment of *I. nigrum* prepared under the EPBC Act conflated the identification of these two species. Specimens collected at the Weld Range by Ecologia (2009b) were identified as *I. nigrum* at the time but have since been reassigned to *I. clypeatum* (Rix *et al.* 2018). Ellis (2015) summarises aspects of the biology of this species based on observations at the Weld Range where burrows are adorned with a 'moustache-like' arrangement of twig-lines. Males have been collected wandering in search of females in late autumn, winter and spring, with a peak of activity in winter.

Database records indicate the species occurs most frequently in the mid to lower slopes of the Weld Range, including within the Survey Area and immediate surrounds. Targeted searches for shield-backed trapdoor spider were conducted in 2009 and targeted search is appropriate within the Survey Area to determine the current status of species presence.

## 6 CONCLUSIONS

### 6.1 FLORA

The flora and vegetation survey recorded a total of 77 taxa within the Survey Area. The average species diversity recorded per quadrat (14.75) is less than that reported by Markey and Dillon (20.5 - 49.8) but comparable with that of Ecologia (2009a) for the same vegetation types.

Modelled species richness indicated that the floristic survey was approximately 77% complete. Season of survey and seasonal conditions are a minor constraint for the completeness of the survey, and it is expected that a higher species richness in annual/ephemeral taxa would be recorded during the recommended survey period following average or above average rainfall. This is only a minor constraint as the local area is well surveyed (Markey and Dillon 2008, Ecologia 2009a) and conditions were sufficient to describe vegetation types, which are dominated by perennial vegetation in this bioregion. Whilst occurring outside of the recommended survey period, the remotely captured NDVI index indicates that greenness in the Beebyn Station was near to the 90<sup>th</sup> percentile in November 2023, compared to long term datasets (DPIRD 2023a).

The flora and vegetation of the Survey Area is generally typical of the Weld Range, of the Land Systems present in the Survey Area and of the adjacent lands surrounding the Survey Area.

### 6.2 FLORA OF CONSERVATION SIGNIFICANCE

No T flora was recorded in the Survey Area. One specimen that may be a P3 species was recorded.

*Hibiscus? krichauffianus* was recorded at one location, quadrat E14, at 0.01% cover. Insufficient material was available to definitively determine the species, due to seasonal conditions. If confirmed, this would be a significant range extension for the species. Whilst occurring in the broadly distributed vegetation type 3b, the specific location was limited to a narrow drainage gully.

An additional four species were determined as present based upon historic survey records and ten assessed as Likely to occur based upon the proximity of known locations and the availability of suitable habitat. Targeted search for these species would be required to determine the currency and abundance of presence within the Survey Area. Periods of fertility for these species, and therefore suitable timing for targeted search is in winter and early spring.

### 6.3 INTRODUCED FLORA

No weeds Declared under the BAM Act or classed as WoNS were recorded in the Survey Area or are known to occur in the local area.

### 6.4 VEGETATION OF CONSERVATION SIGNIFICANCE

Approximately half the Survey Area is within the Weld Range PEC. Vegetation types recorded during the survey are consistent with vegetation types described previously for the Weld Range PEC by Markey and Dillon (2008) and Ecologia (2009a).

The amount of each vegetation type within the Survey Area as a proportion of that mapped within the Weld Range PEC by Ecologia (2009a) is 1.1% of 2a, 11.2% of 3a, and 20.3% of 3b.

Regional Vegetation Associations within the Survey Area as described by Beard (1975) have over 99% pre-European Vegetation extent remaining.

## 6.5 FAUNA OF CONSERVATION SIGNIFICANCE

The Southern whiteface has recently been determined as a T species under the EPBC Act. The species was previously widespread across temperate mainland Australia, but has suffered sharp declines in population numbers, chiefly due to habitat loss and degradation. The species is not currently listed as Threatened under the BC Act. Southern whiteface has been recorded in the Weld Range and in the surrounding landscapes. The habitats available in the Survey Area are highly likely to be part of the species historic range. The current quality of available habitat is low due to a loss of undergrowth due to heavy grazing pressure from native animals, station stocking and feral goats. Land clearing for station tracks and mining exploration has also impacted the quality of the habitat. Due to the low quality of the understory, it is unlikely that the Survey Area constitutes Critical habitat (DCCEE 2023), however determination of current use by the species is required to unequivocally verify this. Optimal survey period is July to October during the breeding season; however, the species is sedentary (outside of drought periods) and therefore can be surveyed in any season.

Suitable foraging habitat for the Grey falcon is present within the Survey Area, however no suitable nesting habitat is present and preferred nesting habitat is not available in the surrounding local area. Occurrence records are more than 50 km away and whilst Grey falcon may occasionally visit the locality, it is unlikely to provide an important habitat for this species.

The Survey Area is likely part of the historic range of the malleefowl, as evidenced by the presence of long inactive mounds recorded during baseline surveys. Mounds may last decades after abandonment, and the presence of inactive mounds is not a reliable indication of current presence. Malleefowl males begin nest construction in autumn and breeding between September and January. Survey for active mounds, is therefore possible from late autumn through to mid-summer.

Presence of the Long-tailed dunnart was confirmed in the Weld Range by the Ecologia (2009b) baseline surveys, including within the Survey Area. Suitable habitat occurs in the Banded Ironstone Ridges and the small gullies that occur between the ridges. There are no seasonal restrictions on the survey of mammals in the Eremean climatic district (EPA 2020).

The Western spiny-tailed skink has not previously been recorded in BIF; however, the species is poorly known (DSEWPAC 2011), and crevices are present in the Banded Ironstone Ridge habitat. The species is sedentary and searching crevice habitats for skinks and their distinctive latrine piles can be conducted in any season however, animals are likely to be least active in winter and most active in spring (DSEWPA 2011).

The West Coast mulga slider has been recorded in Weld Range including locations close to the Survey Area. Whilst the Survey Area is likely to be within the species broader area of occupation, the habitats within the Survey Area are generally of poor quality. Leaf litter is scarce within the Survey Area, and soils are degraded and likely poor for burrowing. Higher quality microhabitats occur in the Drainage Line habitat however, soils may be too stony to be suitable. Survey period for reptiles in the Eremean climatic district is September to April.

The Northern shield-backed trapdoor spider is known to occur in the Weld Range including within the Survey Area. The species present in the Weld Range was previously determined to be the T species *I. nigrum*, however taxonomic revision of the group led to a reassignment to *I. clypeatum* and a reduction in conservation ranking to P. Targeted survey can occur in any season as the spiders are sedentary and the burrow entrances are detectable. Suitable habitat occurs in the Mulga Woodland on Hill Slope habitat. Geographic isolation of the Northern shield-backed trapdoor spider in the region means spiders can be assigned to a species through burrow detection and without harvesting individuals.



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## APPENDICES

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## **APPENDIX A: CONSERVATION AND DECLARED CATEGORIES**

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Conservation Categories for Flora, Fauna and Ecological Communities, and Categories  
for Introduced Flora - Appendix A

Conservation categories for threatened species and communities protected under Federal legislation are defined under the *Environment Protection and Biodiversity Conservation Act 1999* and the *Environment Protection and Biodiversity Conservation Regulations 2000* are listed in Tables A.1. and A.2.

**Table A.1: Categories and definitions for threatened flora and fauna species listed under the *Environment Protection and Biodiversity Conservation Act 1999*.**

Conservation Category	Definition
Extinct	Taxa with no reasonable doubt that the last member of the species has died.
Extinct in the wild	Taxa known to survive only in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriated seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered (CR)	Taxa facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (E)	Taxa are not critically endangered; and are facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable (V)	Taxa are not critically endangered or endangered; and are facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Conservation dependent (CD)	<p>Taxa are the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or the following subparagraphs are satisfied:</p> <ul style="list-style-type: none"> <li>i) the taxa is a species of fish;</li> <li>ii) the taxa is the focus of a management plan that provides management actions necessary to stop the decline of, and support the recovery of, the taxa so that its chances of long term survival in nature are maximized;</li> <li>iii) the management plan is in force under a law of the Commonwealth or of a State or Territory; and</li> <li>iv) Cessation of the management plan would adversely affect the conservation status of the taxa.</li> </ul> <p>Fish includes all taxa of bony fish, sharks, rays, crustaceans, molluscs and other marine organisms, but does not include marine mammals/reptiles.</p>

**Table A.2: Definitions for Threatened Ecological Communities under the *Environment Protection and Biodiversity Conservation Act 1999*.**

Conservation Category	Definition
Critically endangered	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

Conservation Categories for Flora, Fauna and Ecological Communities, and Categories  
for Introduced Flora - Appendix A

For Section 182 of the EPBC Act and 179 of the EPBC Act Threatened Ecological Communities and Native species are in the Critically Endangered, Endangered or Vulnerable category if they meet any of the criteria for the category mentioned in Table A.3:

**Table A.3: Criteria for listing Threatened Species and Threatened Ecological Communities under the *Environment Protection and Biodiversity Conservation Regulations 2000***

Threatened Species				
Item	Criterion	Category		
		Critically Endangered	Endangered	Vulnerable
1	It has undergone, is suspected to have undergone, or is likely to undergo in the immediate future:	A very severe reduction in numbers	A severe reduction in numbers	A substantial reduction in numbers
2	Its geographic distribution is precarious for the survival of the species and is:	Very restricted	Restricted	limited
3	The estimated total number of mature individuals is: And: (a) Evidence suggests that the number will continue to decline at: or (b) The number is likely to continue to decline and its geographic distribution is:	Very low	Low	limited
	(a) Evidence suggests that the number will continue to decline at:	A very high rate	A high rate	A substantial rate
	(b) The number is likely to continue to decline and its geographic distribution is:	Precarious for its survival	Precarious for its survival	Precarious for its survival
4	The estimated total number of mature individuals is:	Extremely low	Very low	low
5	The probability of its extinction in the wild is at least:	50% in the immediate future	20% in the near future	10% in the medium term future
Threatened Ecological Communities				
Item	Criterion	Category		
		Critically Endangered	Endangered	Vulnerable
1	Its decline in geographic distribution is:	Very severe	Severe	substantial
2	Its geographic distribution is: And the nature of its distribution makes it likely that the action of a threatening process could cause it to be lost in:	Very restricted The immediate future	restricted The near future	limited The medium term future
3	For a population of a native species that is likely to play a major role in the community, there is a: To the extent that restoration of the community is not likely to be possible in:	Very severe decline The immediate future	Severe decline The near future	Substantial decline The medium term future
4	The reduction in its integrity across most of its geographic distribution is: As indicated by degradation of the community or its habitat, or disruption of important community processes, that is:	Very severe Very severe	severe severe	substantial substantial



Conservation Categories for Flora, Fauna and Ecological Communities, and Categories  
for Introduced Flora - Appendix A

5	<p>The rate of continuing detrimental change is: As indicated by</p> <p>(a) A rate of continuing decline in its geographic distribution, or a population of a native species that is believed to play a major role in the community, that is: or</p> <p>(b) Intensification, across most of its geographic distribution, in degradation, or disruption of important community processes, that is:</p>	Very severe	severe	substantial
		Very severe	severe	serious
		Very severe	severe	serious
6	A quantitative analysis shows that its probability of extinction, or extreme degradation over all its geographic distribution, is:	At least 50% in the immediate future	At least 20% in the near future	At least 10% in the medium term future

Conservation Categories for Flora, Fauna and Ecological Communities, and Categories  
for Introduced Flora - Appendix A

In Western Australia, the *Biodiversity Conservation Act 2016* (BC Act) provides for the statutory listing of Threatened Ecological Communities, under the categories listed in Table A.4.

**Table A.4: Definitions and criteria for Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable Ecological Communities. Department of Environment and Conservation (2013).**

<b>PD : Presumed Totally Destroyed</b>
<p>An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.</p> <p>An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B):</p> <p>A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats <b>or</b></p> <p>B) All occurrences recorded within the last 50 years have since been destroyed.</p>
<b>CR : Critically Endangered</b>
<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.</p> <p>An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):</p> <p>A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii):</p> <p>i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years);</p> <p>ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated.</p> <p>B) Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <p>i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years);</p> <p>ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes;</p> <p>iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.</p> <p>C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).</p>
<b>En : Endangered</b>
<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.</p> <p>An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C):</p> <p>A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):</p> <p>i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years);</p> <p>ii) modification throughout its range is continuing such that in the short term future (within approximately</p>

Conservation Categories for Flora, Fauna and Ecological Communities, and Categories  
for Introduced Flora - Appendix A

20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.  
B) Current distribution is limited, and one or more of the following apply (i, ii or iii):  
i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years);  
ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes;  
iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.  
C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

VU : Vulnerable

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):

A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.

B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.

C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

Conservation Categories for Flora, Fauna and Ecological Communities, and Categories  
for Introduced Flora - Appendix A

In Western Australia, possible Threatened Ecological Communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5 (Table A.4).

**Table A.5: Definitions and criteria for Priority Ecological Communities Department of Environment and Conservation (2013).**

<b>P1: Priority One – Poorly-known ecological communities</b>
Ecological communities that are known from very few occurrences with a very restricted distribution (generally $\leq 5$ occurrences or a total area of $\leq 100$ ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
<b>P2: Priority Two – Poorly-known ecological communities</b>
Communities that are known from few occurrences with a restricted distribution (generally $\leq 10$ occurrences or a total area of $\leq 200$ ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
<b>P3: Priority Three – Poorly-known ecological communities</b>
(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; (iii) communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.
<b>P4: Priority Four</b>
Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. (i) Rare. Ecological communities known from few occurrences 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 communities are usually represented on conservation lands. (ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.
<b>P5: Priority Five – Conservation dependent ecological communities</b>
Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Conservation Categories for Flora, Fauna and Ecological Communities, and Categories  
for Introduced Flora - Appendix A

In Western Australia, 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*.

Categories of Threatened, Extinct and Specially Protected fauna and flora are listed in Table A.6.

The definition of flora includes algae, fungi and lichens. The definition of Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

**Table A.6: Conservation codes for Western Australian flora and fauna under the *Biodiversity Conservation Act 2016* (DBCA 2019).**

Code	Conservation Category	Definition
<b>Threatened species</b>		
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.		
CR	Critically Endangered	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.
EN	Endangered	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
VU	Vulnerable	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.
<b>Extinct species</b>		
Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.		

Conservation Categories for Flora, Fauna and Ecological Communities, and Categories  
for Introduced Flora - Appendix A

EX	Extinct	Species where “there is no reasonable doubt that the last member of the species has died”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.
EW	Extinct in the Wild	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.
<b>Specially protected species</b>		
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.		
MI	Migratory Species	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). 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. Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
CD	Species of special conservation interest (conservation dependent fauna)	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). Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
OS	Other Specially protected species	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). Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.

Conservation Categories for Flora, Fauna and Ecological Communities, and Categories  
for Introduced Flora - Appendix A

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.

**Table A.7: Priority species under Western Australian *Biodiversity Conservation Act 2016*.**

<b>P1: Priority One – Poorly known taxa</b>
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.
<b>P2: Priority Two – Poorly known taxa</b>
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.
<b>P3: Priority Three – Poorly known taxa</b>
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.
<b>P4: Priority Four: Rare, near threatened and other taxa in need of monitoring</b>
<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>

## Conservation Categories for Flora, Fauna and Ecological Communities, and Categories for Introduced Flora - Appendix A

The management of introduced species in Western Australia is regulated through the *Biosecurity and Agriculture Management Act 2007* (BAM Act). The BAM Act seeks to establish a biosecurity regulatory scheme to prevent serious animal and plant pests from entering the State and becoming established, and to minimise the spread and impact of any that are already present within the State.

The list of declared pests is provided under the BAM Act. Declared animal and plant pests fall into three categories as Gazetted under the *Biosecurity and Agriculture Management Regulations 2013*. These categories are outlined in Table A.7.

**Table A.8: Declared pests control categories as gazetted under the *Biosecurity and Agriculture Management Regulations 2013*.**

Category	Description
C1 (Exclusion)	Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 (Eradication)	Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 (Management)	Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

### References

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Department of Environment and Conservation (2013). Definitions, categories and criteria for threatened and priority ecological communities. Accessed 25/04/20 [https://www.dpaw.wa.gov.au/images/plants-animals/threatened-species/definitions\\_categories\\_and\\_criteria\\_for\\_threatened\\_and\\_priority\\_ecological\\_communities.pdf](https://www.dpaw.wa.gov.au/images/plants-animals/threatened-species/definitions_categories_and_criteria_for_threatened_and_priority_ecological_communities.pdf)



## **APPENDIX B: PMST SEARCH RESULTS**

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Australian Government

Department of Climate Change, Energy,  
the Environment and Water

# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 24-Jan-2024

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

# Summary

## Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance (Ramsar)</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	None
<a href="#">Listed Threatened Species:</a>	8
<a href="#">Listed Migratory Species:</a>	7

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

<a href="#">Commonwealth Lands:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	10
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None
<a href="#">Habitat Critical to the Survival of Marine Turtles:</a>	None

## Extra Information

This part of the report provides information that may also be relevant to the area you have

<a href="#">State and Territory Reserves:</a>	None
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">EPBC Act Referrals:</a>	4
<a href="#">Key Ecological Features (Marine):</a>	None
<a href="#">Biologically Important Areas:</a>	None
<a href="#">Bioregional Assessments:</a>	None
<a href="#">Geological and Bioregional Assessments:</a>	None

# Details

## Matters of National Environmental Significance

### Listed Threatened Species

[\[ Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.  
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
<b>BIRD</b>			
<a href="#">Aphelocephala leucopsis</a> Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
<a href="#">Falco hypoleucos</a> Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
<a href="#">Pezoporus occidentalis</a> Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
<b>REPTILE</b>			
<a href="#">Egernia stokesii badia</a> Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat likely to occur within area	In buffer area only

### SPIDER

Scientific Name	Threatened Category	Presence Text	Buffer Status
-----------------	---------------------	---------------	---------------

[Idiosoma nigrum](#)

Shield-backed Trapdoor Spider, Black  
Rugose Trapdoor Spider [66798]

Vulnerable

Species or species  
habitat known to  
occur within area

In feature area

### Listed Migratory Species

[\[ Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text	Buffer Status
-----------------	---------------------	---------------	---------------

#### Migratory Marine Birds

[Apus pacificus](#)

Fork-tailed Swift [678]

Species or species  
habitat likely to occur  
within area

In buffer area only

#### Migratory Terrestrial Species

[Motacilla cinerea](#)

Grey Wagtail [642]

Species or species  
habitat may occur  
within area

In feature area

[Motacilla flava](#)

Yellow Wagtail [644]

Species or species  
habitat may occur  
within area

In feature area

#### Migratory Wetlands Species

[Actitis hypoleucos](#)

Common Sandpiper [59309]

Species or species  
habitat may occur  
within area

In feature area

[Calidris acuminata](#)

Sharp-tailed Sandpiper [874]

Vulnerable

Species or species  
habitat may occur  
within area

In feature area

[Calidris ferruginea](#)

Curlew Sandpiper [856]

Critically Endangered

Species or species  
habitat may occur  
within area

In feature area

[Calidris melanotos](#)

Pectoral Sandpiper [858]

Species or species  
habitat may occur  
within area

In feature area

## Other Matters Protected by the EPBC Act

### Listed Marine Species [\[ Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text	Buffer Status
-----------------	---------------------	---------------	---------------

Bird

Scientific Name	Threatened Category	Presence Text	Buffer Status
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In buffer area only
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Chalcites osculans as Chrysococcyx osculans</a> Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
<a href="#">Thinornis cucullatus as Thinornis rubricollis</a> Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In buffer area only

## Extra Information

### EPBC Act Referrals [ [Resource Information](#) ]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
<b>Controlled action</b>				
<a href="#">Oakajee Rail Development</a>	2010/5500	Controlled Action	Post-Approval	In feature area
<b>Not controlled action</b>				
<a href="#">Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia</a>	2015/7522	Not Controlled Action	Completed	In feature area
<a href="#">Jack Hills Expansion Project</a>	2011/5853	Not Controlled Action	Completed	In buffer area only
<a href="#">Weld Range Iron Ore Project</a>	2011/6030	Not Controlled Action	Completed	In feature area

# Caveat

## 1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

## 2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

## 3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

## 4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.



# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

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Department of Climate Change, Energy, the Environment and Water

GPO Box 3090

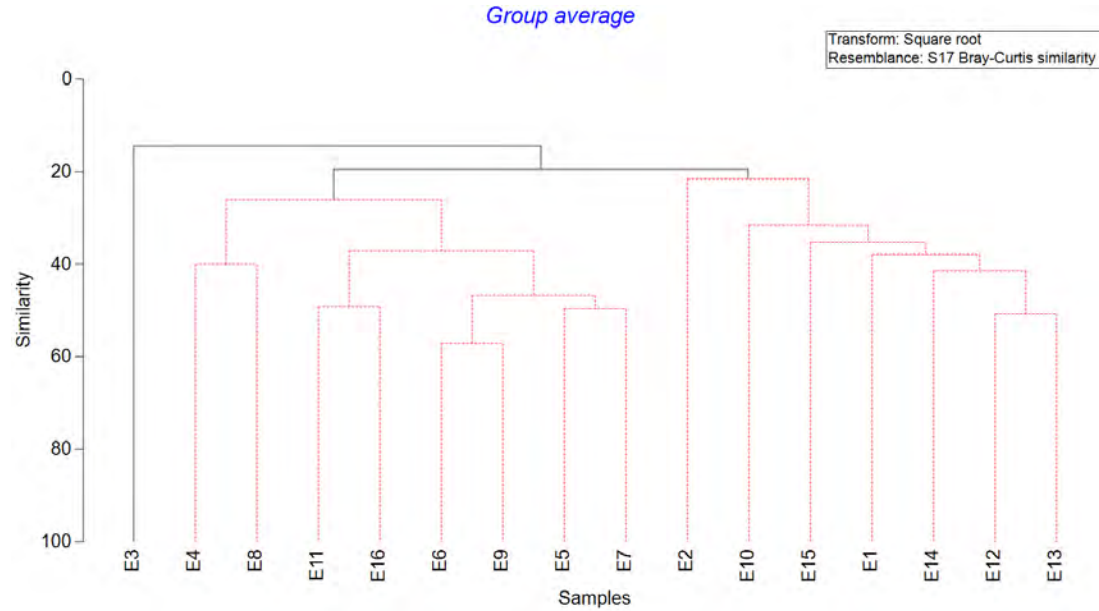
Canberra ACT 2601 Australia

+61 2 6274 1111

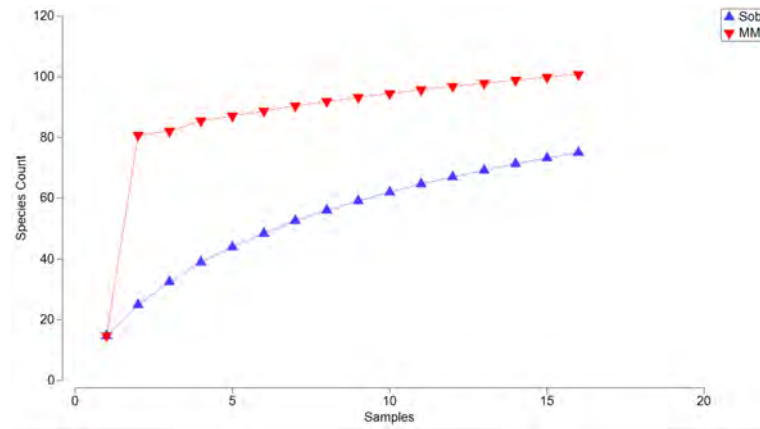
## **APPENDIX C: DETAILED FLORA AND VEGETATION SURVEY SITES**

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Beebyn 11 Weld Range -Detailed Flora and Vegetation Survey  
 Appendix C – Detailed Flora and Vegetation Sites





**Figure C-1. Dendrogram resulting from the cluster analysis of detailed vegetation sites**





**Figure C-2. Species accumulation curve. Sobs=Sample observations; MM= Michaelis Menton modelled richness**

Beebyn 11 Weld Range -Detailed Flora and Vegetation Survey  
Appendix C – Detailed Flora and Vegetation Sites

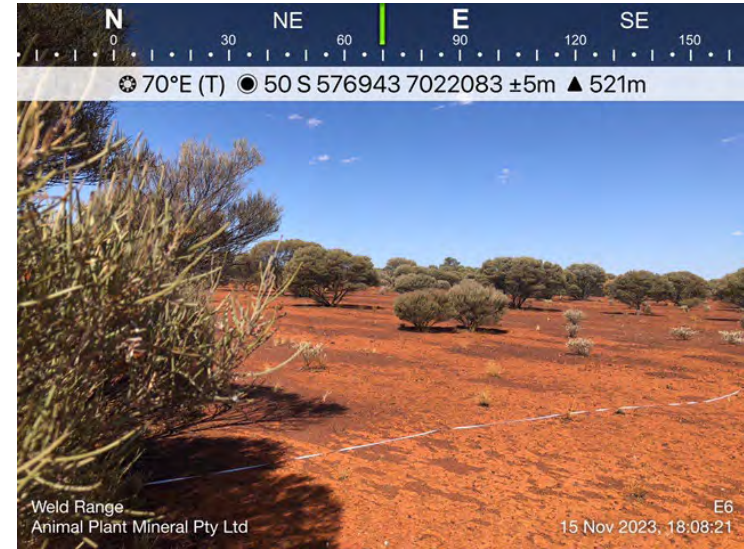
Site: E1				Site: E2			
WP-NW-(E) 583661 (N) 7026955				WP-NW-(E) 582754 (N) 7027066			
Date: 15/11/2023 WP-NE-(E) 583679 (N) 7026952				Date: 15/11/2023 WP-NE-(E) 582767 (N) 7027053			
Botanist: EH WP-SE-(E) 583679 (N) 7026937				Botanist: EH WP-SE-(E) 582758 (N) 7027036			
Site Type / Size: Quadrat, 20 x 20 m WP-SW-(E) 583660 (N) 7026936				Site Type / Size: Quadrat, 20 x 20 m WP-SW-(E) 582744 (N) 7027050			
 <p>143°SE (T) ● 50 S 583664 7026954 ±5m ▲ 502m</p> <p>Weld Range Animal Plant Mineral Pty Ltd 15 Nov 2023, 06:36:28</p>				 <p>50°NE (T) ● 50 S 582741 7027045 ±5m ▲ 544m</p> <p>Weld Range Animal Plant Mineral Pty Ltd 15 Nov 2023, 09:00:35</p>			
<b>Seasonal Conditions:</b>		Dry - rain 2 days ago <5mm. Soil is dry		<b>Age Since Last Fire:</b>		>10 years	
<b>Soil Type:</b>		Clay loam with gravel		<b>Soil Colour:</b>		Red	
<b>Surface Rocks Size/Shape:</b>		2-5cm		<b>Surface Rock Cover (%):</b>		1%	
<b>Rock Type:</b>		Ironstone					
<b>Landform</b>		Plain					
<b>Slope aspect</b>		Very gentle slope to south, range to north					
<b>Vegetation Description</b>		A. aneura low open woodland, E. forrestii mid open shrubland, sparse tussock grasses					
<b>Condition</b>		Good					
<b>Disturbances</b>		Grazing, cow and goat high intensity, occasional tracks and fences					
<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>				
<b>Overstorey</b>	4.5	10	<i>A.aneura, Acacia craspedocarpa</i>				
<b>Midstorey</b>	1.1	10	<i>E. forrestii ssp. forrestii, Exocarpos aphyllus</i>				
<b>Understorey</b>	0.3	0.1					
<b>Conservation Significant Flora:</b> none							
<b>Seasonal Conditions:</b>		Dry - recent low rain Dry soil		<b>Age Since Last Fire:</b>		>10 years	
<b>Soil Type:</b>		Sandy clay loam		<b>Soil Colour:</b>		Light red	
<b>Surface Rocks Size/Shape:</b>		40-100cm/blocky		<b>Surface Rock Cover (%):</b>		95%	
<b>Rock Type:</b>		Ironstone					
<b>Landform</b>		Crest of BIF ridge					
<b>Slope aspect</b>		Crest					
<b>Vegetation Description</b>		Sparse tall shrubland A. aneura. Open low shrubland					
<b>Condition</b>		Good					
<b>Disturbances</b>		Moderate to heavy goat grazing, frequent tracks and clearing					
<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>				
<b>Overstorey</b>	3.5	0.5	<i>A. aneura, A. pruinocarpa</i>				
<b>Midstorey</b>	2.2	5	<i>A. aneura, Thyrtomene decussata</i>				
<b>Understorey</b>	0.6	20	<i>Ptilotus obovatus, Dodonaea pachyneura</i>				
<b>Conservation Significant Flora:</b> none							

Beebyn 11 Weld Range -Detailed Flora and Vegetation Survey  
Appendix C – Detailed Flora and Vegetation Sites

Site:	WP-NW-(E)	(N)	Site:	WP-NW-(E)	(N)		
E3	583087	7027232	E4	583087	7026640		
Date: 15/11/2023	WP-NE-(E) 583105	(N) 7027240	Date: 15/11/2023	WP-NE-(E) 583104	(N) 7026650		
Botanist: EH	WP-SE-(E) 583109	(N) 7027221	Botanist: EH	WP-SE-(E) 583115	(N) 7026630		
Site Type / Size: Quadrat, 20 x 20 m	WP-SW-(E) 583090	(N) 7027213	Site Type / Size: Quadrat, 20 x 20 m	WP-SW-(E) 583096	(N) 7026624		
							
<b>Seasonal Conditions:</b>	Dry	<b>Age Since Last Fire:</b>	>10 years	<b>Seasonal Conditions:</b>	Dry	<b>Age Since Last Fire:</b>	>10 years
<b>Soil Type:</b>	Sandy clay loam	<b>Soil Colour:</b>	Light red	<b>Soil Type:</b>	Clay loam with gravel	<b>Soil Colour:</b>	Red brown
<b>Surface Rocks Size/Shape:</b>	20-50cm blocky	<b>Surface Rock Cover (%):</b>	70%	<b>Surface Rocks Size/Shape:</b>	1-2cm	<b>Surface Rock Cover (%):</b>	1%
<b>Rock Type:</b>	Ironstone			<b>Rock Type:</b>	Ironstone		
<b>Landform</b>	Midslope			<b>Landform</b>	Plain		
<b>Slope aspect</b>	South			<b>Slope aspect</b>	Very gentle to south		
<b>Vegetation Description</b>	Tall open shrubland, sparse mid shrubland			<b>Vegetation Description</b>	Isolated snakewood, low woodland, A. aneura tall open shrubland		
<b>Condition</b>	Good			<b>Condition</b>	Good		
<b>Disturbances</b>	Moderate to heavy goat grazing, exploration clearing frequent			<b>Disturbances</b>	Heavy grazing, occasional tracks, many senesced shrubs		
<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>	<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>
<b>Overstorey</b>	2.7	5	<i>A.aneura</i>	<b>Overstorey</b>	10	1	<i>Acacia pruinocarpa</i>
<b>Midstorey</b>	1.1	1	<i>Eremophila latrobei ssp. latrobei</i>	<b>Midstorey</b>	3	15	<i>Acacia aneura, A sibina</i>
<b>Understorey</b>	0.3	2	<i>Maireana villosa, Ptilotus obovatus, Aristida holathera</i>	<b>Understorey</b>	1	1	<i>Eremophila forrestii ssp. forrestii</i>
<b>Conservation Significant Flora:</b> none				<b>Conservation Significant Flora:</b> none			

Beebyn 11 Weld Range -Detailed Flora and Vegetation Survey  
Appendix C – Detailed Flora and Vegetation Sites


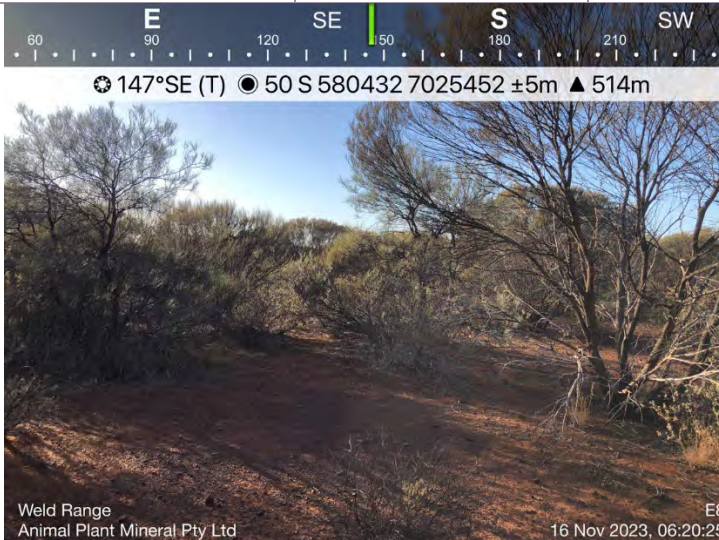
<b>Site:</b> E5	<b>WP-NW-(E)</b> 575901	<b>(N)</b> 7021026	<b>Site:</b> E6	<b>WP-NW-(E)</b> 576962	<b>(N)</b> 7022100
<b>Date:</b> 15/11/2023	<b>WP-NE-(E)</b> 575856	<b>(N)</b> 7021028	<b>Date:</b> 15/11/2023	<b>WP-NE-(E)</b> 576977	<b>(N)</b> 7022085
<b>Botanist:</b> EH	<b>WP-SE-(E)</b> 575855	<b>(N)</b> 7021008	<b>Botanist:</b> EH	<b>WP-SE-(E)</b> 576963	<b>(N)</b> 7022069
<b>Site Type / Size:</b> Quadrat, 20 x 20 m	<b>WP-SW-(E)</b> 575833	<b>(N)</b> 7021009	<b>Site Type / Size:</b> Quadrat, 20 x 20 m	<b>WP-SW-(E)</b> 576948	<b>(N)</b> 7022082



<b>Seasonal Conditions:</b>	Dry	<b>Age Since Last Fire:</b>	>10 years
<b>Soil Type:</b>	Clay loam with gravel	<b>Soil Colour:</b>	Red brown
<b>Surface Rocks Size/Shape:</b>	2-5cm angular	<b>Surface Rock Cover (%):</b>	25%
<b>Rock Type:</b>	Ironstone		
<b>Landform</b>	Plain		
<b>Slope aspect</b>	Very gentle to south		
<b>Vegetation Description</b>	Tall sparse shrubland, low sparse shrubland, isolated tussock grasses		
<b>Condition</b>	Good		
<b>Disturbances</b>	Occasional tracks, moderate grazing, sheet erosion		
<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>
<b>Overstorey</b>	2.5	5	<i>A.aneura</i>
<b>Midstorey</b>	0.4	1	<i>Eremophila punicea</i>
<b>Understorey</b>	0.15	0.1	<i>Aristida holathera</i>
<b>Conservation Significant Flora:</b> none			

<b>Seasonal Conditions:</b>	Dry	<b>Age Since Last Fire:</b>	>10 years
<b>Soil Type:</b>	Clay loam with gravel	<b>Soil Colour:</b>	Red brown
<b>Surface Rocks Size/Shape:</b>	2-5cm	<b>Surface Rock Cover (%):</b>	20%
<b>Rock Type:</b>	Ironstone		
<b>Landform</b>	Plain		
<b>Slope aspect</b>	Very gentle to south		
<b>Vegetation Description</b>	Sparse tall shrubland, sparse low shrubland, isolated tussock grasses		
<b>Condition</b>	Good		
<b>Disturbances</b>	Moderate to high grazing intensity, sheet erosion		
<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>
<b>Overstorey</b>	2.5	2	<i>A. aneura</i> , <i>A. sclerosperma</i> , <i>A. aneura wider leaf</i>
<b>Midstorey</b>	0.45	0.5	<i>Eremophila punicea</i>
<b>Understorey</b>	0.2	0.2	<i>Aristida holathera</i> , <i>Ptilotus schwartzii</i>
<b>Conservation Significant Flora:</b> none			

Beebyn 11 Weld Range -Detailed Flora and Vegetation Survey  
Appendix C – Detailed Flora and Vegetation Sites

Site: E7	WP-NW-(E) 577136	(N) 7023624	Site: E8	WP-NW-(E) 580433	(N) 7025448		
Date: 15/11/2023	WP-NE-(E) 577158	(N) 7023640	Date: 16/11/2023	WP-NE-(E) 580452	(N) 7025448		
Botanist: EH	WP-SE-(E) 577169	(N) 7023623	Botanist: EH	WP-SE-(E) 580448	(N) 7025428		
Site Type / Size: Quadrat, 20 x 20 m	WP-SW-(E) 577156	(N) 7023605	Site Type / Size: Quadrat, 20 x 20 m	WP-SW-(E) 580430	(N) 7025433		
							
<b>Seasonal Conditions:</b>	Dry	<b>Age Since Last Fire:</b>	>10 years	<b>Seasonal Conditions:</b>	Dry - recent low rain Dry soil	<b>Age Since Last Fire:</b>	>10 years
<b>Soil Type:</b>	Clay loam with gravel	<b>Soil Colour:</b>	Red brown	<b>Soil Type:</b>	Clay loam with gravel	<b>Soil Colour:</b>	Red brown
<b>Surface Rocks Size/Shape:</b>	2-7cm blocky	<b>Surface Rock Cover (%):</b>	25%	<b>Surface Rocks Size/Shape:</b>	2-5cm blocky	<b>Surface Rock Cover (%):</b>	5%
<b>Rock Type:</b>	Ironstone			<b>Rock Type:</b>	Ironstone		
<b>Landform</b>	Plain			<b>Landform</b>	Plain		
<b>Slope aspect</b>	Very gentle to south			<b>Slope aspect</b>	Very gentle to south		
<b>Vegetation Description</b>	Sparse mid shrubland, sparse low shrub			<b>Vegetation Description</b>	Tall open shrubland <i>A.aneura</i> , <i>G.striata</i> , <i>A. silvery</i> . Mid shrubland <i>A. assimilis</i> , <i>Eremophila forrestii</i> , Isolated tussock grasses		
<b>Condition</b>	Good			<b>Condition</b>	Good		
<b>Disturbances</b>	Moderate to heavy grazing. Sheet erosion, occasional tracks.			<b>Disturbances</b>	Moderate grazing, occasional tracks		
<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>	<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>
<b>Overstorey</b>	0	0	<i>Acacia aneura</i> <i>Acacia mulganeura</i>	<b>Overstorey</b>	4	10	<i>A. aneura</i> , <i>G. obliquistigma</i>
<b>Midstorey</b>	1.6	1	<i>Eremophila punicea</i> , <i>E. latrobei</i> subsp. <i>latrobei</i>	<b>Midstorey</b>	2.2	5	<i>A.assimilis</i> , <i>E. forrestii</i>
<b>Understorey</b>	0.3	0.5	<i>Ptilotus obovatus</i> , <i>Aristida holathera</i> , <i>Swainsona purpurea</i>	<b>Understorey</b>	0.6	20	<i>Ptilotus calostachyus</i> , <i>Eriachne pulchella</i> , <i>Eragrostis eriopoda</i>
<b>Conservation Significant Flora:</b> none				<b>Conservation Significant Flora:</b> none			



Beebyn 11 Weld Range -Detailed Flora and Vegetation Survey  
Appendix C – Detailed Flora and Vegetation Sites

<b>Site:</b> E9	<b>WP-NW-(E)</b> 581443	<b>(N)</b> 7025809	<b>Site:</b> E10	<b>WP-NW-(E)</b> 582029	<b>(N)</b> 7025941		
<b>Date:</b> 16/11/2023	<b>WP-NE-(E)</b> 581463	<b>(N)</b> 7025806	<b>Date:</b> 16/11/2023	<b>WP-NE-(E)</b> 582055	<b>(N)</b> 7025936		
<b>Botanist:</b> EH	<b>WP-SE-(E)</b> 581463	<b>(N)</b> 7025783	<b>Botanist:</b> EH	<b>WP-SE-(E)</b> 582047	<b>(N)</b> 7025919		
<b>Site Type / Size:</b> Quadrat, 20 x 20 m	<b>WP-SW-(E)</b> 581440	<b>(N)</b> 7025785	<b>Site Type / Size:</b> Quadrat, 20 x 20 m	<b>WP-SW-(E)</b> 582029	<b>(N)</b> 7025919		
<b>Seasonal Conditions:</b>	Dry	<b>Age Since Last Fire:</b>	>10 years	<b>Seasonal Conditions:</b>	Dry	<b>Age Since Last Fire:</b>	>10 years
<b>Soil Type:</b>	Clay loam	<b>Soil Colour:</b>	Red brown	<b>Soil Type:</b>	Clay loam with gravel	<b>Soil Colour:</b>	Red brown
<b>Surface Rocks Size/Shape:</b>	2-5cm blocky	<b>Surface Rock Cover (%):</b>	2%	<b>Surface Rocks Size/Shape:</b>	2-3cm	<b>Surface Rock Cover (%):</b>	1%
<b>Rock Type:</b>	Ironstone			<b>Rock Type:</b>	Ironstone		
<b>Landform</b>	Plain			<b>Landform</b>	Plain		
<b>Slope aspect</b>	Very gentle to south			<b>Slope aspect</b>	Very gentle to south		
<b>Vegetation Description</b>	Sparse tall shrubland, sparse low shrubland, isolated tussock grasses			<b>Vegetation Description</b>	Tall open shrubland, Mid sparse shrubland, Isolated tussock grasses		
<b>Condition</b>	Good			<b>Condition</b>	Good		
<b>Disturbances</b>	Moderate grazing, occasional tracks			<b>Disturbances</b>	Heavy grazing, occasional tracks		
<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>	<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>
<b>Overstorey</b>	4	5	<i>A. aneura</i>	<b>Overstorey</b>	3	40	<i>A. aneura, Grevillea obliquistigma, Acacia ramulosa var linophylla</i>
<b>Midstorey</b>	0.4	2.5	<i>E. forestii subsp. forestii, E. punicea</i>	<b>Midstorey</b>	1	10	<i>Ptilotus obovatus, E. forrestii, Rhagodia eremaea</i>
<b>Understorey</b>	0.3	1	<i>Ptilotus obovatus, Marieana villosa, ?Swainsona purpurea</i>	<b>Understorey</b>	0.3	1	<i>Eragrostis eriopoda, Ptilotus calostachyus, Eriachne pulchella</i>
<b>Conservation Significant Flora:</b> none				<b>Conservation Significant Flora:</b> none			

Beebyn 11 Weld Range -Detailed Flora and Vegetation Survey  
Appendix C – Detailed Flora and Vegetation Sites

<b>Site:</b> E11	<b>WP-NW-(E)</b> 578232	<b>(N)</b> 7024708	<b>Site:</b> E12	<b>WP-NW-(E)</b> 579038	<b>(N)</b> 7025138
<b>Date:</b> 16/11/2023	<b>WP-NE-(E)</b> 578255	<b>(N)</b> 7024714	<b>Date:</b> 16/11/2023	<b>WP-NE-(E)</b> 579051	<b>(N)</b> 7025147
<b>Botanist:</b> EH	<b>WP-SE-(E)</b> 578264	<b>(N)</b> 7024688	<b>Botanist:</b> EH	<b>WP-SE-(E)</b> 579064	<b>(N)</b> 7025136
<b>Site Type / Size:</b> Quadrat, 20 x 20 m	<b>WP-SW-(E)</b> 578248	<b>(N)</b> 7024673	<b>Site Type / Size:</b> Quadrat, 20 x 20 m	<b>WP-SW-(E)</b> 579048	<b>(N)</b> 7025125


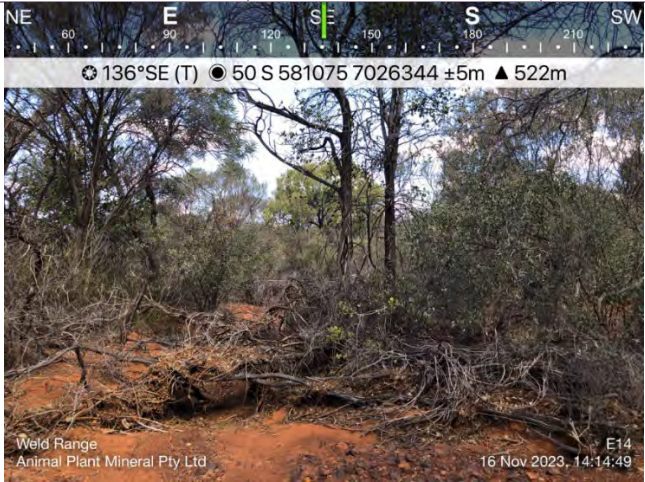
  

<p>☀️ 109°E (T) 📍 50 S 578228 7024702 ±5m ▲ 523m</p>		<p>☀️ 70°E (T) 📍 50 S 579029 7025134 ±5m ▲ 537m</p>	
<p>Weld Range Animal Plant Mineral Pty Ltd</p>		<p>Weld Range Animal Plant Mineral Pty Ltd</p>	
<p>E11 16 Nov 2023, 10:07:39</p>		<p>E12 16 Nov 2023, 11:07:24</p>	

<b>Seasonal Conditions:</b>	Dry	<b>Age Since Last Fire:</b>	>10 years	<b>Seasonal Conditions:</b>	Dry	<b>Age Since Last Fire:</b>	>10 years
<b>Soil Type:</b>	Clay loam with gravel	<b>Soil Colour:</b>	Red brown	<b>Soil Type:</b>	Clay loam with gravel	<b>Soil Colour:</b>	Red brown
<b>Surface Rocks Size/Shape:</b>	3-10cm blocky	<b>Surface Rock Cover (%):</b>	5%	<b>Surface Rocks Size/Shape:</b>	2-10cm	<b>Surface Rock Cover (%):</b>	5%
<b>Rock Type:</b>	Ironstone			<b>Rock Type:</b>	Ironstone		
<b>Landform</b>	Plain			<b>Landform</b>	Upper plain/lower slope		
<b>Slope aspect</b>	Very gentle southerly slope			<b>Slope aspect</b>	Gentle southerly slope		
<b>Vegetation Description</b>	Tall sparse shrubland, Mid sparse shrubland, Isolated tussock grasses			<b>Vegetation Description</b>	Isolated low trees, tall open shrubland, mid open shrubland		
<b>Condition</b>	Good			<b>Condition</b>	Good		
<b>Disturbances</b>	Heavy grazing occasional tracks			<b>Disturbances</b>	Heavy grazing		
<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>	<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>
<b>Overstorey</b>	3.5	6	<i>A. aneura</i> , <i>A. ramulosa</i> var <i>linophylla</i>	<b>Overstorey</b>	10	2	<i>Acacia pruinocarpa</i>
<b>Midstorey</b>	0.9	0.5	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Psydrax l</i>	<b>Midstorey</b>	2.5	12	<i>Acacia ramulosa</i> var <i>linophylla</i> , <i>A. aneura</i>
<b>Understorey</b>	0.3	0.5	? <i>Swainsona atropurpurea</i> , <i>Eragrostis eriopoda</i> , <i>Ptilotus exaltatus</i>	<b>Understorey</b>	1.2	15	<i>Eremophila forrestii</i> subsp <i>forrestii</i>
<b>Conservation Significant Flora:</b> none				<b>Conservation Significant Flora:</b> none			

Beebyn 11 Weld Range -Detailed Flora and Vegetation Survey  
Appendix C – Detailed Flora and Vegetation Sites

<b>Site:</b> E13				<b>WP-NW-(E)</b> 579751		<b>(N)</b> 7025768		<b>Site:</b> E14				<b>WP-NW-(E)</b> 581063		<b>(N)</b> 7026343					
<b>Date:</b> 16/11/2023				<b>WP-NE-(E)</b> 579768		<b>(N)</b> 7025761		<b>Date:</b> 16/11/2023				<b>WP-NE-(E)</b> 581076		<b>(N)</b> 7026352					
<b>Botanist:</b> EH				<b>WP-SE-(E)</b> 579752		<b>(N)</b> 7025741		<b>Botanist:</b> EH				<b>WP-SE-(E)</b> 581083		<b>(N)</b> 7026339					
<b>Site Type / Size:</b> Quadrat, 20 x 20 m				<b>WP-SW-(E)</b> 579738		<b>(N)</b> 7025755		<b>Site Type / Size:</b> Quadrat, 20 x 20 m				<b>WP-SW-(E)</b> 581076		<b>(N)</b> 7026330					
																			
<b>Seasonal Conditions:</b>				Dry		<b>Age Since Last Fire:</b>		>10 years		<b>Seasonal Conditions:</b>				Dry		<b>Age Since Last Fire:</b>		>10 years	
<b>Soil Type:</b>				Sandy gravel/clay loam		<b>Soil Colour:</b>		Red brown		<b>Soil Type:</b>				Sandy gravel/clay loam		<b>Soil Colour:</b>		Red brown	
<b>Surface Rocks Size/Shape:</b>				5-20cm blocky ironstones, rounded granite		<b>Surface Rock Cover (%):</b>		30%		<b>Surface Rocks Size/Shape:</b>				5-20cm		<b>Surface Rock Cover (%):</b>		30%	
<b>Rock Type:</b>				Ironstone and granite		<b>Rock Type:</b>				Ironstone									
<b>Landform</b>				Ephemeral creek		<b>Landform</b>				Ephemeral creek									
<b>Slope aspect</b>				Gentle slope to south		<b>Slope aspect</b>				Gentle slope to south									
<b>Vegetation Description</b>				Low open woodland, mid shrubland, isolated tussock grassland		<b>Vegetation Description</b>				Low open woodland, mid shrubland, isolated tussock grasses									
<b>Condition</b>				Good		<b>Condition</b>				Good									
<b>Disturbances</b>				Moderate to heavy grazing, frequent clearing		<b>Disturbances</b>				Moderate to heavy grazing, frequent clearing									
<b>Strata</b>		<b>Height (m)</b>		<b>Cover (%)</b>		<b>Species</b>		<b>Strata</b>		<b>Height (m)</b>		<b>Cover (%)</b>		<b>Species</b>					
<b>Overstorey</b>		6		15		<i>A. aneura</i> , <i>A. ramulosa</i> var <i>linophylla</i> , <i>A. pruinocarpa</i>		<b>Overstorey</b>		6		15		<i>A. aneura</i> , <i>A. pruinocarpa</i> , <i>A. mulganeura</i>					
<b>Midstorey</b>		1.5		20		<i>E. forrestii</i> ssp. <i>forrestii</i> , <i>E. latrobei</i> ssp. <i>latrobei</i> , <i>E. eriocalyx</i>		<b>Midstorey</b>		1.5		20		<i>E. latrobei</i> ssp. <i>latrobei</i> , <i>E. forrestii</i> ssp. <i>forrestii</i> , <i>E. georgei</i>					
<b>Understorey</b>		0.4		10		<i>Aristida contorta</i> , <i>Cymbopogon ambiguus</i> , <i>Euploca ovalifolia</i>		<b>Understorey</b>		0.4		<1		<i>Gastrolobium laytonii</i> , <i>Cymbopogon ambiguus</i> , <i>Eragrostis eriopoda</i>					
<b>Conservation Significant Flora:</b> none								<b>Conservation Significant Flora:</b> <i>Hibiscus ?krichauffianus</i> (P3)											

Beebyn 11 Weld Range -Detailed Flora and Vegetation Survey  
Appendix C – Detailed Flora and Vegetation Sites

<b>Site:</b> E15	<b>WP-NW-(E)</b> 571896	<b>(N)</b> 7019071	<b>Site:</b> E16	<b>WP-NW-(E)</b> 570143	<b>(N)</b> 7018629		
<b>Date:</b> 16/11/2023	<b>WP-NE-(E)</b> 571912	<b>(N)</b> 7019071	<b>Date:</b> 16/11/2023	<b>WP-NE-(E)</b> 570169	<b>(N)</b> 7028626		
<b>Botanist:</b> EH	<b>WP-SE-(E)</b> 571915	<b>(N)</b> 7019052	<b>Botanist:</b> EH	<b>WP-SE-(E)</b> 570165	<b>(N)</b> 7018601		
<b>Site Type / Size:</b> Quadrat, 20 x 20 m	<b>WP-SW-(E)</b> 571891	<b>(N)</b> 7019052	<b>Site Type / Size:</b> Quadrat, 20 x 20 m	<b>WP-SW-(E)</b> 570150	<b>(N)</b> 7018605		
<b>Seasonal Conditions:</b>	Dry	<b>Age Since Last Fire:</b>	>10 years	<b>Seasonal Conditions:</b>	Dry	<b>Age Since Last Fire:</b>	>10 years
<b>Soil Type:</b>	Clay loam	<b>Soil Colour:</b>	Red brown	<b>Soil Type:</b>	Clay loam	<b>Soil Colour:</b>	Red brown
<b>Surface Rocks Size/Shape:</b>	2-10cm blocky	<b>Surface Rock Cover (%):</b>	3%	<b>Surface Rocks Size/Shape:</b>	2-10cm blocky	<b>Surface Rock Cover (%):</b>	2%
<b>Rock Type:</b>	Ironstone			<b>Rock Type:</b>	Ironstone		
<b>Landform</b>	Drainage or plain			<b>Landform</b>	Plain		
<b>Slope aspect</b>	Very gently to south			<b>Slope aspect</b>	Very gently to south		
<b>Vegetation Description</b>	Isolated mid trees, tall open shrubland, mid open shrubland			<b>Vegetation Description</b>	Sparse tall shrubland, sparse mid shrubland, isolated tussock grasses		
<b>Condition</b>	Good			<b>Condition</b>	Good		
<b>Disturbances</b>	Moderate grazing			<b>Disturbances</b>			
<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>	<b>Strata</b>	<b>Height (m)</b>	<b>Cover (%)</b>	<b>Species</b>
<b>Overstorey</b>	15	5	<i>Acacia pruinocarpa</i>	<b>Overstorey</b>	3	3	<i>A. aneura</i>
<b>Midstorey</b>	4	20	<i>A. aneura</i>	<b>Midstorey</b>	0.4	1	<i>E. punicea</i>
<b>Understorey</b>	1	20	<i>Eremophila latrobei</i> , <i>E. georgei</i> , <i>Sida calyxhymenia</i>	<b>Understorey</b>	0.5	0.5	<i>Eragrostis eriopoda</i>
<b>Conservation Significant Flora:</b> none				<b>Conservation Significant Flora:</b> none			

## **APPENDIX D: SPECIES BY SITE MATRIX - FLORA**

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Biological Survey - Beebyn 11 - Weld Range  
Appendix D - Flora Species by Site

Species	Status	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15	E16	Op Col
<b>Acanthaceae</b>																		
<i>Harnieria kempeana</i>	NT				0.1													
<b>Amaranthaceae</b>																		
<i>Ptilotus roei</i>	NT							0.01	0.1			0.1					0.05	
<i>Ptilotus exaltatus</i>	NT											0.5		0.1			0.1	x
<i>Ptilotus ?calostachyus</i>	NT					0.01												
<i>Ptilotus obovatus</i>	NT	1	10	0.3				0.2		1	1	0.1	1	1		2		
<i>Ptilotus rotundifolius</i>	NT			0.1							0.1							
<i>Ptilotus schwartzii</i>	NT			0.05			0.1		1	0.1	0.1				0.1			x
<b>Apocynaceae</b>																		
<i>Cynanchum floribundum</i>	NT										0.01			0.1		0.1		
<b>Asteraceae</b>																		
<i>Cephalopterum drummondii</i>	NT								0.01					0.4				x
<i>Pluchea dentex</i>	NT													0.1			0.1	x
<b>Boraginaceae</b>																		
<i>Euploca ovalifolia</i>	NT													2				
<b>Brassicaceae</b>																		
<i>Lepidium oxytrichum</i>	NT			0.01														
<i>Stenopetalum filifolium</i>	NT							0.1			0.1			1				
<b>Chenopodiaceae</b>																		
<i>Dysphania rhadinostachya</i>	NT		0.5															
<i>Enchylaena tomentosa</i>	NT											0.02				0.5		
<i>Eriochiton sclerolaenoides</i>	NT				0.01	0.1	0.1			0.05	0.01	0.1				1.1		
<i>Maireana villosa</i>	NT	0.1	0.01	1	0.1					0.6		0.02						x
<i>Rhagodia eremaea</i>	NT										8							x
<i>Sclerolaena densiflora</i>	NT					0.01												
<b>Convolvulaceae</b>																		
<i>Duperreya commixta</i>	NT												0.01		0.01			
<b>Fabaceae</b>																		
<i>?Swainsona purpurea</i>	NT					0.1	0.1	0.1	0.1	0.1		0.5		0.3				
<i>Acacia aneura</i>	NT	0.1	0.5		8	0.6	2	0.5	5	5	24	4	5.1	10	3.2	10	3	
<i>Acacia craspedocarpa</i>	NT	2											0.1					

Appendix D - Flora Species by Site Matrix

<i>Acacia mulganeura</i>	NT						0.5					0.5		5			
<i>Acacia pruinocarpa</i>	NT	4	0.1		1								5	6	5		
<i>Acacia pteraneura</i>	NT	4															
<i>Acacia ramulosa var linophylla</i>	NT								5	2	6	5	0.2		0.5	x	
<i>Acacia rhodophloia</i>	NT															x	
<i>Acacia sclerosperma</i>	NT					0.3											
<i>Acacia sibina</i>	NT				6	0.5		15								x	
<i>Acacia tetragonophylla</i>	NT	0.1	0.1												0.2		
<i>Gastrolobium laytonii</i>	NT												3				
<i>Senna artemisioides ssp helmsii</i>	NT														0.1		
<i>Senna artemisioides ssp sturtii</i>	NT										1					x	
<i>Senna glutinosa ssp chatelainia</i>	NT		0.5								0.7						
<b>Goodeniaceae</b>																	
<i>Goodenia mimuloides</i>	NT		0.1		0.1												
<i>Goodenia tenuiloba</i>	NT									0.01		0.1					
<b>Lamiaceae</b>																	
<i>Dicrastylis ?sessilifolia</i>	NT		0.1														
<i>Teucrium teucriiflorum</i>	NT			0.01				0.01							1		
<b>Malvaceae</b>																	
<i>Abutilon cryptopetalum</i>	NT	0.1		0.1						0.1		0.1		1			
<i>Hibiscus ?krichauffianus</i>	P3												0.01				
<i>Sida calyxhymenia</i>	NT	0.11												5	0.01	x	
<i>Sida ectogama</i>	NT				0.01						0.01						
<i>Sida sp</i>	NT	0.01		0.01	0.05					0.01							
<b>Myrtaceae</b>																	
<i>Thryptomene decussata</i>	NT		4.5														
<b>Poaceae</b>																	
<i>Aristida contorta</i>	NT											5					
<i>Aristida holathera</i>	NT			0.2	0.1	0.1	0.1		0.01		0.02						
<i>Cymbopogon ambiguus</i>	NT											2	0.2				
<i>Eragrostis eriopoda</i>	NT	0.1			0.01	0.01	0.01	0.1	1	0.1	0.1	0.5	0.1	0.2		0.3	
<i>Eragrotis sp</i>													0.1		0.1		
<i>Eriachne ?mucronata</i>	NT		0.1											0.1	0.1	0.1	

Appendix D - Flora Species by Site Matrix

<i>Eriachne pulchella</i>	NT	0.01						0.1	0.01	0.1					0.1	0.1	
<i>Monachather paradoxus</i>	NT	0.05			0.01						0.02		0.2				
<i>Paspalidium clementii</i>	NT		0.01														
<i>Thyridolepis multiculmis</i>	NT														0.2		
<b>Proteaceae</b>																	
<i>Grevillea obliquistigma</i>	NT							5		10							
<b>Pteridaceae</b>																	
? <i>Cheilanthes</i>	NT			0.01											0.1		
<b>Rubiaceae</b>																	
<i>Psydrax latifolia</i>	NT	0.1	0.1	0.3						1		2.1	1	6	0.4		
<i>Psydrax suaveolens</i>	NT	0.01						0.5		0.1	0.1	0.02	0.1				
<b>Rutaceae</b>																	
<i>Philotheca brucei</i>	NT		1														
<b>Santalaceae</b>																	
<i>Exocarpos aphyllus</i>	NT	0.5															
<i>Santalum spicatum</i>	NT													2			
<b>Sapindaceae</b>																	
<i>Dodonaea pachyneura</i>	NT		1														
<b>Scrophulariaceae</b>																	
<i>Eremophila compacta</i>	NT									0.5							
<i>Eremophila eriocalyx</i>	NT												1				
<i>Eremophila foliosissima</i>	NT				0.1												
<i>Eremophila forrestii ssp forrestii</i>	NT	8						15	1		0.52	10	15	5	0.5		
<i>Eremophila georgei</i>	NT									0.2	0.02		0.1	0.1	5		x
<i>Eremophila glutinosa</i>	NT	0.3										0.2					
<i>Eremophila latrobei subsp. latrobei</i>	NT	0.2	5	0.5	0.1		0.05			0.5		0.1	1	5.1	5.5		
<i>Eremophila margarethae</i>	NT				0.3												
<i>Eremophila punicea</i>	NT				1	0.5	0.3		0.5							1	
<i>Eremophila serrulata</i>	NT	0.1										3	0.5				
<b>Solanaceae</b>																	
<i>Solanum lasiophyllum</i>	Mixed										0.01					0.1	x
Indet. climber															0.1		



## **APPENDIX E: FAUNA LIKELIHOOD OF OCCURRENCE ASSESSMENT - FAUNA**

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Species	Common Name	Conservation Code		Relevant Habitat Preference	Assessment of Occurrence
		BC Act	EPBC Act		
-- Birds --					
<i>Aphelocephala leucopsis</i>	Southern whiteface	-	VU	<p>Most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range (DCCEEW 2023b).</p> <p>Open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains (Higgins and Peter 2002).</p>	<p>Likely. 10 records within 15 km between 2001 and 2009. All habitats are suitable; however habitat quality is low due to lack of groundcover.</p>
<i>Apus pacificus</i>	Fork-tailed Swift	MI	MI	<p>Broadly distributed aerial species that is not specifically limited to any particular habitat type.</p> <p>Aerial: over open country, from semi-arid deserts to coasts, islands; sometimes over forests, cities (Pizzey and Knight, 2012).</p> <p>Occurs over dry or open habitats comprising of riparian woodland, low scrub, heathland, or saltmarsh, also grasslands and sandplains with spinifex (Morcombe, 2011).</p>	<p>Likely. Listed by the PMST as Likely to occur, but no records available within 30 km.</p> <p>This species is distributed across Australia. It is an aerial species that rarely comes to land. Individuals would not be specifically dependant on any habitats present in the Survey Area.</p>
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	MI	VU, MI	<p>Scarce to moderately common (much more plentiful near coasts than in interior) (Johnstone and Storr, 1998).</p> <p>Tidal mudflats, saltmarshes, mangroves; shallow fresh, brackish or saline inland wetlands; floodwaters, irrigated pastures and crops; sewage ponds, saltfields. Widespread summer migrant to coastal and inland Australia (Pizzey and Knight, 2012).</p>	<p>Unlikely. No suitable habitat.</p> <p>No records in the local area. PMST considers the species May occur.</p>
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	CR, MI	<p>Mainly shallows of estuaries and near-coastal saltlakes (including saltwork ponds) and drying near-coastal freshwater</p>	<p>Unlikely. No suitable habitat.</p>

Species	Common Name	Conservation Code		Relevant Habitat Preference	Assessment of Occurrence
		BC Act	EPBC Act		
				lakes and swamps. Also beaches and near-coastal sewage ponds (Johnstone and Storr, 1998) Tidal mudflats; saltmarsh, saltfields; fresh, brackish or saline wetlands; sewage ponds (Pizzey and Knight, 2012).	No records in the local area. PMST considers the species May occur.
<i>Calidris melanotos</i>	Pectoral Sandpiper	MI	MI	Mainly fresh waters (swamps, lagoons, river pools, irrigation channels and sewage ponds); also, samphire flats around estuaries and saltlakes (Johnstone and Storr, 1998). Shallow fresh waters, often with low grass or other herbage; swamp margins, flooded pastures, sewage ponds, occasionally tidal areas, saltmarshes (Pizzey and Knight, 2012).	Unlikely. No suitable habitat. No records in the local area. PMST considers the species May occur.
<i>Falco hypoleucos</i>	Grey Falcon	VU	VU	Mainly lightly wooded and coastal riverine flats (Johnstone and Storr, 1998). Lightly treed and inland plains; gibber deserts, sandridges, pastoral lands, timbered watercourses; seldom in driest deserts (Pizzey and Knight, 2012).	Possible. The Survey Area contains potentially suitable foraging habitat. No suitable nesting habitat is present or nearby. Listed by EPBC as May Occur in the feature area. No records occur on the DBCA database within 30 km, the ALA lists a few records within 50 km however they are undated and of low spatial accuracy.
<i>Falco peregrinus</i>	Peregrine Falcon	OS	-	Mainly about cliffs along coasts, rivers and ranges, and about wooded watercourses and lakes (Johnstone and Storr, 1998). Cliffs, gorges, timbered watercourses, environs of rivers, wetlands, plains, open woodlands, pylons, spires, buildings (Pizzey and Knight, 2012).	Possible. Habitats in the Weld Range are suitable. Two local records from 1979 and 2001. Foraging habitat present.
<i>Leipoa ocellata</i>	Malleefowl	VU	VU	Semi-arid to arid shrublands and low woodlands, especially those dominated by mallee and/or acacias. A sandy substrate and abundance of leaf litter are required for breeding.	Possible. PMST considers likely to occur, however species records are 50 km or more to the south, and groundcover/litter is sparse with clay soils so habitat

Species	Common Name	Conservation Code		Relevant Habitat Preference	Assessment of Occurrence
		BC Act	EPBC Act		
				Densities of the birds are generally greatest in areas of higher rainfall and on more fertile soils where habitats tend to be thicker and there is an abundance of food plants (Benshemesh, 2007).	quality poor for nest construction. Ecologia (2009) reported old inactive mounds present.
<i>Motacilla cinerea</i>	Grey Wagtail	MI	MI	<p>Mainly banks and rocks in fast-running fresh water habitats; rivers, creeks, streams and around waterfalls, both in forest and open country; but occurs almost anywhere during migration. Flits from rock to rock, and often enters water after insects (or performs flycatcher sallies after them) (Johnstone and Storr, 2004).</p> <p>In Australia, near running water in disused quarries; sandy, rocky streams in escarpments and rainforests; sewage ponds, ploughed fields, airfields (Pizzey and Knight, 2012).</p>	<p>Unlikely. No suitable habitat.</p> <p>No records in the local area. PMST considers the species May occur.</p>
<i>Motacilla flava</i>	Yellow Wagtail	MI	MI	Damp short-grass flats: rice stubbles and edge of swamps, sewage ponds, bore overflows, grazed or mowed grass and irrigated areas (Johnstone and Storr, 2004).	<p>Unlikely. No suitable habitat.</p> <p>No records in the local area. PMST considers the species May occur.</p>
<i>Pezoporus occidentalis</i>	Night Parrot	CR	EN	<p>Treeless or sparsely wooded spinifex <i>Triodia</i> spp. near water (including artesian bores) (Johnstone and Storr, 1998).</p> <p>Seeding spinifex on stony rises, breakaway country, sandy lowlands; shrubby glasswort, chenopods; succulents on flats around salt lakes; flooded claypans saltbush, bluebush, bassia associations (Pizzey and Knight, 2012).</p>	Unlikely. No local records. Habitat modelling includes the Survey Area at the extremity of the species potential extent and PMST list as May occur. Foraging resources are limited, no spinifex mounds are present.
-- Mammals --					
<i>Antechinomys longicaudata</i>	Long-tailed Dunnart	P4		A specialist rock dwelling species (Freeland <i>et al.</i> 1988). It prefers exposed rock and stony soils with hummock grasses	Present. Suitable habitat in the Banded Ironstone Ridge habitat and Drainage Lines between ridges.

Species	Common Name	Conservation Code		Relevant Habitat Preference	Assessment of Occurrence
		BC Act	EPBC Act		
				and shrubs, on flat-topped hills, lateritic plateaus, sandstone ranges and breakaways.	
<i>Dasyercus blythi</i>	Brush-tailed Mulgara	P4	-	Inhabits spinifex grasslands and burrows on the flats between low sand dunes (Van Dyck and Strahan, 2008).	Unlikely. No suitable habitat. The local record is a fossilised specimen described from Wilgie Mia (Baynes 1984).
<i>Leporillus conditor</i>	greater stick-nest rat	CD	VU	The Northern Quoll will usually den in hollow tree trunks (Hill and Ward, 2010) or in small caves and crevices in rocky outcrops.	Unlikely. The species is conservation dependent in WA. The local record is a fossilised specimen described from Wilgie Mia (Baynes 1984)..
<i>Macroderma gigas</i>	Ghost Bat	VU	VU	Their distribution is influenced by the availability of suitable caves and mines for roost sites (Churchill 2008). They prey on large insects, frogs, birds, lizards and small mammals including other bats. They swoop on their prey killing with powerful bites, then fly to a feeding site to eat (Australian Museum 2023).	Unlikely. The database record is a fossilised bat and a scat (Baynes 1984) of unreported age. The species is not known to persist in the Murchison.
<i>Macrotis lagotis</i>	Bilby	VU	VU	Occupy a variety of inland habitats including grass and stony downs country on cracking clays, desert sandplains and dune fields of laterite with hummock grassland and massive red earths with <i>Acacia</i> shrubland (Van Dyck and Strahan, 2008).	Unlikely. The local record has a low level of certainty and was recorded in 1984. Modelled current species distribution does not predict it to occur in the Survey Area (DCCEEW 2024b).
<i>Petrogale lateralis lateralis</i>	black-flanked rock-wallaby	EN	EN	Occur where suitable shelter and food co-exist. During the daytime they shelter under deep shade in rocky areas such as caves, cliffs, screes and rockpiles, and emerge at dusk to feed on grasses, forbs, shrubs and occasionally seeds and fruits. Feeding occurs as near to shelter as possible, especially where exotic predators are present (TSSC 2016).	Unlikely. Habitat at the Weld Range is likely suitable, however modelling of the current range of the species does not include the Survey Area. The local record is a fossilised specimen described from Wilgie Mia (Baynes 1984), and presence in the region is historic only.
<i>Pseudomys gouldii</i>	Gould's mouse, Shark Bay mouse	VU	VU	Current distribution restricted to offshore islands.	Unlikely. The current range of the species does not include the Survey Area. The local record is a fossilised specimen described from Wilgie Mia

Species	Common Name	Conservation Code		Relevant Habitat Preference	Assessment of Occurrence
		BC Act	EPBC Act		
					(Baynes 1984), and presence in the region is historic only.
-- Reptiles --					
<i>Egernia stokesii badia</i>	Western Spiny-tailed Skink	VU	EN	In the Murchison the black form inhabits rock crevices, predominantly in granite whalebacks and outcrops (Ecologia 2010).	Possible. Modelled as likely to occur in the buffer area only. Records 40 km to the west from 2006 and 2010. No granite outcrops are present but suitable habitat may be present in the BIF outcrops.
<i>Lerista eupoda</i>	West Coast mulga slider	P1		Restricted to the arid southern interior between Cue and Meekatharra, in open mulga on red loams and sandy loams (Smith 1996). Local records are in lower slopes/upper plain habitats, often near drainage lines.	Likely. Multiple records from nearby and suitable habitat is present in the lower slopes/upper plains habitat.
-- Invertebrates --					
<i>Idiosoma clypeatum</i>	northern shield-backed trapdoor spider	P3	-	Widespread in the Murchison and Yalgoo regions,	Present. The distribution of the population occurs across the length of the Weld Range, with the majority of individuals being concentrated at the northern end of the range.
<i>Idiosoma nigrum</i>	Shield-backed Trapdoor Spider		VU	Has a restricted distribution in the central and central-western Wheatbelt bioregion of south-western Australia (Rix et al 2018). Generally found in microhabitats associated with low-lying woodlands or bush vegetation (Main 2003).	Unlikely. The PMST considers that the species is known to occur in the feature area, however Rix et al (2018) taxonomic revision determine all specimens in the Murchison region to be <i>I. clypeatum</i>

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MARCH 2020



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**FENIX RESOURCES  
IRON RIDGE BIOLOGICAL SURVEY 2019**



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## EXECUTIVE SUMMARY

*ecologia* Environment (*ecologia*) was engaged by Fenix Resources Ltd. (Fenix) to conduct a detailed flora and vegetation survey and a Level 1 fauna and fauna habitat assessment, including a targeted survey for the Priority 3 listed *Idiosoma clypeatum* (northern shield-backed trapdoor spider), and a stygofauna survey to support environmental approvals for the proposed Iron Ridge Project over tenement M20/118 (the 'study area') located approximately 55 km northwest of Cue in the Murchison region. The current survey was conducted between the 2<sup>nd</sup> and 6<sup>th</sup> September 2019 and expands on a reconnaissance flora and fauna habitat survey conducted by *ecologia* in July 2019.

### Flora and Vegetation

A total of 171 vascular plant taxa (species, infraspecific taxa, and phrase names) representing 37 families and 93 genera were recorded from 24 sampling sites and additional opportunistic records within the study area. No EPBC Act (1999) or BC Act (2016) listed Threatened species were recorded, however, eight state listed Priority species were recorded, including *Acacia dilloniorum* (Priority 1), *Stenanthemum patens* (Priority 1), *Hemigenia virescens* (Priority 3), *Micromyrtus placoides* (Priority 3), *Prostanthera petrophila* (Priority 3), *Acacia speckii* (Priority 4), *Dodonaea amplisemina* (Priority 4), and *Grevillea inconspicua* (Priority 4). Of these species, *A. dilloniorum*, *S. patens*, *M. placoides*, *P. petrophila*, *A. speckii*, and *D. amplisemina* have been recorded from the proposed infrastructure development envelope. Three introduced plant species were recorded from the study area: *Cuscuta planifolia*, *Lysimachia arvensis*, and *Rostraria pumila*. No Weeds of National Significance (WONS) or Declared Pests were recorded.

Hierarchical cluster analysis was conducted using floristic data collected from 24 sampling sites surveyed within the study area. Based on this analysis, ten vegetation types were described and delineated. None of the vegetation types were assessed as corresponding to any National or State listed TEC, nor were any considered to be regionally significant based on available data. However, most vegetation types are associated with the Priority 1 PEC 'Weld Range vegetation complexes (banded ironstone formation)', the spatial extent of which is defined by the DBCA and includes a 500 m administrative buffer. Within the study area, 263.80 ha of vegetation occurs within the DBCA defined PEC boundary, of which 78.4 ha is within the proposed project infrastructure envelope, representing 0.3% of the total extent of the PEC. Five vegetation types may also be considered locally significant on the basis of supporting populations of Priority 1 listed species, having high overall species diversity, or being locally restricted.

Vegetation condition across most of the study area was assessed as Very Good to Excellent, with no or minimal weed invasion in most areas and only minor grazing impacts.

### Vertebrate Fauna

A Level 1 vertebrate fauna and fauna habitat assessment of the study area, including targeted searches for conservation significant fauna, was undertaken concurrently with detailed flora and vegetation survey. Fauna habitat assessments were undertaken at 12 sites to obtain representative examples of fauna habitats present. Four broad fauna habitats were identified, described and mapped within the study area. Habitats were generally assessed to be in Very Good to Excellent condition. The landforms, land systems and habitat types identified during the survey are considered locally common and the survey did not identify any restricted conservation significant vertebrate fauna habitat, or habitats that were restricted to the survey area itself.

*Acacia* sp. Weld Range (A. Markey & S. Dillon 2004) and *Acacia speckii* dominated shrubland on mid and lower slopes provides suitable habitat for the Priority 3 (BC Act) northern shield-backed trapdoor spider (*Idiosoma clypeatum*) while mulga (*Acacia aneura*) woodland over ironstone ridge crests and slopes provides suitable habitat for the Priority 4 (BC Act) long-tailed dunnart (*Sminthopsis*

*longicauda*). The thick leaf litter associated with the minor drainage line supporting dense shrubs habitat provides shelter for the Priority 1 (BC Act) west coast mulga slider (*Lerista eupoda*).

Fifteen vertebrate fauna species were recorded during the survey including 13 bird, one mammal and one reptile species. These represent the potential vertebrate fauna of the survey area; however, species other than those recorded are likely to occur.

Five northern shield-backed trapdoor spider (*Idiosoma clypeatum* (Priority 3 BC Act)) burrows were recorded within the *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* shrubland on mid and lower slopes habitat type under acacias that exhibit narrow phyllodes. The Iron Ridge study area only contains a small area of suitable habitat (4.29% of the total study area) for this species. Survey effort within suitable habitat for this species was considered adequate.

Previous survey within the Weld Range have recorded the long-tailed dunnart (*Sminthopsis longicauda* (Priority 4 (BC Act))) which has been given a likelihood of occurrence rating of 'Likely (1)' within the mulga woodland over ironstone ridge crests and slopes habitat type. The peregrine falcon has also been recorded on multiple occasion within the Weld Range and has been given a likelihood of occurrence rating of 'Likely (1)'. This species may overfly all habitat types without utilising any part of the study area in particular.

Seventeen species of conservation significance were deemed unlikely to occur due to the lack of suitable habitat including four species of mammal, 12 birds and one reptile.

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY.....</b>	<b>III</b>
<b>1 INTRODUCTION.....</b>	<b>1</b>
1.1 PROJECT BACKGROUND.....	1
1.2 SURVEY OBJECTIVES.....	1
1.3 LEGISLATIVE AND REGULATORY FRAMEWORK .....	1
<b>2 METHODOLOGY .....</b>	<b>4</b>
2.1 DESKTOP STUDY .....	4
2.2 FLORA AND VEGETATION.....	5
2.3 VERTEBRATE FAUNA .....	8
2.4 ANIMAL ETHICS.....	10
2.5 STUDY TEAM AND LICENCES.....	11
2.6 LIMITATIONS AND CONSTRAINTS .....	12
<b>3 DESKTOP STUDY.....</b>	<b>14</b>
3.1 CLIMATE .....	14
3.2 IBRA 7 BIOGEOGRAPHIC SUBREGIONS .....	14
3.3 LAND SYSTEMS, GEOLOGY, AND SOILS.....	15
3.4 CONSERVATION RESERVES AND NATIONALLY IMPORTANT WETLANDS .....	16
3.5 FLORA AND VEGETATION.....	21
3.6 SIGNIFICANT ECOLOGICAL COMMUNITIES.....	29
3.7 OTHER SIGNIFICANT ECOSYSTEMS .....	30
3.8 TERRESTRIAL FAUNA.....	32
3.9 PREVIOUS BIOLOGICAL SURVEYS NEAR THE STUDY AREA .....	36
<b>4 FIELD SURVEY RESULTS.....</b>	<b>39</b>
4.1 FLORA AND VEGETATION.....	39
4.2 VERTEBRATE FAUNA .....	55
<b>5 DISCUSSION .....</b>	<b>64</b>
5.1 FLORISTIC DIVERSITY.....	64
5.2 VEGETATION .....	64
5.3 VERTEBRATE FAUNA .....	66
<b>6 REFERENCES.....</b>	<b>68</b>
<b>7 APPENDICES.....</b>	<b>71</b>

## TABLES

Table 2.1: Databases queried for the desktop study .....	4
Table 2.2: Criteria used to assess the likelihood of occurrence of conservation significant species and communities .....	4
Table 2.3: EPA Vegetation Condition Scale (EPA 2016c).....	8
Table 2.4: Habitat Condition Assessment .....	9
Table 2.5: Study team and licences.....	11
Table 2.6: Flora and vegetation survey limitations. ....	12
Table 2.7: Fauna survey limitations.....	13
Table 3.1: Land systems associated with the study area (Curry <i>et al.</i> 1994).....	15
Table 3.2: Geomorphology and soils of land systems associated with the study area (Curry <i>et al.</i> 1994) .....	15
Table 3.3: Soil units associated with the study area (Northcote <i>et al.</i> 1960-1968).....	16
Table 3.4: Conservation significant plant taxa recorded within 50 km of the study area and their likelihood of occurrence. ....	22
Table 3.5: Introduced plant species recorded within 40 km of the study area (NatureMap). ....	24
Table 3.6: Pre-European vegetation associated with the study area .....	26
Table 3.7: Threatened and Priority Ecological communities recorded within 50 km of study area and their likelihood of occurrence within the study area. ....	29
Table 3.8: Summary of fauna records .....	32
Table 3.9: Conservation significant fauna likelihood of occurrence .....	34
Table 3.10: Summary of significant features identified during biological surveys relevant to the study area .....	37
Table 4.1: Summary of conservation significant species recorded within the study area.....	43
Table 4.2: Summary of introduced species recorded within the study area .....	45
Table 4.3: Summary of vegetation types within the study area .....	48
Table 4.4: Area of potential impact to DBCA defined PEC and vegetation occurring on Weld Range. ....	51
Table 4.6: Fauna habitat types within the study area.....	55
Table 4.7: Vertebrate species recorded .....	59
Table 4.8: Locations of conservation significant fauna. ....	60

## FIGURES

Figure 1.1: Study area and mining related infrastructure.....	3
Figure 3.1: Rainfall data from the Beebyn BOM weather station (7001) and temperature data from Meekatharra Airport BOM weather station (7045).....	14
Figure 3.2: IBRA 7 subregions (Department of Sustainability Environment Water Population and Communities 2012).....	17

Figure 3.3: Land systems associated with the study area (Curry <i>et al.</i> 1994).....	18
Figure 3.4: Soil units associated with the study area (Northcote <i>et al.</i> 1960-1968).....	19
Figure 3.5: Conservation Reserves and Nationally Important Wetlands. ....	20
Figure 3.6: DBCA Priority Flora records within 50 km of the study area .....	25
Figure 3.7: Pre-European vegetation associations (Shepherd <i>et al.</i> 2001).....	28
Figure 3.8: DBCA Priority Ecological Communities (50 km buffer). ....	31
Figure 3.9: Conservation significant fauna species found within 100 km of the survey area (DBCA). .	35
Figure 4.1: Predicted species accumulation curves for four estimators (bootstrap, Chao, jackknife 1 and jackknife 2) and observed species richness (S) with upper and lower 95% confidence intervals. ....	39
Figure 4.2: Photos of Priority Flora species recorded within the study area .....	42
Figure 4.3: Distribution of Priority Flora species recorded within the study area (ecologia 2019 and Woodman 2012 records). ....	44
Figure 4.4: UPGMA dendrogram summarising floristic relationships among quadrats and vegetation types.....	46
Figure 4.5: Vegetation types associated with the study area. ....	52
Figure 4.6: Vegetation condition of the study area. ....	53
Figure 4.7: Extent of the Priority 1 PEC 'Weld Range vegetation complexes (banded ironstone formation)' and vegetation types associated with banded ironstone ranges and dolerite hills.....	54
Figure 4.8: Representative photographs of habitat types within the study area. ....	57
Figure 4.9: Fauna habitat types and assessment sites. ....	58
Figure 4.10: <i>Idiosoma clypeatum</i> habitat and burrows .....	61
Figure 4.11: Locations of conservation significant fauna recorded. ....	63

## APPENDICES

Appendix A Definitions.....	72
Appendix B Vascular flora and Fauna Records (NatureMap) and Birdlife Birdata .....	83
Appendix C EPBC protected matters search tool.....	84
Appendix D Plant species Inventory .....	85
Appendix E Priority Flora species recored within the study area .....	89
Appendix F Species constancy within vegetation types .....	92
Appendix G Quadrat site data .....	98
Appendix H Survey track log.....	99
Appendix I Threatened and Priority Flora Report Forms.....	100
Appendix J Fauna Habitat Assessment Site sheets .....	101



## ACRONYMS

<b>BAM Act</b>	<i>Biosecurity and Agriculture Management Act 2007</i>
<b>BC Act</b>	<i>Biodiversity Conservation Act 2016</i>
<b>BOM</b>	Bureau of Meteorology
<b>CALM</b>	Department of Conservation and Land Management (now DBCA and DWER)
<b>CSIRO</b>	Commonwealth Scientific and Industrial Research Organisation
<b>DAFWA</b>	Department of Agriculture and Food Western Australia (now DPIRD)
<b>DBCA</b>	Department of Biodiversity, Conservation and Attractions (previously DPaW)
<b>DEC</b>	Department of Environment and Conservation (now DBCA)
<b>DWER</b>	Department of Water and Environmental Regulation
<b>DoEE</b>	Department of the Environment and Energy (previously DSEWPaC)
<b>DPaW</b>	Department of Parks and Wildlife (now DBCA)
<b>DPIRD</b>	Department of Primary Industry and Regional Development
<b>DSEWPaC</b>	Department of Sustainability, Environment, Water, Population and Communities (now DoEE)
<b>EPA</b>	Environment Protection Authority
<b>EP Act</b>	<i>Environment Protection Act 1986</i>
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
<b>ESCAVI</b>	Executive Steering Committee for Australian Vegetation Information
<b>IBRA</b>	Interim Biogeographic Regionalisation for Australia
<b>IUCN</b>	International Union for Conservation of Nature
<b>NVIS</b>	National Vegetation Information System
<b>PEC</b>	Priority Ecological Community
<b>SAC</b>	Species accumulation curve
<b>TEC</b>	Threatened Ecological Community
<b>TPFL</b>	Threatened and Priority Flora List database
<b>TPFR</b>	Threatened and Priority Flora Report form
<b>WA</b>	Western Australia
<b>WAH</b>	Western Australian Herbarium
<b>WAHERB</b>	Western Australian Herbarium Specimen Database
<b>WAOL</b>	Western Australian Organism List
<b>WC Act</b>	<i>Wildlife Conservation Act 1950</i>
<b>WONS</b>	Weeds of National Significance

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# 1 INTRODUCTION

## 1.1 PROJECT BACKGROUND

*ecologia* Environment (*ecologia*) was engaged by Fenix Resources Ltd. (Fenix) to conduct a detailed flora and vegetation survey, a Level 1 fauna and fauna habitat assessment including a targeted survey for the Priority 3 listed northern shield-backed trapdoor spider (*Idiosoma clypeatum*) and a stygofauna survey to support environmental approvals for the proposed Iron Ridge Project over tenement M20/118 (the 'study area'). The study area is located approximately 55 km northwest of Cue in the Murchison region (Figure 1.1). The current survey was undertaken between 2<sup>nd</sup> and 6<sup>th</sup> September 2019 which followed a reconnaissance flora, vegetation, and fauna habitat survey of the study area conducted by *ecologia* in July 2019. Biological surveys have previously been completed over an 83 ha area in the north-east of the study area (Figure 1.1) (Biologic Environmental 2009; Woodman Environmental 2009, 2012); this area was not surveyed by *ecologia*.

## 1.2 SURVEY OBJECTIVES

The Environmental Protection Authority's (EPA) environmental objectives for the factors *Flora and Vegetation* (Environmental Protection Authority 2016a) are: "To protect flora and vegetation so that biological diversity and ecological integrity are maintained." In the context, 'ecological integrity' is the composition, structure, function and processes of ecosystems, and the natural range of variation of these elements. The primary objective of this flora and fauna assessment was to provide sufficient information for the EPA to assess the impact of any proposed development on the flora, vegetation and fauna of the study area, thereby ensuring that the EPA's objectives can be met. To this end, the following were provided as part of this assessment:

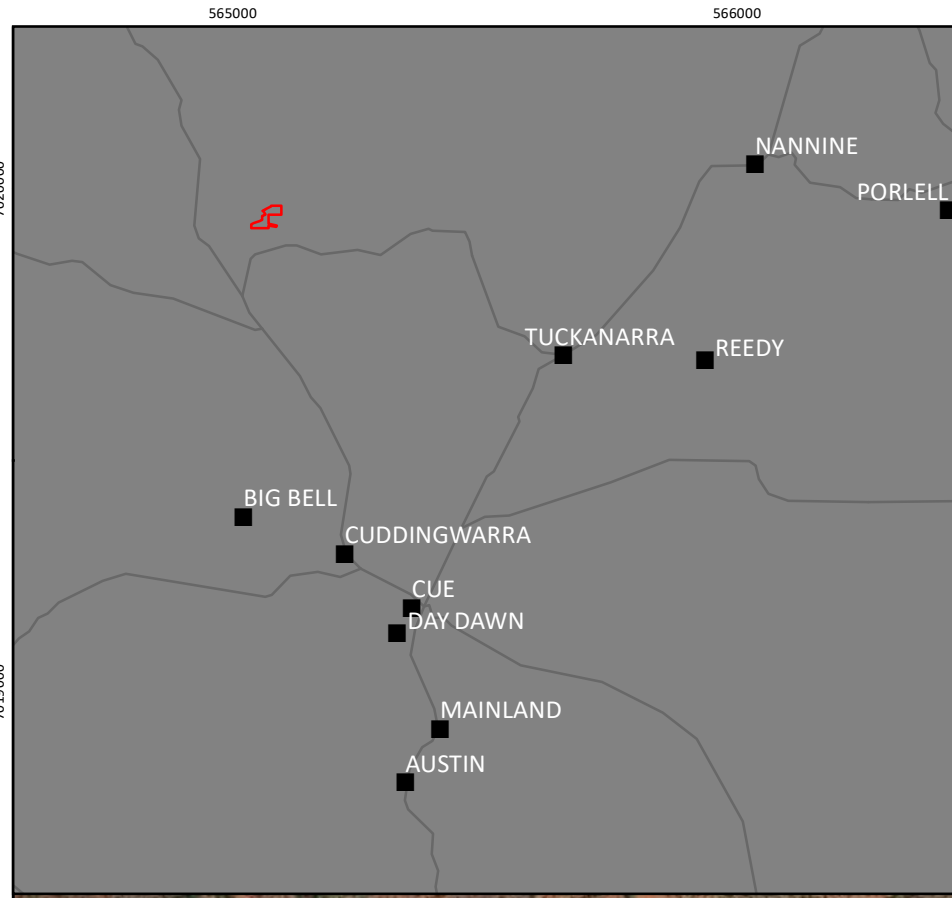
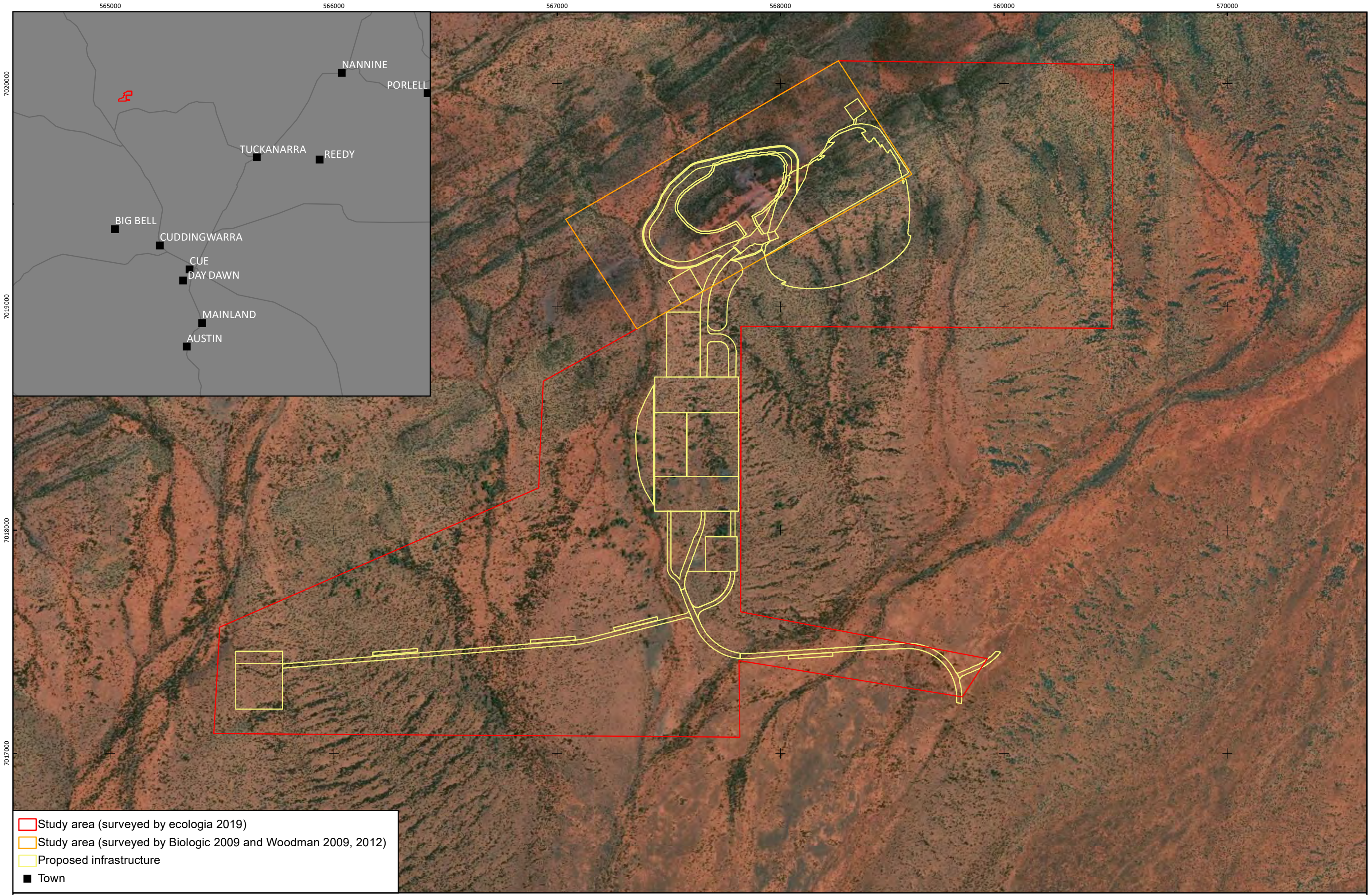
- A desktop study to evaluate biological values of the study area and surrounds, including a review of existing environmental values, threatened and priority flora, fauna and community databases, and other relevant available literature;
- A single-phase Detailed flora and vegetation survey, including a quadrat-based survey and conservation significant flora searches;
- A Level 1 vertebrate fauna and fauna habitat survey to outline vertebrate fauna present, fauna habitats, significant fauna features and conservation significant fauna;
- A plant species inventory for the study area;
- An inventory and a map of conservation significant flora and fauna species recorded within the study area, and the local and regional distribution of these species where data are available;
- An inventory and a map of Weeds of National Significance (WONS) and Declared Organisms within the study area;
- Description and mapping of vegetation types within the study area;
- Description and mapping of fauna habitat types within the study area;
- A two-phase stygofauna survey of three water bores;
- An assessment of local and regional vegetation significance; and
- Assessment and mapping of the vegetation condition within the study area.

## 1.3 LEGISLATIVE AND REGULATORY FRAMEWORK

The survey was designed and conducted to comply with the following guidance documents:

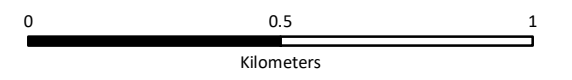
- Environmental Factor Guideline: Flora and Vegetation (Environmental Protection Authority 2016a);
- Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (Environmental Protection Authority 2016c);

- Environmental Factor Guideline: Terrestrial Fauna (Environmental Protection Authority 2016b);
- Technical Guidance: Sampling methods for terrestrial vertebrate fauna (Environmental Protection Authority 2016d); and
- Technical Guidance: Terrestrial Fauna Surveys (Environmental Protection Authority 2016e).



- Study area (surveyed by ecologia 2019)
- Study area (surveyed by Biologic 2009 and Woodman 2009, 2012)
- Proposed infrastructure
- Town

**Figure 1.1:** Study area and proposed mining related infrastructure.



## 2 METHODOLOGY

### 2.1 DESKTOP STUDY

The methodology adopted for the desktop study was consistent with that recommended by Environmental Protection Authority (2016c). A review of background environmental information for the study area was undertaken, including climate (BoM), biogeography (IBRA 7) (Department of Sustainability Environment Water Population and Communities 2012a), land systems (Curry *et al.* 1994), soils (Northcote *et al.* 1960-1968; Tille 2006), and pre-European vegetation (Shepherd *et al.* 2001).

Searches of the databases listed in Table 2.1 and a review of other relevant surveys were conducted to construct a list of conservation significant species and ecological communities previously recorded within or in the vicinity of the study area. The criteria listed in Table 2.2 were then applied to determine the likelihood of occurrence of significant species and communities occurring within the study area given the likely landforms and broad habitats present.

**Table 2.1: Databases queried for the desktop study**

Database	Search details
EPBC Act Protected Matters database	Records of matters of national significance under the EPBC Act within a 40 km search buffer
DBCA Threatened and Priority Ecological Communities Database	All TECs and PECs within a 40 km search buffer
DBCA Threatened and Priority Flora Database (TPFL) and Western Australian Herbarium Specimen Database (WAHERB)	Conservation significant plant species within a 40 km search buffer
DBCA Threatened and Priority Fauna	Conservation significant fauna species within a 50 km search buffer
DBCA NatureMap database	All flora and fauna species records within a 40 km search buffer

**Table 2.2: Criteria used to assess the likelihood of occurrence of conservation significant species and communities**

Rating	Criterion
<b>Recorded</b>	The species/community has been recorded within the study area previously or during the current survey.
<b>Likely (1)</b>	The species/community may occur within the study area as suitable habitat is known to be present and there are existing records very close to the study area (within ca. 10 km).
<b>Possible (2)</b>	The species/community may occur within the study area as there are existing records in the vicinity of the study area, and suitable habitat is likely to be present; OR The species/community may occur within the study area as there is insufficient information available to exclude the possibility of occurrence.
<b>Unlikely (3)</b>	The species/community is unlikely to occur within the study area as suitable habitat is not present or is not likely to be present; OR Suitable habitat is present within the study area, but the taxon/community has not been recorded despite reasonable survey effort.
<b>Does not occur</b>	The community is an existing regionally mapped vegetation association (e.g. Shepherd <i>et al.</i> 2011) or land system which does not occur within the study area.

## 2.2 FLORA AND VEGETATION

### 2.2.1 Survey Timing and Methodology

An initial reconnaissance flora and vegetation survey of the study area was undertaken over three days between July 3 and 5, 2019 by *ecologia* botanists to provide structural vegetation description mapping for the area and to determine the presence of Priority flora species or suitable habitat for these species. The reconnaissance survey focused on areas proposed for workshop facilities, offices, access roads and other mining related infrastructure to assist Fenix in identifying potential ecological risks and areas to be avoided to allow for planning of the site layout.

The detailed flora and vegetation survey was conducted over five days by *ecologia* botanists between September 2 and 6, 2019. Survey methodologies were in accordance with the *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (Environmental Protection Authority 2016c). The survey was conducted primarily by sampling vascular plant species within bounded quadrats (50m x 50m in dimension), supplemented by a series of traverses, along which changes in vegetation type and disturbance were periodically noted, supplemented opportunistically records. Opportunistic floristic records collected during traverses are a more time efficient approach to maximising the floristic inventory and increasing the probability of locating taxa of potential significance. However, sampling standardised quadrats allows the vegetation and floristic composition to be consistently recorded and characterised. Both methods contributed to the delineation of vegetation types and a floristic inventory of the study area.

Woodman Environmental Consulting conducted a flora and vegetation survey (Woodman Environmental 2009) and systematic targeted conservation significant flora survey (Woodman Environmental 2012) of a section of the study area (Figure 1.1). **However, this area was not surveyed by *ecologia*.**

### 2.2.2 Quadrat Sampling

A total of twenty-four (24) sampling sites (17 quadrats and seven relevés) were surveyed and sampled within the study area during the detailed survey. Site locations were selected using a combination of aerial photography, topographic features, landforms, and field observations to represent the geomorphological and floristic variation found within the study area. Sites were located to avoid transition zones between plant communities and were preferentially placed in areas of intact mature vegetation and minimal disturbance. Where possible, at least three sites were sampled within each vegetation type; however, as final vegetation types are determined post-survey, this is not always feasible. Vegetation types may also have fewer than three sites if they represent relatively small continuous areas. All quadrats had a north-south orientation and were 50 m x 50 m in dimension. In instances where installation of quadrats 50 m x 50 m in dimension was not feasible (e.g. narrow creeks, steep gorges, edges of water bodies), relevés were assessed. In this context, a relevé is an unbounded area, with a size approximate to that of a 50 m x 50 m quadrat, in which floristic data are recorded.

The following parameters were recorded from each site: site number and location; photograph from the north-west corner; size and shape of quadrat, including a GPS coordinate of each corner; dominant growth form, height, cover and up to three species for the three traditional strata (upper, mid and ground) compatible with NVIS Level V (Executive Steering Committee for Australian Vegetation Information 2003); a comprehensive species list (including weeds) and the stratum and estimated percent foliage cover of each; landform and soil type; vegetation condition (Table 2.3) and description of disturbance; and additional information to assist vegetation classification, including slope, aspect, rock type and abundance, litter, and fire history.

### 2.2.3 Conservation Significant Species

Threatened and Priority flora species identified during the desktop study were targeted during both field surveys, utilising known locations and habitat preferences. The surveys involved searches for species within potential suitable habitat made during traverses walked between sites. Where conservation significant species were observed the following parameters were recorded: recorder and date; location (for individual or localised plants) or population boundary (for more extensive populations, time permitting); number of plants (count, for individual or localised plants) or estimated number of plants for more extensive populations; reproductive state; vegetation type; and landform.

Representative voucher specimens for new populations, where discernible, were collected for submission to the Western Australian Herbarium. Copies of Threatened and Priority flora Report Forms were forwarded to the Species and Communities Branch (DBCAs) and included in Appendix I.

### 2.2.4 Specimen Identification and Vouchering

Plant specimen identification was undertaken with reference to current taxonomic literature and herbarium reference specimens. Scientific names used in this report follow the species concepts currently adopted by the Western Australian Herbarium. Specimens that were believed to differ significantly from typical material were indicated with 'affinity' (aff.). Specimens that could not be adequately identified to genus or species level due to the absence of reproductive material required for positive identification were indicated with a question mark but were not considered to be otherwise anomalous. Atypical specimens were submitted to the Western Australian Herbarium for identification or confirmation.

### 2.2.5 Species Accumulation Curve Analysis

Sampling adequacy was assessed by extrapolating species accumulation curves (SAC). SACs display the rate at which new species are found within the study area in relation to sampling effort and can be extrapolated to provide an estimate of species richness. As sampling effort increases, the rate at which new species are recorded is reduced until ultimately the number of species recorded reaches the number present. At the point where there is a minimal increase in species richness with continued sampling effort, the sample size is considered adequate. Four incidence-based coverage estimators (Chao 2, bootstrap, jackknife 1 and jackknife 2) were used to extrapolate species richness for the study area. Analysis was performed using the *vegan* package (Oksanen *et al.* 2017) of R 3.5.2 (R Core Team 2016) on combined floristic data from both phases, using 9,999 permutations.

### 2.2.6 Floristic Classification

Floristic classification using multivariate clustering methods provides an objective and repeatable means of delineating vegetation types within a given geographic area and provides insight into the relationship between types. This classification method is based on the complete plant community at sampled sites rather than just dominant species. It is preferred over structural classification for detailed surveys as it is repeatable, can be more readily placed into a regional context, and is more suitable for the identification of significant vegetation (Environmental Protection Authority 2016c).

All analyses were conducted using the R statistical software package (R Core Team 2016). The Bray-Curtis coefficient was used to calculate a site association matrix from transformed (square root) species percent cover data, and a dendrogram was constructed using hierarchical agglomerative clustering using unweighted arithmetic average clustering (UPGMA). Transformation is used in this case to downplay the relative influence of dominant species while increasing the signal of less abundant species. Similarity Profile Analysis (SIMPROF) was then used as a hypothesis testing-based approach for assessing multivariate group structure, which detects groups of homogenous objects (sampling sites) with respect to a set of descriptors (species). SIMPROF provides a means of stopping unwarranted over-interpretation of group substructure. When no significant group structure is



detected by the test there is no justification for further interpretation of substructure, and sites at this point may be considered homogenous (i.e. vegetation types). The *simplif* function from the *clustsig* package (Whitaker and Christman 2014) was used to determine statistically different clusters of sites ( $\alpha = 0.01$ ), with 9,999 permuted similarity profiles. Some groups identified by SIMPROF can be too fine to meaningfully interpret; in such cases group supersets may be interpreted as vegetation types.

Specimens that could not be positively identified to species level were excluded from the analysis if there was potential for confusion with other similar taxa. Conversely, taxa that could not be fully identified, but were not considered to correspond to any other taxon in the data set, were retained. Intraspecific taxa belonging to the same species were amalgamated if specimens could not be consistently identified to the same level. As all quadrats were assessed during the same survey and season, annual species were retained as they can be important for discriminating types.

### 2.2.7 Vegetation Characterisation

The vegetation types determined by SIMPROF were characterised by the constancy of shared taxa and any diagnostic species. Indicator species analysis using the *indicspecies* package (De Cáceres and Legendre 2009) was used to identify diagnostic species for vegetation types. Species with high indicator values are those that occur in all (or most) sites assigned to a vegetation type, but also occur in no (or few) sites outside of that type.

Local scale vegetation types were given descriptions consistent with NVIS Level V – Association (Executive Steering Committee for Australian Vegetation Information 2003), which includes the structural features and dominant or diagnostic species of the type. Plant communities are naturally variable across wide geographic areas, and vegetation types here are delineated based on the overall floristic similarity of sites with various spatial coverage. Therefore, species used in descriptions are those that are most characteristic of the vegetation type but were not necessarily recorded at all sites. Species that are recorded as sometimes dominant in a vegetation type are indicated in the description by “+/-” (Executive Steering Committee for Australian Vegetation Information 2003). The mapping codes used correspond to the most dominant structural formation class (NVIS) present within the type (e.g. SH for shrublands, HG for hummock grasslands etc.).

### 2.2.8 Vegetation Mapping

Preliminary vegetation mapping of study area was undertaken in the field using aerial imagery and data gathered from ground-truthed sites and other field observations. Vegetation types were determined post-survey using the floristic classification methods described above and applied to these ground-truthed areas. Vegetation type boundaries were then refined using aerial imagery in ESRI ArcMap v.10.3. Given the large size of the study area, extrapolative mapping was undertaken in areas that could not be ground-truthed. Extrapolative mapping was based on observed similarities in spectral and structural features between ground-truthed sites and unvisited areas, with consideration given to vegetation types recorded at surrounding sites.

The Floristic Community Type descriptions and mapping of Woodman Environmental (2009) were used to inform the extrapolation of the vegetation types over the north-eastern section of the study area (Figure 1.1).

### 2.2.9 Assessment of Vegetation Significance

Plant communities recorded within the study area were assessed, where relevant data were available, for national, state, regional and local significance. National significance refers to those features of the environment which are recognised under the EPBC Act as Threatened Ecological Communities (TECs). State significance refers to features of the environment which are recognised by DBCA as Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs). For this assessment, spatial data from the DBCA Threatened and Priority Ecological Communities Database were used to assess

the presence of TECs and PECs within the study area. A list of TECs and PECs for the Pilbara IBRA bioregion (Department Biodiversity Conservation and Attractions 2017) was also reviewed to assess the potential presence of communities not identified in the database search.

Regional significance addresses the representation of habitats at a biogeographic regional level. Plant communities that are restricted or uncommon in a bioregional context are considered regionally significant. Plant communities acting as a refuge for Threatened flora species may also be considered regionally significant. Regional significance was assessed using two sources of information that cover the whole of the Pilbara IBRA bioregion: the land systems of Van Vreeswyk *et al.* (2004) and vegetation mapping of Shepherd *et al.* (2001).

Locally significant vegetation may include plant communities that are locally restricted, contain comparatively high structural or species diversity, or contain DBCA listed Priority flora species that are restricted to these plant communities. The local significance of vegetation types within the study area were assessed in relation to species diversity, conservation significant species recorded within them and to their local extent in relation to existing vegetation mapping surrounding the study area (if available).

**Table 2.3: EPA Vegetation Condition Scale (EPA 2016c).**

Vegetation condition	Criterion (Eremaean and Northern Botanical Provinces)
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

## 2.3 VERTEBRATE FAUNA

A Level 1 vertebrate fauna and fauna habitat assessment was undertaken concurrently with the flora and vegetation between September 2<sup>nd</sup> and 6<sup>th</sup> 2019. The survey methods adopted accorded with the Technical Guideline for sampling terrestrial vertebrate fauna for conducting a Level 1 fauna and fauna habitat assessment published by the Environmental Protection Authority (2016d). Low-intensity fauna sampling was also undertaken to detect vertebrate fauna of conservation significance within the study area.

### 2.3.1 Habitat Descriptions and Mapping

A fauna habitat type broadly describes an area of fauna habitat that is distinguishable by its vegetation, soil characteristics and land features, and is likely to host a different fauna assemblage to that found in other fauna habitats. Habitat delineation and mapping was based upon interpretation of aerial photography and landforms, habitat site assessments, soil descriptions, and the complementary detailed vegetation descriptions and mapping undertaken for this report (see Section 4.1). Particular

attention was given to the likelihood that certain species of conservation significance may be present only in particular habitat types.

Habitat assessments were conducted at 12 fauna survey site locations (HA01 – HA12) considered representative of each habitat type (Table 4.5). For each fauna survey site, the following parameters were recorded:

- broad habitat type;
- digital photographs;
- landform type;
- soil colour, type and characteristics;
- type and extent of non-vegetative surface cover;
- type of vegetation in lower, middle and upper strata;
- observable fire history and evidence of any disturbance;
- presence and extent of leaf litter and coarse woody debris;
- presence of, or distance to, water sources;
- presence of significant microhabitats such as tree hollows and rocky outcrops; and
- notes on suitability for hosting conservation significant fauna.

A habitat condition rating was assigned to each habitat delineated based upon the habitat condition criteria described in Table 2.4.

**Table 2.4: Habitat Condition Assessment**

Habitat Condition	Criteria
Excellent	Pristine or nearly so, no obvious sign of damage caused by modern humans or introduced fauna (cattle, feral cat, dog and rabbit). No signs of recent, extensive fires.
Very Good	Some relatively slight signs of damage caused by the activities of modern humans. e.g. damage to tree trunks by repeated fires, no significant signs of introduced fauna or occasional vehicle tracks.
Good	More obvious signs of damage caused by the activities of modern humans, including some obvious impact to vegetation structure such as that caused by low levels of grazing or by selective logging. Some tracks or secondary evidence of introduced fauna. Some signs of recent fires.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of modern humans such as partial clearing or very frequent fires. Presence of introduced fauna.
Very Poor	Severely impacted by grazing, introduced fauna, fire, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management.
Completely Degraded	Areas that are completely or almost completely without vegetation communities and are heavily impacted by extensive fires and/or introduced species e.g. cow paddock

### 2.3.2 Fauna Records

At each of the 12 fauna survey sites established for the habitat assessments (HA01 – HA12) (Figure 4.9) all fauna observed were recorded. At each site the following actions were undertaken:

- fixed-time bird surveys of 10 minutes;
- targeted searches involving direct observation of animals focussing on conservation significant species, as well as detection of secondary evidence including tracks, scats, remains and other traces; and
- hand searching for cryptic species including raking leaf litter, searching beneath the bark of dead trees, breaking open old logs, stumps and dead free-standing trees, investigating burrows and over-turning logs and stones.

Opportunistic fauna observations were made at all times during the survey to provide additional data to supplement the site survey results. Tracks, diggings, scats, burrows and nests were recorded wherever where secondary evidence was available.

### 2.3.3 Targeted Conservation Significant Fauna Surveying

Prior to undertaking the field survey, a desktop assessment of the preferred habitats of the conservation significant species potentially occurring in the study area was undertaken and used to assess the likelihood of occurrence of conservation significant species (Section 3.8). These results were ground-truthed during the field survey and, based on the actual habitats present, searches were undertaken to determine the presence of potential conservation significant species occurring.

Targeted searches were undertaken for the Priority 3 (BC Act) northern shield-backed trapdoor spider (*Idiosoma clypeatum*) within suitable habitat. A total of ten hours was spent searching for burrows within suitable habitat and adjacent to known burrow locations.

### 2.3.4 Stygofauna

Stygofauna are small groundwater, generally invertebrate fauna that live permanently underground in a range of groundwater habitats including voids and spaces between sand grains to pools and streams in caves. *ecologia* conducted the initial phase of a two-phase stygofauna survey that conformed with the requirements of a pilot study as outlined in EPA Factor Guideline: *Subterranean Fauna* and EPA Technical Guidance: *Sampling Methods for Subterranean fauna*.

Sampling was conducted concurrently with the Level 1 survey using haul nets of appropriate diameter (depending on water bore diameter). The net is lowered slowly into the bore using a rope and reel to ensure that the net does not fall freely to the bottom of bore. A minimum of three hauls are performed with a 150µm mesh net and further three hauls are performed with a 50µm mesh net. All samples are washed in 50µm sieve and preserved in a vial with 100% ethanol. All vials are labelled with date, bore name and replicate number. Samples are kept in cool, dark place and transported back to Perth for sorting and identification. Specimens are sent to WAM taxonomic specialist for identification.

The second phase of the survey will be conducted six months after the first phase (March 2020) and the results will be outlined in a standalone report.

## 2.4 ANIMAL ETHICS

The fauna survey was conducted as per *ecologia*'s Animal Ethics Code of Practice, which conforms to Section 5 of the *Australian code of practice for the care and use of animals for scientific purposes* (NHMRC 2004). In all cases, fauna species were identified in the field, and not captured or collected during the survey.

## 2.5 STUDY TEAM AND LICENCES

The flora and vegetation assessment was planned, coordinated, executed and reported by those summarised below in Table 2.5.

**Table 2.5: Study team and licences**

Project Staff			
Name	Qualification	Role	Project role
Shaun Grein	B.App. Sc (Biology); Grad. Dip. Nat. Resources; MBA	Managing Director/Principal Scientist	Project management, reporting, QA
Andrew Craigie	BSc (Hons.), PhD (Botany)	Principal Botanist	Field survey, specimen identification, data analysis, reporting
Tim McCabe	BSc EnvBiol, Dip ProjMgt, Cert III Vert Pest Mgt	Senior Zoologist	Field survey, reporting
Rob Sellers	BSc (Hons.)	Botanist	Desktop assessment
Licences - "Flora Taking (Biological Assessment) Licence"			
Andrew Craigie		Licence No: FB62000084	Valid until: 30/04/2022

## 2.6 LIMITATIONS AND CONSTRAINTS

### 2.6.1 Flora Survey Limitations and Constraints

An assessment of survey-specific issues and limitations (Environmental Protection Authority 2016c) is detailed in Table 2.6.

**Table 2.6: Flora and vegetation survey limitations.**

Constraint	Constraint	Comment
Availability of contextual information at a regional and local scale	Nil	Broad scale vegetation, soil, and geology mapping data were available for the study area, in addition to Threatened and Priority Flora database records, and conservation significant vegetation community records. This information was adequate to provide appropriate contextual information for the current survey.
Competency/experience of the team carrying out the survey, including experience in the bioregion surveyed	Nil	The botanist undertaking the field work and specimen identification for the survey has extensive experience conducting flora and vegetation surveys in the Murchison region.
Proportion of flora recorded and/or collected, any identification issues	Minor	Representative specimens of all taxa identified in the field were collected for confirmation. Some of these could not be confidently identified to species level due to a lack of required reproductive material available the time of the survey. However, a small number of unidentified samples is unlikely to have had any significant impact on the classification of plant communities, and none of these specimens were considered to correspond to any conservation significant species.
Was the appropriate area fully surveyed (effort and extent)	Nil	Twenty-four sampling sites (quadrats and relevés) were surveyed and sampled across the entirety of the study area. This is considered adequate for this level of survey.
Access restrictions within the survey area	Nil	The entirety of the study area was accessible by walking from existing roads and tracks.
Survey timing, rainfall, season of survey	Nil	The survey was conducted in September 2019. Seasonal conditions were considered to be adequate for a primary season flora and vegetation survey.
Disturbance that may have affected the results of survey such as fire, flood or clearing	Nil	There were no natural or human interventions that constrained the survey of the study area.

## 2.6.2 Fauna Survey Limitations and Constraints

According to Environmental Protection Authority (2016d), terrestrial fauna surveys may be limited by several aspects. An assessment of these aspects regarding this study is detailed in Table 2.7.

**Table 2.7: Fauna survey limitations**

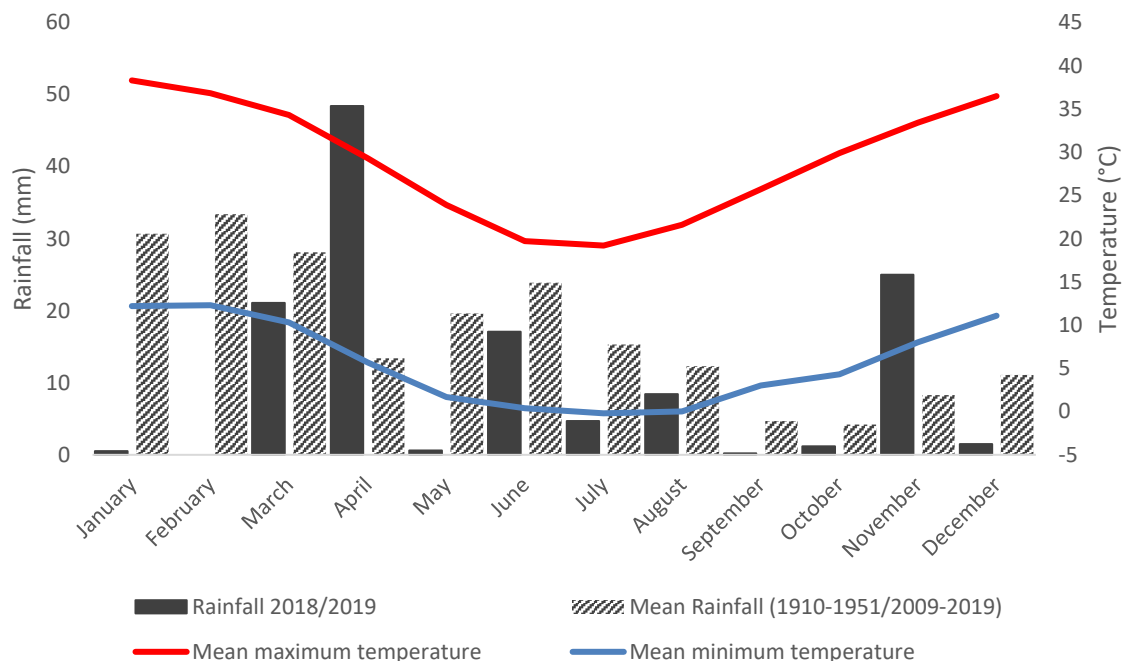
Aspect	Constraint	Comment
Competency/experience of the consultant carrying out the survey.	Nil	The Senior Zoologist undertaking the fauna survey has more than 12 years of experience in conducting terrestrial vertebrate fauna surveys in Western Australia.
Scope (what faunal groups were sampled and were some sampling methods not able to be employed because of constraints such as weather conditions).	Nil	The fauna survey focussed on the fauna taxa of conservation significance that may have the potential to occur in the study area. The scope was well defined. Fauna and their habitats were surveyed using standardised and well-established techniques. All relevant databases were reviewed.
Proportion of fauna identified, recorded and/or collected.	Low	A desktop study adequately gathered background information on the study area. The fauna and fauna habitat field survey verified the desktop results and characterised habitats and terrestrial fauna likely to be present. The fauna survey focussed on the fauna taxa of conservation significance that may have the potential to occur in the study area. All fauna taxa observed were identified and considered adequate for a Level 1 survey.
Sources of information (previously available information as distinct from new data).	Nil	Database records, including conservation significant species, were available for the area and considered adequate to provide appropriate contextual information for the study.
The proportion of the task achieved and further work which might be needed.	Nil	Planned survey works were conducted and completed. No further work is required to complete the survey scope.
Timing/weather/season/cycle.	Nil	The survey was conducted during an appropriate time/season.
Disturbances which affected results of the survey (e.g. fire, flood, accidental human intervention).	Nil	There were no natural or human interventions that constrained the survey of the study area.
Intensity (in retrospect was the intensity adequate).	Nil	Given the access to available information from the area, the survey intensity was considered adequate and is appropriate for a Level 1 fauna assessment.
Completeness (e.g. was relevant area fully surveyed).	Nil	The Level 1 survey was considered complete. Database searches of relevant databases was undertaken, and a large proportion of the study area was sampled on foot.
Resources (e.g. degree of expertise available in animal identification to taxon level).	Nil	Resources were adequate to carry out the survey and survey participants were competent in the identification of species and likelihood of occurrence. Database searches and literature reviews were used to prepare for the survey and used for the confirmation of any species.
Remoteness and/or access problems.	Nil	The study area was easily accessible by vehicle and on foot.
Availability of contextual (e.g. biogeographic) information on the region.	Nil	The data available was adequate for the level of survey work undertaken during this assessment.
Efficacy of sampling methods (i.e. any groups not sampled by survey methods).	Nil	A comprehensive desktop study adequately gathered background information on the study area. A Level 1 survey verified the desktop results and characterised habitats.

### 3 DESKTOP STUDY

#### 3.1 CLIMATE

The Western Murchison IBRA subregion is located in the northern end of the Yilgarn Craton, which experiences an arid (desert) climate with bimodal rainfall tending to semi-desert Mediterranean in the south-west corner (Curry *et al.* 1994). Rainfall occurs either in rare widespread major falls (due to cyclones near the Pilbara coast between November and April) or as sharply isolated minor falls of highly variable intensity (due to thunderstorms occurring in the summer months driven by convectational activity). Day time temperatures range from 14 to 22°C in winter to 29 to 38°C in summer. Frosts occur occasionally in the mid-winter months throughout the region.

Rainfall data from the nearest long-term Bureau of Meteorology (BOM) weather station were obtained from Beebyn (Station No. 7001) (BOM 2018) approximately 23.9 km from the centre of the study area. The nearest long-term temperature data were obtained from Meekatharra Airport weather station (Station No. 7045) 93.5 km from the centre of the study area. Mean rainfall and 2018/2019 rainfall as well as and mean maximum and minimum temperatures are displayed in Figure 3.1.



**Figure 3.1: Rainfall data from the Beebyn BOM weather station (7001) and temperature data from Meekatharra Airport BOM weather station (7045)**

#### 3.2 IBRA 7 BIOGEOGRAPHIC SUBREGIONS

The Interim Biogeographic Regionalisation for Australia (IBRA) classifies the Australian continent into regions or bioregions on the basis of similar geology, landform, vegetation, fauna and climate characteristics (Department of Sustainability ENvironment Water Population and Communities 2012b). The study area is situated within the Murchison region according to IBRA 7 (Department of Sustainability ENvironment Water Population and Communities 2012b), which is further divided into two subregions: Eastern Murchison and Western Murchison. The study area is situated within the Western Murchison subregion (Figure 3.2).

The West Murchison subregion is in the northern end of the Yilgarn Craton, which experiences an arid climate with bimodal rainfall that usually falls in the winter months. The subregion is characterised by Mulga low woodlands on outcrop and fine textured Quaternary alluvial and eluvial surfaces mantling



granitic and greenstone strata (Desmond *et al.* 2001). Quaternary plains contain hummock grasslands, saltbush shrublands on calcareous soils and *Halosarcia* low shrublands on saline alluvia.

### 3.3 LAND SYSTEMS, GEOLOGY, AND SOILS

Curry *et al.* (1994) undertook a regional inventory of the Murchison rangelands to document the land systems present and their condition. The Murchison Regional Inventory (MRI) covered 88,360 km<sup>2</sup>, bounded by Mt Magnet and Meekatharra in east and the catchments of the Greenough and Wooramel rivers in the west. The extent of each land system occurring within the Murchison Regional Inventory varies significantly, with almost half the area comprised of just eight land systems: Yanganoo, Kalli, Koonmarra, Challenge, Sherwood, Belele, Mindura and Narryer (Curry *et al.* 1994).

Four land systems occur within the study area (Violet, Jundee, Weld and Yarrameedie), of which the Yarrameedie land system accounts for over 68.93% its total area (Table 3.1, Figure 3.3). The underlying geology, geomorphology and soils of each land system associated with the study area is detailed in Table 3.2. Two soil types of the Atlas of Australia Soils (Northcote *et al.* 1960-1968) are associated with the study area (Table 3.3, Figure 3.4).

**Table 3.1: Land systems associated with the study area (Curry *et al.* 1994)**

Land system	Land type	Description	Total extent (ha)	Extent within study area (ha)
Violet	Stony plains with acacia shrublands and halophytic shrublands	Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supporting groved mulga and bowgada shrublands and patchy halophytic shrublands.	584,970	0.76
Jundee	Wash plains on hardpan with mulga shrublands	Hardpan plains with ironstone gravel mantles and occasional sandy banks supporting mulga shrublands.	661,728	39.32
Weld	Hills and ranges with acacia shrublands	Rugged ranges and ridges of banded ironstone and quartzite, supporting acacia shrublands.	37,235	126.18
Yarrameedie	Stony plains with acacia shrublands	Undulating stony interfluves, drainage floors and pediment (foothill) plains below major ranges of crystalline rocks (mainly Weld land system) supporting sparse mulga shrublands.	68,323	368.82

**Table 3.2: Geomorphology and soils of land systems associated with the study area (Curry *et al.* 1994)**

Land system	Geomorphology	Soils
Violet	Erosional surfaces; remnants of old plateau as gravelly sand plains above gently undulating outcrops of laterite and weathered greenstones; broad, lower stony plains on greenstone or red-brown hardpan, often densely mantled by pebbles of mixed lithology and with sluggish, occasionally channelled, drainage floors; relief mostly < 10 m.	Dark red gravelly loamy sands; dark red gravelly clayey sands or fine loams with abundant laterite and ironstone inclusions; Shallow red earths, clay loams or fine sandy loams; red earths, reddish brown sandy clay loams or fine sandy loams.
Jundee	Depositional surfaces carrying sheet drainage; broad plains with variable, but frequently dense, mantles of gravel and pebbles and occasional small groves and sandy banks; higher marginal stony plains on weathered greenstones; drainage tracts receiving more concentrated flow and with some gutters and channels. Relief mostly < 10 m.	Soils are red earths with ironstone gravel; hardpan loams; dark red hardpan sandy clay loams or shallow red earths.

Land system	Geomorphology	Soils
Weld	Erosional surfaces; mountain ranges of strike belts and ridges with peaks 200 m or more above the new plateau plains; lower, rounded hill spurs flanking major ranges; steep hillslopes with extensive loose mantling and rock outcrop; lateritised ridges with caves; valley floors and undulating interfluvies often intensely dissected by narrow rectangular drainage tracts with incised channels; sheds most colluvium and drainage to pediment Yarrameedie land system.	Soils are skeletal lithosols confined to pockets of dark red loamy or clayey sands; reddish-brown or dark red shallow earths; red earthy sands.
Yarrameedie	Erosional surfaces; piedmont slopes and plains; mainly 2 to 4 km wide, parallel with major ranges, heavily mantled by mixed pebbles and gravels; higher parts consist of spurs and stony interfluvial slopes dissected by often fairly closely spaced parallel incised drainage lines leading to narrow drainage floors, spreading into minor alluvial tracts downslope; overall relief mainly 5 to 20 m.	Soils are dark red earthy sands, shallow or red earths or occasional duplexes; dark red or reddish-brown earthy sands to hardpan clay loams.

**Table 3.3: Soil units associated with the study area (Northcote et al. 1960-1968)**

Soil unit	Description	Area (ha)
Fa7	Greenstone hills and low ranges with some slate and basalt: dominant soils are shallow stony earthy loams (Um5.51) on the steep slopes while (Um5.3) and (Uc5.21) overlying red-brown hardpan occur on the stony pediments	521.58
My50	Broad plains with a scatter of surface gravels: chief soils are shallow neutral red earths (Gn2.12) and shallow earthy loams (Um5.3) in intimate micro-association. They are underlain by a red-brown hardpan at depths of 6-30in.	13.50

### 3.4 CONSERVATION RESERVES AND NATIONALLY IMPORTANT WETLANDS

The Department of the Environment and Energy's (DoEE) Protected Matters Search Tool (Department of the Environment and Energy 2018) and the DBCA's managed lands and waters database were interrogated for Ramsar Wetlands, Nationally Important Wetlands, and DBCA managed waters occurring near the study area. The closest reserves to the study area include ex Lakeside former pastoral lease 51.5 km to the south (Figure 3.5). No Ramsar wetland occurs in the vicinity of study area.

552000

560000

568000

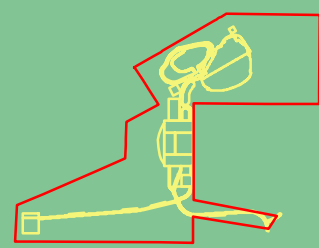
576000





584000

7024000


7016000

7008000

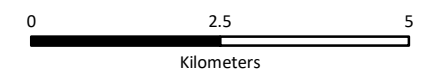


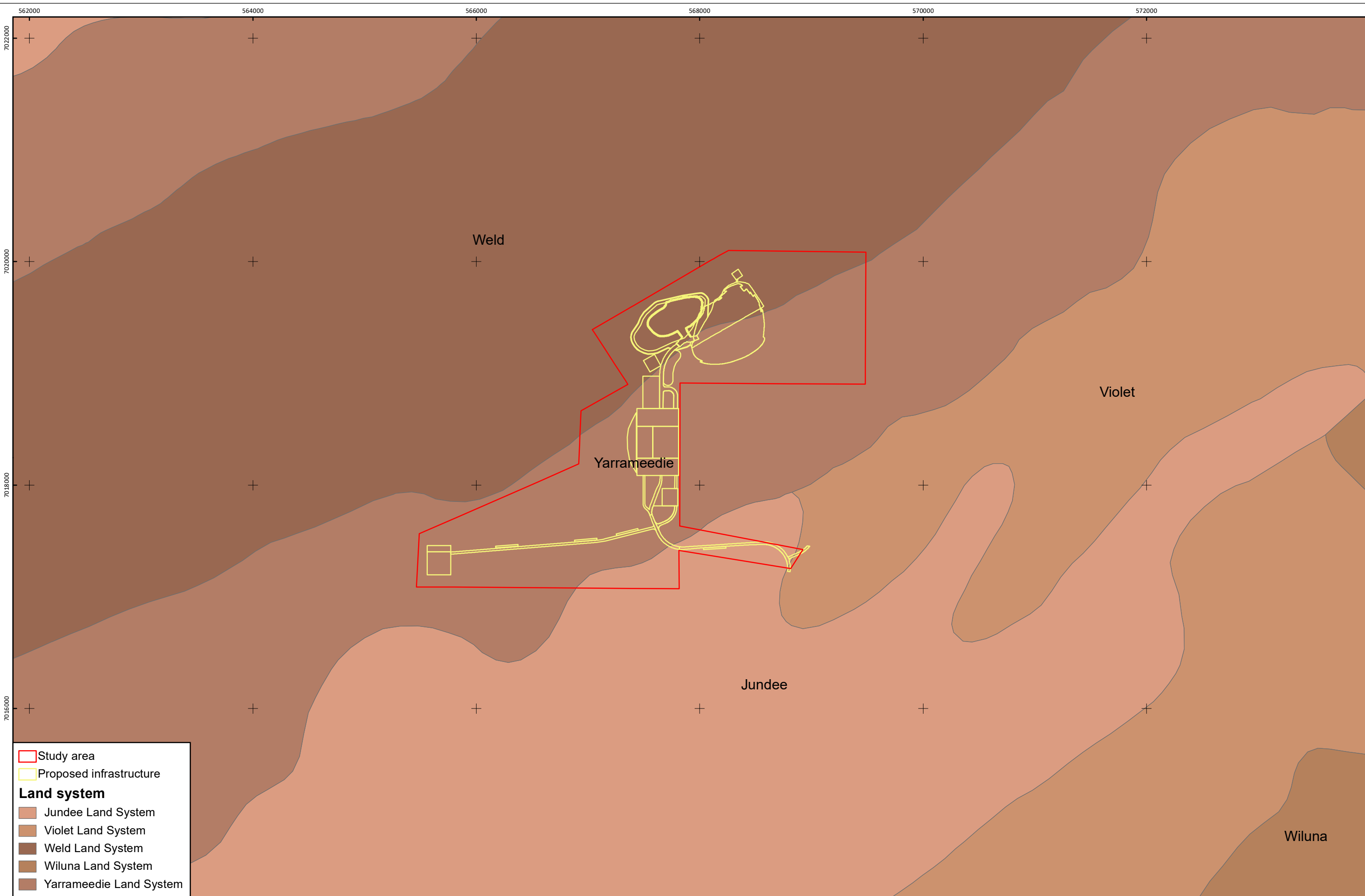
 Study area  
 Proposed infrastructure  
**IBRA subregion**  
 Eastern Murchison  
 Western Murchison

**Figure 3.2:** IBRA 7 subregions (Department of Sustainability Environment Water Population and Communities 2012).


 Project: 1796  
 Date: 13 August 2019  
 Author: RS  
 Coordinate System: GDA 1994 MGA Zone 50  
 Projection: Transverse Mercator  
 Absolute Scale: 1:100,000 @A3

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





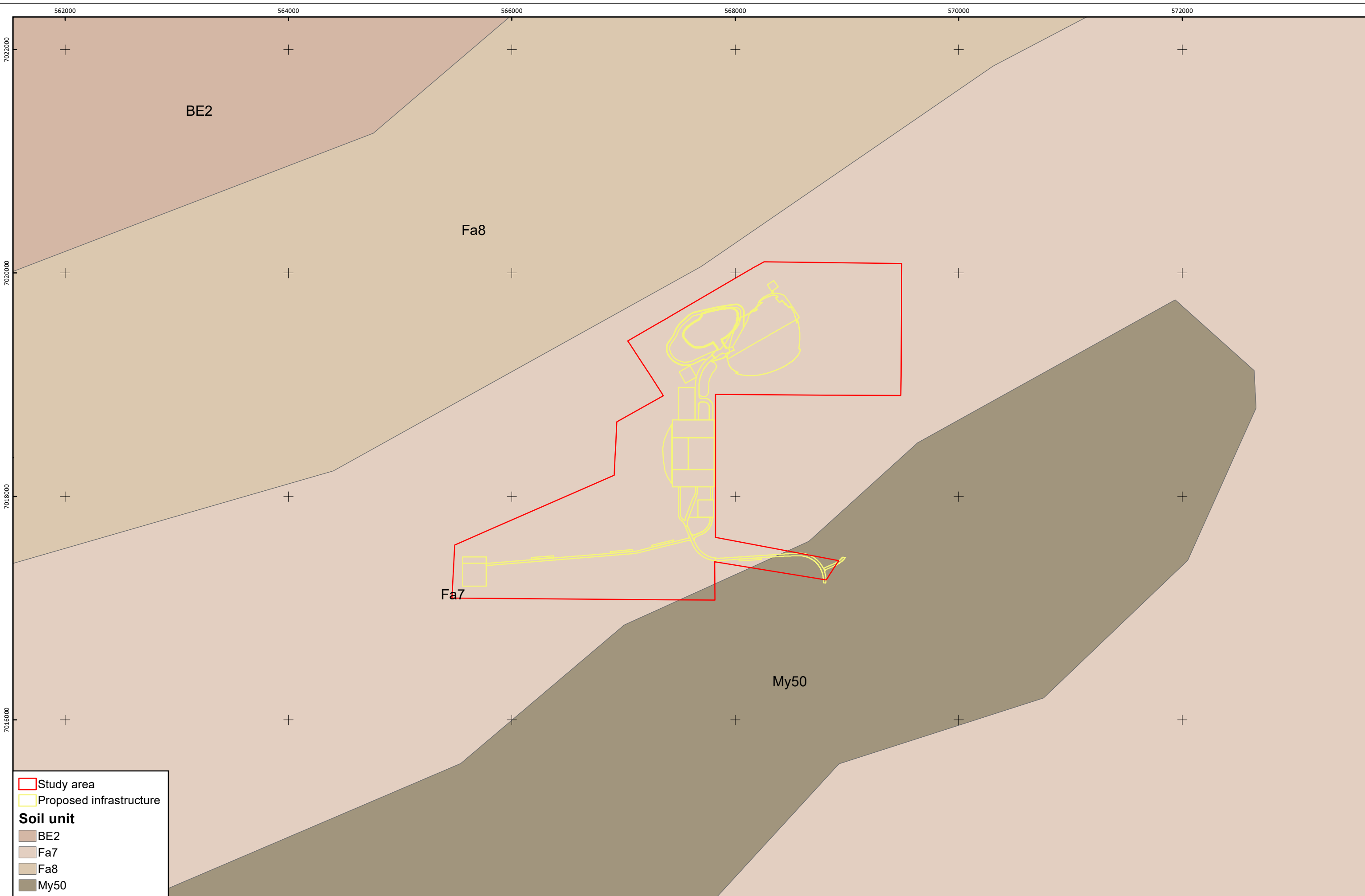
Study area  
 Proposed infrastructure  
**Land system**  
 Jundee Land System  
 Violet Land System  
 Weld Land System  
 Wiluna Land System  
 Yarrameedie Land System

Project: 1796  
 Date: 13 August 2019  
 Author: RS  
 Coordinate System: GDA 1994 MGA Zone 50  
 Projection: Transverse Mercator  
 Absolute Scale: 1:30,000 @A3

**Figure 3.3:** Land systems associated with the study area (Curry et al. 1994).

0 0.75 1.5  
 Kilometers

Service Layer Credits:




Study area  
 Proposed infrastructure  
**Soil unit**  
 BE2  
 Fa7  
 Fa8  
 My50

**Figure 4.3:** Soil units associated with the study area (Northcote et al. 1960-1968).

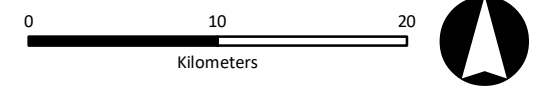


Study area  
 DBCA managed lands and waters

ex Lakeside


 Project: 1796  
 Date: 13 August 2019  
 Author: RS  
 Coordinate System: GDA 1994 MGA Zone 50  
 Projection: Transverse Mercator  
 Absolute Scale: 1:400,000 @A3

**Figure 3.5:** Conservation reserves and nationally important wetlands.



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

### 3.5 FLORA AND VEGETATION

#### 3.5.1 Floristic Diversity

A total of 281 vascular plant taxa (including species, infraspecific taxa, and phrase name taxa) have been recorded from the vicinity of the study area (NatureMap, Appendix B), representing 49 families and 134 genera. The most diverse families are the Asteraceae (44 taxa), Fabaceae (31 taxa), Chenopodiaceae (22 taxa) and Poaceae (21 taxa). The most diverse genera are *Acacia* (23), *Eremophila* (17), *Ptilotus* (11) and *Rhodanthe* (8).

#### 3.5.2 Conservation Significant Species

The TPFL and WAHERB database searches identified 30 conservation significant plant taxa within the 50 km search area, including eight Priority 1 taxa, one Priority 2 taxon, sixteen Priority 3 taxa and five Priority 4 taxa (Table 3.4). The likelihood for each taxon to occur within the study area was assessed (Table 3.4) using the criteria outlined in Table 2.2 (Section 2.1). To assist in this assessment, habitat preferences were sourced, where available, from relevant taxonomic literature, FloraBase records (Western Australian Herbarium 1998–2018), Threatened species profiles (SPRATs) (Threatened Species Scientific Committee 2016), or specimen data from the Australasian Virtual Herbarium (AVH) database (CHAH 2017). Herbarium catalogue numbers are provided if habitat information was derived from specimen data. Data from the reconnaissance level flora survey conducted by *ecologia* in July 2019 was also used.

Five conservation significant plant species were recorded from the study area by *ecologia* during a July 2019 reconnaissance survey (Figure 3.6). In addition to these, based on the proximity of previous records and the potential presence of suitable habitat, five species were considered likely to occur and 10 species possibly occur within the study area (Table 3.4). Eight taxa were considered unlikely to occur due to the probable absence of suitable habitat within the study area.

#### 3.5.3 Introduced Species

A search of the NatureMap database identified seven introduced (weed) species within 40 km of the study area (Table 3.5), none of which are classified as WONS or Declared Pests according to the Western Australian Organism List (WAOL). All species are listed on WOAL as 'Permitted s11', except for *Rumex vesicarius* which is unlisted (Table 3.5).

**Table 3.4: Conservation significant plant taxa recorded within 50 km of the study area and their likelihood of occurrence.**

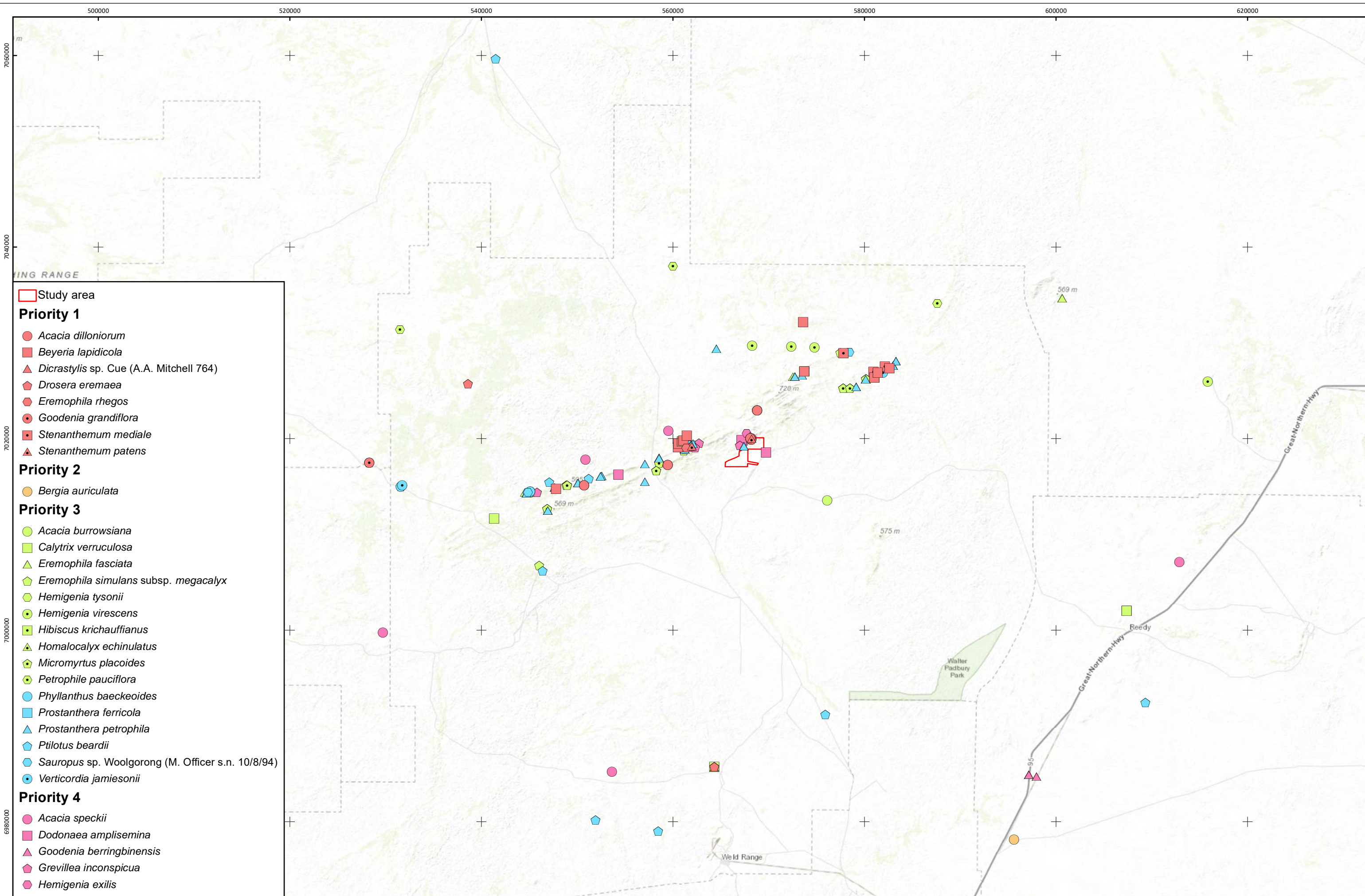
Taxon	Status	Habitat	Flowering	Likelihood of occurrence	Post-survey likelihood of occurrence
<i>Acacia burrowsiana</i>	P3	Red-brown loams with ironstone rubble on surface, calcrete soils, laterite, quartz. Flats adjacent to watercourses, crests of low rises, breakaways.	Unknown	Likely (1)	Unlikely (3)
<i>Acacia dilloniorum</i>	P1	Grows in red clay-loam or red-brown silty clay-loam on the middle and upper slopes and crests of low ranges mostly associated with outcropping basalt, in tall open shrubland.	August	Recorded	Recorded
<i>Acacia speckii</i>	P4	Rocky soils over granite, basalt or dolerite. Rocky hills or rises.	Unknown	Recorded	Recorded
<i>Bergia auriculata</i>	P2	Clay soils. Mud flats.	Unknown	Unlikely (3)	Unlikely (3)
<i>Beyeria lapidicola</i>	P1	<i>Callitris-Acacia</i> woodlands or mulga woodland in sandy loams or on <i>banded ironstone hills</i> .	July to September	Likely (1)	Unlikely (3)
<i>Calytrix verruculosa</i>	P3	Sandy clay.	August or October	Possible (2)	Unlikely (3)
<i>Dicrastylis</i> sp. Cue (A.A. Mitchell 764)	P1	Drainage area, near granite	September to October	Unlikely (3)	Unlikely (3)
<i>Dodonaea amplisemina</i>	P4	Red-brown sandy clay on basalt and gabbro and banded ironstone or on dolerite and quartzite. Rocky hills.	August	Recorded	Recorded
<i>Drosera eremaea</i>	P1	Grows in shallow soils on the aprons of granite outcrops in winter, wet depressions in arid areas.	-	Unlikely (3)	Unlikely (3)
<i>Eremophila fasciata</i>	P3	Hills to the south-east of Meekatharra, amongst rocks and under shrubs in <i>Acacia</i> shrublands.	August	Possible (2)	Unlikely (3)
<i>Eremophila rhegos</i>	P1	Skeletal stony loam over granite.	September	Likely (1)	Unlikely (3)
<i>Eremophila simulans</i> subsp. <i>megacalyx</i>	P3	Unknown	August to September	Possible (2)	Unlikely (3)
<i>Goodenia berringbinensis</i>	P4	Red sandy loam. Along watercourses.	June to October	Possible (2)	Possible (2)
<i>Goodenia grandiflora</i>	P1	Sandy, gravelly soils. Rocky slopes & breakaways.	May to December	Possible (2)	Possible (2)
<i>Grevillea inconspicua</i>	P4	Loam, gravel. Along drainage lines on rocky outcrops, creeklines.	June to August	Recorded	Recorded
<i>Hemigenia exilis</i>	P4	Laterite. Breakaways, slopes.	April or September to November	Likely (1)	Unlikely (3)
<i>Hemigenia tysonii</i>	P3	Red sand, sandy clay, lateritic sand. Flats, sand dunes, hills.	May or July to December	Unlikely (3)	Unlikely (3)
<i>Hemigenia virescens</i>	P3	Hillsides, in rangelands, in low and high shrublands and on sandy banks. Soil types are commonly yellow-red sandy clay, brown ironstone gravel and brown rocky sand.	July to August	Likely (1)	Recorded
<i>Hibiscus krichauffianus</i>	P3	Red sandy soils.	March or October	Unlikely (3)	Unlikely (3)



Taxon	Status	Habitat	Flowering	Likelihood of occurrence	Post-survey likelihood of occurrence
<i>Homalocalyx echinulatus</i>	P3	Laterite. Breakaways, sandstone hills.	June to September	Unlikely (3)	Unlikely (3)
<i>Micromyrtus placoides</i>	P3	Red-orange sandy clay, orange-yellow sandy clay to clayey loam, coarse gravel, banded ironstone, laterite, quartz, basalt. Gently undulating plains, dry creek beds, hillcrests, ridges.	July to September	Recorded	Recorded
<i>Petrophile pauciflora</i>	P3	Decaying & dissected granite breakaways.	September	Unlikely (3)	Unlikely (3)
<i>Phyllanthus baeckeoides</i>	P3	Red lateritic & sandy clay soils. Granite outcrops.	July to September	Unlikely (3)	Unlikely (3)
<i>Prostanthera ferricola</i>	P3	Shallow red-brown skeletal sandy loam on banded ironstone, laterite, basalt or quartz. Gently inclined mid to upper slopes of hills, rocky crests, outcrops.	July to September	Recorded	Unlikely (3)
<i>Prostanthera petrophila</i>	P3	Lateritic soils, ironstone slopes and foothills on red-orange sandy clay with ferrous stones and boulders.	August	Possible (2)	Recorded
<i>Ptilotus beardii</i>	P3	Clayey soils. Saline flats, low breakaways.	August to October	Possible (2)	Unlikely (3)
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)	P3	Footslopes, plains, rocky banded ironstone outcrops.	June	Possible (2)	Unlikely (3)
<i>Stenanthemum mediale</i>	P1	Red clayey sand.	April to August	Possible (2)	Unlikely (3)
<i>Stenanthemum patens</i>	P1	Basalt and banded ironstone hillsides as well as on sandy loam and clay slopes.	August to September	Recorded	Recorded
<i>Verticordia jamiesonii</i>	P3	Quartzite or laterite breakaways, hill slopes, ridgelines, or on weathered granite within pockets of small sandy clay in depressions.	September to October	Possible (2)	Unlikely (3)

**Table 3.5: Introduced plant species recorded within 40 km of the study area (NatureMap).**

Taxon	Common name	WAOL category	Ecological impact	Invasiveness
<i>Cleretum papulosum</i> subsp. <i>papulosum</i>		Permitted - s11	Unrated	Unrated
<i>Hypochaeris glabra</i>	Smooth catsear	Permitted - s11	Low	Rapid
<i>Lysimachia arvensis</i>	Pimpernel	Permitted - s11	Unrated	Unrated
<i>Pentameris airoides</i>	False hairgrass	Permitted - s11	Unrated	Unrated
<i>Rostraria pumila</i>	Rough cat's tail, hairgrass	Permitted - s11	Unrated	Unrated
<i>Rumex vesicarius</i>	Ruby dock	Not listed	Unrated	Unrated
<i>Sisymbrium erysimoides</i>	Smooth mustard	Permitted - s11	Low	Unknown



- Study area**
- Priority 1**
- *Acacia dilloniorum*
  - *Beyeria lapidicola*
  - ▲ *Dicrastylis* sp. Cue (A.A. Mitchell 764)
  - ◆ *Drosera eremaea*
  - *Eremophila rhegos*
  - *Goodenia grandiflora*
  - *Stenanthemum mediale*
  - ▲ *Stenanthemum patens*
- Priority 2**
- *Bergia auriculata*
- Priority 3**
- *Acacia burrowsiana*
  - *Calytrix verruculosa*
  - ▲ *Eremophila fasciata*
  - ◆ *Eremophila simulans* subsp. *megacalyx*
  - *Hemigenia tysonii*
  - *Hemigenia virescens*
  - *Hibiscus krichauffianus*
  - ▲ *Homalocalyx echinulatus*
  - ◆ *Micromyrtus placoides*
  - *Petrophile pauciflora*
  - *Phyllanthus baeckeoides*
  - *Prostanthera ferricola*
  - ▲ *Prostanthera petrophila*
  - ◆ *Ptilotus beardii*
  - *Sauropus* sp. Woolgorong (M. Officer s.n. 10/8/94)
  - *Verticordia jamiesonii*
- Priority 4**
- *Acacia speckii*
  - *Dodonaea amplisemina*
  - ▲ *Goodenia berringbinensis*
  - ◆ *Grevillea inconspicua*
  - *Hemigenia exilis*

**Figure 3.6:** DBCA Priority Flora records within 50 km of the study area.

### 3.5.4 Pre-European Vegetation

Shepherd *et al.* (2001) mapped the extent of pre-European vegetation of Western Australia with updates reflecting National Vegetation Information System (NVIS) standards. Two vegetation associations are associated with the study area: 18 and 202 (Table 3.6, Figure 3.7). The widespread vegetation association 18 is dominated by mulga (*Acacia aneura* and close relatives) low woodlands over *Eremophila fraseri* and *E. foliosissima* tall open shrublands and comprises the vast majority of the study area. Vegetation association 202, comprising mulga and *Acacia quadrimarginea*, is somewhat more restricted regionally and only makes up 0.6% of the study area. Markey and Dillon (2008) noted, however, that *A. quadrimarginea* has not been recorded from either the Weld Range or Jack Hills. The pre-European and current extent of each vegetation association is available from the Statewide Vegetation Statistics dataset (Government of Western Australia 2018). Vegetation associations below 30% of their pre-European extent within a bioregion are classed as ‘Critical Assets’ according to the National Objectives and Targets for Biodiversity Conservation 2001-2005 (Department of Environment and Heritage 2001), as this is the threshold below which species loss appears to accelerate exponentially (Environmental Protection Authority 2000). The current extent of both vegetation associations is well above the 30% threshold, and none are considered restricted from a bioregional context (Table 3.6).

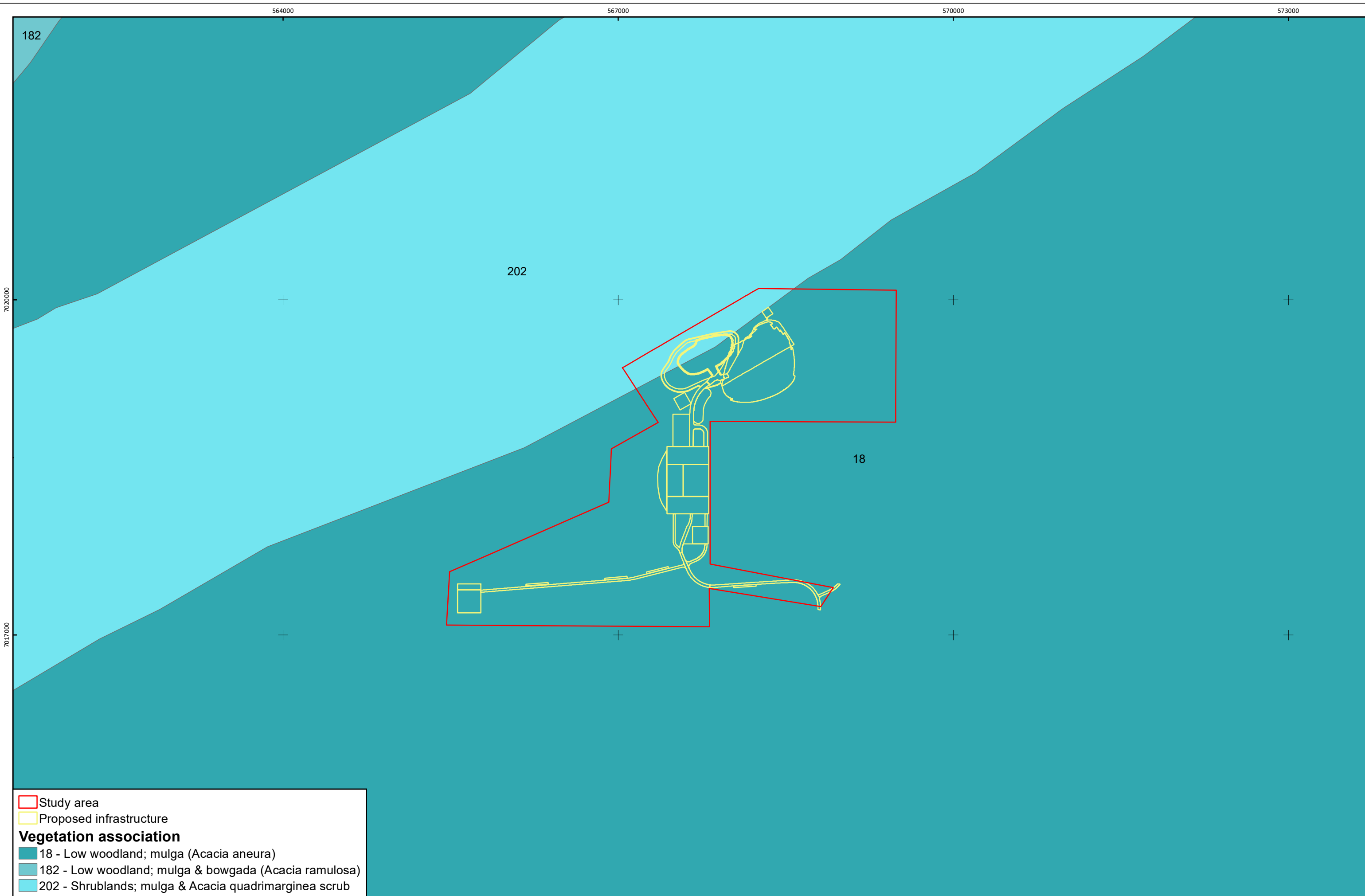
**Table 3.6: Pre-European vegetation associated with the study area**

Vegetation association	Description (NVIS V)	Pre-European extent (ha)	Current extent (ha)	Percent remaining	Percent current extent protected (IUCN I - IV) for conservation	Extent within study area (ha)
18	<i>Acacia aneura</i> low woodland over <i>Eremophila fraseri</i> , <i>Eremophila foliosissima</i> tall open shrubland	19,892,306	19,843,149	99.75	2.13	499.73 (0.003%)
202	<i>Acacia aneura</i> and <i>Acacia quadrimarginea</i> tall open shrubland	448,529	448,343	99.96	0.39	35.34 (0.008%)

In a floristic survey of the Weld Range, primarily targeted crests, slopes and outwashes of the Weld land system, Markey and Dillon (2008) described eight floristic community type for the Weld Range. This survey:

- Community type 1a: *Acacia aneura*, *A. ramulosa* var *linophylla*, and/or *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) over a sparse shrub cover of *Eremophila* spp.
- Community type 1b: Open shrublands and sparse shrublands of *Acacia aneura* (cf. var. *microphylla*, *aneura* and *argentea*), *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), and *Grevillea berryana* over a shrub layer of various species of *Eremophila* (*E. georgei*, *E. latrobei* subsp. *latrobei* and *E. glutinosa*)
- Community type 2: Sparse – open shrublands of *Acacia aneura* cf. var. *microcarpa* and / or *A. aneura* cf. var. *aneura* over the mid-stratum shrub layer which includes species such as *Thryptomene decussata*, *Philotheca brucei* subsp. *brucei* and numerous species of *Eremophila*
- Community type 3: Open shrubland of *Acacia aneura* over isolated shrub species such as *Solanum ashbyae* and *Tribulus suberosus*.
- Community type 4: Open shrublands of *Acacia aneura* and emergent trees of *Acacia pruinocarpa* over shrublands of *Philotheca brucei* subsp. *brucei* and *Eremophila* spp.

- Community type 5a: Isolated, emergent trees of *Acacia pruinocarpa* above *Acacia aneura*/*Acacia ramulosa* var. *linophylla* over an open mid-stratum of shrubs.
- Community type 5b: Sparse open Acacia shrubland (*A. aneura* cf. var. *tenuis*, *A. aneura* cf. var. *aneura* and/or *Acacia coolgardiensis* subsp. *effusa*) over sparse layer of shrubs of *Senna* spp. and *Tribulus suberosus*.
- Community type 6: Sparse – open shrubland of *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia aneura* and *Acacia speckii* over sparse mid-stratum of *Eremophila macmillaniana*, *Eremophila mackinlayi* subsp. *spathulata* and *Senna* spp.



Study area  
 Proposed infrastructure  
**Vegetation association**  
 18 - Low woodland; mulga (*Acacia aneura*)  
 182 - Low woodland; mulga & bowgada (*Acacia ramulosa*)  
 202 - Shrublands; mulga & *Acacia quadrimarginea* scrub

**Figure 3.7:** Pre-European vegetation associations (Shepherd et al. 2001).

### 3.6 SIGNIFICANT ECOLOGICAL COMMUNITIES

No state (DBCAs) or Commonwealth (EPBC Act) listed TECs have been recorded within the study area. Seven Priority Ecological Communities (PECs) have been recorded within 50 km of the study area. These include three Priority 1 and four Priority 3 communities (Table 3.7; Figure 3.8). Four of these represent entire land systems (Austin, Breberle, Trillbar and Yagahong) that do not occur within or in the immediate vicinity of the study area. Both the 'Lake Austin calcrete groundwater assemblage' and 'Taincrow calcrete groundwater assemblage' have been recorded within 50 km of the study area in calcrete substrate; however, these assemblages are specific to the area in which they were recorded. The Priority 1 PEC 'Weld Range Vegetation Complexes (Banded Iron Formation)' occurs over 263.80 ha (49.3%) of the study area according to the spatial extent defined by DBCA, including a 500 m administrative buffer.

**Table 3.7: Threatened and Priority Ecological communities recorded within 50 km of study area and their likelihood of occurrence within the study area.**

Community	Status	Description	Distance from study area (km)	Likelihood of occurrence
Austin Land System	P3	Saline stony plains with low rises and drainage foci supporting low halophytic shrublands with scattered mulga; occurs mainly adjacent to lakes Austin and Annean below greenstone hill systems.	39.88	Does not occur
Breberle Land System	P3	Level saline drainage plains adjacent to ephemeral lakes, claypans and swampy drainage foci with sandy margins and occasional sand dunes; supports tall Acacia shrublands and other fringing shrublands with zonations of perennial grasses and halophytes.	15.78	Does not occur
Lake Austin calcrete groundwater assemblage type on Murchison palaeodrainage on Austin Downs Station	P1	Unique assemblages of invertebrates have been identified in the groundwater calcretes.	42.44	Does not occur
Taincrow calcrete groundwater assemblage type on Murchison palaeodrainage on Taincrow Station	P1	Unique assemblages of invertebrates have been identified in the groundwater calcretes.	34.83	Does not occur
Trillbar Land System	P3	Gently sloping stony plains with low rises of metamorphic rocks and gilgaid drainage foci; supports more or less saline shrublands of snakewood, mulga, bluebush and samphire with patches of tussock grassland	33.75	Does not occur
Weld Range vegetation complexes (banded ironstone formation)	P1	NA	0.00	Recorded
Yagahong Land System	P3	Rough greenstone ridges, hills and cobble-strewn footslopes supporting mulga shrublands	23.63	Does not occur

### 3.7 OTHER SIGNIFICANT ECOSYSTEMS

Twenty-seven ecosystems at risk have been identified as occurring within the Western Murchison subregion (Desmond *et al.* 2001):

- Subterranean fauna of the Murchison Basin. Calcrete formations north east of Cue;
- Mount Narryer and Jack Hills vegetation complexes;
- Stony bluebush mixed shrubland (SBMS) of the Sandstone-Yalgoo-Paynes Find area;
- Hardpan plain mulga shrubland with scattered chenopods (HMCS) of the Sandstone-Yalgoo-Paynes Find area;
- Melaleuca wetlands and spinifex areas of the Lake System on Muggon Station;
- Alluvial plain snakewood chenopod shrubland (ASWS) of the Sandstone- Yalgoo-Paynes Find area;
- Breakaway footslope chenopod low shrubland of the Sandstone-Yalgoo- Paynes Find area;
- Shrubland communities of lake frontages, Murchison area. Polelle Station good condition;
- Floodplains of the Carnarvon Basin, Wooramel and Gascoyne Rivers;
- Assemblages of the inland Granites (Murchison);
- Hardpan mulga (*Acacia aneura*) shrublands HPMS; Murchison River catchment;
- Bluebush (*Maireana* spp.) shrublands BLUS; Murchison River catchment;
- Mixed halophytic shrublands MXHS; Murchison River catchment;
- Stony mulga (*Acacia aneura*) mixed shrubland SMMS; Murchison River catchment;
- Saltbush (*Atriplex* spp.) shrublands SALS; Murchison River catchment;
- Stony snakewood (*Acacia xiphophylla*) shrublands SSWS; Murchison River catchment;
- Calcrete shrubby grasslands CSHG; Murchison River catchment;
- Non-calcareous shrubby grasslands NCSG; Murchison River catchment;
- Creekline grassy shrublands CRGS; Murchison River catchment;
- Calcrete Eucalypt woodlands of Murchison River catchment;
- Assemblages of specific lake communities e.g. Lake Austin, Lake Annean;
- *Eucalyptus camaldulensis* woodlands that are Major Mitchell nesting sites on Berringarra and Milly Milly Stations along the Murchison River;
- Aquatic fauna assemblages of Fish Holes on Doolgunna Station. Possibly have endemic fish and turtles;
- Assemblages of the perched lake at Weld Range;
- Marloo land system Mitchell Grass floodplain, top end type Mia Mia Station;
- Merbla land system Unique treeless grassland;
- CWR Mammals. Extant species include *Dasyercus cristicauda*, Species extinct in subregion include *Macrotis lagotis*, *Pseudomys chapmanii*.





Study area  
 DBCA search buffer (50 km).

**Community**

- Lake Austin calcrete groundwater assemblage type on Murchison palaeodrainage on Austin Downs Station (Priority 1)
- Taincrow calcrete groundwater assemblage type on Murchison palaeodrainage on Taincrow Station (Priority 1)
- AustinLS (Priority 3)
- Breberle Land System (Priority 3)
- Trillbar Land System (Priority 3)
- Yagahong Land System (Priority 3)
- Weld Range vegetation complexes (banded ironstone formation) (Priority 1)

**Figure 3.8:** DBCA Priority Ecological Communities (50 km buffer).

### 3.8 TERRESTRIAL FAUNA

#### 3.8.1 Vertebrate Fauna Assemblage

A total of 199 vertebrate fauna species have been recorded from within 40 km of the study area according to NatureMap database searches (Appendix B) including 122 birds, 42 reptiles, 28 mammals, two fish and two amphibians (Table 3.8). One hundred and three bird species have been recorded within 50 km of the study area according to Birdlife Birdata (Appendix B).

Previous Level 2 vertebrate fauna surveys conducted within the immediate vicinity of the study area by *ecologia* (2009) recorded a total of 141 vertebrate species (Table 3.8).

**Table 3.8: Summary of fauna records**

Database	Mammals	Birds	Reptiles	Amphibians	Fish
NatureMap (all taxa)	28	122	42	5	2
DCBA Threatened and Priority Fauna	4	13	2		
Birdlife Birdata		103			
<i>ecologia</i> (2009) Level 2 survey Weld Range	16	80	44	1	

#### 3.8.2 Fauna of Conservation Significance

Nineteen vertebrate fauna species and one invertebrate species of conservation significance were identified from Threatened and Priority Fauna database searches within 100 km of the study area including four mammals, 13 birds and two reptiles (Table 3.8). Eight Threatened and eight migratory species were identified from the EPBC Act Protected Matters Search Tool (Appendix C) along with 12 listed marine species. Species listed as Marine or species not known to inhabit terrestrial environments have been excluded from further discussion in this report. Significant fauna locations provided in DCBA database search results in relation to the study area, are presented in Figure 3.9.

An assessment of the likelihood of occurrence for relevant conservation significant fauna species recorded based on the desktop assessment was undertaken (Table 3.9). For the relevant species, the likelihood of occurrence was determined by investigating the following:

- Fauna habitats likely to exist within the study area based on the desktop study;
- Distance of previously recorded conservation significant species based on publicly available records;
- Frequency of occurrence of conservation significant species records; and
- Time passed since conservation significant species were recorded.

Each relevant conservation or biologically significant species assessed as potentially occurring within the study area was assigned a likelihood of occurrence rating (Table 3.9) based on the four categories described in (Table 2.2).

The west coast mulga slider (*Lerista eupoda* (P1 BC Act)) has previously been recorded on two occasions within the study area.

The northern shield-backed trapdoor spider (*Idiosoma clypeatum* (P3 BC Act)) (formerly recognised as *I. nigrum*) has been recorded on multiple occasions adjacent the study area in tenement M20/118 and intensive targeted surveys for this species have been conducted within the Weld Range. Rix *et al.* (2018) conducted a conservation systematics review of the genus *Idiosoma* and concluded that the *Idiosoma* populations recorded through the Murchison bioregion and northern sections of the Yalgoo bioregion are *Idiosoma clypeatum*. Based on this classification and species distribution, it can be concluded that the species of trapdoor spider within the Weld Range is *Idiosoma clypeatum* and targeted surveys conducted in the past for *Idiosoma nigrum* are relevant for this species.

Over 1800 trapdoor spider burrows have been identified from database searches, the majority of which are from the Weld Range. Targeted surveys previously conducted by Bamford Consulting Ecologists (2009) and (Biologic 2012a) within tenement M20/118 recorded 135 burrows and 105 burrows respectively. The majority of burrows recorded were found on slopes with a southern aspect under narrow phyllode acacias in a mix of clay and rocky substrates.

Estimated population sizes within tenement M20/118 vary between the two data sets (3,059 for the Bamford data and 4,135 for the Biologic data) (Biologic 2012a). After analysing datasets within similar plant communities within and surrounding M20/118, Biologic (2012a) estimated the population size of *I. clypeatum* to be 14,907 individuals. It was estimated that 27% of this population is within tenement M20/118.

A Level 2 vertebrate fauna assessment conducted by *ecologia* (2009) in the vicinity of the study area recorded three species of conservation significance including the long-tailed dunnart (*Sminthopsis longicaudata* (P4 BC Act)), peregrine falcon (*Falco peregrinus* (OS BC Act)) and west coast mulga slider (*Lerista eupoda* (P1 BC Act)).

**Table 3.9: Conservation significant fauna likelihood of occurrence**

Common name	Scientific name	EPBC status	WA status	Number of records	Latest record	Comments	Likelihood of occurrence pre-survey	Likelihood of occurrence post-survey
<b>Mammals</b>								
Bilby	<i>Macrotis lagotis</i>	VU	VU	1	1984	No suitable habitat present	Unlikely	Unlikely
Black-flanked rock-wallaby	<i>Petrogale lateralis lateralis</i>	EN	EN	1	?	No suitable habitat present	Unlikely	Unlikely
Ghost bat	<i>Macroderma gigas</i>	VU	VU	1	?	No suitable habitat present	Unlikely	Unlikely
Greater stick-nest rat	<i>Leporillus conditor</i>	VU	CD	2	2012	No suitable habitat present	Unlikely	Unlikely
Long-tailed dunnart	<i>Sminthopsis longicaudata</i>		P4		2009	Records in vicinity, suitable habitat present	Likely	Likely
<b>Birds</b>								
Blue-billed duck	<i>Oxyura australis</i>		P4	1	2000	No suitable habitat present	Unlikely	Unlikely
Caspian tern	<i>Hydroprogne caspia</i>	MI	IA	1	2013	No suitable habitat present	Unlikely	Unlikely
Common greenshank	<i>Tringa nebularia</i>	MI	IA	18	2013	No suitable habitat present	Unlikely	Unlikely
Common sandpiper	<i>Actitis hypoleucos</i>	MI	IA	3	2015	No suitable habitat present	Unlikely	Unlikely
Glossy ibis	<i>Plegadis falcinellus</i>	MI	IA	4	2005	No suitable habitat present	Unlikely	Unlikely
Gull-billed tern	<i>Gelochelidon nilotica</i>	MI	IA	4	2001	No suitable habitat present	Unlikely	Unlikely
Hooded plover	<i>Thinornis rubricollis</i>		P4	2	2015	No suitable habitat present	Unlikely	Unlikely
Marsh sandpiper	<i>Tringa stagnatilis</i>	MI	IA	4	2013	No suitable habitat present	Unlikely	Unlikely
Peregrine falcon	<i>Falco peregrinus</i>		OS	9	2017	Records in vicinity, has the potential to overfly the study area	Likely	Likely
Red-necked stint	<i>Calidris ruficollis</i>	MI	IA	3	2012	No suitable habitat present	Unlikely	Unlikely
Sharp-tailed sandpiper	<i>Calidris acuminata</i>	MI	IA	1	2007	No suitable habitat present	Unlikely	Unlikely
White-winged black tern	<i>Chlidonias leucopterus</i>	MI	IA	2	2015	No suitable habitat present	Unlikely	Unlikely
Wood sandpiper	<i>Tringa glareola</i>	MI	IA	4	2005	No suitable habitat present	Unlikely	Unlikely
<b>Reptiles</b>								
West coast mulga slider	<i>Lerista eupoda</i>		P1	21	2014	Previously recorded within the study area	Recorded	Recorded
Western spiny-tailed skink	<i>Egernia stokesii badia</i>	EN	VU	4	2010	Records in vicinity, some suitable habitat present	Possible	Unlikely
<b>Invertebrate</b>								
Northern shield-backed trapdoor spider	<i>Idiosoma clypeatum</i>		P3	1894	2016	Recorded within the study area	Recorded	Recorded



- Study area
- Common name**
- ▲ Caspian tern
  - ▲ bilby
  - ▲ black-flanked rock-wallaby
  - ▲ blue-billed duck
  - △ common greenshank
  - common sandpiper
  - ghost bat
  - glossy ibis
  - greater stick-nest rat
  - gull-billed tern
  - × hooded plover
  - × marsh sandpiper
  - × peregrine falcon
  - × red-necked stint
  - × sharp-tailed sandpiper
  - + shield-backed trapdoor spider
  - ◆ west coast mulga slider
  - ◆ western spiny-tailed skink
  - ◆ white-winged black tern
  - ◆ wood sandpiper

**Figure 3.9:** Conservation significant fauna within 50 km of study area (DBCA).



### 3.9 PREVIOUS BIOLOGICAL SURVEYS NEAR THE STUDY AREA

Several recent flora and fauna assessments have been conducted in the vicinity of the study area, the significant conservation features of which are summarised in Table 3.10:

- Flora and Vegetation of the banded iron formations of the Yilgarn Craton: the Weld Range (Markey and Dillon 2008);
- Atlas Iron Ltd: Weld Range Level 1 Targeted Fauna Survey 2009 (Biologic Environmental 2009);
- Conservation significant flora from Twenty flora surveys (Level 1 and targeted) conducted by *ecologia* between 2006 and 2008 have been summarised in Sinosteel Midwest Corporation LTD: Weld Range Iron Ore Project, Rare Flora Management Plan (*ecologia* 2012);
- Atlas Iron Ltd: Weld Range DSO Project, Local and Regional Significant Flora Assessment 2012 (Woodman Environmental 2012);
- Atlas Iron Ltd: Weld Range *Idiosoma nigrum* Survey 2012 (Biologic 2012a);
- Atlas Iron Ltd: Weld Range DSO Project, Flora and Vegetation Assessment 2012 (Woodman Environmental 2012);
- Weld Range Vertebrate Fauna Assessment. Unpublished Report for Sinosteel-Midwest Management (*ecologia* 2009).

**Table 3.10: Summary of significant features identified during biological surveys relevant to the study area**

Survey	Location	Conservation significant species recorded	TEC/PEC
Flora and Vegetation of the banded iron formations of the Yilgarn Craton: the Weld Range (Markey and Dillon 2008)	Weld Range	<i>Dodonaea amplisemina</i> (P3) <i>Micromyrtus placoides</i> (P1) <i>Phyllanthus baeckeoides</i> (P1) <i>Prostanthera petrophila</i> (P1) <i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94) <i>Stenanthemum patens</i> (P1) <i>Acacia speckii</i> (P3) <i>Prostanthera ferricola</i> (P3)	
Atlas Iron Ltd: Weld Range Level I Targeted Fauna Survey ( <i>ecologia</i> Environment 2009)	ca. 60 km north-east of Cue within tenement M20/118 (adjacent to north-east boundary of current study area).	<i>Lerista eupoda</i> (P1) <i>Pseudantechinus woolleyae</i> (locally significant)	None
Sinosteel Midwest Corporation Ltd: Weld Range Iron Ore Project, Rare Flora Management Plan 2012 ( <i>ecologia</i> 2012)	ca. 60 km north-east of Cue within Sinosteel Midwest Corporation tenements E 20/457, E 20/492, E 20/635, M 20/311, M 20/419, M 51/869, E 20/457, E 20/492, E 20/635, M 20/311, M 20/419 (adjacent to north-east boundary of current study area).	<i>Acacia</i> sp. Wilgie Mia (D. Coultas & G. Woodman AW03-Opp 1) (P1) [now <i>Acacia dilloniorum</i> ] <i>Beyeria lapidicola</i> (P1) <i>Euphorbia sarcostemmoides</i> (P1) <i>Sauropus</i> sp. Woolgorong (P1) <i>Stenanthemum patens</i> (P1) <i>Acacia burrowsiana</i> (P3) <i>Eremophila arachnoides</i> subsp. <i>arachnoides</i> (P3) <i>Goodenia lyrata</i> (P3) <i>Hemigenia tysonii</i> (P3) <i>Homalocalyx echinulatus</i> (P3) <i>Indigofera gilesii</i> subsp. <i>gilesii</i> (P3) <i>Micromyrtus placoides</i> (P3) <i>Mirbelia stipitata</i> (P3) <i>Prostanthera ferricola</i> (P3) <i>Prostanthera petrophila</i> (P3) <i>Ptilotus beardii</i> (P3) <i>Ptilotus luteolus</i> (P3) <i>Tecticornia cymbiformis</i> (P3) <i>Verticordia jamiesonii</i> (P3) <i>Acacia speckii</i> (P4) <i>Dodonaea amplisemina</i> (P4) <i>Goodenia berringbinensis</i> (P4) <i>Grevillea inconspicua</i> (P4)	None

Survey	Location	Conservation significant species recorded	TEC/PEC
Atlas Iron Ltd: Weld Range DSO Project, Local and Regional Significant Flora Assessment 2012 (Woodman Environmental 2012)	ca. 60 km north-east of Cue within tenement M20/118 (overlapping with current study area).	<i>Acacia</i> sp. Wilgie Mia (D. Coultas & G. Woodman AW03-Opp 1) (P1) [now <i>Acacia dilloniorum</i> ] <i>Stenanthemum patens</i> (P1) <i>Micromyrtus placoides</i> (P3) <i>Prostanthera petrophila</i> (P3) <i>Acacia speckii</i> (P4) <i>Dodonaea amplisemina</i> (P4) <i>Grevillea inconspicua</i> (P4)	None
Atlas Iron Ltd: Weld Range <i>Idiosoma nigrum</i> Survey 2012 (Biologic 2012a)	ca. 60 km north-east of Cue within tenement M20/118 (adjacent to north-east boundary of current study area).	<i>Idiosoma nigrum</i> (P3)	None
Atlas Iron Ltd: Weld Range DSO Project, Flora and Vegetation Assessment 2012 (Woodman Environmental 2012)	ca. 60 km north-east of Cue within tenement M20/118 (adjacent to north-east boundary of current study area).	<i>Micromyrtus placoides</i> (P1) <i>Prostanthera petrophila</i> (P1) <i>Stenanthemum patens</i> (P1) <i>Acacia speckii</i> (P3) <i>Dodonaea amplisemina</i> (P3) <i>Grevillea inconspicua</i> (P4).	Weld Range Vegetation Complexes (Banded Iron Formation)
Weld Range Vertebrate Fauna Assessment Unpublished Report for Sinosteel-Midwest Management ( <i>ecologia</i> 2009)	ca. 60 km north-east of Cue within Sinosteel's main ore bodies within the Weld Range	Long-tailed dunnart ( <i>Sminthopsis longicaudata</i> (P4 BC Act)) peregrine falcon ( <i>Falco peregrinus</i> (OS BC Act)) West coast mulga slider ( <i>Lerista eupoda</i> (P1 BC Act))	None



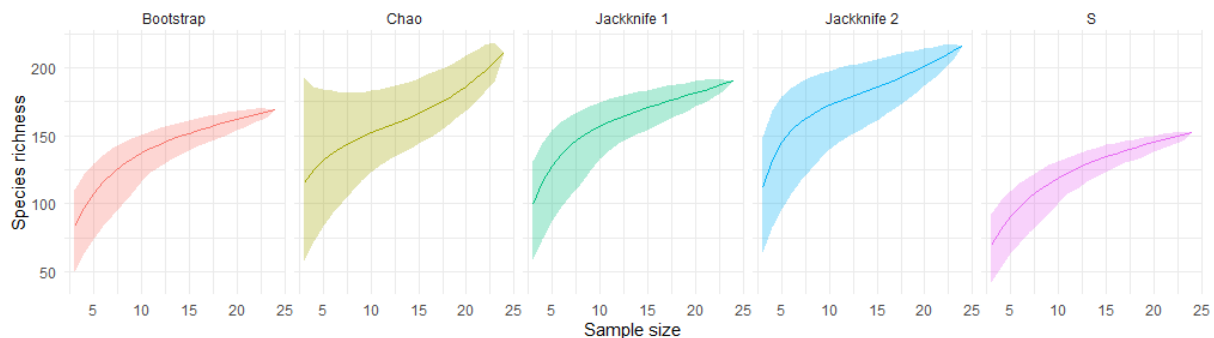
## 4 FIELD SURVEY RESULTS

### 4.1 FLORA AND VEGETATION

#### 4.1.1 Floristic Diversity

A total of 171 vascular plant taxa (species, infraspecific taxa, and phrase names) representing 37 families and 93 genera were recorded during the current survey (Appendix E). The most dominant families in terms of species richness were the Asteraceae (26 taxa), Fabaceae (25), Poaceae (11), Scrophulariaceae (11), Chenopodiaceae (10), and Amaranthaceae (9). At the generic level, the most dominant groups were *Acacia* (16 taxa), *Eremophila* (11), *Ptilotus* (9), *Goodenia* (6), and *Rhodanthe* (6) (Appendix E). Most genera (68) were represented by only one taxon. A large proportion (ca. 44%) of species recorded were annual or short-lived perennial species. Only a small proportion of collected specimens (ca. 1.9% of specimens) could not be confidently identified to species level due to the absence of reproductive material required for positive identification. These identifications (indicated by “?” or “indet.”) are included in the species inventory for the study area but are not included in the statistics described above unless they were unlikely to be confused with any other recorded taxon.

The extrapolated species richness of the study area using the bootstrap, Chao, jackknife 1 and jackknife 2 estimators was 168, 210, 215, and 215 taxa respectively. The total number of taxa recorded from quadrats was 153 taxa, representing between 71% and 91% of the extrapolated species richness. Predicted species accumulation curves of the four estimators showed accumulation of new species not tending towards zero (asymptote) by 25 sites (Figure 4.1). Additional site-based survey effort may therefore have resulted in a larger number of species recorded within sites; however, an additional 17 taxa were recorded opportunistically. For the purposes of this survey, sampling effort was considered adequate.



**Figure 4.1: Predicted species accumulation curves for four estimators (bootstrap, Chao, jackknife 1 and jackknife 2) and observed species richness (S) with upper and lower 95% confidence intervals.**

#### 4.1.2 Significant Flora

##### Conservation Significant Flora

No EPBC Act or BC Act listed Threatened flora species were recorded within the study area during the current survey. Eight DBCA listed Priority Flora species were recorded: *Acacia dilloniorum* (Priority 1), *Stenanthemum patens* (Priority 1), *Hemigenia virescens* (Priority 3), *Micromyrtus placoides* (Priority 3), *Prostanthera petrophila* (Priority 3), *Acacia speckii* (Priority 4), *Dodonaea amplisemina* (Priority 4), and *Grevillea inconspicua* (Priority 4) (Table 4.1). Records from the current survey and from the targeted survey conducted by Woodman Environmental (2012) are shown in Figure 4.3 and those from the current survey are listed in Appendix E. Priority species were primarily recorded from the banded ironstone and dolerite ranges in the northern section of the study area, although several records (*Dodonaea amplisemina* and *Grevillea inconspicua*) were from a stony creek line and stony flats (*Hemigenia virescens*) to the south of the range (Figure 4.3). The results outlined below include the records from the Woodman Environmental survey (2012).

*Acacia dilloniorum* (Fabaceae) (Figure 4.2, Figure 4.3) has been recorded from 110 locations (total of 584 individuals) within the study area on lower and middle slopes of dolerite hills in *Acacia* sp. Weld Range (A. Markey & S. Dillon 2004), *Acacia speckii*, and *Acacia pteraneura* tall sparse shrubland. There are an additional 5,580 recorded individuals of this species occurring outside of the study area within the desktop study area. It is endemic to the Weld Range.

*Stenanthemum patens* (Rhamnaceae) (Figure 4.2, Figure 4.3) has been recorded from a 11 locations (14 individuals) within the study area on a steep rocky banded ironstone slope in *Acacia rhodophloia*, *Acacia incurvaneura*, and *Thryptomene decussata* tall sparse shrubland. There are an additional 377 recorded individuals of this species occurring outside of the study area within the desktop study area. It has a restricted distribution in the Eastern and Western Murchison IBRA subregions, primarily occurring at to highly disjunct localities at Weld Range and near Leonora.

*Hemigenia virescens* (Lamiaceae) (Figure 4.2, Figure 4.3) has been recorded from four locations (total of 37 individuals) within the study area on stony flats to the south of the banded ironstone ranges in *Acacia ramulosa* var. *linophylla*, *Acacia incurvaneura*, and *Acacia incurvaneura* × *mulganeura* tall sparse shrubland. There are an additional four recorded individuals of this species occurring outside of the study area within the desktop study area. It has a relatively restricted distribution in the northern Murchison and southern Gascoyne.

*Micromyrtus placoides* (Myrtaceae) (Figure 4.2, Figure 4.3) has been recorded from 79 locations (4,625 individuals) within the study area on gentle to moderate slopes of banded ironstone ranges primarily in *Acacia incurvaneura*, *Acacia mulganeura*, and *Acacia ramulosa* var. *linophylla* tall sparse shrubland. There are an additional 28 recorded individuals of this species occurring outside of the study area within the desktop study area. It has a relatively restricted distribution primarily in the western Murchison, although it has been recorded from the Yalgoo IBRA bioregion.

*Prostanthera petrophila* (Lamiaceae) (Figure 4.2, Figure 4.3) has been recorded from 20 locations (total of 119 individuals) within the study area on moderate to steep slopes of banded ironstone ranges in *Acacia rhodophloia*, *Acacia incurvaneura*, and *Thryptomene decussata* tall sparse shrubland, and in *Acacia incurvaneura*, *Acacia mulganeura*, and *Acacia ramulosa* var. *linophylla* tall sparse shrubland. There are an additional 943 recorded individuals of this species occurring outside of the study area within the desktop study area. It has a relatively restricted distribution at a few localities primarily in the western Murchison, although it has been recorded from the Yalgoo IBRA bioregion.

*Acacia speckii* (Fabaceae) (Figure 4.2, Figure 4.3) has been recorded from 156 locations (total of 559 individuals) within the study area on middle and upper slopes of low dolerite hills in *Acacia* sp. Weld Range (A. Markey & S. Dillon 2004), *Acacia speckii*, and *Acacia pteraneura* tall sparse shrubland. There are an additional 166 recorded individuals of this species occurring outside of the study area within

the desktop study area. It has relatively widespread distribution in the western Murchison and central Yalgoo IBRA bioregions.

*Dodonaea amplisemina* (Sapindaceae) (Figure 4.2, Figure 4.3) has been recorded from 85 locations (total of 430 individuals) within the study area on lower and middle slopes of low dolerite hills and along stony creek lines in *Acacia* sp. Weld Range (A. Markey & S. Dillon 2004), *Acacia speckii* (P4), and *Acacia pteraneura* tall sparse shrubland, and in *Acacia* sp. Weld Range (A. Markey & S. Dillon 2004), and *Acacia ramulosa* var. *linophylla* tall sparse shrubland. There are an additional 121 recorded individuals of this species occurring outside of the study area within the desktop study area. It has a relatively widespread distribution in the western Murchison and central Yalgoo IBRA bioregions.

*Grevillea inconspicua* (Proteaceae) (Figure 4.2, Figure 4.3) has been recorded from 15 locations (total of 35 individuals) within the study area along stony creek lines in *Acacia* sp. Weld Range (A. Markey & S. Dillon 2004) and *Acacia ramulosa* var. *linophylla* tall sparse shrubland. There are an additional 70 recorded individuals of this species occurring outside of the study area within the desktop study area. It has a relatively widespread distribution in the western and eastern Murchison IBRA bioregion.

### **Atypical Specimens and Range Extensions**

Although several specimens were unable to be identified to species level, none of these were believed to represent Threatened or Priority flora species, nor were any considered to be anomalous (i.e. potentially new species). There were no species recorded that were considered representative of the range of the species (i.e. at the limits of their distributional range, newly recorded bioregional range extensions, or isolated outliers).



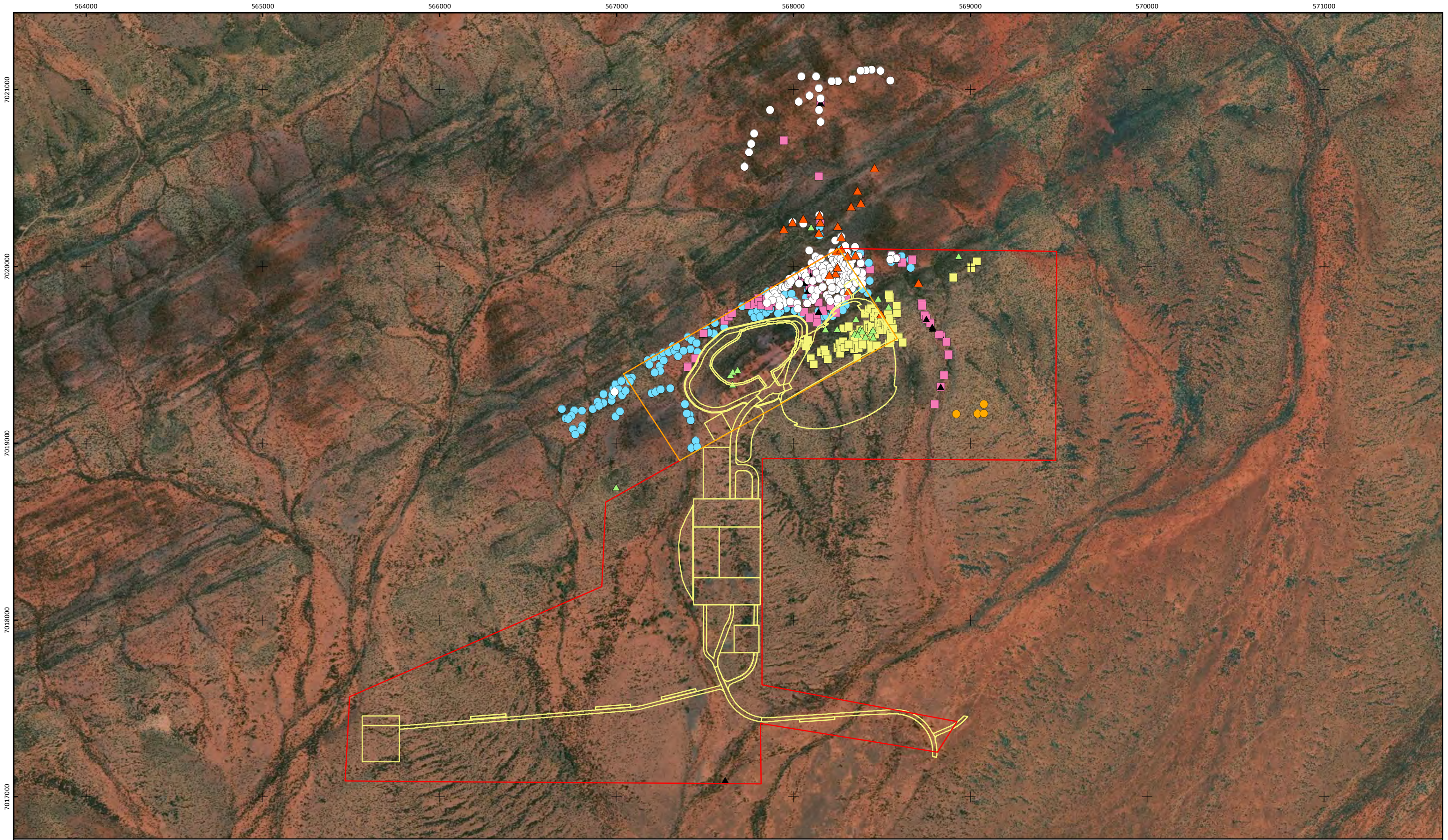
**Figure 4.2: Photos of Priority Flora species recorded within the study area**

Top left to right: *Acacia dilloniorum* phyllodes and flower; *Acacia speckii* phyllodes and pods; *Dodonaea amplisemina* leaves and fruit; *Grevillea inconspicua* leaves and fruit. Bottom left to right: *Hemigenia virescens* leaves and flower; *Micromyrtus placoides* leaves and flowers; *Prostanthera petrophila* leaves and fruit; *Stenanthemum patens* leaves and flowers.

**Table 4.1: Summary of conservation significant species recorded within the study area**

Taxon	Description and habitat	Vegetation type(s)	Number of point locations (number of individuals) within study area <sup>1</sup>	Estimate of total known local individuals <sup>1</sup>	Individuals recorded within proposed infrastructure envelope	IBRA subregion distribution
<b>Priority 1</b>						
<i>Acacia dilloniorum</i>	Intricately branched shrub with spinescent branchlets to ca. 1.8 m. Red clay loam or red-brown silty clay loam on middle and upper slopes and crests of low dolerite ranges.	SH02, SH07	110 (584)	6,164	21	Western Murchison (MUR)
<i>Stenanthemum patens</i>	Low rounded shrub to ca. 0.5 m. Red-brown clay loam on slopes of low hills of dolerite and banded ironstone.	SH02, SH04, SH05, SH07	11 (14)	391	1	Eastern Murchison (MUR), Western Murchison (MUR)
<b>Priority 3</b>						
<i>Hemigenia virescens</i>	Low rounded shrub to ca. 0.6 m. Red-brown clay loam on flats, sand and lateritic gravel.	SH08	4 (37)	41	0	Augustus (GAS), Western Murchison (MUR)
<i>Micromyrtus placoides</i>	Shrub to ca. 2.3 m. Red-orange sandy clay to clay loam, gravel, banded ironstone, laterite, quartz, dolerite; gently undulating plains, dry creek beds, hillcrests, ridges.	SH05, SH07, SH08	79 (4625)	4,653	3,864	Eastern Murchison (MUR), Tallering (YAL), Western Murchison (MUR)
<i>Prostanthera petrophila</i>	Low spreading shrub to ca. 1.5 m. Lateritic soils.	SH05, SH07, SH08	20 (119)	1,062	63	Eastern Murchison (MUR), Tallering (YAL), Western Murchison (MUR)
<b>Priority 4</b>						
<i>Acacia speckii</i>	Rounded shrub or tree to 3 m. Rocky soils over granite, dolerite.	SH02, SH03, SH07	156 (559)	725	21	Augustus (GAS), Eastern Murchison (MUR), Tallering (YAL), Western Murchison (MUR)
<i>Dodonaea amplisemina</i>	Low shrub to ca. 1 m. Red-brown sandy clay or clay loam on basalt, banded ironstone, quartzite; rocky hills and drainage lines.	SH02, SH03, SH04, SH07	85 (430)	551	10	Augustus (GAS), Avon Wheatbelt P1 (AVW), Eastern Murchison (MUR), Tallering (YAL), Western Murchison (MUR)
<i>Grevillea inconspicua</i>	Intricately branched spreading shrub to ca. 2 m. Loam gravel; rocky drainage lines, creeks, outcrops.	SH02, SH03, SH04	15 (35)	105	0	Eastern Murchison (MUR), Western Murchison (MUR)

<sup>1</sup>Records from the current survey, Woodman Environmental (2012), and current DBCA Threatened and Priority Flora database searches. Records with no abundance data were assumed to have one individual.



- |                                       |                                |                              |                             |
|---------------------------------------|--------------------------------|------------------------------|-----------------------------|
| Study area                            | <b>Priority 1</b>              | <b>Priority 3</b>            | <b>Priority 4</b>           |
| Study area (surveyed by Woodman 2012) | <i>Acacia dilloniorum</i>      | <i>Hemigenia virescens</i>   | <i>Acacia speckii</i>       |
| Proposed infrastructure               | <i>Stenanthemum patens</i>     | <i>Micromyrtus placoides</i> | <i>Dodonaea amplisemina</i> |
|                                       | <i>Prostanthera petrophila</i> | <i>Grevillea inconspicua</i> |                             |

**Figure 4.3:** Distribution of Priority Flora species recorded within the study area (ecologia 2019 and Woodman 2012 records).



#### 4.1.3 Introduced Flora

Three introduced plant species (weeds) were recorded during the survey (Table 4.2): *Cuscuta planiflora* (small-seeded dodder), *Lysimachia arvensis* (pimpernel), and *Rostraria pumila* (rough cat's tail). None of these are WONS or listed as a Declared Pests on the Western Australian Organism List (Department of Agriculture and Food Western Australia 2016): all species are listed as Permitted - s11 by DAFWA. Ecological impact and invasiveness ratings (see Appendix A for definitions) have been determined for introduced species in the Midwest region (Department of Parks and Wildlife 2013), which are listed for these species in Table 4.2. Each of these species were recorded from very few locations within the study area and were in very low abundance.

**Table 4.2: Summary of introduced species recorded within the study area**

Species	Common name	Family	WAOL rating	Ecological Impact	Invasiveness
<i>Cuscuta planiflora</i>	Small-seeded dodder	Convolvulaceae	Permitted - s11	Unknown	Rapid
<i>Lysimachia arvensis</i>	Pimpernel	Primulaceae	Permitted - s11	Low	Rapid
<i>Rostraria pumila</i>	Rough cat's tail, hairgrass	Poaceae	Permitted - s11	Unknown	Unknown

#### 4.1.4 Vegetation Types

A Similarity Profile Analysis was conducted on floristic data collected from 24 sampling sites surveyed within the study area. SIMPROF identified ten significantly different groups (Figure 4.4) within which sites may be considered homogenous with respect to overall species composition; these clusters informed the description of ten vegetation types (Table 4.3), which were mapped across the area by extrapolation from aerial imagery and ground-truthed sites (Figure 4.5). The species assemblages associated with each vegetation type are shown in a constancy table in Appendix F. The vegetation types identified tended to correlate strongly with soil types, topographic features, and landforms present within the study area.

The floristic richness of sampled sites ranged from 15 to 63 taxa per site. The least diverse sites were associated with stony plains to the south of the BIF ranges (i.e. vegetation types SH01 and SH08, mean 19.5 and 21 taxa respectively), while the most diverse sites were associated with minor creeks to the south of the range (vegetation types SH03 and SH04, mean 53 and 54.3 taxa respectively).

##### *Minor creeks, drainage lines, and floodplains*

Four vegetation types were described from minor stony creeks and drainage lines. Two tall shrubland types (SH03 and SH04) associated with the prominent creeks were primarily dominated by *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia ramulosa* var. *linophylla* tall sparse shrubland, and exhibited a comparatively high level of species diversity (Table 4.3). Two low woodland types (W01 and W02) occurring along minor drainage lines and associated floodplains are typically dominated by *Acacia pruinocarpa* low open woodland and various mulga species (*Acacia pteraneura*, *A. incurvaneura*, *A. mulganeura*) in the tall shrub layer (Table 4.3). These vegetation types account for 19.6% (104.76 ha) of the study area.

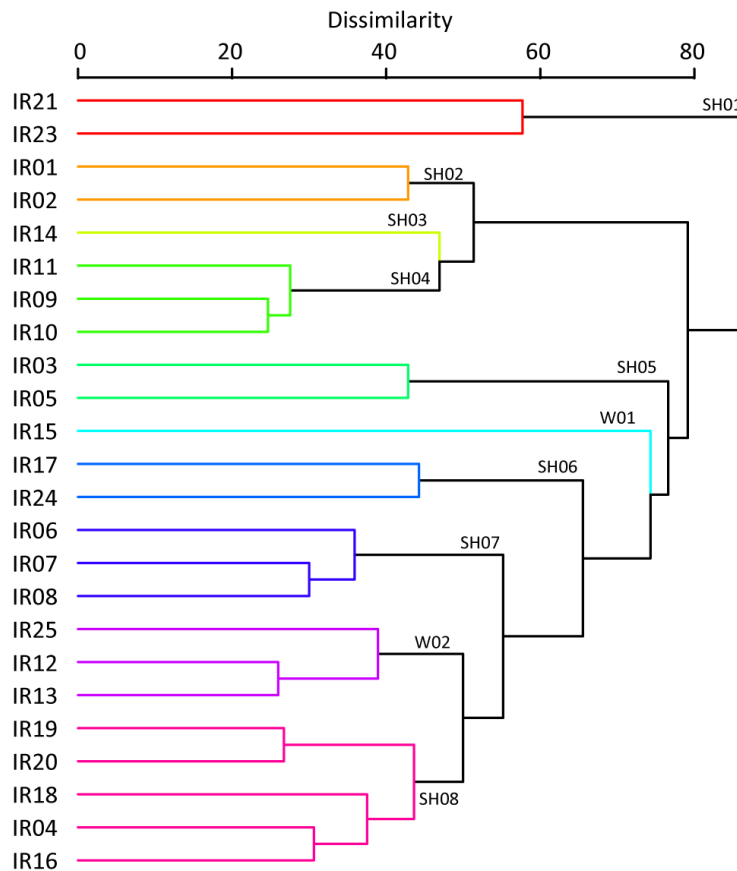
##### *Stony and gravelly plains*

Three vegetation types (SH01, SH06 and SH08) were described from stony clay-loam plains to the south of the BIF ranges. SH01 is floristically distinct from all other clusters (Figure 4.4) and restricted to small calcrete patches. It was dominated by *Acacia ramulosa* subsp. *ramulosa* and *Acacia tetragonophylla* tall sparse shrubland over *Ptilotus obovatus*, *Scaevola spinescens*, and *Senna artemisioides* subsp. *xartemisioides* low sparse shrubland (Table 4.3). SH06 and SH08 are more widespread occurring extensively on plains with ironstone and banded ironstone gravel, and typically dominated by mulga species (*A. incurvaneura*, *A. fuscaneura*, *A. incurvaneura* × *A. mulganeura*) and *A. ramulosa* subsp.

*linophylla* in the tall shrub layer over *Eremophila* low shrubs (Table 4.3). These vegetation types account for 70.3% (376.58 ha) of the study area.

*Dolerite and banded ironstone hills and outcrops*

Three vegetation types (SH02, SH05, and SH07) were described from dolerite hills and BIF ranges and crests in the northern section of the study area. SH02 is restricted to the lower and middle slopes of dolerite hills in far north of the study area and is dominated by *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii* (P4), *Acacia pteraneura* tall sparse shrubland. SH05 is restricted to the steep middle and upper slopes and crests of BIF ranges in the far north of the study area and is dominated by *Acacia rhodophloia*, *Acacia incurvaneura*, *Thryptomene decussata* tall sparse shrubland. SH07 is restricted to the gentler lower and middle slopes surrounding vegetation type SH05 and was dominated by *Acacia incurvaneura*, *Acacia mulganeura*, *Acacia ramulosa* var. *linophylla* tall sparse shrubland. These vegetation types accounts for 10.1% (54.22 ha) of the study area.



**Figure 4.4: UPGMA dendrogram summarising floristic relationships among quadrats and vegetation types.**

Coloured branches indicate significantly different clusters based on similarity profile analysis ( $\alpha = 0.01$ ). Described vegetation types are indicated on branches.



#### 4.1.5 Vegetation Condition

Vegetation condition at all sampling sites was assessed as 'Very Good' or 'Excellent' according to the EPA Vegetation Condition Scale. Excluding cleared vehicle tracks and graded grid lines, vegetation across the entire study area showed either no obvious evidence of disturbance or only minor weed invasion or grazing by cattle and goats. Vegetation condition mapping of the study area (Figure 4.6) was primarily extrapolated from site-based vegetation condition assessments. Because of this, a broader category of 'Very Good to Excellent' was used as vegetation tends to vary somewhat over larger areas with respect to the presence or absence of disturbance factors such as grazing and weeds.

**Table 4.3: Summary of vegetation types within the study area**

Code	Broad floristic formation (NVIS III)	Vegetation description (NVIS V)	Landform	Soil type and surface geology	Vegetation condition	Indicator species (indicator value $\geq 0.80$ , $p < 0.05$ )	Mean quadrat/relevé species richness (range)	Extent within study area (ha) (%)	Representative sites
SH01	Acacia sparse shrubland	<i>Acacia ramulosa</i> var. <i>ramulosa</i> , <i>Acacia tetragonophylla</i> tall sparse shrubland; <i>Ptilotus obovatus</i> , <i>Scaevola spinescens</i> , <i>Senna artemisioides</i> subsp. <i>xartemisioides</i> low sparse shrubland.	Plains	Red-brown clay loam; calcrete, BIF pebbles	Excellent	<i>Acacia craspedocarpa</i> (1.000)	19.5 (19–20)	0.53 (0.1%)	IR21, IR23, V10
SH02	Acacia sparse shrubland	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia speckii</i> (P4), <i>Acacia pteraneura</i> tall sparse shrubland; <i>Eremophila glutinosa</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Senna artemisioides</i> subsp. <i>xsturtii</i> low sparse shrubland.	Gentle to moderate dolerite slopes	Red-brown clay loam; dolerite, BIF	Excellent	<i>Acacia speckii</i> (1.000), <i>Goodenia berardiana</i> (0.866), <i>Eremophila macmillaniana</i> (0.816)	40.5 (40–41)	22.96 (4.29%)	IR01, IR02, V06
SH03	Acacia open shrubland	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia incurvaneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> tall open shrubland; <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Ptilotus obovatus</i> low sparse shrubland.	Minor creeks	Red-brown clay loam; BIF pebbles	Excellent	–	63	17.97 (3.36%)	IR14, V11
SH04	Acacia sparse shrubland	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994), <i>Acacia ramulosa</i> var. <i>linophylla</i> tall sparse shrubland; <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Ptilotus obovatus</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> low sparse shrubland.	Minor creeks	Red-brown clay loam; dolerite, BIF pebbles	Very Good to Excellent	<i>Senecio</i> sp. (1.000), <i>Cymbopogon ambiguus</i> (0.913), <i>Lepidium oxytrichum</i> (0.816), <i>Phyllanthus maderaspatensis</i> (0.813)	54.3 (52–57)	5.5 (1.03%)	IR09, IR10, IR11, V05
SH05	Acacia sparse shrubland	<i>Acacia rhodophloia</i> , <i>Acacia incurvaneura</i> , <i>Thryptomene decussata</i> tall sparse shrubland; <i>Ptilotus obovatus</i> , <i>Dodonea pachyneura</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> low sparse shrubland.	Steep banded ironstone slopes and crests	Red-brown clay loam; BIF	Excellent	<i>Acacia rhodophloia</i> (1.000), <i>Philothea brucei</i> subsp. <i>brucei</i> (0.866), <i>Thryptomene decussata</i> (0.820)	29 (26–32)	7.89 (1.47%)	IR03, IR05, V04
SH06	Acacia sparse shrubland	<i>Acacia incurvaneura</i> , <i>Acacia fuscaneura</i> , <i>Acacia incurvaneura</i> <i>x mulganeura</i> tall sparse shrubland; <i>Eremophila georgei</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Psyrax latifolia</i> low sparse shrubland.	Plains	Red-brown clay loam; BIF pebbles	Excellent	–	22 (19–25)	103.17 (19.28%)	IR17, IR24, V12

Code	Broad floristic formation (NVIS III)	Vegetation description (NVIS V)	Landform	Soil type and surface geology	Vegetation condition	Indicator species (indicator value $\geq 0.80$ , $p < 0.05$ )	Mean quadrat/relevé species richness (range)	Extent within study area (ha) (%)	Representative sites
SH07	Acacia sparse shrubland	<i>Acacia incurvaneura</i> , <i>Acacia mulganeura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> tall sparse shrubland; <i>Eremophila glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Micromyrtus placoides</i> (P3) low sparse shrubland.	Gentle to moderate banded ironstone slopes	Red-brown clay loam; BIF pebbles	Excellent	<i>Micromyrtus placoides</i> (1.000)	27.6 (26–29)	55.94 (10.45%)	IR06, IR07, IR08, V03
SH08	Acacia sparse shrubland	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia incurvaneura</i> , <i>Acacia incurvaneura</i> × <i>mulganeura</i> tall sparse shrubland; <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>Ptilotus schwartzii</i> low sparse shrubland.	Plains	Red-brown clay loam; BIF pebbles	Excellent	–	21 (15–25)	253.16 (47.31%)	IR04, IR16, IR18, IR19, IR20, V01, V07, V09, V14
W01	Acacia open woodland	<i>Acacia pruinocarpa</i> low open woodland; <i>Acacia pteraneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> tall open shrubland; <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Ptilotus obovatus</i> low sparse shrubland.	Drainage lines, floodplains	Red-brown clay loam; ironstone	Excellent	–	33	27.19 (5.08%)	IR15, V02
W02	Acacia open woodland	<i>Acacia pruinocarpa</i> low open woodland; <i>Acacia incurvaneura</i> , <i>Acacia fuscaneura</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> tall open shrubland; <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eremophila georgei</i> , <i>Ptilotus obovatus</i> low sparse shrubland.	Drainage lines, floodplains	Red-brown clay loam; BIF pebbles	Very Good to Excellent	<i>Euphorbia drummondii</i> (1.000)	42.3 (38–45)	40.76 (7.62%)	IR12, IR13, IR14, IR25, V08, V13

#### 4.1.6 Significant Vegetation

##### Threatened and Priority Ecological Communities

No state (DBCA) or Commonwealth (EPBC Act) listed TECs have been recorded within or in the vicinity of the study area, and none of the vegetation types described here were assessed as corresponding to any known TEC.

The Priority 1 PEC 'Weld Range vegetation complexes (banded ironstone formation)' includes any vegetation associated with the Weld Range and occurs over the northern part of the study area. The study area includes 263.8 ha of the PEC as defined by DBCA, including a 500 m administrative buffer, which represents ca. 1% of the total extent of the PEC. The proposed infrastructure includes 78.48 ha (0.3%) of the DBCA defined PEC (Table 4.4, Figure 4.7).

Within the study area, vegetation type SH07 is considered to approximate the southern edge of the Weld Range, south of which are primarily foot-slopes and stony plains (primarily consisting of vegetation type SH06 and SH08). Vegetation occurring within this boundary is therefore considered to correspond closely to the PEC. Six vegetation types occur within this boundary: SH02 (22.9 ha), SH03 (2.55 ha), SH04 (1.70 ha), SH05 (7.89 ha), SH07 (55.94 ha), and W01 (0.17 ha), totalling 91.22 ha, including 30.28 ha associated with the proposed infrastructure boundary (Table 4.4, Figure 4.7).

##### Vegetation of potential local significance

Vegetation types SH02, SH04, SH05, and SH07 may be considered locally significant as they support the Priority 1 species *Acacia dilloniorum* and *Stenanthemum patens*. Vegetation types SH03 and SH04 may be considered locally significant as they support a comparatively high level of plant species diversity. Vegetation type SH01 is highly restricted within the study area (0.53 ha, 0.1% of study area) and may therefore be considered locally significant. The extent of each of these vegetation types within the study area potentially impacted by the proposed infrastructure is outlined in Table 4.4.

**Table 4.4: Area of potential impact to DBCA defined PEC and vegetation occurring on Weld Range.**

Vegetation type	Total area mapped (ha)	Local significance	Total clearing area (proposed infrastructure) (ha)	Area impact to PEC (ha) (DBCA defined, including buffer)	Percent impact to PEC (ha) (DBCA defined, including buffer)	Area impact to range vegetation (ha) (range defined)
SH01	0.53	Locally restricted	0.03	–	–	–
SH02	22.96	Supports <i>Acacia dilloniorum</i> (P1) and <i>Stenanthemum patens</i> (P1)	0.36	0.36	0.001%	0.36
SH03	17.97	High species diversity	0.62	0.03	< 0.001 %	0.02
SH04	5.50	Supports <i>Stenanthemum patens</i> (P1), high species diversity	–	–	–	–
SH05	7.89	Supports <i>Stenanthemum patens</i> (P1)	2.84	2.84	0.011%	2.84
SH06	103.17	–	5.58	–	–	–
SH07	55.94	Supports <i>Acacia dilloniorum</i> (P1) and <i>Stenanthemum patens</i> (P1)	26.89	26.89	0.102%	26.89
SH08	253.16	–	66.31	41.35	0.157%	–
W01	27.19	–	4.36	4.36	0.017%	0.17
W02	40.76	–	8.72	2.64	0.010%	–
<b>TOTAL</b>	<b>535.07</b>		<b>115.71</b>	<b>78.48</b>	<b>0.298%</b>	<b>30.29</b>



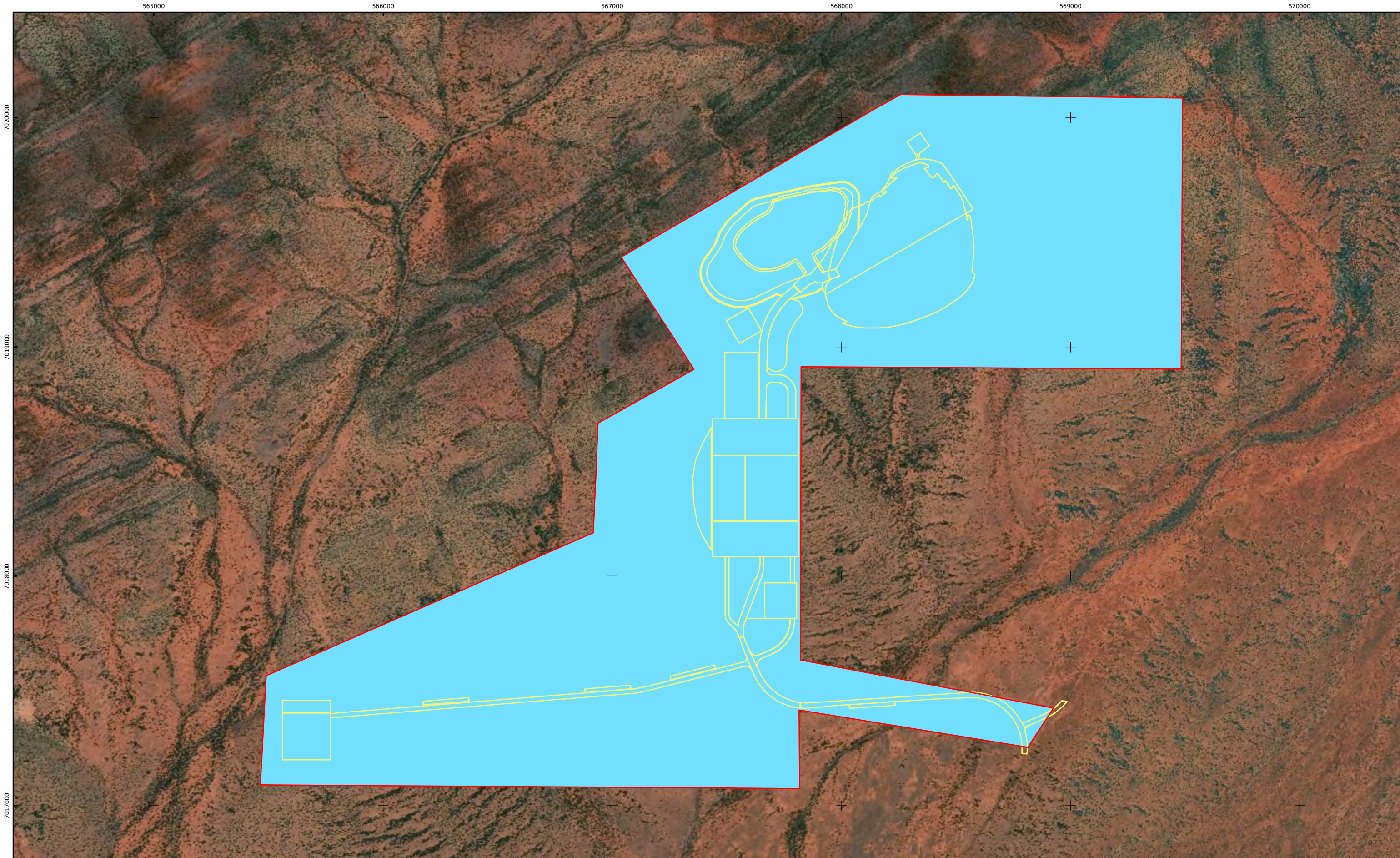
**Study area (Woodman 2009) Vegetation type**

- Study area
- Proposed infrastructure
- Quadrat/relevé
- Vegetation description

- SH01: *Acacia ramulosa* var. *ramulosa*, *Acacia tetragonophylla* tall sparse shrubland; *Ptilotus obovatus*, *Scaevola spinescens*, *Senna artemisioides* subsp. *xartemisioides* low sparse shrubland.
- SH02: *Acacia* sp. Weld Range (A. Markey & S. Dillon 1994), *Acacia speckii* (P4), *Acacia pteraneura* tall sparse shrubland; *Eremophila glutinosa*, *Eremophila mackinlayi* subsp. *spathulata*, *Senna artemisioides* subsp. *xsturtii* low sparse shrubland.
- SH03: *Acacia* sp. Weld Range (A. Markey & S. Dillon 1994), *Acacia incurvaneura*, *Acacia ramulosa* var. *linophylla* tall open shrubland; *Eremophila forrestii* subsp. *forrestii*, *Harnieria kempeana* subsp. *muelleri*, *Ptilotus obovatus* low sparse shrubland.
- SH04: *Acacia* sp. Weld Range (A. Markey & S. Dillon 1994), *Acacia ramulosa* var. *linophylla* tall sparse shrubland; *Eremophila mackinlayi* subsp. *spathulata*, *Ptilotus obovatus*, *Senna artemisioides* subsp. *helmsii* low sparse shrubland.
- SH05: *Acacia rhodophloia*, *Acacia incurvaneura*, *Thryptomene decussata* tall sparse shrubland; *Ptilotus obovatus*, *Dodoniaea pachyneura*, *Eremophila latrobei* subsp. *latrobei* low sparse shrubland.
- SH06: *Acacia incurvaneura*, *Acacia fuscaneura*, *Acacia incurvaneura* x *mulganeura* tall sparse shrubland; *Eremophila georgei*, *Eremophila forrestii* subsp. *forrestii*, *Psydrax latifolia* low sparse shrubland.
- SH07: *Acacia incurvaneura*, *Acacia mulganeura*, *Acacia ramulosa* var. *linophylla* tall sparse shrubland; *Eremophila glutinosa*, *Eremophila latrobei* subsp. *latrobei*, *Micromyrtus placoides* (P3) low sparse shrubland.
- SH08: *Acacia ramulosa* var. *linophylla*, *Acacia incurvaneura*, *Acacia incurvaneura* x *mulganeura* tall sparse shrubland; *Eremophila forrestii* subsp. *forrestii*, *Eremophila jucunda* subsp. *jucunda*, *Ptilotus schwartzii* low sparse shrubland.
- W01: *Acacia pruinocarpa* low open woodland; *Acacia pteraneura*, *Acacia ramulosa* var. *linophylla* tall open shrubland; *Eremophila forrestii* subsp. *forrestii*, *Harnieria kempeana* subsp. *muelleri*, *Ptilotus obovatus* low sparse shrubland.
- W02: *Acacia pruinocarpa* low open woodland; *Acacia incurvaneura*, *Acacia fuscaneura*, *Acacia ramulosa* var. *linophylla* tall open shrubland; *Eremophila forrestii* subsp. *forrestii*, *Eremophila georgei*, *Ptilotus obovatus* low sparse shrubland.

**Figure 4.5: Vegetation types associated with the study area.**

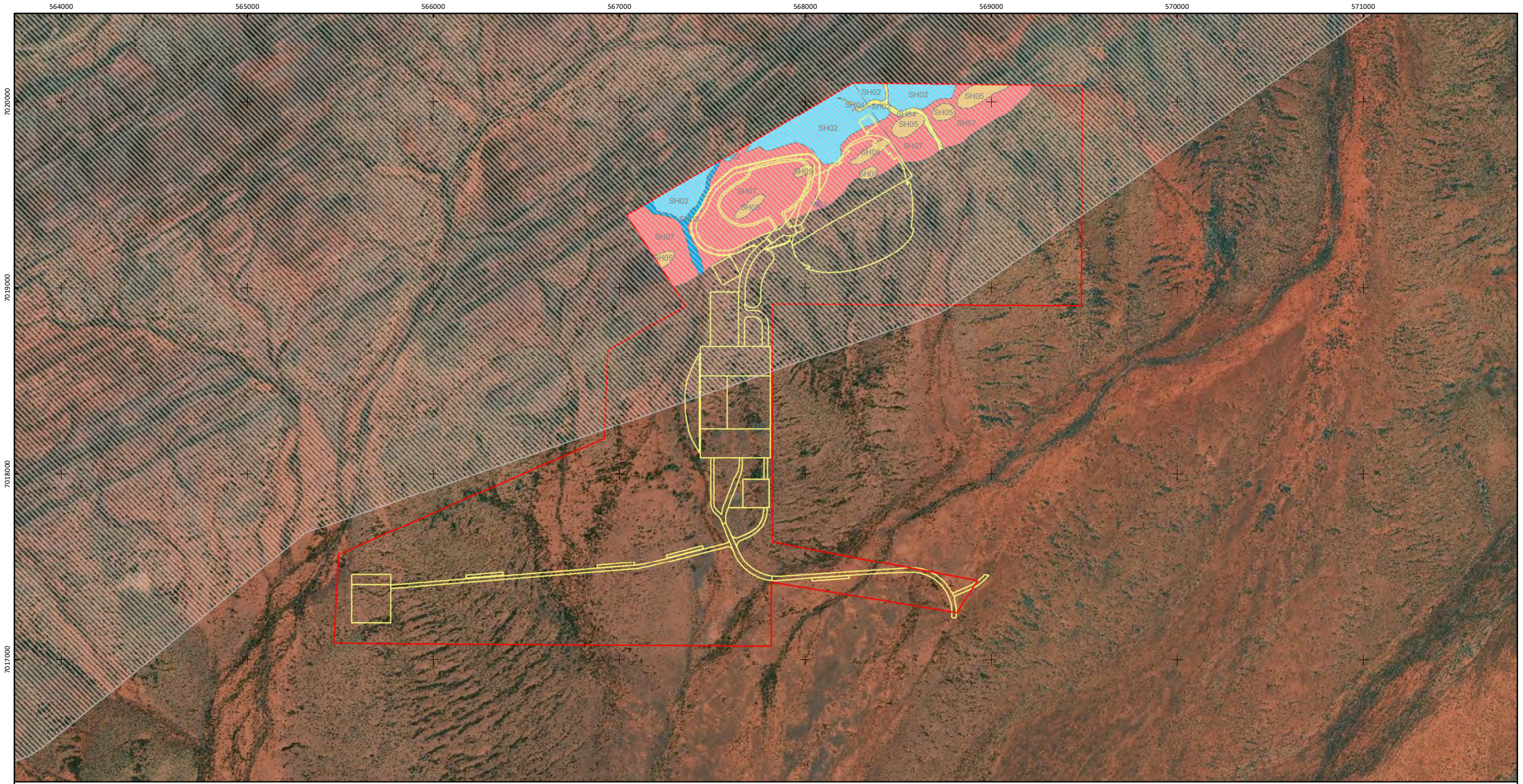




Study area
 **Vegetation condition**  
 Proposed infrastructure
  Very Good to Excellent

**Figure 4.6: Vegetation condition\*** of the study area.  
 \*Mapping excludes minor unsealed tracks.





Priority 1 PEC 'Weld Range vegetation complexes (banded ironstone formation)'

Study area

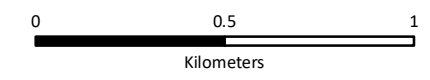
Proposed infrastructure

**Vegetation type associated with banded ironstone ranges and dolerite hills**

- SH02: *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia speckii* (P4), *Acacia pteraneura* tall sparse shrubland; *Eremophila glutinosa*, *Eremophila mackinlayi* subsp. *spathulata*, *Senna artemisioides* subsp. *xsturtii* low sparse shrubland.
- SH03: *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia incurvaneura*, *Acacia ramulosa* var. *linophylla* tall open shrubland; *Eremophila forrestii* subsp. *forrestii*, *Harnieria kempeana* subsp. *muelleri*, *Ptilotus obovatus* low sparse shrubland.
- SH04: *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994), *Acacia ramulosa* var. *linophylla* tall sparse shrubland; *Eremophila mackinlayi* subsp. *spathulata*, *Ptilotus obovatus*, *Senna artemisioides* subsp. *helmsii* low sparse shrubland.
- SH05: *Acacia rhodophloia*, *Acacia incurvaneura*, *Thryptomene decussata* tall sparse shrubland; *Ptilotus obovatus*, *Dodonaea pachyneura*, *Eremophila latrobei* subsp. *latrobei* low sparse shrubland.
- SH07: *Acacia incurvaneura*, *Acacia mulganeura*, *Acacia ramulosa* var. *linophylla* tall sparse shrubland; *Eremophila glutinosa*, *Eremophila latrobei* subsp. *latrobei*, *Micromyrtus placoides* (P3) low sparse shrubland.
- W01: *Acacia pruinocarpa* low open woodland; *Acacia pteraneura*, *Acacia ramulosa* var. *linophylla* tall open shrubland; *Eremophila forrestii* subsp. *forrestii*, *Harnieria kempeana* subsp. *muelleri*, *Ptilotus obovatus* low sparse shrubland.

7016000

**Figure 4.7:** Extent of the Priority 1 PEC 'Weld Range vegetation complexes (banded ironstone formation)' and vegetation types associated with banded ironstone ranges and dolerite hills.





## 4.2 VERTEBRATE FAUNA

### 4.2.1 Broad Fauna Habitats

Fauna habitat assessments of the study area were undertaken to describe and map broad fauna habitat types that have the potential of supporting conservation significant fauna species. After assessing the various vegetation types, soil units, and landforms, four broad fauna habitat types were identified and described within the study area (Table 4.5). To remain consistent with previous fauna habitat assessments conducted in the study area, *ecologia* used the same habitat types described by Biologic (2012b). Habitat assessments were undertaken at 12 sites (HA01 to HA12) (Figure 4.9) to describe habitats and identify areas considered most likely to support conservation significant fauna species. Data from individual site assessments are presented in Appendix J. Representative photos of each habitat type are presented in Figure 4.8 and habitat mapping is provided in Figure 4.9.

From a local perspective, habitat features that are disjunct and provide sources of shelter, food and mesic qualities required for restricted species may be considered important. Rocky habitats associated with the Mulga Woodland over ironstone ridge crests and slopes provides habitat for the long-tailed dunnart and minor drainage line supporting dense shrubs provides habitat for the west coast mulga slider.

The threatening processes considered to potentially affect vertebrate fauna biodiversity within the study area include:

- impacts of introduced predators and grazing introduced herbivores;
- weed invasion along roadside and drainage areas; and
- clearing of native vegetation.

**Table 4.5: Fauna habitat types within the study area**

Habitat type	Area (ha)	% study area	Condition
<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994) and <i>Acacia speckii</i> shrubland on mid and lower slopes	22.95	4.29%	Excellent
Mulga woodland over ironstone ridge crests and slopes	58.82	10.99%	Excellent
Mixed <i>Acacia</i> shrublands over stony lower slopes and stony plains	407.54	76.16%	Excellent
Minor drainage line supporting dense shrubs	45.76	8.55%	Excellent
Total	433	100%	

#### 4.2.1.1 *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* shrubland on mid and lower slopes

Occurring predominantly on the lower slopes and valleys on the northern margins of the study area, this habitat type is confined to the Weld Range where it is considered widespread. Associated soils include basalt-like rocks, on stony slopes and loams on valley floors. This habitat type provides suitable substrates, vegetation and habitat to support the Priority 3 (BC Act) northern shield-backed trapdoor spider.

#### 4.2.1.2 Mulga woodland over ironstone ridge crests and slopes

Widespread across the Weld Range, this habitat type is dominated by *Acacia aneura* shrublands over rocky banded ironstone ridges and slopes. Ironstone outcropping and abundant mantels of pebbles, cobbles and small boulders providing cracks and crevices provides suitable habitat for occupation by lizards and small mammals. Conservation significant fauna known to occupy this habitat type includes the long-tailed dunnart and the locally significant Woolley's pseudantichinus.

#### 4.2.1.3 Mixed *Acacia* shrublands over stony lower slopes and stony plains

This habitat type is comprised of mixed shrublands dominated by *Acacia aneura*, *A. pruinocarpa*, *A. ramulosa* var. *linophylla* over scattered shrubs and herbs. This habitat type extends from the lower slopes of the Weld range onto adjacent ironstone gravels and clay loams plains and is considered widespread in a regional context.

#### 4.2.1.4 Minor drainage line supporting dense shrubs

Minor drainage lines extending east from the Weld Range into the mixed *Acacia* shrublands support dense this habitat of fringing vegetation of *Acacia* species, *Psydrax latifolia* and *Santalum spicatum* over herbs. A stony creek bed is present in some areas with leaf litter and woody debris present under surrounding vegetation. This habitat type is considered widespread and provides potential suitable habitat for the Priority 1 listed west coast mulga slider.



*Acacia* sp. Weld Range (A. Markey & S. Dillon 1994) and *Acacia speckii* shrubland on mid and lower slopes



Mulga woodland over ironstone ridge crests and slopes



**Mixed *Acacia* shrublands over stony lower slopes and stony plains**



**Minor drainage line supporting dense shrubs**

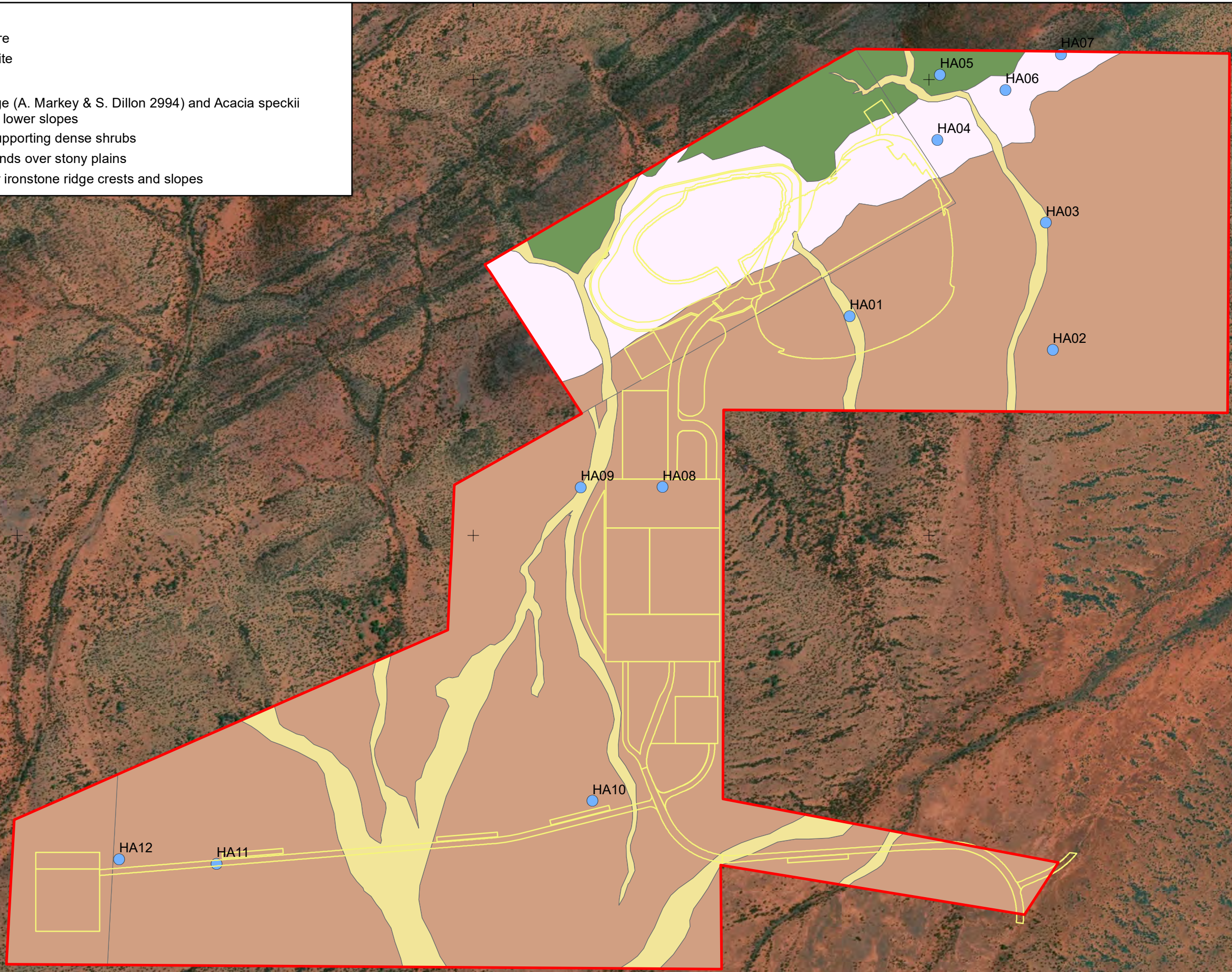
**Figure 4.8: Representative photographs of habitat types within the study area.**

**Study area**

- Proposed infrastructure
- Habitat assessment site

**Fauna habitat**

- Acacia sp. Weld Range (A. Markey & S. Dillon 1994) and Acacia speckii shrubland on mid and lower slopes
- Minor drainage line supporting dense shrubs
- Mixed Acacia Shrublands over stony plains
- Mulga Woodland over ironstone ridge crests and slopes



**Figure 4.9:** Fauna habitat mapping and assessment sites.

#### 4.2.2 Terrestrial Vertebrate Fauna

Fifteen vertebrate fauna species were recorded during the survey including 13 bird, one mammal and one reptile species (Table 4.6). No vertebrate species of conservation significance were recorded during the level one survey. One introduced species was recorded. Dingo/wild dog tracks were recorded in a drainage line.

**Table 4.6: Vertebrate species recorded**

Common name	Species
<b>Mammals</b>	
Dingo/wild dog	<i>Canis familiaris</i>
<b>Birds</b>	
Red-capped robin	<i>Petroica goodenovii</i>
Little crow	<i>Corvus bennetti</i>
Pied butcherbird	<i>Cracticus nigrogularis</i>
Splendid fairy wren	<i>Malurus splendens</i>
Chestnut-rumped thornbill	<i>Acanthiza uropygialis</i>
Redthroat	<i>Pyrrholaemus brunneus</i>
White-browed babbler	<i>Pomatostomus superciliosus</i>
Crested bellbird	<i>Oreoica gutturalis</i>
Little woodswallow	<i>Artamus minor</i>
Willie wagtail	<i>Rhipidura leucophrys</i>
Black-faced woodswallow	<i>Artamus cinereus</i>
Rufous whistler	<i>Pachycephala rufiventris</i>
Spotted nightjar	<i>Eurostopodus argus</i>
<b>Reptiles</b>	
Ring-tailed dragon	<i>Ctenophorus caudicinctus</i>
<b>Total</b>	15

#### 4.2.3 Conservation Significant Fauna

Conservation significant fauna are species that have been adequately surveyed and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such. The likelihood of occurrence assessment (Section 3.8.2) identified a number of fauna taxa of listed conservation significance which may have the potential to occur within the study area. Following the Level 1 fauna assessment, one invertebrate species of conservation significance, the northern shield-back trapdoor spider (*Idiosoma clypeatum* (P3 BC Act)), was recorded at five locations. The west coast mulga slider (*Lerista eupoda* (P1 BC Act)) has previously been recorded within the study area.

Previous fauna surveys conducted in the immediate vicinity have recorded two species of conservation significance including the long-tailed dunnart (*Sminthopsis longicaudata* (P4 BC Act)) and the peregrine falcon (*Falco peregrinus* (OS BC Act)). As a consequence, both the long-tailed dunnart and the peregrine falcon were assessed as 'Likely (1)' to occur in the study area. Four species of mammal, 12 species of bird (primarily migratory wading birds) and one reptile were deemed 'Unlikely (3)' to occur within the study area. Conservation significant vertebrate species recorded or assessed as having a

likelihood of occurrence rating of 'Likely (1)' or 'Possible (2)' within the study area, are summarised below. Species assessed as 'Unlikely (3)' are not discussed further.

**Table 4.7: Locations of conservation significant fauna.**

Common name	Species name	Evidence	Easting	Northing
Northern shield-backed trapdoor spider	<i>Idiosoma clypeatum</i>	Active burrow	568395.78	7020076.6
Northern shield-backed trapdoor spider	<i>Idiosoma clypeatum</i>	Active burrow	568408.1	7020078.7
Northern shield-backed trapdoor spider	<i>Idiosoma clypeatum</i>	Active burrow	568413.43	7020072.2
Northern shield-backed trapdoor spider	<i>Idiosoma clypeatum</i>	Inactive burrow	568409.03	7020067.3
Northern shield-backed trapdoor spider	<i>Idiosoma clypeatum</i>	Inactive burrow	568810.61	7020051.7

#### 4.2.3.1 Conservation significant species recorded within the study area

##### Northern shield-backed trapdoor spider (*Idiosoma clypeatum*) (Priority 3 BC Act)

*Idiosoma clypeatum* is one of seven highly automorphic species in the polyphyletic 'sigillate complex' and has a widespread distribution in Western Australia's arid zone, principally throughout the Yalgoo and Murchison bioregions where it is the only known species in the *nigrum*-group (Rix *et al.* 2018). Their range extends from near Paynes Find, to Karara in the south and north to Coolcalalaya Homestead, Jack Hills and Yeelirrie (Rix *et al.* 2018). *Idiosoma clypeatum* was historically misidentified as *Idiosoma nigrum* and is distinguished from all other species of the *nigrum*-group by the presence of well-defined lateral sclerotic strips on the male abdomen and by the very heavily sclerotised, leathery, 'shield-like' morphology of the female abdomen (Rix *et al.* 2018). Males grow to 17.3 mm (total length) while females are slightly larger with a total length of 21.8 mm and burrows are characteristically adorned with a 'moustache-like' arrangement of twig-lines (Rix *et al.* 2018). Wandering males in search of females have been collected in late autumn, winter and spring and work completed on the biology of this species by Ellis RJ (2015) was completed at the Weld range.

DBCA database search results identified 1894 records of *Idiosoma clypeatum* within 100 km of the study area (Figure 3.9). Intensive targeted surveys for this species were undertaken immediately adjacent to the study area within tenement M20/118 with 239 burrows recorded. A total of five burrows were recorded during the recent reconnaissance and Level 1 survey in the north-western corner of the study area (Figure 4.10, Figure 4.11) under narrow phyllode acacias within the *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* shrubland on mid and lower slopes habitat type on a slope with a southern aspect.



Figure 4.10: *Idiosoma clypeatum* habitat and burrows

**West coast mulga slider (*Lerista eupoda*) (Priority 1 BC Act)**

This small (85 mm snout vent length) elongated smooth fossorial lizard is known to inhabit open mulga on red loams and sandy loams (Cogger 2018). This species has a pale brown above with a broad dark brownish-black vertebral stripe from nape to base of tail and a broad dark brown upper lateral stripe from nostril to base of tail (Cogger 2018). Known from the arid interior of the Midwest of WA and endemic to the Murchison bioregion, this species has previously been recorded within Weld Range within leaf litter fringing drainage lines.

This species has previously been recorded twice within the study area according to DBCA search results with a further 19 records are found within 100 km (Figure 3.9). Although no individuals were recorded during the current survey, minor drainage lines supporting dense shrubs provides suitable habitat for this species and it is considered likely that this species persists within the study area.

#### **4.2.3.2 Conservation significant species with a likelihood of occurrence rating of 'Likely (1)'**

##### **Peregrine falcon (*Falco peregrinus*) (Other specially protected fauna BC Act)**

The species is widespread in Australia but requires specific nesting sites. It does not build a nest but requires cliffs, rocky outcrops, or large tree hollows (Johnstone and Storr 1998). Suitable breeding habitat has the potential to occur in the study area in the form of rocky outcrops; however, due to its widespread movements, the species may also overfly all habitats of the study area intermittently. peregrine falcons feed almost entirely on birds, especially ducks, parrots and pigeons. With nine recent records in the vicinity of the study area including records from surveys in adjacent tenements (Figure 3.9), this species was given a likelihood of occurrence rating of 'Likely (1)'.

##### **Long-tailed dunnart (*Sminthopsis longicaudata*) (Priority 4 BC Act)**

The long-tailed dunnart has been recorded from widely scattered localities in the arid zone where it inhabits rugged, rocky areas. It typically occurs on plateaus near breakaways and scree slopes, and on rugged boulder-strewn scree slopes (van Dyck and Strahan 2008). It was once considered rare but has recently been shown to be relatively common and widespread within rocky habitats especially banded iron formation ranges within the Midwest (van Dyck and Strahan 2008). Widely separated populations occur in the Pilbara, Murchison, Gibson Desert, southern Carnarvon Basin and in the Western MacDonnell Ranges (Northern Territory) (Burbidge *et al.* 2008).

Although DBCA database searches yielded no records of this species within 100 km of the study area, individuals have been recorded on five occasions within the Weld Range (ecologia 2009). Long-tailed dunnarts have been recorded in habitats consisting of BIF ridge crests, slopes and in minor drainage lines. Suitable habitat is present within the study area and the long-tailed dunnart has been assessed as having a likelihood of occurrence rating of 'Likely (1)'.



566000

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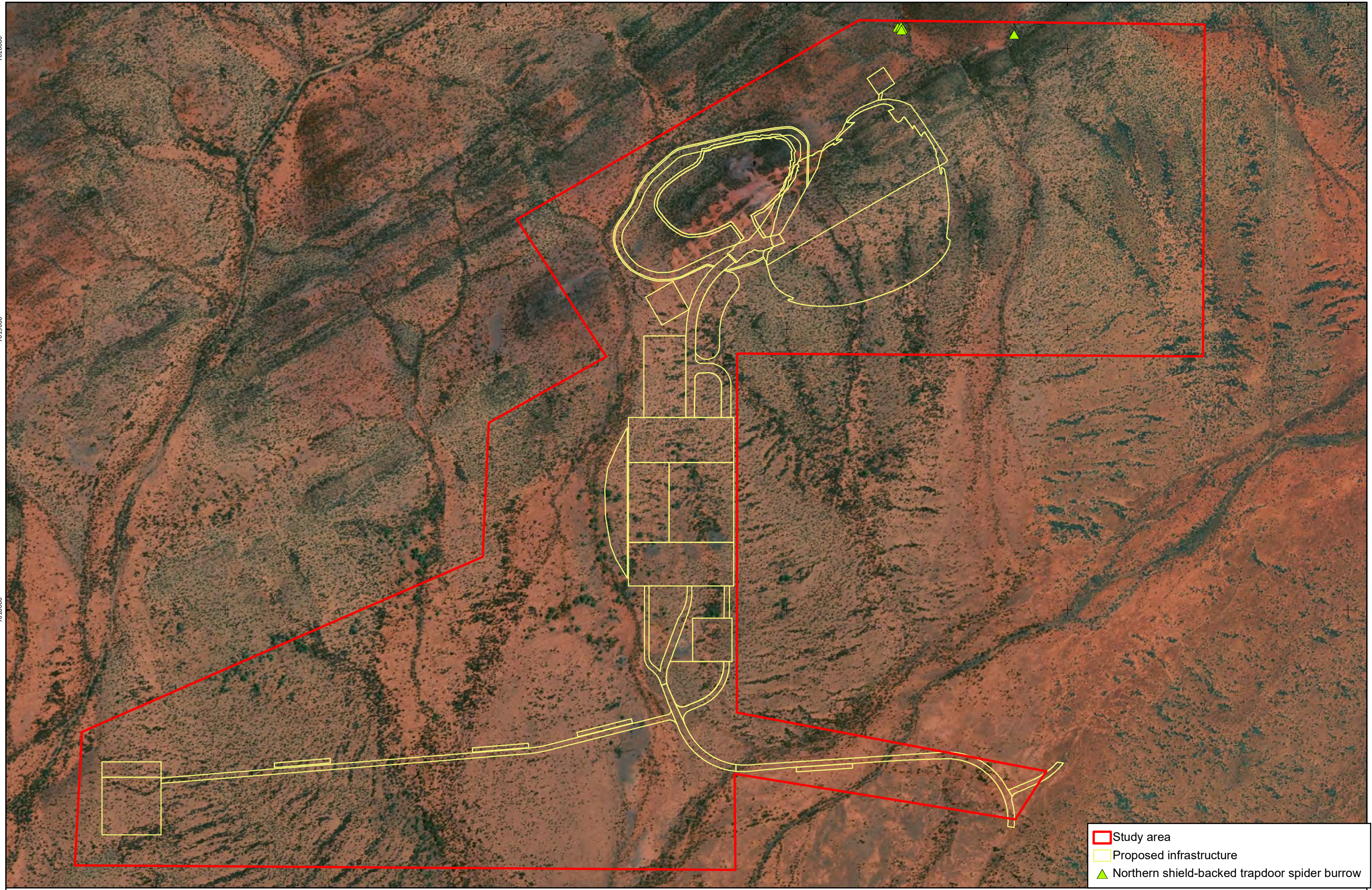
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Study area  
 Proposed infrastructure  
▲ Northern shield-backed trapdoor spider burrow

**Figure 4.11:** Locations of conservation significant fauna recorded.

## 5 DISCUSSION

### 5.1 FLORISTIC DIVERSITY

A total of 171 vascular plant taxa (species, infraspecific taxa, and phrase names) representing 37 families and 93 genera were recorded during the survey. The most dominant families in terms of species richness were the Asteraceae (26 taxa), Fabaceae (25), Poaceae (11), Scrophulariaceae (11), Chenopodiaceae (10), and Amaranthaceae (9). At the generic level, the most dominant groups were *Acacia* (16 taxa), *Eremophila* (11), *Ptilotus* (9), *Goodenia* (6), and *Rhodanthe* (6). The composition of the flora is typical of the Weld Range more broadly (Markey and Dillon 2008) and of the landforms present within the study area, which is also generally characteristic of the Murchison IBRA region. No species records represented bioregional range extensions, no taxa were endemic to the study area, and no taxa were potentially new species or otherwise anomalous.

Although there are few plant taxa endemic to the Weld Range, it is acknowledged as a refugia for conservation significant species (Markey and Dillon 2008). No EPBC Act (1999) listed Threatened Flora species or BC Act listed Threatened Flora species were recorded within the study area during the current survey. Eight state listed Priority flora species were recorded: *Acacia dilloniorum* (Priority 1), *Stenanthemum patens* (Priority 1), *Hemigenia virescens* (Priority 3), *Micromyrtus placoides* (Priority 3), *Prostanthera petrophila* (Priority 3), *Acacia speckii* (Priority 4), *Dodonaea amplisemina* (Priority 4), and *Grevillea inconspicua* (Priority 4). Priority species were primarily recorded from rocky substrates of the banded ironstone ranges in the northern section of the study area, although several records were made from the minor stony creek (*Dodonaea amplisemina* and *Grevillea inconspicua*) and stony flats (*Hemigenia virescens*) to the south of the ranges. The expected impact of the proposed clearing on these species is minimal in most cases (< 100 individuals), but the impact is expected to be greater for *Micromyrtus placoides* (ca. 3,864 individuals).

A number of Priority species were assessed during the desktop assessment as potentially occurring within the study area based on proximity and potential presence of suitable habitat. Post-field survey, many of these were reassessed as 'unlikely' to occur as suitable habitat was not present or they were sufficiently surveyed for and not recorded. Two species (*Goodenia berringbinensis* and *Goodenia grandiflora*) that were not recorded are still considered to potentially occur within the study area as these are annual or ephemeral taxa that were difficult to detect at the time of the field survey.

Three introduced plant species (*Cuscuta planifolia*, *Lysimachia arvensis*, and *Rostraria pumila*) were recorded within the study area, none of which were WONS or Declared Pests (DAFWA 2016). All of these species were recorded infrequently and in very low abundance, primarily along creek banks in riparian habitats, and are not currently problematic. These species recorded are widely naturalised across the Murchison region, and their presence within the study area is not considered unusual.

### 5.2 VEGETATION

Hierarchical cluster analysis was conducted using floristic data collected from 24 sampling sites surveyed within the study area. Based on this classification, 10 vegetation types were described and mapped. The vegetation types identified tended to correlate strongly with the geological substrates and topographic features present within the study area.

Four vegetation types were described from minor stony creeks and drainage lines. Dominant vegetation in these types typically included *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia ramulosa* var. *linophylla* tall sparse shrubland occurring in more prominent creek lines (SH03 and SH04), and *Acacia pruinocarpa* low open woodlands over mulga tall open shrublands along minor drainage channels and associated floodplains (W01 and W02). The dominant understorey species of these types generally included *Eremophila forrestii* subsp. *forrestii*, *Eremophila georgei*, *Eremophila mackinlayi* subsp. *spathulata*, *Harnieria kempeana* subsp. *muelleri*, and *Ptilotus obovatus*.

Three vegetation types were described from stony plains to the south of the BIF ranges. *Acacia ramulosa* subsp. *ramulosa* and *Acacia tetragonophylla* tall sparse shrubland (SH01) was floristically distinct and restricted to small calcrete patches in the southern section of the study area. The remaining types (SH06 and SH08) were more widespread across the study area, occurring on plains with ironstone and banded ironstone gravel, and were typically dominated by mulga species (*A. incurvaneura*, *A. fuscaneura*, *A. incurvaneura* × *A. mulganeura*) and *A. ramulosa* subsp. *linophylla* in the tall shrub layer and by *Eremophila forrestii* subsp. *forrestii*, *Eremophila georgei*, *Eremophila jucunda* subsp. *jucunda*, and *Ptilotus schwartzii* in the understorey.

Three vegetation types were described from dolerite slopes and BIF outcrops in the northern section of the study area. SH02 was restricted to the lower and middle slopes of dolerite hills in far north of the study area and was dominated by *Acacia* sp. Weld Range (*A. Markey* & *S. Dillon* 2994), *Acacia speckii* (P4), *Acacia pteraneura* tall sparse shrubland. It also supported a significant population of the Priority 1 species *Acacia dilloniorum*. SH05 was restricted to the steep middle and upper slopes and crests of BIF outcrops also in the far north of the study area and consisted of *Acacia rhodophloia*, *Acacia incurvaneura*, *Thryptomene decussata* tall sparse shrubland. The only record of the Priority 1 species *Stenanthemum patens* within the study area was within the vegetation type. SH07 was restricted to the gentler lower and middle slopes surrounding vegetation type SH05 and was dominated by *Acacia incurvaneura*, *Acacia mulganeura*, *Acacia ramulosa* var. *linophylla* tall sparse shrubland, and supported a large population of the Priority 3 species *Micromyrtus placoides*.

### 5.2.1 Listed Plant Communities

TECs listed under the EPBC Act are regarded as nationally significant. None of the vegetation types described here were assessed as corresponding to any nationally listed TEC. State listed TECs and PECs are regarded as being of State significance. None of the vegetation types described here correspond to any State listed TEC, although vegetation across part of the study area coincides with the Priority 1 PEC 'Weld Range vegetation complexes (banded ironstone formation)'.

The spatial extent of this PEC is defined by DBCA and includes a 500 m administrative buffer. Vegetation type SH01 excepted, all of the vegetation types described either partially or completely occur within the PEC boundary. Within the study area, a total of 263.8 ha of vegetation occurs within the DBCA defined PEC boundary (representing approximately 1% of the total PEC area). This includes 78.48 ha within the proposed project infrastructure footprint, which accounts for 0.3% of the total PEC area.

### 5.2.2 Vegetation of Regional Significance

Regional significance addresses the representation of habitats at a biogeographic regional level. Plant communities that are restricted or uncommon in a regional context are considered regionally significant. Plant communities acting as a refuge Threatened Flora species may also be considered regionally significant. For the purposes of this assessment, this does not include TECs or PECs as these are addressed above.

None of the vegetation associations mapped by Shepherd *et al.* (2001) within the study area are restricted within the Murchison IBRA bioregion, and are not considered to be regionally significant. Moreover, none of the land systems described and mapped by Curry *et al.* (1994) that occur within the study area are considered restricted. None of the vegetation types described here are known to support Threatened Flora species, and none of the Ecosystems at Risk described for the Western Murchison IBRA subregion (Desmond *et al.* 2001) correspond to the vegetation types described here.

### 5.2.3 Vegetation of Local Significance

Locally significant vegetation may include plant communities that are locally restricted, contain comparatively high structural or species diversity, or support Priority species that are restricted to these plant communities. Based on these criteria, vegetation types SH02, SH04, SH05 and SH07 may

be considered locally significant as they support the Priority 1 species *Acacia dilloniorum* and *Stenanthemum patens*. These species were not recorded from any other vegetation types. Vegetation types SH03 and SH04 may be also considered locally significant as they support comparatively high levels of plant species diversity. With the exception of SH07, the impact to these vegetation types is expected to be negligible. The expected impact of the proposed clearing on SH07 is 26.89 ha (48% of its total mapped area); however, this vegetation type is expected to be more widespread outside of the study area. Vegetation type SH01 is highly restricted within the study area, occurring only on low calcrete rises in the southern section of the study area, and appears to be locally uncommon based on interrogation of aerial imagery outside of the study area. The potential impact to this vegetation type is negligible (0.03 ha, 2% of its total mapped area).

### 5.3 VERTEBRATE FAUNA

#### 5.3.1 Broad fauna habitats

Four broad fauna habitats were identified, described and mapped within the study area:

- *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* shrubland on mid and lower slopes
- Mulga woodland over ironstone ridge crests and slopes
- Mixed *Acacia* shrublands over stony lower slopes and stony plains
- Minor drainage line supporting dense shrubs

Habitats were assessed to be in Very Good to Excellent condition. The landforms, land systems and habitat types identified during the survey are considered locally common and the survey did not identify any restricted conservation significant vertebrate fauna habitat, or habitats that were restricted to the survey area itself. *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* shrubland on mid and lower slopes provides habitat for the Priority 3 (BC Act) northern shield-backed trap-door spider especially on south facing slopes. Minor drainage line supporting dense shrubs provides suitable habitat in the form of thick leaf litter for the Priority 1 (BC Act) west coast mulga slider (*Lerista eupoda*). The rocky outcrop and bouldering habitat found within the mulga woodland over ironstone ridge crests and slopes is consistent with that preferred by the Priority 4 (BC Act) long-tailed dunnart.

#### 5.3.2 Fauna assemblage

Fifteen vertebrate fauna species including 13 birds, one mammal and one reptile, were recorded during the survey. Species recorded during this survey represent the potential vertebrate fauna of the survey area; however, species other than those recorded are likely to occur.

#### 5.3.3 Conservation significant fauna

Nineteen vertebrate fauna species and one invertebrate species of conservation significance were identified from Threatened and Priority Fauna database searches within 100 km of the study area including four mammals, 13 birds and two reptiles.

One species of conservation significance was recorded during the survey. Five burrows belonging to the Priority 3 (BC Act) northern shield-backed trapdoor spider (*Idiosoma clypeatum*) were recorded during the survey in the north-western corner of the study area. All burrows were recorded on a southern aspect slope, in a mix of clay and rocky substrates under narrow phyllode acacias. These conditions are consistent with previous records within the Weld Range. This species favours burrowing under acacias with narrow phyllodes which are used to construct the characteristic 'moustache-like' arrangement of twigs around the trapdoor of the burrow.

Biologic Environmental (2019) conducted a status review of the trapdoor spider *Idiosoma clypeatum* and an assessment of previously undertaken targeted surveys and potential future survey works within tenement M20/118. It was concluded that Priority 3 species (BC Act) require further survey although the extent of previous survey work was regarded as adequate for impact assessment requirements (Biologic Environmental (2019)). In the current survey, areas of suitable habitat were adequately traversed to identify and quantify burrows.

Previous surveys in the immediate vicinity of the study area recorded two species of conservation significance; the long-tailed dunnart (*Sminthopsis longicaudata* (P4 BC Act)) and peregrine falcon (*Falco peregrinus* (OS BC Act)). Suitable habitat for these species is present within the study area. Consequently both the long-tailed dunnart and peregrine falcon were assigned a likelihood of occurrence rating of 'Likely (1)'.

Seventeen species of conservation significance were assessed as unlikely to occur due to a lack of suitable habitat including four species of mammal, 12 birds and one reptile.

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## 7 APPENDICES

## APPENDIX A      DEFINITIONS

## SIGNIFICANT FLORA

According to the *EPA Factor Guideline: Flora and Vegetation* (Environmental Protection Authority 2016a), plant taxa (or records) may be considered significant for a number of reasons including, but not restricted to, the following:

- Being listed as a 'Threatened Species' under the *Biodiversity Conservation Act 2016* (WA) or the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth);
- Being classified by the Department of Biodiversity, Conservation and Attractions (DBCA) as a 'Priority flora' species;
- Locally endemic species or those associated with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems);
- New species or those having anomalous features that indicate a potential new species;
- Being representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range);
- Unusual species, including restricted subspecies, varieties or naturally occurring hybrids; and
- Being representative of taxonomic groups that no longer occur widely in the broader landscape (relictual species/populations).

### **Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Cwlth)**

At a Commonwealth level, Threatened flora species are protected under the EPBC Act, which lists species in accordance with the criteria of the International Union for Conservation of Nature (International Union for Conservation of Nature 2014), that is, 'Critically Endangered', 'Endangered', 'Vulnerable', 'Conservation Dependant', 'Extinct', or 'Extinct in the Wild' (category definitions can be seen below).

### **Biodiversity Conservation Act 2016 (Western Australia)**

At a State level, Threatened flora species are protected under the BC Act. These are taxa which have been adequately surveyed and are deemed to be either rare, in danger of extinction, or otherwise in need of special protection in the wild and are gazetted as Threatened (Declared Rare) Flora. Threatened flora are further categorised by the Department of Biodiversity, Conservation and Attractions (DBCA) according to their level of threat using the International Union for Conservation of Nature (IUCN) red list criteria ((International Union for Conservation of Nature 2014) (see below).

### **Priority Flora (DBCA)**

The DBCA maintains a list of Priority flora species, which are considered poorly known, uncommon or under threat but for which there is insufficient justification to be listed as Threatened, based on known distribution and population sizes. Priority flora species are assigned to one of four categories, described below. DBCA listed Priority flora species do not have any statutory protection.

### **Significant Vegetation**

According to *EPA Factor Guideline: Flora and Vegetation* (Environmental Protection Authority 2016a), vegetation may be considered significant for a number of reasons including, but not restricted to, the following:

- Being identified as a 'Threatened Ecological Community' under the *Biodiversity Conservation (BC) Act 2016* (WA) or the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* (Cwlth);
- Being classified as a 'Priority Ecological Communities' by DBCA;
- Having a restricted distribution;
- The degree of historical impact from threatening processes;
- Playing a role as a refuge;

- Providing an important function required to maintain ecological integrity of a significant ecosystem.

## **INTRODUCED FLORA**

### **Weeds of National Significance (WONS)**

At a national level, there are 32 weed species listed as Weeds of National Significance (WONS). The Commonwealth National Weeds Strategy: *A Strategic Approach to Weed Problems of National Significance* (DSEWPaC 2012) describes broad goals and objectives to manage these species.

### **Declared Pests**

The purpose of the *Biosecurity and Agriculture Management Act 2007* (BAM Act) is to prevent serious animal and plant pests and diseases from entering WA and becoming established, and to minimise the spread and impact of those that are already present. The BAM Act (and associated regulations) replaces the *Agriculture and Related Resources Protection Act 1976* (and associated regulations).

The BAM regulations were enacted on 1 May 2013, placing organisms into one of five legal status categories: Declared Pest - Prohibited, Declared Pest, Permitted, Permitted – Requires Permit, and Unlisted (Appendix A). The Western Australian Organism List (WAOL) (Department of Agriculture and Food Western Australia 2016) lists organisms in each of these categories. Unlisted organisms must not be imported (unless in accordance with an import permit and regulations). The BAM Act further categorises Declared Pests in one of three control categories: C1 Exclusion, C2 Eradication, and C3 Management (see below).

### **Environmental Weeds**

At a regional level, DBCA rates weed species against four criteria based on the Weed Prioritisation Process (Department of Parks and Wildlife 2013): invasiveness, ecological impact, potential and current distribution, and feasibility of control. Currently, only species with a rating for both the ecological impact and invasiveness criteria are listed (see below).

## **SIGNIFICANT FAUNA**

According to *EPA Factor Guideline: Terrestrial Fauna* (Environmental Protection Authority 2016b), terrestrial fauna may be considered significant for a number of reasons including, but not restricted to:

- Being identified as a Threatened or Priority species (Appendix A);
- Species with restricted distribution;
- Degree of historical impact from threatening processes; and
- Providing an important function required to maintain the ecological integrity of a significant ecosystem.

Additionally, as described in EPA Guidance (Environmental Protection Authority 2016e) terrestrial fauna may be considered significant for the following reasons:

- Species is protected by international agreement or treaty (i.e. migratory fauna);
- Species is a short-range endemic;
- Species has declining populations or distribution;
- Species is at the extreme of its range, or is part of an outlying population; and
- Species is undescribed.

Fauna habitats may be significant if they provide habitat important to the life history of a significant species, i.e. breeding, feeding and roosting or aggregation areas, or where they are unique or isolated habitats, for example wetlands, in the landscape or region (Environmental Protection Authority 2016b).

## **Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)**

At the Commonwealth level, Threatened fauna are protected under Section 178 of the EPBC Act, which may list species as: extinct, extinct in the wild, critically endangered, endangered, vulnerable, and conservation dependent. In addition, under sections 209 and 248 of the Act, some migratory and marine species are protected under international agreements. EPBC Act conservation code definitions can be found below.

#### **Biodiversity Conservation Act 2016 (WA)**

At a state level, fauna species are protected under the BC Act. Threatened, Extinct and Specially Protected fauna 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. BC Act conservation code definitions can be found below.

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. 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 BC Act.

Specially protected fauna under section 13(1) of the BC Act are species that meet 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.

#### **Priority Fauna (DBCA)**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority fauna 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. 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. Priority conservation code definitions can be found below.

### Threatened Flora and Fauna Categories (EPBC Act)

Code	Definition
EX	<b>Extinct</b> Taxa which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
EW	<b>Extinct in the Wild</b> Taxa which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it 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.
CR	<b>Critically Endangered</b> Taxa which at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
EN	<b>Endangered</b> Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
VU	<b>Vulnerable</b> Taxa which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	<b>Conservation Dependent</b> Taxa which at a particular time if, at that time, the species is the focus of a specific conservation programme, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

### Threatened Flora and Fauna Categories (BC Act)

Category	Code	Definition	Schedule
Critically Endangered	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.	<b>Schedule 1</b>
Endangered	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.	<b>Schedule 2</b>
Vulnerable	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.	<b>Schedule 3</b>
Extinct species	EX	Species where “there is no reasonable doubt that the last member of the species has died”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.	<b>Schedule 4</b>
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.
Migratory	MI	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). 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. Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.	<b>Schedule 5</b>
Species of special conservation interest (conservation dependent fauna)	CD	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). Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.	<b>Schedule 6</b>
Other specially protected species	OS	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). Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.	<b>Schedule 7</b>

### Definition of codes for Priority Flora and Fauna (BC Act)

Code	Definition
P1: Priority One	<p><b>Poorly-known species</b> 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>
P2: Priority Two	<p><b>Poorly-known species</b> 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>
P3: Priority Three	<p><b>Poorly-known species</b> 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>
P4: Priority Four	<p><b>Rare, Near Threatened and other species in need of monitoring</b></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>



### Control categories for Declared Pests (Weeds)

Declared plant category	Description
C1 - Exclusion	Pests assigned to this category are not established in WA and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 - Eradication	Pests assigned to this category are present in WA in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 - Management	Pests assigned to this category are established in WA but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

### Categorisation of Environmental Weeds

Field	Description	Code
Ecological Impact	<p>Impact of species within the Region, from low impact (causes minimal disruption to ecological processes or loss of biodiversity) to high (causes acute disruption of ecological processes, dominates and/or significantly alters vegetation structure, composition and function of ecosystems).</p> <p>Examples of impact attributes to consider:</p> <ul style="list-style-type: none"> <li>- changed fire regime</li> <li>- changed nutrient conditions</li> <li>- changed hydrological patterns</li> <li>- changed soil erosion patterns</li> <li>- changed geomorphological processes</li> <li>- changed biomass distribution</li> <li>- changed light distribution</li> <li>- loss of biodiversity</li> <li>- substantially reduces regeneration opportunities of native plants</li> <li>- allelopathic effects</li> </ul>	<p>Low (L) Medium (M) High (H) Unknown (U)</p>
Invasiveness	<p>Rate of spread of a weed in native vegetation, encompassing factors of establishment, reproduction and long distance dispersal (&gt;100m).</p> <p>Examples of establishment factors include:</p> <ul style="list-style-type: none"> <li>- ability to outcompete (light, moisture, nutrients, rapid root growth)</li> <li>- sexual or asexual establishment</li> <li>- need for disturbance to establish</li> </ul> <p>Examples of reproduction factors include:</p> <ul style="list-style-type: none"> <li>- time to seeding</li> <li>- seed production</li> <li>- vegetative reproduction</li> </ul> <p>Examples of long distance dispersal mechanisms include:</p> <ul style="list-style-type: none"> <li>- wind</li> <li>- water</li> <li>- flying/ground animals</li> <li>- deliberate/accidental human spread</li> <li>- vehicles</li> <li>- produce contaminant</li> </ul>	<p>Slow (S) Moderate (M) Rapid (R) Unknown (U)</p>

## BAM Act Definitions (Declared Pests)

Legal status	Definition
Declared Pest, Prohibited - s12	Prohibited organisms are declared pests by virtue of section 22(1), and may only be imported and kept subject to permits. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions.
Declared Pest - s22(2)	Declared pests must satisfy any applicable import requirements when imported, and may be subject to an import permit if they are potential carriers of high-risk organisms. They may also be subject to control and keeping requirements once within Western Australia.
Permitted - s11	Permitted organisms must satisfy any applicable import requirements when imported. They may be subject to an import permit if they are potential carriers of high-risk organisms.
Permitted, Requires Permit - r73	Regulation 73 permitted organisms may only be imported subject to an import permit. These organisms may be subject to restriction under legislation other than the Biosecurity and Agriculture Management Act 2007. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions.
Unlisted - s14	If you are considering importing an unlisted organism/s you will need to submit the name/s for assessment, as unlisted organisms are automatically prohibited entry into WA.
Control categories	Definition
C1 Exclusion	Organisms which should be excluded from part or all of Western Australia.
C2 Eradication	Organisms which should be eradicated from part or all of Western Australia.
C3 Management	Organisms that should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism or prevent or contain the spread of the organism.
Unassigned	Unassigned: Declared pests that are recognised as having a harmful impact under certain circumstances, where their subsequent control requirements are determined by a Plan or other legislative arrangements under the Act.

## Definition of codes for Threatened Ecological Communities

Code	Definition
PD: Presumed Totally Destroyed	An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B): A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or B) All occurrences recorded within the last 50 years have since been destroyed.
CR: Critically Endangered	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C): A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii): i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years); ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. B) Current distribution is limited, and one or more of the following apply (i, ii or iii): i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years); ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes; iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).
EN: Endangered	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C): A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii): i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years); ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated. B) Current distribution is limited, and one or more of the following apply (i, ii or iii): i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years); ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes; iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes. C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).
VU: Vulnerable	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range. An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium (within approximately 50 years) to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C): A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated. B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations. C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long-term future because of existing or impending threatening processes.

## Definition of codes for Priority Ecological Communities

Code	Definition
P1: Priority One	Ecological communities that are known from very few occurrences with a very restricted distribution (generally $\leq 5$ occurrences or a total area of $\leq 100$ ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
P2: Priority Two	Communities that are known from few occurrences with a restricted distribution (generally $\leq 10$ occurrences or a total area of $\leq 200$ ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
P3: Priority Three	<p>(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:</p> <p>(ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or;</p> <p>(iii) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc.</p> <p>Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.</p>
P4: Priority Four	<p>Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.</p> <p>(i) Rare. Ecological communities known from few occurrences 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 communities are usually represented on conservation lands.</p> <p>(ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category.</p> <p>(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.</p>
P5: Priority Five	Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

**APPENDIX B            VASCULAR FLORA AND FAUNA RECORDS  
(NATUREMAP) AND BIRDLIFE BIRDATA**

# NatureMap Species Report

Created By Guest user on 15/08/2019

**Kingdom** Plantae  
**Current Names Only** Yes  
**Core Datasets Only** Yes  
**Vouchered Status** Vouchered  
**Species Group** Vascular Plants  
**Method** 'By Line'  
**Vertices** 26° 57' 60" S, 117° 39' 47" E 26° 56' 22" S, 117° 41' 60" E

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
1.	4889 <i>Abutilon cryptopetalum</i>			
2.	43020 <i>Abutilon oxycarpum</i> subsp. <i>Prostrate</i> (A.A. Mitchell PRP 1266)			
3.	3217 <i>Acacia aneura</i> (Mulga, Wanari)			
4.	16112 <i>Acacia aulacophylla</i>			
5.	31072 <i>Acacia burrowsiana</i>		P3	
6.	36417 <i>Acacia caesaneura</i>			
7.	23977 <i>Acacia cockertoniana</i>			
8.	14088 <i>Acacia cyperophylla</i> var. <i>cyperophylla</i>			
9.	44474 <i>Acacia dilloniorum</i>		P1	Y
10.	32118 <i>Acacia effusifolia</i>			
11.	3330 <i>Acacia exocarpoides</i>			
12.	36781 <i>Acacia fuscaneura</i>			
13.	3355 <i>Acacia grasbyi</i> (Miniritchie)			
14.	36418 <i>Acacia incurvaneura</i>			
15.	36416 <i>Acacia mulganeura</i>			
16.	3500 <i>Acacia pruinocarpa</i> (Gidgee)			
17.	36800 <i>Acacia pteraneura</i>			
18.	19483 <i>Acacia ramulosa</i> var. <i>linophylla</i>			
19.	3519 <i>Acacia rhodophloia</i>			
20.	13078 <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>			
21.	30373 <i>Acacia</i> sp. <i>Peak Hill</i> (R. Gibson 0003)			
22.	30391 <i>Acacia</i> sp. <i>Weld Range</i> (A. Markey & S. Dillon 2994)			
23.	14615 <i>Acacia speckii</i>		P4	
24.	29531 <i>Acacia thoma</i>			
25.	31511 <i>Acacia victoriae</i> subsp. <i>victoriae</i>			
26.	19901 <i>Actinobole oldfieldianum</i>			
27.	13904 <i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>			
28.	19465 <i>Aluta aspera</i> subsp. <i>hesperia</i>			
29.	2660 <i>Amaranthus cuspidifolius</i>			
30.	2382 <i>Amyema nestor</i>			
31.	7836 <i>Angianthus tomentosus</i> (Camel-grass)			
32.	207 <i>Aristida contorta</i> (Bunched Kerosene Grass)			
33.	1266 <i>Arthropodium dyeri</i>			
34.	2450 <i>Atriplex amnicola</i> (Swamp Saltbush)			
35.	11516 <i>Atriplex nummularia</i> subsp. <i>spathulata</i> (Old Man Saltbush)			
36.	2481 <i>Atriplex vesicaria</i> (Bladder Saltbush)			
37.	17237 <i>Austrostipa elegantissima</i>			
38.	17246 <i>Austrostipa nitida</i>			
39.	17251 <i>Austrostipa scabra</i>			
40.	17255 <i>Austrostipa trichophylla</i>			
41.	34240 <i>Beyeria lapidicola</i>		P1	
42.	2770 <i>Boerhavia coccinea</i> (Tar Vine, Wituka)			
43.	247 <i>Bromus arenarius</i> (Sand Brome)			
44.	7413 <i>Brunonia australis</i> (Native Cornflower)			
45.	2853 <i>Calandrinia eremaea</i> (Twining Purslane)			
46.	2869 <i>Calandrinia schistorhiza</i>			
47.	31073 <i>Calandrinia</i> sp. <i>The Pink Hills</i> (F. Obbens FO 19/06)			
48.	14090 <i>Calocephalus beardii</i>			
49.	7891 <i>Calocephalus francisii</i> (Fine-leaf Beauty-heads)			
50.	7893 <i>Calocephalus knappii</i>			
51.	7895 <i>Calocephalus multiflorus</i> (Yellow-top)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
52.	7903 <i>Calotis hispidula</i> (Bindy Eye)			
53.	7905 <i>Calotis multicaulis</i> (Many-stemmed Burr-daisy)			
54.	5438 <i>Calytrix amethystina</i>			
55.	5451 <i>Calytrix desolata</i>			
56.	5452 <i>Calytrix divergens</i>			
57.	7922 <i>Cephalopterum drummondii</i> (Pompom Head)			
58.	12796 <i>Cheilanthes adiantoides</i>			
59.	32 <i>Cheilanthes brownii</i>			
60.	34 <i>Cheilanthes distans</i> (Bristly Cloak Fern)			
61.	12815 <i>Cheilanthes sieberi</i> subsp. <i>pseudovellea</i>			
62.	12818 <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			
63.	3756 <i>Chorizema genistoides</i>			
64.	7933 <i>Chthonocephalus pseudevax</i> (Woolly Groundheads)			
65.	12619 <i>Chthonocephalus viscosus</i>			
66.	20522 <i>Cleretum papulosum</i> subsp. <i>papulosum</i>	Y		
67.	17095 <i>Corymbia lenziana</i>			
68.	11709 <i>Crassula colorata</i> var. <i>acuminata</i>			
69.	20271 <i>Crassula extrorsa</i>			
70.	20268 <i>Crassula tetramera</i>			
71.	6663 <i>Cuscuta epithymum</i> (Lesser Dodder, Greater Dodder)	Y		
72.	279 <i>Cymbopogon ambiguus</i> (Scentgrass)			
73.	31757 <i>Cynoglossum</i> sp. Inland Ranges (C.A. Gardner 14499)			
74.	5506 <i>Darwinia capitellata</i>			
75.	6218 <i>Daucus glochidiatus</i> (Australian Carrot)			
76.	12721 <i>Dielitzia tysonii</i>			
77.	2499 <i>Dissocarpus paradoxus</i> (Curious Saltbush)			
78.	4752 <i>Dodonaea adenophora</i>			
79.	31881 <i>Dodonaea amplisemina</i>		P4	
80.	4772 <i>Dodonaea pachyneura</i>			
81.	4773 <i>Dodonaea petiolaris</i>			
82.	31274 <i>Duperreya commixta</i>			
83.	2502 <i>Dysphania kalpari</i> (Rat's Tail, Kalpari)			
84.	33597 <i>Dysphania melanocarpa</i> forma <i>melanocarpa</i> (Black Goosefoot)			
85.	33483 <i>Dysphania saxatilis</i>			
86.	357 <i>Enneapogon caerulescens</i> (Limestone Grass)			
87.	369 <i>Eragrostis australasica</i> (Canegrass)			
88.	378 <i>Eragrostis dielsii</i> (Mallee Lovegrass)			
89.	379 <i>Eragrostis elongata</i> (Clustered Lovegrass)			
90.	7189 <i>Eremophila clarkei</i> (Turpentine Bush)			
91.	7205 <i>Eremophila exilifolia</i>			
92.	7207 <i>Eremophila foliosissima</i>			
93.	15052 <i>Eremophila forrestii</i> subsp. <i>forrestii</i>			
94.	7211 <i>Eremophila georgei</i>			
95.	16732 <i>Eremophila gilesii</i> subsp. <i>gilesii</i>			
96.	14191 <i>Eremophila glabra</i> subsp. <i>tomentosa</i>			
97.	7216 <i>Eremophila glutinosa</i>			
98.	17576 <i>Eremophila latrobei</i> subsp. <i>latrobei</i>			
99.	7234 <i>Eremophila longifolia</i> (Berrigan, Tulypurpa)			
100.	15158 <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>			
101.	7236 <i>Eremophila macmillaniana</i> (Grey Turpentine Bush)			
102.	18570 <i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>			
103.	7257 <i>Eremophila punicea</i> (Crimson Eremophila)			
104.	17166 <i>Eremophila simulans</i> subsp. <i>lapidensis</i>			
105.	17164 <i>Eremophila simulans</i> subsp. <i>simulans</i>			
106.	30347 <i>Eremophila</i> sp. Weld Range (M.J. Greeve & J.D. Start D7 34)			
107.	413 <i>Eriachne mucronata</i> (Mountain Wanderrie Grass)			
108.	16486 <i>Eriachne pulchella</i> subsp. <i>pulchella</i>			
109.	4335 <i>Erodium cygnorum</i> (Blue Heronsbill)			
110.	20300 <i>Eucalyptus eremicola</i> subsp. <i>peeneri</i>			
111.	5779 <i>Eucalyptus striatocalyx</i> (Cue York Gum)			
112.	35303 <i>Euphorbia australis</i> var. <i>subtomentosa</i>			
113.	4620 <i>Euphorbia boophthona</i> (Gascoyne Spurge)			
114.	4626 <i>Euphorbia drummondii</i> (Caustic Weed, Piwi)			
115.	42869 <i>Euphorbia porcata</i>			
116.	10977 <i>Exocarpos aphyllus</i> (Leafless Ballart)			
117.	12780 <i>Gilberta tenuifolia</i>			
118.	11008 <i>Gilruthia osbornii</i>			
119.	7989 <i>Gnephosis brevifolia</i> (Short-leaved Gnephosis)			
120.	8002 <i>Gnephosis tenuissima</i>			
121.	7495 <i>Goodenia berardiana</i>			

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122.	12527 <i>Goodenia kingiana</i>			
123.	7531 <i>Goodenia occidentalis</i>			
124.	7556 <i>Goodenia tenuiloba</i>			
125.	1963 <i>Grevillea berryana</i>			
126.	1986 <i>Grevillea deflexa</i>			
127.	13430 <i>Grevillea hakeoides</i> subsp. <i>stenophylla</i>			
128.	2019 <i>Grevillea inconspicua</i> (Cue <i>Grevillea</i> )		P4	
129.	2047 <i>Grevillea nematophylla</i>			
130.	8553 <i>Gypsophila tubulosa</i>			
131.	2196 <i>Hakea preissii</i> (Needle Tree, Dandjin)			
132.	17556 <i>Hakea recurva</i> subsp. <i>arida</i>			
133.	6687 <i>Halgania cyanea</i> (Rough <i>Halgania</i> )			
134.	29840 <i>Halgania cyanea</i> var. <i>Allambi Str</i> (B.W. Strong 676)			
135.	6176 <i>Haloragis odontocarpa</i> (Mulga Nettle)			
136.	6180 <i>Haloragis trigonocarpa</i>			
137.	17325 <i>Harnieria kempeana</i> subsp. <i>muelleri</i>			
138.	6713 <i>Heliotropium ovalifolium</i>			
139.	6853 <i>Hemigenia exilis</i>		P4	
140.	17397 <i>Hemigenia</i> sp. <i>Yalgoo</i> (A.M. Ashby 2624)			
141.	33760 <i>Hemigenia virescens</i>		P3	
142.	11188 <i>Hibiscus sturtii</i> var. <i>forrestii</i>			
143.	5809 <i>Homalocalyx echinulatus</i>		P3	
144.	11546 <i>Hydrocotyle pilifera</i> var. <i>glabrata</i>			
145.	8086 <i>Hypochoeris glabra</i> (Smooth Catsear)	Y		
146.	48648 <i>Hysterobaeckea occlusa</i>			
147.	3982 <i>Indigofera monophylla</i>			
148.	8087 <i>Isoetopsis graminifolia</i> (Cushion Grass)			
149.	13284 <i>Lawrencella rosea</i>			
150.	4951 <i>Lawrencia chrysoderma</i>			
151.	12628 <i>Lemooria burkittii</i>			
152.	3033 <i>Lepidium oxytrichum</i>			
153.	7403 <i>Lobelia heterophylla</i> (Wing-seeded <i>Lobelia</i> )			
154.	7409 <i>Lobelia winfridae</i> (Little <i>Lobelia</i> )			
155.	2398 <i>Lysiana murrayi</i> (Mistletoe, Parka-Parka)			
156.	36375 <i>Lysimachia arvensis</i> (Pimpernel)	Y		
157.	2544 <i>Maireana georgei</i> (Satiny Bluebush)			
158.	2551 <i>Maireana melanocoma</i> (Pussy Bluebush)			
159.	2560 <i>Maireana pyramidata</i> (Sago Bush)			
160.	2568 <i>Maireana trichoptera</i> (Downy Bluebush)			
161.	2571 <i>Maireana villosa</i>			
162.	12949 <i>Marsdenia australis</i>			
163.	30411 <i>Micromyrtus placoides</i>		P3	
164.	6003 <i>Micromyrtus sulphurea</i>			
165.	8105 <i>Millotia myosotidifolia</i>			
166.	8107 <i>Minuria cunninghamii</i> (Bush <i>Minuria</i> )			
167.	490 <i>Monachather paradoxus</i>			
168.	8116 <i>Myriocephalus guerinae</i>			
169.	14186 <i>Myriocephalus pygmaeus</i>			
170.	8121 <i>Myriocephalus rudallii</i>			
171.	494 <i>Neurachne minor</i>			
172.	6972 <i>Nicotiana cavicola</i> (Talara)			
173.	11331 <i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>			
174.	11734 <i>Nicotiana rosulata</i> subsp. <i>rosulata</i>			
175.	12734 <i>Olearia humilis</i>			
176.	8151 <i>Olearia stuartii</i>			
177.	12670 <i>Parietaria cardiostegia</i>			
178.	10975 <i>Paspalidium basicladum</i>			
179.	40423 <i>Pentameris airoides</i> (False Hairgrass)	Y		
180.	18537 <i>Philothea brucei</i> subsp. <i>brucei</i>			
181.	18508 <i>Philothea sericea</i>			
182.	17626 <i>Phyllanthus erwinii</i>			
183.	19744 <i>Pittosporum angustifolium</i>			
184.	7299 <i>Plantago debilis</i>			
185.	17817 <i>Pluchea dunlopii</i>			
186.	8174 <i>Podolepis gardneri</i>			
187.	8184 <i>Podothea gnaphalioides</i> (Golden Long-heads)			
188.	8188 <i>Pogonolepis stricta</i>			
189.	41365 <i>Polygala glaucifolia</i>			
190.	12707 <i>Prostanthera albiflora</i>			
191.	15822 <i>Prostanthera althoferi</i> subsp. <i>althoferi</i>			



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192.	31783 <i>Prostanthera ferricola</i>		P3	
193.	12703 <i>Prostanthera petrophila</i>		P3	
194.	6926 <i>Prostanthera wilkieana</i>			
195.	18154 <i>Psydrax latifolia</i>			
196.	18210 <i>Psydrax rigidula</i>			
197.	18155 <i>Psydrax suaveolens</i>			
198.	2690 <i>Ptilotus aervoides</i>			
199.	2700 <i>Ptilotus beardii</i> (Low Mulla Mulla)		P3	
200.	48602 <i>Ptilotus eremita</i>			
201.	2721 <i>Ptilotus exaltatus</i> (Tall Mulla Mulla)			
202.	2729 <i>Ptilotus grandiflorus</i>			
203.	2731 <i>Ptilotus helipteroides</i> (Hairy Mulla Mulla)			
204.	2747 <i>Ptilotus obovatus</i> (Cotton Bush)			
205.	2751 <i>Ptilotus polystachyus</i> (Prince of Wales Feather)			
206.	2754 <i>Ptilotus roei</i>			
207.	2755 <i>Ptilotus rotundifolius</i> (Royal Mulla Mulla)			
208.	2757 <i>Ptilotus schwartzii</i>			
209.	2581 <i>Rhagodia drummondii</i>			
210.	13306 <i>Rhodanthe battii</i>			
211.	13308 <i>Rhodanthe charsleyae</i>			
212.	13242 <i>Rhodanthe chlorocephala</i> subsp. <i>splendida</i>			
213.	13300 <i>Rhodanthe citrina</i>			
214.	13292 <i>Rhodanthe forrestii</i>			
215.	13294 <i>Rhodanthe laevis</i>			
216.	13238 <i>Rhodanthe maryonii</i>			
217.	13249 <i>Rhodanthe oppositifolia</i> subsp. <i>oppositifolia</i>			
218.	45148 <i>Roebuckiella ciliocarpa</i>			
219.	48889 <i>Roepera eichleri</i>			
220.	48897 <i>Roepera lobulata</i>			
221.	11151 <i>Rostraria pumila</i>	Y		
222.	2443 <i>Rumex vesicarius</i> (Ruby Dock)	Y		
223.	2357 <i>Santalum lanceolatum</i> (Northern Sandalwood, Yarnguli)			
224.	7644 <i>Scaevola spinescens</i> (Currant Bush, Maroon)			
225.	1002 <i>Schoenus nanus</i> (Tiny Bog Rush)			
226.	2607 <i>Sclerolaena densiflora</i>			
227.	2611 <i>Sclerolaena ericantha</i> (Tall Bindii)			
228.	2612 <i>Sclerolaena eurotioides</i> (Fluffy Bindii)			
229.	2625 <i>Sclerolaena obliquicuspis</i> (Limestone Bindii)			
230.	2628 <i>Sclerolaena recurvicuspis</i>			
231.	8207 <i>Senecio glossanthus</i> (Slender Groundsel)			
232.	20161 <i>Senecio pinnatifolius</i>			
233.	12279 <i>Senna artemisioides</i> subsp. <i>helmsii</i>			
234.	17558 <i>Senna artemisioides</i> subsp. <i>x artemisioides</i>			
235.	12283 <i>Senna artemisioides</i> subsp. <i>x sturtii</i>			
236.	18449 <i>Senna glaucifolia</i>			
237.	14577 <i>Senna</i> sp. <i>Meekatharra</i> (E. Bailey 1-26)			
238.	31759 <i>Sida ectogama</i>			
239.	31854 <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)			
240.	31857 <i>Sida</i> sp. <i>Golden calyces</i> glabrous (H.N. Foote 32)			
241.	19712 <i>Sida</i> sp. <i>dark green fruits</i> (S. van Leeuwen 2260)			
242.	3069 <i>Sisymbrium erysimoides</i> (Smooth Mustard)	Y		
243.	6989 <i>Solanum ashbyae</i>			
244.	6999 <i>Solanum coactiliferum</i> (Western Nightshade)			
245.	7008 <i>Solanum ferocissimum</i>			
246.	19555 <i>Stackhousia muricata</i> subsp. <i>annual</i> (W.R. Barker 2172)			
247.	16196 <i>Stenanthemum mediale</i>		P1	
248.	19705 <i>Stenanthemum patens</i>		P1	
249.	16199 <i>Stenanthemum petraeum</i>			
250.	3074 <i>Stenopetalum anfractum</i>			
251.	3076 <i>Stenopetalum filifolium</i>			
252.	8236 <i>Streptoglossa cylindriceps</i>			
253.	7740 <i>Stylidium induratum</i> (Desert Triggerplant)			
254.	7754 <i>Stylidium longibracteatum</i> (Long-bracted Trigger Plant)			
255.	12355 <i>Swainsona affinis</i>			
256.	13339 <i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>			
257.	2641 <i>Tecticornia arborea</i> (Bulli Bulli)			
258.	46513 <i>Tecticornia doliiformis</i>			
259.	33239 <i>Tecticornia halocnemoides</i> subsp. <i>catenulata</i>			
260.	33319 <i>Tecticornia indica</i> subsp. <i>bidens</i>			
261.	2819 <i>Tetragonia cristata</i>			

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262.	48603 <i>Teucrium teucriiflorum</i>			
263.	6054 <i>Thryptomene decussata</i>			
264.	675 <i>Thyridolepis multiculmis</i> (Soft Wanderrie Grass)			
265.	46756 <i>Thysanotus exfimbriatus</i>			
266.	1338 <i>Thysanotus manglesianus</i> (Fringed Lily)			
267.	6268 <i>Trachymene cyanopetala</i>			
268.	6279 <i>Trachymene ornata</i> (Spongefruit)			
269.	19053 <i>Trachymene pilbarensis</i>			
270.	18072 <i>Tribulus suberosus</i>			
271.	33276 <i>Triglochin isingiana</i>			
272.	17877 <i>Triodia melvillei</i>			
273.	48319 <i>Tripogonella loliiformis</i>			
274.	7660 <i>Velleia glabrata</i> (Pee the Bed)			
275.	7661 <i>Velleia hispida</i> (Hispid Velleia)			
276.	7664 <i>Velleia rosea</i> (Pink Velleia)			
277.	6092 <i>Verticordia jamiesonii</i>		P3	
278.	48986 <i>Vincetoxicum lineare</i>			
279.	7386 <i>Wahlenbergia gracilentia</i> (Annual Bluebell)			
280.	7393 <i>Wahlenbergia tumidifruca</i>			
281.	13331 <i>Waitzia acuminata</i> var. <i>acuminata</i>			

**Conservation Codes**

T - Rare or likely to become extinct  
X - Presumed extinct  
IA - Protected under international agreement  
S - Other specially protected fauna  
1 - Priority 1  
2 - Priority 2  
3 - Priority 3  
4 - Priority 4  
5 - Priority 5

<sup>1</sup> For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

# NatureMap Species Report

Created By Tim McCabe on 15/10/2019

**Origin** Native  
**Current Names Only** Yes  
**Core Datasets Only** Yes  
**Species Group** All Animals  
**Method** 'By Circle'  
**Centre** 117° 38' 14" E, 26° 58' 02" S  
**Buffer** 40km  
**Group By** Species Group

Species Group	Species	Records
Amphibian	5	31
Bird	122	1164
Fish	2	2
Invertebrate	12	1910
Mammal	28	164
Reptile	42	135
<b>TOTAL</b>	<b>211</b>	<b>3406</b>

Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
<b>Amphibian</b>				
1.	25376 <i>Cyclorana platycephala</i> (Water-holding Frog)			
2.	25392 <i>Litoria rubella</i> (Little Red Tree Frog)			
3.	25427 <i>Neobatrachus sutor</i> (Shoemaker Frog)			
4.	25428 <i>Neobatrachus wilmorei</i> (Plonking Frog)			
5.	25434 <i>Pseudophryne occidentalis</i> (Western Toadlet)			
<b>Bird</b>				
6.	24559 <i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
7.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
8.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
9.	24264 <i>Acanthiza robustirostris</i> (Slaty-backed Thornbill)			
10.	24265 <i>Acanthiza uropygialis</i> (Chestnut-rumped Thornbill)			
11.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
12.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
13.	25544 <i>Aegotheles cristatus</i> (Australian Owlet-nightjar)			
14.	24312 <i>Anas gracilis</i> (Grey Teal)			
15.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
16.	25670 <i>Anthus australis</i> (Australian Pipit)			
17.	25528 <i>Aphelocephala leucopsis</i> (Southern Whiteface)			
18.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
19.	41324 <i>Ardea modesta</i> (great egret, white egret)			
20.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
21.	24610 <i>Ardeotis australis</i> (Australian Bustard)			
22.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
23.	24355 <i>Artamus minor</i> (Little Woodswallow)			
24.	24356 <i>Artamus personatus</i> (Masked Woodswallow)			
25.	<i>Barnardius zonarius</i>			
26.	24359 <i>Burhinus grallarius</i> (Bush Stone-curlew)			
27.	25715 <i>Cacatua roseicapilla</i> (Galah)			
28.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
29.	24269 <i>Calamanthus campestris</i> (Rufous Fieldwren)			
30.	34000 <i>Calamanthus campestris</i> subsp. <i>montanellus</i> (Rufous Fieldwren, Western Fieldwren (western wheatbelt))			
31.	24788 <i>Calidris ruficollis</i> (Red-necked Stint)		IA	
32.	24564 <i>Certhionyx variegatus</i> (Pied Honeyeater)			
33.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
34.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
35.	47909 <i>Cheramoeca leucosterna</i> (White-backed Swallow)			
36.	24431 <i>Chrysococcyx basalus</i> (Horsfield's Bronze Cuckoo)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
37.	24434 <i>Chrysococcyx osculans</i> (Black-eared Cuckoo)			
38.	25580 <i>Cinclosoma castaneothorax</i> (Chestnut-breasted Quail-thrush)			
39.	24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt)			
40.	25581 <i>Climacteris affinis</i> (White-browed Treecreeper)			
41.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
42.	24361 <i>Coracina maxima</i> (Ground Cuckoo-shrike)			
43.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
44.	24416 <i>Corvus bennetti</i> (Little Crow)			
45.	25593 <i>Corvus orru</i> (Torresian Crow)			
46.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
47.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
48.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
49.	24322 <i>Cygnus atratus</i> (Black Swan)			
50.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			
51.	25607 <i>Dicaeum hirundinaceum</i> (Mistletoebird)			
52.	24470 <i>Dromaius novaehollandiae</i> (Emu)			
53.	<i>Egretta novaehollandiae</i>			
54.	47937 <i>Elseornis melanops</i> (Black-fronted Dotterel)			
55.	<i>Eolophus roseicapillus</i>			
56.	24568 <i>Epthianura aurifrons</i> (Orange Chat)			
57.	24570 <i>Epthianura tricolor</i> (Crimson Chat)			
58.	24379 <i>Erythronyctis cinctus</i> (Red-kneed Dotterel)			
59.	24368 <i>Eurostopodus argus</i> (Spotted Nightjar)			
60.	25621 <i>Falco berigora</i> (Brown Falcon)			
61.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
62.	25623 <i>Falco longipennis</i> (Australian Hobby)			
63.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
64.	25727 <i>Fulica atra</i> (Eurasian Coot)			
65.	24401 <i>Geopelia cuneata</i> (Diamond Dove)			
66.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
67.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
68.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
69.	24297 <i>Hamirostra melanostemon</i> (Black-breasted Buzzard)			
70.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
71.	24775 <i>Himantopus himantopus</i> subsp. <i>leucocephalus</i> (Black-winged Stilt)			
72.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
73.	24367 <i>Lalage tricolor</i> (White-winged Triller)			
74.	25637 <i>Larus novaehollandiae</i> (Silver Gull)			
75.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
76.	24326 <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)			
77.	25651 <i>Malurus lamberti</i> (Variegated Fairy-wren)			
78.	25652 <i>Malurus leucopterus</i> (White-winged Fairy-wren)			
79.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
80.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
81.	47997 <i>Melanodryas cucullata</i> (Hooded Robin)			
82.	24736 <i>Melopsittacus undulatus</i> (Budgerigar)			
83.	25693 <i>Microeca fascians</i> (Jacky Winter)			
84.	24737 <i>Neophema bourkii</i> (Bourke's Parrot)			
85.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
86.	<i>Neopsephotus bourkii</i>			
87.	25747 <i>Ninox connivens</i> (Barking Owl)			
88.	24742 <i>Nymphicus hollandicus</i> (Cockatiel)			
89.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
90.	24618 <i>Oreoica gutturalis</i> (Crested Bellbird)			
91.	34011 <i>Oreoica gutturalis</i> subsp. <i>gutturalis</i> (Crested Bellbird (southern))			
92.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
93.	24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)			
94.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
95.	24659 <i>Petroica goodenovii</i> (Red-capped Robin)			
96.	24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
97.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
98.	24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
99.	24748 <i>Platycercus varius</i> (Mulga Parrot)			
100.	25721 <i>Platycercus zonarius</i> (Australian Ringneck, Ring-necked Parrot)			
101.	24751 <i>Platycercus zonarius</i> subsp. <i>zonarius</i> (Port Lincoln Parrot)			
102.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
103.	24679 <i>Podargus strigoides</i> subsp. <i>brachypterus</i> (Tawny Frogmouth)			
104.	25704 <i>Podiceps cristatus</i> (Great Crested Grebe)			
105.	24681 <i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)			
106.	24683 <i>Pomatostomus superciliosus</i> (White-browed Babbler)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
107.	34013 <i>Pomatostomus superciliosus</i> subsp. <i>ashbyi</i> ( <i>White-browed Babbler</i> ( <i>western wheatbill</i> ))			
108.	25706 <i>Pomatostomus temporalis</i> ( <i>Grey-crowned Babbler</i> )			
109.	24390 <i>Psophodes occidentalis</i> ( <i>Western Wedgebill, Chiming Wedgebill</i> )			
110.	<i>Ptilonorhynchus guttatus</i>			
111.	24757 <i>Ptilonorhynchus maculatus</i> subsp. <i>guttatus</i> ( <i>Western Bowerbird</i> )			
112.	42344 <i>Purnella albifrons</i> ( <i>White-fronted Honeyeater</i> )			
113.	24278 <i>Pyrrholaemus brunneus</i> ( <i>Redthroat</i> )			
114.	24776 <i>Recurvirostra novaehollandiae</i> ( <i>Red-necked Avocet</i> )			
115.	48096 <i>Rhipidura albiscapa</i> ( <i>Grey Fantail</i> )			
116.	25614 <i>Rhipidura leucophrys</i> ( <i>Willie Wagtail</i> )			
117.	30948 <i>Smicromis brevirostris</i> ( <i>Weebill</i> )			
118.	25705 <i>Tachybaptus novaehollandiae</i> ( <i>Australasian Grebe, Black-throated Grebe</i> )			
119.	24331 <i>Tadorna tadornoides</i> ( <i>Australian Shelduck, Mountain Duck</i> )			
120.	30870 <i>Taeniopygia guttata</i> ( <i>Zebra Finch</i> )			
121.	24845 <i>Threskiornis spinicollis</i> ( <i>Straw-necked Ibis</i> )			
122.	42351 <i>Todiramphus pyrrhopygius</i> ( <i>Red-backed Kingfisher</i> )			
123.	25549 <i>Todiramphus sanctus</i> ( <i>Sacred Kingfisher</i> )			
124.	48141 <i>Tribonyx ventralis</i> ( <i>Black-tailed Native-hen</i> )			
125.	24808 <i>Tringa nebularia</i> ( <i>Common Greenshank, greenshank</i> )		IA	
126.	24851 <i>Turnix velox</i> ( <i>Little Button-quail</i> )			
127.	24386 <i>Vanellus tricolor</i> ( <i>Banded Lapwing</i> )			

### Fish

128.	<i>Craterocephalus cuneiceps</i>			
129.	<i>Leiopotherapon unicolor</i>			

### Invertebrate

130.	<i>Anidiops villosus</i>			
131.	<i>Cherax destructor</i>			
132.	<i>Cormocephalus turneri</i>			
133.	33917 <i>Idiosoma nigrum</i> ( <i>Shield-backed Trapdoor Spider</i> )		T	
134.	<i>Indolpium</i> sp.			
135.	<i>Nomindra leeuweni</i>			
136.	<i>Phryganoporus candidus</i>			
137.	<i>Scolopendra laeta</i>			
138.	<i>Scolopendra morsitans</i>			
139.	<i>Stoena sinuosa</i>			
140.	<i>Supunna funerea</i>			
141.	<i>Supunna picta</i>			

### Mammal

142.	24087 <i>Antechinomys laniger</i> ( <i>Kultarr</i> )			
143.	24149 <i>Chaeropus ecaudatus</i> ( <i>Pig-footed Bandicoot, kantjilpa</i> )		X	
144.	24186 <i>Chalinolobus gouldii</i> ( <i>Gould's Wattleed Bat</i> )			
145.	30903 <i>Dasycercus blythi</i> ( <i>Brush-tailed Mulgara, Ampurta</i> )		P4	
146.	24125 <i>Lagorchestes hirsutus</i> subsp. <i>hirsutus</i> ( <i>Rufous Hare-wallaby (south-western)</i> )		X	
147.	24218 <i>Leporillus apicalis</i> ( <i>Lesser Stick-nest Rat</i> )		X	
148.	24219 <i>Leporillus conditor</i> ( <i>Greater Stick-nest Rat, Wopilkara</i> )		S	
149.	24180 <i>Macroderma gigas</i> ( <i>Ghost Bat</i> )		T	
150.	24135 <i>Macropus robustus</i> subsp. <i>erubescens</i> ( <i>Euro, Biggada</i> )			
151.	24136 <i>Macropus rufus</i> ( <i>Red Kangaroo, Marlu</i> )			
152.	24168 <i>Macrotis lagotis</i> ( <i>Bilby, Dalgyte, Ninu</i> )		T	
153.	24224 <i>Notomys alexis</i> ( <i>Spinifex Hopping-mouse</i> )			
154.	24227 <i>Notomys longicaudatus</i> ( <i>Long-tailed Hopping-mouse, koolawa</i> )		X	
155.	24194 <i>Nyctophilus geoffroyi</i> ( <i>Lesser Long-eared Bat</i> )			
156.	24195 <i>Nyctophilus gouldi</i> ( <i>Gould's Long-eared Bat</i> )			
157.	34016 <i>Ovis aries</i> ( <i>Sheep</i> )			
158.	24142 <i>Petrogale lateralis</i> subsp. <i>lateralis</i> ( <i>Black-flanked Rock-wallaby, Black-footed Rock-wallaby</i> )		T	
159.	24106 <i>Pseudantechinus woolleyae</i> ( <i>Woolley's Pseudantechinus</i> )			
160.	24236 <i>Pseudomys fieldi</i> ( <i>Shark Bay Mouse, Djoongari</i> )		T	
161.	24237 <i>Pseudomys hermannsburgensis</i> ( <i>Sandy Inland Mouse</i> )			
162.	24108 <i>Sminthopsis crassicaudata</i> ( <i>Fat-tailed Dunnart</i> )			
163.	24109 <i>Sminthopsis dolichura</i> ( <i>Little long-tailed Dunnart</i> )			
164.	24116 <i>Sminthopsis macroura</i> ( <i>Stripe-faced Dunnart</i> )			
165.	24207 <i>Tachyglossus aculeatus</i> ( <i>Short-beaked Echidna</i> )			
166.	24175 <i>Taphozous georgianus</i> ( <i>Common Sheath-tailed Bat</i> )			
167.	24176 <i>Taphozous hilli</i> ( <i>Hill's Sheath-tail-bat</i> )			
168.	24158 <i>Trichosurus vulpecula</i> subsp. <i>vulpecula</i> ( <i>Common Brushtail Possum</i> )			
169.	24205 <i>Vespadelus finlaysoni</i> ( <i>Finlayson's Cave Bat</i> )			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Reptile</b>				
170.	25318 <i>Antaresia perthensis</i> (Pygmy Python)			
171.	25339 <i>Chelodina steindachneri</i> (Flat-shelled Turtle)			
172.	25020 <i>Cryptoblepharus plagiocephalus</i>			
173.	25458 <i>Ctenophorus caudicinctus</i> (Ring-tailed Dragon)			
174.	24869 <i>Ctenophorus caudicinctus</i> subsp. <i>mensarum</i> (Ring-tailed Dragon)			
175.	24882 <i>Ctenophorus nuchalis</i> (Central Netted Dragon)			
176.	24886 <i>Ctenophorus reticulatus</i> (Western Netted Dragon)			
177.	24888 <i>Ctenophorus salinarum</i> (Salt Pan Dragon)			
178.	24889 <i>Ctenophorus scutulatus</i> (Lozenge-marked Dragon)			
179.	25052 <i>Ctenotus leonhardii</i>			
180.	25057 <i>Ctenotus nasutus</i>			
181.	25075 <i>Ctenotus severus</i>			
182.	25080 <i>Ctenotus uber</i> subsp. <i>uber</i> (Spotted Ctenotus)			
183.	24995 <i>Delma australis</i>			
184.	25092 <i>Egernia depressa</i> (Southern Pygmy Spiny-tailed Skink)			
185.	25107 <i>Egernia stokesii</i> subsp. <i>badia</i> (Western Spiny-tailed Skink, Gidgee Skink)		T	
186.	25109 <i>Eremiascincus richardsonii</i> (Broad-banded Sand Swimmer)			
187.	24958 <i>Gehyra punctata</i>			
188.	24959 <i>Gehyra variegata</i>			
189.	24961 <i>Heteronotia binoei</i> (Bynoe's Gecko)			
190.	25125 <i>Lerista bipes</i>			
191.	25134 <i>Lerista eupoda</i> (West Coast mulga slider, Good-legged Lerista)		P1	
192.	25151 <i>Lerista macropisthopus</i> subsp. <i>fusciceps</i>			
193.	25157 <i>Lerista nichollsi</i>			
194.	42411 <i>Lerista timida</i>			
195.	25184 <i>Menetia greyii</i>			
196.	24904 <i>Moloch horridus</i> (Thorny Devil)			
197.	24971 <i>Nephruerus vertebralis</i>			
198.	24973 <i>Nephruerus wheeleri</i> subsp. <i>wheeleri</i>			
199.	24976 <i>Oedura marmorata</i> (Marbled Velvet Gecko)			
200.	25510 <i>Pogona minor</i> (Dwarf Bearded Dragon)			
201.	24907 <i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)			
202.	25261 <i>Pseudechis australis</i> (Mulga Snake)			
203.	42416 <i>Pseudonaja mengdeni</i> (Western Brown Snake)			
204.	25263 <i>Pseudonaja modesta</i> (Ringed Brown Snake)			
205.	25264 <i>Pseudonaja nuchalis</i> (Gwardar, Northern Brown Snake)			
206.	24982 <i>Rhynchoedura ornata</i> (Western Beaked Gecko)			
207.	25266 <i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
208.	24946 <i>Strophurus strophurus</i>			
209.	25269 <i>Suta fasciata</i> (Rosen's Snake)			
210.	30814 <i>Tympanocryptis cephalus</i> (Pebble Dragon)			
211.	25524 <i>Varanus panoptes</i> (Yellow-spotted Monitor)			

**Conservation Codes**

T - Rare or likely to become extinct  
X - Presumed extinct  
IA - Protected under international agreement  
S - Other specially protected fauna  
1 - Priority 1  
2 - Priority 2  
3 - Priority 3  
4 - Priority 4  
5 - Priority 5

<sup>1</sup> For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Common Name	Scientific Name	Count	Reporting Rate
Emu	<i>Dromaius novaehollandiae</i>	24	28.57%
Pink-eared Duck	<i>Malacorhynchus membranaceus</i>	4	4.76%
Black Swan	<i>Cygnus atratus</i>	1	1.19%
Australian Shelduck	<i>Tadorna tadornoides</i>	4	4.76%
Pacific Black Duck	<i>Anas superciliosa</i>	4	4.76%
Grey Teal	<i>Anas gracilis</i>	5	5.95%
Australian Wood Duck	<i>Chenonetta jubata</i>	5	5.95%
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	5	5.95%
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>	3	3.57%
Great Crested Grebe	<i>Podiceps cristatus</i>	1	1.19%
Common Bronzewing	<i>Phaps chalcoptera</i>	13	15.48%
Crested Pigeon	<i>Ocyphaps lophotes</i>	30	35.71%
Diamond Dove	<i>Geopelia cuneata</i>	10	11.90%
Horsfield's Bronze-Cuckoo	<i>Chalcites basalis</i>	3	3.57%
Black-eared Cuckoo	<i>Chalcites osculans</i>	5	5.95%
Pallid Cuckoo	<i>Heteroscenes pallidus</i>	1	1.19%
Spotted Nightjar	<i>Eurostopodus argus</i>	3	3.57%
Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	8	9.52%
Black-tailed Native-hen	<i>Tribonyx ventralis</i>	3	3.57%
Eurasian Coot	<i>Fulica atra</i>	2	2.38%
Bush Stone-curlew	<i>Burhinus grallarius</i>	3	3.57%
Black-winged Stilt	<i>Himantopus leucocephalus</i>	4	4.76%
Red-capped Plover	<i>Charadrius ruficapillus</i>	4	4.76%
Black-fronted Dotterel	<i>Elsyornis melanops</i>	6	7.14%
Banded Lapwing	<i>Vanellus tricolor</i>	3	3.57%
Red-kneed Dotterel	<i>Erythrogonyx cinctus</i>	3	3.57%
Australian Pelican	<i>Pelecanus conspicillatus</i>	1	1.19%
White-necked Heron	<i>Ardea pacifica</i>	1	1.19%
Great Egret	<i>Ardea alba</i>	1	1.19%
White-faced Heron	<i>Egretta novaehollandiae</i>	1	1.19%
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	3	3.57%
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	2	2.38%
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>	1	1.19%
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	1	1.19%
Black-breasted Buzzard	<i>Hamirostra melanosternon</i>	3	3.57%
Wedge-tailed Eagle	<i>Aquila audax</i>	26	30.95%
Collared Sparrowhawk	<i>Accipiter cirrocephalus</i>	2	2.38%
Whistling Kite	<i>Haliastur sphenurus</i>	8	9.52%
Sacred Kingfisher	<i>Todiramphus sanctus</i>	2	2.38%
Red-backed Kingfisher	<i>Todiramphus pyrrhopygius</i>	2	2.38%
Nankeen Kestrel	<i>Falco cenchroides</i>	15	17.86%
Australian Hobby	<i>Falco longipennis</i>	2	2.38%
Brown Falcon	<i>Falco berigora</i>	10	11.90%
Peregrine Falcon	<i>Falco peregrinus</i>	1	1.19%
Cockatiel	<i>Nymphicus hollandicus</i>	2	2.38%
Galah	<i>Eolophus roseicapilla</i>	21	25.00%
Mulga Parrot	<i>Psephotellus varius</i>	35	41.67%
Australian Ringneck	<i>Barnardius zonarius</i>	12	14.29%
Bourke's Parrot	<i>Neopsephotus bourkii</i>	11	13.10%

Elegant Parrot	<i>Neophema elegans</i>	2	2.38%
Budgerigar	<i>Melopsittacus undulatus</i>	7	8.33%
Western Bowerbird	<i>Ptilonorhynchus guttatus</i>	21	25.00%
White-browed Treecreeper	<i>Climacteris affinis</i>	1	1.19%
Variiegated Fairy-wren	<i>Malurus lamberti</i>	4	4.76%
Splendid Fairy-wren	<i>Malurus splendens</i>	22	26.19%
White-winged Fairy-wren	<i>Malurus leucopterus</i>	3	3.57%
Brown Honeyeater	<i>Lichmera indistincta</i>	5	5.95%
Grey Honeyeater	<i>Conopophila whitei</i>	2	2.38%
Crimson Chat	<i>Epthianura tricolor</i>	4	4.76%
Orange Chat	<i>Epthianura aurifrons</i>	2	2.38%
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>	32	38.10%
Singing Honeyeater	<i>Gavicalis virescens</i>	43	51.19%
White-plumed Honeyeater	<i>Ptilotula penicillata</i>	13	15.48%
White-fronted Honeyeater	<i>Purnella albifrons</i>	1	1.19%
Yellow-throated Miner	<i>Manorina flavigula</i>	26	30.95%
Striated Pardalote	<i>Pardalotus striatus</i>	1	1.19%
Western Gerygone	<i>Gerygone fusca</i>	1	1.19%
Weebill	<i>Smicronis brevirostris</i>	1	1.19%
Redthroat	<i>Pyrrholaemus brunneus</i>	21	25.00%
Southern Whiteface	<i>Aphelocephala leucopsis</i>	20	23.81%
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	26	30.95%
Inland Thornbill	<i>Acanthiza apicalis</i>	14	16.67%
Slaty-backed Thornbill	<i>Acanthiza robustirostris</i>	9	10.71%
Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>	38	45.24%
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	27	32.14%
White-browed Babbler	<i>Pomatostomus superciliosus</i>	12	14.29%
Ground Cuckoo-shrike	<i>Coracina maxima</i>	2	2.38%
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	14	16.67%
Chestnut-breasted Quail-thrush	<i>Cinclosoma castaneothorax</i>	12	14.29%
Rufous Whistler	<i>Pachycephala rufiventris</i>	33	39.29%
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	28	33.33%
Crested Bellbird	<i>Oreoica gutturalis</i>	33	39.29%
Australian Magpie	<i>Gymnorhina tibicen</i>	17	20.24%
Pied Butcherbird	<i>Cracticus nigrogularis</i>	15	17.86%
Grey Butcherbird	<i>Cracticus torquatus</i>	29	34.52%
Masked Woodswallow	<i>Artamus personatus</i>	4	4.76%
Black-faced Woodswallow	<i>Artamus cinereus</i>	24	28.57%
Little Woodswallow	<i>Artamus minor</i>	13	15.48%
Willie Wagtail	<i>Rhipidura leucophrys</i>	37	44.05%
Grey Fantail	<i>Rhipidura fuliginosa</i>	3	3.57%
Torresian Crow	<i>Corvus orru</i>	8	9.52%
Little Crow	<i>Corvus bennetti</i>	13	15.48%
Magpie-lark	<i>Grallina cyanoleuca</i>	23	27.38%
Red-capped Robin	<i>Petroica goodenovii</i>	20	23.81%
Hooded Robin	<i>Melanodryas cucullata</i>	7	8.33%
Mistletoebird	<i>Dicaeum hirundinaceum</i>	4	4.76%
Zebra Finch	<i>Taeniopygia guttata</i>	35	41.67%
Australasian Pipit	<i>Anthus novaeseelandiae</i>	16	19.05%
Brown Songlark	<i>Cincloramphus cruralis</i>	1	1.19%



White-backed Swallow	<i>Cheramoeca leucosterna</i>	2	2.38%
Tree Martin	<i>Petrochelidon nigricans</i>	7	8.33%
Welcome Swallow	<i>Hirundo neoxena</i>	18	21.43%
Crow & Raven spp		4	4.76%

## APPENDIX C      EPBC PROTECTED MATTERS SEARCH TOOL



# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 20/08/19 15:48:35

[Summary](#)

[Details](#)

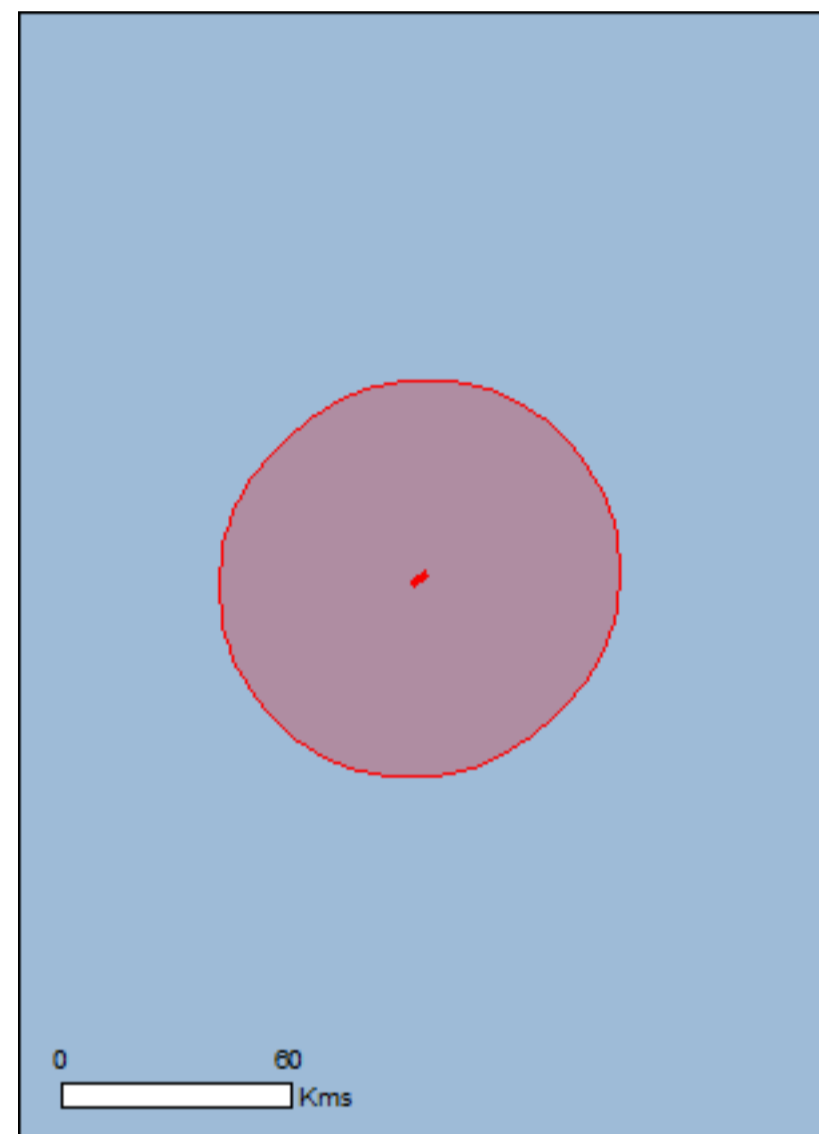
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

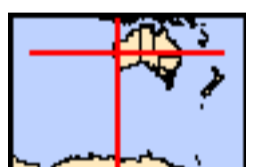
[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 50.0Km



# Summary

## Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	None
<a href="#">Listed Threatened Species:</a>	8
<a href="#">Listed Migratory Species:</a>	8

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

<a href="#">Commonwealth Land:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	12
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Australian Marine Parks:</a>	None

## Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

<a href="#">State and Territory Reserves:</a>	None
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	10
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

### Listed Threatened Species [\[ Resource Information \]](#)

Name	Status	Type of Presence
------	--------	------------------

#### Birds

<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
---	-----------------------	--

<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
---	------------	--

<a href="#">Pezoporus occidentalis</a> Night Parrot [59350]	Endangered	Species or species habitat may occur within area
--	------------	--

<a href="#">Rostratula australis</a> Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
--	------------	--

#### Mammals

<a href="#">Leporillus conditor</a> Wopilkara, Greater Stick-nest Rat [137]	Vulnerable	Species or species habitat may occur within area
--	------------	--

#### Other

<a href="#">Idiosoma nigrum</a> Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798]	Vulnerable	Species or species habitat known to occur within area
--	------------	---

#### Plants

<a href="#">Eremophila rostrata</a> Beaked Eremophila [65124]	Critically Endangered	Species or species habitat may occur within area
--	-----------------------	--

#### Reptiles

<a href="#">Egernia stokesii badia</a> Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat known to occur within area
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### Listed Migratory Species [\[ Resource Information \]](#)

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
------	------------	------------------

#### Migratory Marine Birds

<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
---	--	--

#### Migratory Terrestrial Species

<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within
---	--	---

Name	Threatened	Type of Presence area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

## Other Matters Protected by the EPBC Act

Listed Marine Species		[ <a href="#">Resource Information</a> ]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
<b>Birds</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat known to occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat known to occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Chrysococcyx osculans</a> Black-eared Cuckoo [705]		Species or species habitat known to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within

Name	Threatened	Type of Presence area
<a href="#">Motacilla flava</a> Yellow Wagtail [644]		Species or species habitat may occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

## Extra Information

### Invasive Species [ [Resource Information](#) ]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
<b>Birds</b>		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
<b>Mammals</b>		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
<b>Plants</b>		
Carrichtera annua Ward's Weed [9511]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur

Name

Status

Type of Presence  
within area



# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

# Coordinates

-26.96667 117.66306,-26.93944 117.7

# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

## APPENDIX D      PLANT SPECIES INVENTORY

Family	Name
Acanthaceae	<i>Harnieria kempeana</i> subsp. <i>muelleri</i>
Aizoaceae	<i>Trianthema glossostigmum</i>
Amaranthaceae	<i>Ptilotus aervoides</i> <i>Ptilotus exaltatus</i> <i>Ptilotus gaudichaudii</i> <i>Ptilotus helipteroides</i> <i>Ptilotus obovatus</i> <i>Ptilotus polystachyus</i> <i>Ptilotus roei</i> <i>Ptilotus rotundifolius</i> <i>Ptilotus schwartzii</i>
Apiaceae	<i>Daucus glochidiatus</i>
Apocynaceae	Apocynaceae sp. (indet.) <i>Marsdenia australis</i>
Araliaceae	<i>Trachymene cyanopetala</i> <i>Trachymene ornata</i> <i>Trachymene pilbarensis</i>
Asparagaceae	<i>Arthropodium dyeri</i> <i>Thysanotus manglesianus</i>
Asteraceae	? <i>Rhodanthe</i> sp. (indet.) <i>Actinobole oldfieldianum</i> <i>Angianthus tomentosus</i> <i>Brachyscome ciliaris</i> <i>Calocephalus knappii</i> <i>Calotis hispidula</i> <i>Calotis porphyroglossa</i> <i>Cephalipterum drummondii</i> <i>Chthonocephalus viscosus</i> <i>Erymophyllum ramosum</i> subsp. <i>ramosum</i> <i>Gnephosis tenuissima</i> <i>Helipterum craspedioides</i> <i>Lawrencella davenportii</i> <i>Myriocephalus oldfieldii</i> <i>Myriocephalus rudallii</i> <i>Pluchea dentex</i> <i>Podolepis gardneri</i> <i>Rhodanthe battii</i> <i>Rhodanthe charsleyae</i> <i>Rhodanthe maryonii</i> <i>Rhodanthe polycephala</i> <i>Rhodanthe propinqua</i> <i>Roebuckiella ciliocarpa</i> <i>Senecio</i> sp. (indet.) <i>Trichanthodium skirrophorum</i> <i>Waitzia acuminata</i> var. <i>acuminata</i>
Boraginaceae	<i>Heliotropium ovalifolium</i> <i>Trichodesma zeylanicum</i>
Brassicaceae	<i>Lepidium oxytrichum</i> <i>Stenopetalum filifolium</i> <i>Stenopetalum lineare</i> var. <i>lineare</i>
Campanulaceae	<i>Wahlenbergia tumidifruta</i>
Casuarinaceae	<i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>
Chenopodiaceae	<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i> <i>Dysphania saxatilis</i> <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> <i>Maireana georgei</i> <i>Maireana melanocoma</i> <i>Maireana triptera</i> <i>Maireana villosa</i> <i>Rhagodia eremaea</i> <i>Salsola australis</i>

Family	Name	
Convolvulaceae	<i>Sclerolaena densiflora</i>	
	<i>Convolvulus clementii</i>	
	* <i>Cuscuta planiflora</i>	
Euphorbiaceae	<i>Duperreya commixta</i>	
	<i>Euphorbia australis</i> var. <i>subtomentosa</i>	
	<i>Euphorbia boophthona</i>	
Fabaceae	<i>Euphorbia drummondii</i>	
	<i>Acacia craspedocarpa</i>	
	<i>Acacia craspedocarpa</i> (hybrid)	
	<i>Acacia dilloniorum</i> (P1)	
	<i>Acacia exocarpoides</i>	
	<i>Acacia fuscaneura</i>	
	<i>Acacia incurvaneura</i>	
	<i>Acacia incurvaneura</i> × <i>mulganeura</i>	
	<i>Acacia mulganeura</i>	
	<i>Acacia pruinocarpa</i>	
	<i>Acacia pteraneura</i>	
	<i>Acacia ramulosa</i> var. <i>linophylla</i>	
	<i>Acacia ramulosa</i> var. <i>ramulosa</i>	
	<i>Acacia rhodophloia</i>	
	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)	
	<i>Acacia speckii</i> (P4)	
	<i>Acacia tetragonophylla</i>	
	<i>Chorizema genistoides</i>	
	<i>Glycine canescens</i>	
	<i>Indigofera monophylla</i> sens. lat.	
<i>Senna artemisioides</i> subsp. × <i>artemisioides</i>		
<i>Senna artemisioides</i> subsp. × <i>sturtii</i>		
<i>Senna artemisioides</i> subsp. <i>filifolia</i>		
<i>Senna artemisioides</i> subsp. <i>helmsii</i>		
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)		
<i>Swainsona kingii</i>		
Geraniaceae	<i>Erodium crinitum</i>	
Goodeniaceae	<i>Brunonia australis</i>	
	<i>Goodenia berardiana</i>	
	<i>Goodenia havilandii</i>	
	<i>Goodenia macroplectra</i>	
	<i>Goodenia mimuloides</i>	
	<i>Goodenia quasilibera</i>	
	<i>Goodenia tenuiloba</i>	
	<i>Scaevola spinescens</i>	
	Haloragaceae	<i>Haloragis trigonocarpa</i>
	Lamiaceae	<i>Hemigenia virescens</i> (P3)
<i>Prostanthera althoferi</i> subsp. <i>althoferi</i>		
<i>Prostanthera petrophila</i> (P3)		
Malvaceae	<i>Teucrium teucriiflorum</i>	
	<i>Abutilon oxycarpum</i>	
	<i>Brachychiton gregorii</i>	
	<i>Hibiscus burtonii</i>	
	<i>Hibiscus</i> sp. Gardneri (A.L. Payne PRP 1435)	
	<i>Hibiscus sturtii</i> var. <i>forrestii</i>	
	<i>Sida ectogama</i>	
	<i>Sida</i> sp. (indet.)	
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)		
Montiaceae	<i>Calandrinia</i> ? <i>ptychosperma</i>	
	<i>Calandrinia eremaea</i>	
	<i>Calandrinia stagnensis</i>	
Myrtaceae	<i>Aluta aspera</i> subsp. <i>hesperia</i>	
	<i>Calytrix desolata</i>	
	<i>Micromyrtus placoides</i> (P3)	
	<i>Thryptomene decussata</i>	

Family	Name
Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>
Plantaginaceae	<i>Plantago drummondii</i>
Poaceae	<i>Aristida contorta</i> <i>Austrastipa trichophylla</i> <i>Cymbopogon ambiguus</i> <i>Enneapogon caerulescens</i> <i>Eragrostis eriopoda</i> <i>Eriachne helmsii</i> <i>Eriachne pulchella</i> subsp. <i>dominii</i> <i>Eriachne pulchella</i> subsp. <i>pulchella</i> <i>Monachather paradoxus</i> <i>Paspalidium clementii</i> <i>*Rostraria pumila</i>
Primulaceae	<i>*Lysimachia arvensis</i>
Proteaceae	<i>Grevillea berryana</i> <i>Grevillea inconspicua</i> (P4) <i>Hakea lorea</i> subsp. <i>lorea</i>
Pteridaceae	<i>Cheilanthes brownii</i> <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>
Rhamnaceae	<i>Stenanthemum patens</i> (P1) <i>Stenanthemum petraeum</i> <i>Stenanthemum</i> sp. (indet.)
Rubiaceae	<i>Psyrax latifolia</i> <i>Psyrax rigidula</i> <i>Psyrax suaveolens</i> <i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>
Rutaceae	<i>Philotheca brucei</i> subsp. <i>brucei</i>
Santalaceae	<i>Santalum lanceolatum</i> <i>Dodonaea amplisemina</i> (P4) <i>Dodonaea pachyneura</i>
Scrophulariaceae	<i>Eremophila exilifolia</i> <i>Eremophila foliosissima</i> <i>Eremophila forrestii</i> subsp. <i>forrestii</i> <i>Eremophila fraseri</i> <i>Eremophila georgei</i> <i>Eremophila glutinosa</i> <i>Eremophila jucunda</i> subsp. <i>jucunda</i> <i>Eremophila latrobei</i> subsp. <i>latrobei</i> <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> <i>Eremophila macmillaniana</i> <i>Eremophila simulans</i>
Solanaceae	<i>Nicotiana rosulata</i> subsp. <i>rosulata</i> <i>Solanum ashbyae</i> <i>Solanum austropiceum</i> <i>Solanum cleistogamum</i> <i>Solanum lasiophyllum</i>
Zygophyllaceae	<i>Roepera eichleri</i> <i>Tribulus astrocarpus</i> <i>Tribulus suberosus</i>

\*Introduced.

**APPENDIX E**

**PRIORITY FLORA SPECIES RECORDED WITHIN THE STUDY AREA**

Name	WAConsStat	Abundance	DateObs	Easting	Northing
<i>Acacia dilloniorum</i>	P1	1	3/09/2019	568556.44	7020064.3
<i>Acacia dilloniorum</i>	P1	1	3/09/2019	568208.36	7019805.9
<i>Acacia dilloniorum</i>	P1	3	3/09/2019	568548.65	7020038.1
<i>Acacia dilloniorum</i>	P1	4	3/09/2019	568580.66	7020046.1
<i>Acacia dilloniorum</i>	P1	5	3/09/2019	568309.93	7019897.6
<i>Acacia dilloniorum</i>	P1	20	3/09/2019	568357.89	7019974.3
<i>Acacia dilloniorum</i>	P1	25	3/09/2019	568341.34	7019942.2
<i>Acacia dilloniorum</i>	P1	25	3/09/2019	568548.65	7020038.1
<i>Acacia speckii</i>	P4	1	3/09/2019	568378.39	7020074
<i>Acacia speckii</i>	P4	1	3/09/2019	568556.44	7020064.3
<i>Acacia speckii</i>	P4	1	3/09/2019	568590.46	7020039.3
<i>Acacia speckii</i>	P4	1	3/09/2019	568664.56	7019992.3
<i>Acacia speckii</i>	P4	4	3/09/2019	568572.62	7020045.6
<i>Acacia speckii</i>	P4	5	3/09/2019	568553.45	7020025.6
<i>Acacia speckii</i>	P4	10	3/09/2019	568427.83	7020019.6
<i>Acacia speckii</i>	P4	10	3/09/2019	568660.84	7020039.2
<i>Acacia speckii</i>	P4	14	3/09/2019	568378.39	7020074
<i>Acacia speckii</i>	P4	25	3/09/2019	568611.91	7020060
<i>Acacia speckii</i>	P4	1	4/07/2019	568575.5	7020046.7
<i>Dodonaea amplisemina</i>	P4	1	3/09/2019	568378.39	7020074
<i>Dodonaea amplisemina</i>	P4	1	3/09/2019	568556.44	7020064.3
<i>Dodonaea amplisemina</i>	P4	1	4/09/2019	568836.86	7019605.7
<i>Dodonaea amplisemina</i>	P4	1	4/09/2019	568800.3	7019220.1
<i>Dodonaea amplisemina</i>	P4	50	3/09/2019	568434.49	7019983.5
<i>Dodonaea amplisemina</i>	P4	1	3/09/2019	568318.18	7019900.7
<i>Dodonaea amplisemina</i>	P4	1	3/09/2019	568614.39	7020022
<i>Dodonaea amplisemina</i>	P4	1	3/09/2019	568727.47	7019788.1
<i>Dodonaea amplisemina</i>	P4	1	3/09/2019	568852.33	7019385.2
<i>Dodonaea amplisemina</i>	P4	2	3/09/2019	568580.66	7020046.1
<i>Dodonaea amplisemina</i>	P4	2	3/09/2019	568878.18	7019500.5
<i>Dodonaea amplisemina</i>	P4	3	3/09/2019	568572.62	7020045.6
<i>Dodonaea amplisemina</i>	P4	5	3/09/2019	568744.49	7019724
<i>Dodonaea amplisemina</i>	P4	5	3/09/2019	568823.72	7019615.9
<i>Dodonaea amplisemina</i>	P4	5	3/09/2019	568672.24	7020036.4
<i>Dodonaea amplisemina</i>	P4	10	3/09/2019	568728.71	7019778.6
<i>Dodonaea amplisemina</i>	P4	10	3/09/2019	568751.92	7019703.7
<i>Dodonaea amplisemina</i>	P4	10	3/09/2019	568773.63	7019679.3
<i>Dodonaea amplisemina</i>	P4	10	3/09/2019	568834.39	7019318.6
<i>Dodonaea amplisemina</i>	P4	20	3/09/2019	568866.17	7019573
<i>Grevillea inconspicua</i>	P4	0	4/09/2019	568836.86	7019605.7
<i>Grevillea inconspicua</i>	P4	1	3/09/2019	567613.99	7017093
<i>Grevillea inconspicua</i>	P4	3	3/09/2019	568751.92	7019703.7
<i>Grevillea inconspicua</i>	P4	5	3/09/2019	568786.02	7019657
<i>Grevillea inconspicua</i>	P4	5	3/09/2019	568834.39	7019318.6
<i>Grevillea inconspicua</i>	P4	5	3/09/2019	568788.27	7019651.1
<i>Hemigenia virescens</i>	P3	15	4/09/2019	569077.07	7019221.5
<i>Hemigenia virescens</i>	P3	2	3/09/2019	569042.62	7019166.1
<i>Hemigenia virescens</i>	P3	10	3/09/2019	568921.6	7019165.8
<i>Hemigenia virescens</i>	P3	10	3/09/2019	569077.27	7019167.5
<i>Micromyrtus placoides</i>	P3	20	3/09/2019	568584.15	7019775.8
<i>Micromyrtus placoides</i>	P3	50	3/09/2019	568904.19	7019936.8
<i>Micromyrtus placoides</i>	P3	100	3/09/2019	569038.72	7020028.1
<i>Micromyrtus placoides</i>	P3	10	3/09/2019	568618.55	7019568
<i>Micromyrtus placoides</i>	P3	20	3/09/2019	568545.59	7019822.1



Name	WAConsStat	Abundance	DateObs	Easting	Northing
<i>Micromyrtus placoides</i>	P3	20	3/09/2019	568541.21	7019838.4
<i>Micromyrtus placoides</i>	P3	20	3/09/2019	568550.74	7019583.3
<i>Micromyrtus placoides</i>	P3	100	3/09/2019	569006.95	7019990.6
<i>Micromyrtus placoides</i>	P3	100	3/09/2019	568391.88	7019560.4
<i>Micromyrtus placoides</i>	P3	200	3/09/2019	568587.01	7019736.5
<i>Micromyrtus placoides</i>	P3	200	3/09/2019	568314.23	7019557.5
<i>Micromyrtus placoides</i>	P3	20	4/07/2019	568542.06	7019703.4
<i>Prostanthera petrophila</i>	P3	1	3/09/2019	568934.67	7020061.1
<i>Prostanthera petrophila</i>	P3	50	3/09/2019	568538.28	7019774.9
<i>Stenanthemum patens</i>	P1	2	3/09/2019	568707.68	7019908.1

## APPENDIX F SPECIES CONSTANCY WITHIN VEGETATION TYPES

Family	Species	Vegetation type <sup>1</sup>									
		SH01	SH02	SH03	SH04	SH05	SH06	SH07	SH08	W01	W02
Acanthaceae	<i>Harnieria kempeana</i> subsp. <i>muelleri</i>			100%		100%		33%		100%	
Aizoaceae	<i>Trianthema glossostigmum</i>						50%				
Amaranthaceae	<i>Ptilotus aervoides</i>		100%		100%						
	<i>Ptilotus exaltatus</i>			100%							
	<i>Ptilotus gaudichaudii</i>			100%			50%				
	<i>Ptilotus helipteroides</i>	50%	100%	100%	100%	50%		33%			33%
	<i>Ptilotus obovatus</i>	100%	100%	100%	100%	100%	50%	100%		100%	100%
	<i>Ptilotus polystachyus</i>		50%	100%	100%		50%	33%	80%	100%	100%
	<i>Ptilotus roei</i>		50%				100%		20%		33%
	<i>Ptilotus schwartzii</i>					100%	100%	100%	100%	100%	67%
Apiaceae	<i>Daucus glochidiatus</i>				33%						
Apocynaceae	<i>Marsdenia australis</i>	100%		100%	67%			33%		100%	100%
Araliaceae	<i>Trachymene cyanopetala</i>		50%		67%						
	<i>Trachymene ornata</i>		100%		100%	100%		100%			67%
Asparagaceae	<i>Arthropodium dyeri</i>							33%			
	<i>Thysanotus manglesianus</i>		50%		33%		50%	100%	80%		100%
Asteraceae	? <i>Rhodanthe</i> sp. (indet.)								20%	100%	33%
	<i>Angianthus tomentosus</i>			100%							
	<i>Brachyscome ciliaris</i>		50%		67%		50%		40%		33%
	<i>Calocephalus knappii</i>				67%		50%				100%
	<i>Calotis hispidula</i>		100%	100%	100%						67%
	<i>Calotis porphyroglossa</i>	50%		100%							100%
	<i>Cephalopterum drummondii</i>	100%	100%	100%	100%		50%				67%
	<i>Chthonocephalus viscosus</i>				33%		50%		20%		
	<i>Erymophyllum ramosum</i> subsp. <i>ramosum</i>					50%					
	<i>Helipterum craspedioides</i>		50%	100%	100%				20%		67%
	<i>Lawrencella davenportii</i>					50%		33%			33%
	<i>Myriocephalus rudallii</i>				33%						
	<i>Pluchea dentex</i>				67%						
	<i>Podolepis gardneri</i>	50%	100%	100%	100%						
	<i>Rhodanthe battii</i>			100%		50%					67%
	<i>Rhodanthe charsleyae</i>		50%		67%		50%				33%
	<i>Rhodanthe maryonii</i>		100%		100%	100%		33%			67%
	<i>Rhodanthe polycephala</i>			100%		100%		33%			
	<i>Rhodanthe propinqua</i>										67%
<i>Roebuckiella ciliocarpa</i>		50%		67%			67%		100%	33%	

Family	Species	Vegetation type <sup>1</sup>									
		SH01	SH02	SH03	SH04	SH05	SH06	SH07	SH08	W01	W02
	<i>Senecio</i> sp. (indet.)				100%						
	<i>Trichanthodium skirrophorum</i>	50%									
	<i>Waitzia acuminata</i> var. <i>acuminata</i>			100%	67%	50%		67%	60%		33%
Boraginaceae	<i>Heliotropium ovalifolium</i>		100%		67%						
	<i>Trichodesma zeylanicum</i>			100%	100%						
Brassicaceae	<i>Lepidium oxytrichum</i>				100%	50%					
	<i>Stenopetalum filifolium/lineare</i>	50%	100%	100%	100%	100%	100%	100%	20%	100%	100%
Campanulaceae	<i>Wahlenbergia tumidifructa</i>			100%	67%						
Casuarinaceae	<i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>					50%					
	<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>		50%	100%	100%	100%			20%	100%	67%
	<i>Dysphania saxatilis</i>							33%			
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>			100%						100%	
	<i>Maireana georgei</i>	100%	50%	100%						100%	
	<i>Maireana melanocoma</i>	50%									
	<i>Maireana triptera</i>	50%									
	<i>Maireana villosa</i>			100%			100%		40%		100%
	<i>Rhagodia eremaea</i>			100%							
	<i>Salsola australis</i>	50%									
	<i>Sclerolaena densiflora</i>			100%							
Convolvulaceae	<i>Convolvulus clementii</i>			100%	33%						
	<i>Cuscuta planiflora</i>										33%
	<i>Duperreya commixta</i>			100%	67%						
Euphorbiaceae	<i>Euphorbia australis</i> var. <i>subtomentosa</i>		50%		67%						
	<i>Euphorbia boophthona</i>		100%	100%	100%					100%	67%
	<i>Euphorbia drummondii</i>										100%
	<i>Acacia ? incurvaneura</i> × <i>mulganeura</i>						100%	33%	100%		67%
	<i>Acacia craspedocarpa</i>	100%									
	<i>Acacia dilloniorum</i>		50%								
	<i>Acacia exocarpoides</i>					50%		100%	20%	100%	33%
	<i>Acacia fuscaneura</i>	50%			50%		50%				33%
	<i>Acacia incurvaneura</i>	50%		100%	50%	100%	50%	100%	100%		67%
	<i>Acacia mulganeura</i>							33%	20%		33%
	<i>Acacia pruinocarpa</i>			100%					20%	100%	100%
	<i>Acacia pteraneura</i>		50%						20%	100%	67%
	<i>Acacia ramulosa</i> var. <i>linophylla</i>		50%	100%	100%	50%		100%	100%	100%	100%
	<i>Acacia ramulosa</i> var. <i>ramulosa</i>	50%									

Family	Species	Vegetation type <sup>1</sup>									
		SH01	SH02	SH03	SH04	SH05	SH06	SH07	SH08	W01	W02
	<i>Acacia rhodophloia</i>					100%					
	<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)		100%	100%	100%				20%		
	<i>Acacia speckii</i>		100%								
	<i>Acacia tetragonophylla</i>	100%					100%				33%
	<i>Chorizema genistoides</i>		50%								
	<i>Glycine canescens</i>			100%	67%						
	<i>Indigofera monophylla sens. lat.</i>		100%	100%	100%						
	<i>Senna artemisioides</i> subsp. <i>xartemisioides</i>	100%		100%	100%						
	<i>Senna artemisioides</i> subsp. <i>xsturtii</i>	100%	100%	100%	100%	50%		67%	20%	100%	67%
	<i>Senna artemisioides</i> subsp. <i>helmsii</i>		50%	100%	100%					100%	33%
	<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)									100%	
	<i>Swainsona kingii</i>	50%		100%	33%						33%
Geraniaceae	<i>Erodium crinitum</i>		100%	100%	100%	100%	50%	67%	60%		100%
	<i>Goodenia berardiana</i>		100%		33%						
	<i>Goodenia havilandii</i>			100%				33%			
	<i>Goodenia macroplectra</i>								20%		
	<i>Goodenia mimuloides</i>		50%								
	<i>Goodenia quasilibera</i>						50%		40%		
	<i>Goodenia tenuiloba</i>		50%	100%	67%	100%	50%	100%	100%	100%	100%
	<i>Scaevola spinescens</i>	50%		100%							
Haloragaceae	<i>Haloragis trigonocarpa</i>		100%	100%	100%						
	<i>Hemigenia virescens</i>								20%		
	<i>Prostanthera althoferi</i> subsp. <i>althoferi</i>		50%								
	<i>Prostanthera petrophila</i>					50%		33%			
	<i>Teucrium teucriiflorum</i>			100%			50%		20%	100%	33%
	<i>Abutilon oxycarpum</i>				67%						67%
	<i>Brachychiton gregorii</i>		50%								
	<i>Hibiscus burtonii</i>			100%					20%		33%
	<i>Hibiscus</i> sp. Gardneri (A.L. Payne PRP 1435)									100%	33%
	<i>Hibiscus sturtii</i> var. <i>forrestii</i>		50%	100%	67%						
	<i>Sida ectogama</i>			100%							
	<i>Sida</i> sp. (indet.)							33%			
	<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)		50%		100%					100%	100%
Montiaceae	<i>Calandrinia</i> ? <i>ptychosperma</i>				33%						
	<i>Calandrinia eremaea</i>		100%	100%	100%	100%			20%		33%
Myrtaceae	<i>Micromyrtus placoides</i>							100%			

Family	Species	Vegetation type <sup>1</sup>									
		SH01	SH02	SH03	SH04	SH05	SH06	SH07	SH08	W01	W02
	<i>Thryptomene decussata</i>					100%		100%			
Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>		50%		100%						
Poaceae	<i>Aristida contorta</i>	50%	100%	100%	100%	50%	100%		20%		
	<i>Austrostipa trichophylla</i>				33%						
	<i>Cymbopogon ambiguus</i>			100%	100%						
	<i>Enneapogon caerulescens</i>	50%									
	<i>Eragrostis eriopoda</i>						100%		80%		33%
	<i>Eriachne helmsii</i>					50%				100%	67%
	<i>Eriachne pulchella</i> subsp. <i>dominii</i>					50%					
	<i>Eriachne pulchella</i> subsp. <i>pulchella</i>			100%							
	<i>Monachather paradoxus</i>			100%					40%		33%
	<i>Paspalidium clementii</i>				33%	100%					33%
	<i>Rostraria pumila</i>				33%						
Primulaceae	<i>Lysimachia arvensis</i>				33%						
Proteaceae	<i>Grevillea berryana</i>			100%		50%		100%	40%		67%
	<i>Grevillea inconspicua</i>				33%						
Pteridaceae	<i>Cheilanthes brownii</i>		100%		67%	50%					
	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>				33%	50%		100%		67%	
Rhamnaceae	<i>Stenanthemum patens</i>		50%								
	<i>Stenanthemum petraeum</i>							33%			
Rubiaceae	<i>Psyrax latifolia</i>				33%	50%	100%		60%	100%	67%
	<i>Psyrax rigidula</i>	50%		100%	33%	50%	50%	33%	40%	100%	67%
	<i>Psyrax suaveolens</i>					50%		100%	80%	100%	100%
	<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>				67%						
Rutaceae	<i>Philotheca brucei</i> subsp. <i>brucei</i>					100%		33%			
Santalaceae	<i>Santalum lanceolatum</i>			100%	33%	50%					33%
	<i>Dodonaea amplisemina</i>		100%		100%						
	<i>Dodonaea pachyneura</i>					100%		100%			
Scrophulariaceae	<i>Eremophila foliosissima</i>						50%		40%		33%
	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>		50%	100%			50%	33%	100%	100%	100%
	<i>Eremophila fraseri</i>	100%					100%				
	<i>Eremophila georgei</i>			100%	33%		100%	67%	80%	100%	100%
	<i>Eremophila glutinosa</i>		100%					100%	40%	100%	33%
	<i>Eremophila jucunda</i> subsp. <i>jucunda</i>	50%							60%		
	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>					100%		100%	60%	100%	33%
<i>Eremophila mackinlayi</i> subsp. <i>spatulata</i>		100%	100%	100%							

Family	Species	Vegetation type <sup>1</sup>									
		SH01	SH02	SH03	SH04	SH05	SH06	SH07	SH08	W01	W02
	<i>Eremophila macmillaniana</i>		100%				50%				
	<i>Eremophila simulans</i>								20%		
Solanaceae	<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>		50%		100%			67%	20%		100%
	<i>Solanum ashbyae</i>				33%			67%	40%	100%	33%
	<i>Solanum austropiceum</i>				33%						
	<i>Solanum lasiophyllum</i>	100%		100%	33%		100%		20%		33%
Zygophyllaceae	<i>Roepera eichleri</i>	100%	100%	100%	67%						
	<i>Tribulus astrocarpus</i>				33%						
	<i>Tribulus suberosus</i>		50%		67%						33%

<sup>1</sup>Values indicate the percentage of sampling sites in which the taxon was recorded.

## APPENDIX G      QUADRAT SITE DATA



# IR01

<b>Botanist</b>	AC	<b>Date</b>	03-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 568378.39 mE 7020074 mN
<b>Landform</b>	Footslope	<b>Slope</b>	Moderate
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Basalt; Banded ironstone	<b>Rock Abundance</b>	Continuous (> 70 %)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Brachychiton gregorii</i>	Tree (<10 m)	< 1
<i>Acacia pteraneura</i>	Shrub (>2 m)	5
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	< 1
<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	5
<i>Acacia speckii</i>	Shrub (1-2 m)	5
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (1-2 m)	1
<i>Eremophila macmillaniana</i>	Shrub (1-2 m)	< 1
<i>Senna artemisioides</i> subsp. <i>xsturtii</i>	Shrub (1-2 m)	1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	Shrub (1-2 m)	5
<i>Dodonaea amplisemina</i>	Shrub (0-1 m)	< 1
<i>Eremophila glutinosa</i>	Shrub (0-1 m)	1
<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>	Shrub (0-1 m)	1
<i>Heliotropium ovalifolium</i>	Shrub (0-1 m)	< 1
<i>Hibiscus sturtii</i> var. <i>forrestii</i>	Shrub (0-1 m)	< 1
<i>Indigofera monophylla</i> sens. <i>lat.</i>	Shrub (0-1 m)	< 1
<i>Prostanthera althoferi</i> subsp. <i>althoferi</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	1
<i>Tribulus suberosus</i>	Shrub (0-1 m)	< 1
<i>Aristida contorta</i>	Grass	< 1
<i>Calandrinia eremaea</i>	Herb	< 1
<i>Calotis hispidula</i>	Herb	< 1
<i>Cephalopterum drummondii</i>	Herb	< 1
<i>Cheilanthes brownii</i>	Herb	< 1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	Herb	< 1
<i>Euphorbia boophthona</i>	Herb	< 1
<i>Goodenia berardiana</i>	Herb	1
<i>Haloragis trigonocarpa</i>	Herb	< 1
<i>Maireana georgei</i>	Herb	< 1

<b>Name</b>	<b>Stratum</b>	<b>Percent cover (%)</b>
<i>Podolepis gardneri</i>	Herb	< 1
<i>Ptilotus aervoides</i>	Herb	< 1
<i>Ptilotus helipteroides</i>	Herb	1
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Ptilotus roei</i>	Herb	< 1
<i>Rhodanthe charsleyae</i>	Herb	< 1
<i>Rhodanthe maryonii</i>	Herb	< 1
<i>Roepera eichleri</i>	Herb	< 1
<i>Stenopetalum lineare</i> var. <i>lineare</i>	Herb	1
<i>Trachymene cyanopetala</i>	Herb	< 1
<i>Trachymene ornata</i>	Herb	< 1

# IR02

<b>Botanist</b>	AC	<b>Date</b>	03-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 568556.44 mE 7020064.29 mN
<b>Landform</b>	Midslope	<b>Slope</b>	Moderate
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Basalt; Banded ironstone	<b>Rock Abundance</b>	Continuous (> 70 %)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	10
<i>Acacia speckii</i>	Shrub (>2 m)	5
<i>Acacia dilloniorum</i>	Shrub (0-1 m)	5
<i>Chorizema genistoides</i>	Shrub (0-1 m)	< 1
<i>Dodonaea amplisemina</i>	Shrub (0-1 m)	< 1
<i>Eremophila glutinosa</i>	Shrub (0-1 m)	5
<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>	Shrub (0-1 m)	1
<i>Eremophila macmillaniana</i>	Shrub (0-1 m)	< 1
<i>Heliotropium ovalifolium</i>	Shrub (0-1 m)	< 1
<i>Indigofera monophylla</i> sens. lat.	Shrub (0-1 m)	< 1
<i>Indigofera monophylla</i> sens. lat.	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	1
<i>Senna artemisioides</i> subsp. <i>xsturtii</i>	Shrub (0-1 m)	1
<i>Senna artemisioides</i> subsp. <i>xsturtii</i>	Shrub (0-1 m)	1
<i>Stenanthemum</i> sp. (indet)	Shrub (0-1 m)	< 1
<i>Aristida contorta</i>	Grass	< 1
<i>Brachyscome ciliaris</i>	Herb	< 1
<i>Calandrinia eremaea</i>	Herb	< 1
<i>Calotis hispidula</i>	Herb	< 1
<i>Cephalipterum drummondii</i>	Herb	< 1
<i>Cheilanthes brownii</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Euphorbia boophthona</i>	Herb	< 1
<i>Goodenia berardiana</i>	Herb	1
<i>Goodenia mimuloides</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	< 1
<i>Haloragis trigonocarpa</i>	Herb	< 1
<i>Helipterum craspedioides</i>	Herb	< 1
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	Herb	< 1
<i>Phyllanthus maderaspatensis</i>	Herb	< 1

<b>Name</b>	<b>Stratum</b>	<b>Percent cover (%)</b>
<i>Podolepis gardneri</i>	Herb	< 1
<i>Ptilotus aervoides</i>	Herb	< 1
<i>Ptilotus helipteroides</i>	Herb	1
<i>Rhodanthe maryonii</i>	Herb	1
<i>Roebuckiella ciliocarpa</i>	Herb	< 1
<i>Roepera eichleri</i>	Herb	2
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Thysanotus manglesianus</i>	Herb	< 1
<i>Trachymene ornata</i>	Herb	< 1

# IR03

<b>Botanist</b>	AC	<b>Date</b>	03-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 568548.43 mE 7019872.26 mN
<b>Landform</b>	Ridge	<b>Slope</b>	Steep
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Continuous (> 70 %)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia rhodophloia</i>	Shrub (>2 m)	5
<i>Thryptomene decussata</i>	Shrub (>2 m)	10
<i>Acacia incurvaneura</i>	Shrub (1-2 m)	1
<i>Grevillea berryana</i>	Shrub (1-2 m)	< 1
<i>Philotheca brucei</i> subsp. <i>brucei</i>	Shrub (1-2 m)	1
<i>Santalum lanceolatum</i>	Shrub (1-2 m)	< 1
<i>Acacia exocarpoides</i>	Shrub (0-1 m)	< 1
<i>Dodonaea pachyneura</i>	Shrub (0-1 m)	3
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	Shrub (0-1 m)	4
<i>Harnieria kempeana</i> subsp. <i>muelleri</i>	Shrub (0-1 m)	< 1
<i>Psyrax latifolia</i>	Shrub (0-1 m)	< 1
<i>Psyrax rigidula</i>	Shrub (0-1 m)	< 1
<i>Psyrax suaveolens</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	< 1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	< 1
<i>Paspalidium clementii</i>	Grass	< 1
<i>Calandrinia eremaea</i>	Herb	< 1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Erymophyllum ramosum</i> subsp. <i>ramosum</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	1
<i>Rhodanthe maryonii</i>	Herb	1
<i>Rhodanthe polycephala</i>	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Trachymene ornata</i>	Herb	< 1

# IR04

<b>Botanist</b>	AC	<b>Date</b>	05-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 566261.94 mE 7017292.06 mN
<b>Landform</b>	Plain	<b>Slope</b>	Negligible
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Common (10-30%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia incurvaneura</i>	Shrub (>2 m)	15
<i>Acacia incurvaneura</i> × <i>mulganeura</i>	Shrub (>2 m)	5
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	15
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (1-2 m)	5
<i>Eremophila georgei</i>	Shrub (1-2 m)	1
<i>Psyrax latifolia</i>	Shrub (1-2 m)	< 1
<i>Psyrax rigidula</i>	Shrub (1-2 m)	< 1
<i>Psyrax suaveolens</i>	Shrub (1-2 m)	< 1
<i>Eremophila foliosissima</i>	Shrub (0-1 m)	< 1
<i>Eremophila jucunda</i> subsp. <i>jucunda</i>	Shrub (0-1 m)	< 1
<i>Maireana villosa</i>	Shrub (0-1 m)	< 1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	1
<i>Aristida contorta</i>	Grass	< 1
<i>Eragrostis eriopoda</i>	Grass	< 1
<i>Monachather paradoxus</i>	Grass	< 1
? <i>Rhodanthe</i> sp. (indet.)	Herb	< 1
<i>Calandrinia eremaea</i>	Herb	< 1
<i>Chthonocephalus viscosus</i>	Herb	< 1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Goodenia quasilibera</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	< 1
<i>Hibiscus burtonii</i>	Herb	< 1
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1

# IR05

<b>Botanist</b>	AC	<b>Date</b>	03-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 568934.66 mE 7020061.11 mN
<b>Landform</b>	Ridge	<b>Slope</b>	Steep
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Continuous (> 70 %)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia incurvaneura</i>	Shrub (>2 m)	1
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	2
<i>Acacia rhodophloia</i>	Shrub (>2 m)	1
<i>Allocasuarina acutivalvis</i> subsp. <i>acutivalvis</i>	Shrub (>2 m)	< 1
<i>Thryptomene decussata</i>	Shrub (>2 m)	5
<i>Dodonaea pachyneura</i>	Shrub (1-2 m)	2
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	Shrub (0-1 m)	2
<i>Philothea brucei</i> subsp. <i>brucei</i>	Shrub (0-1 m)	1
<i>Prostanthera petrophila</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	< 1
<i>Senna artemisioides</i> subsp. <i>×sturtii</i>	Shrub (0-1 m)	< 1
<i>Aristida contorta</i>	Grass	< 1
<i>Eriachne helmsii</i>	Grass	< 1
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	Grass	< 1
<i>Paspalidium clementii</i>	Grass	< 1
<i>Calandrinia eremaea</i>	Herb	< 1
<i>Cheilanthes brownii</i>	Herb	< 1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	Herb	< 1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	2
<i>Harnieria kempeana</i> subsp. <i>muelleri</i>	Herb	< 1
<i>Lawrencella davenportii</i>	Herb	< 1
<i>Lepidium oxytrichum</i>	Herb	< 1
<i>Ptilotus helipteroides</i>	Herb	< 1
<i>Rhodanthe battii</i>	Herb	< 1
<i>Rhodanthe maryonii</i>	Herb	1
<i>Rhodanthe polycephala</i>	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1

<b>Name</b>	<b>Stratum</b>	<b>Percent cover (%)</b>
<i>Trachymene ornata</i>	Herb	< 1
<i>Waitzia acuminata</i> var. <i>acuminata</i>	Herb	< 1



# IR06

<b>Botanist</b>	AC	<b>Date</b>	03-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 568538.28 mE 7019774.85 mN
<b>Landform</b>	Midslope	<b>Slope</b>	Moderate
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Many (30-70%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia incurvaneura</i>	Shrub (>2 m)	10
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	5
<i>Thryptomene decussata</i>	Shrub (>2 m)	1
<i>Acacia exocarpoides</i>	Shrub (1-2 m)	< 1
<i>Dodonaea pachyneura</i>	Shrub (0-1 m)	3
<i>Eremophila georgei</i>	Shrub (0-1 m)	1
<i>Eremophila glutinosa</i>	Shrub (0-1 m)	1
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	Shrub (0-1 m)	< 1
<i>Grevillea berryana</i>	Shrub (0-1 m)	< 1
<i>Marsdenia australis</i>	Shrub (0-1 m)	< 1
<i>Micromyrtus placoides</i>	Shrub (0-1 m)	2
<i>Philotheca brucei</i> subsp. <i>brucei</i>	Shrub (0-1 m)	< 1
<i>Prostanthera petrophila</i>	Shrub (0-1 m)	< 1
<i>Psyrax rigidula</i>	Shrub (0-1 m)	< 1
<i>Psyrax suaveolens</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	< 1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	< 1
<i>Senna artemisioides</i> subsp. <i>×sturtii</i>	Shrub (0-1 m)	< 1
<i>Stenanthemum petraeum</i>	Shrub (0-1 m)	< 1
<i>Arthropodium dyeri</i>	Herb	< 1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	Herb	< 1
<i>Dysphania saxatilis</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Goodenia havilandii</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	1
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Thysanotus manglesianus</i>	Herb	< 1
<i>Trachymene ornata</i>	Herb	< 1

# IR07

<b>Botanist</b>	AC	<b>Date</b>	03-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 568904.19 mE 7019936.78 mN
<b>Landform</b>	Midslope	<b>Slope</b>	Moderate
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Continuous (> 70 %)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia incurvaneura</i>	Shrub (>2 m)	5
<i>Acacia mulganeura</i>	Shrub (>2 m)	2
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	10
<i>Acacia exocarpoides</i>	Shrub (1-2 m)	< 1
<i>Grevillea berryana</i>	Shrub (1-2 m)	< 1
<i>Thryptomene decussata</i>	Shrub (1-2 m)	5
<i>Dodonaea pachyneura</i>	Shrub (0-1 m)	< 1
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (0-1 m)	< 1
<i>Eremophila georgei</i>	Shrub (0-1 m)	< 1
<i>Eremophila glutinosa</i>	Shrub (0-1 m)	1
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	Shrub (0-1 m)	2
<i>Micromyrtus placoides</i>	Shrub (0-1 m)	2
<i>Psyrax suaveolens</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	< 1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	1
<i>Senna artemisioides</i> subsp. <i>xsturtii</i>	Shrub (0-1 m)	< 1
<i>Solanum ashbyae</i>	Shrub (0-1 m)	< 1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	2
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Rhodanthe maryonii</i>	Herb	< 1
<i>Roebuckiella ciliocarpa</i>	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Thysanotus manglesianus</i>	Herb	< 1
<i>Trachymene ornata</i>	Herb	< 1
<i>Waitzia acuminata</i> var. <i>acuminata</i>	Herb	< 1

# IR08

<b>Botanist</b>	AC	<b>Date</b>	03-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 569038.72 mE 7020028.08 mN
<b>Landform</b>	Midslope	<b>Slope</b>	Moderate
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Continuous (> 70 %)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia incurvaneura</i>	Shrub (>2 m)	10
<i>Acacia incurvaneura</i> × <i>mulganeura</i>	Shrub (>2 m)	5
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	5
<i>Acacia exocarpoides</i>	Shrub (1-2 m)	< 1
<i>Dodonaea pachyneura</i>	Shrub (1-2 m)	< 1
<i>Grevillea berryana</i>	Shrub (1-2 m)	< 1
<i>Thryptomene decussata</i>	Shrub (1-2 m)	5
<i>Eremophila glutinosa</i>	Shrub (0-1 m)	1
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	Shrub (0-1 m)	2
<i>Harnieria kempeana</i> subsp. <i>muelleri</i>	Shrub (0-1 m)	< 1
<i>Micromyrtus placoides</i>	Shrub (0-1 m)	3
<i>Psydrax suaveolens</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	1
<i>Solanum ashbyae</i>	Shrub (0-1 m)	< 1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	2
<i>Lawrencella davenportii</i>	Herb	< 1
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	Herb	< 1
<i>Ptilotus helipteroides</i>	Herb	< 1
<i>Rhodanthe polycephala</i>	Herb	< 1
<i>Roebuckiella ciliocarpa</i>	Herb	< 1
<i>Sida</i> sp. (indet.)	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Thysanotus manglesianus</i>	Herb	< 1
<i>Trachymene ornata</i>	Herb	< 1
<i>Waitzia acuminata</i> var. <i>acuminata</i>	Herb	< 1

# IR09

<b>Botanist</b>	AC	<b>Date</b>	04-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 568836.85 mE 7019605.73 mN
<b>Landform</b>	Minor Creek (< 5 m)	<b>Slope</b>	Gentle
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Basalt; Banded ironstone	<b>Rock Abundance</b>	Many (30-70%)
<b>Vegetation Condition</b>	Very Good	<b>Disturbance</b>	Weeds (minor occurrences)
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia fuscaneura</i>	Shrub (>2 m)	5
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	1
<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	10
<i>Hibiscus sturtii</i> var. <i>forrestii</i>	Shrub (1-2 m)	< 1
<i>Senna artemisioides</i> subsp. <i>×artemisioides</i>	Shrub (1-2 m)	1
<i>Dodonaea amplisemina</i>	Shrub (0-1 m)	1
<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>	Shrub (0-1 m)	5
<i>Grevillea inconspicua</i>	Shrub (0-1 m)	< 1
<i>Indigofera monophylla</i> sens. lat.	Shrub (0-1 m)	< 1
<i>Pluchea dentex</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	2
<i>Senna artemisioides</i> subsp. <i>×sturtii</i>	Shrub (0-1 m)	1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	Shrub (0-1 m)	< 1
<i>Aristida contorta</i>	Grass	< 1
<i>Cymbopogon ambiguus</i>	Grass	5
<i>Abutilon oxycarpum</i>	Herb	< 1
<i>Calandrinia eremaea</i>	Herb	< 1
<i>Calocephalus knappii</i>	Herb	< 1
<i>Calotis hispidula</i>	Herb	< 1
<i>Cephalipterum drummondii</i>	Herb	< 1
<i>Cheilanthes brownii</i>	Herb	< 1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	Herb	< 1
<i>Daucus glochidiatus</i>	Herb	< 1
<i>Duperreya commixta</i>	Herb	< 1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Euphorbia boophthona</i>	Herb	< 1
<i>Glycine canescens</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	1
<i>Haloragis trigonocarpa</i>	Herb	1

Name	Stratum	Percent cover (%)
<i>Helipterum craspedioides</i>	Herb	< 1
<i>Lepidium oxytrichum</i>	Herb	< 1
<i>Lysimachia arvensis</i>	Herb	< 1
<i>Marsdenia australis</i>	Herb	< 1
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	Herb	< 1
<i>Phyllanthus maderaspatensis</i>	Herb	< 1
<i>Podolepis gardneri</i>	Herb	< 1
<i>Ptilotus aervoides</i>	Herb	< 1
<i>Ptilotus helipteroides</i>	Herb	< 1
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Rhodanthe maryonii</i>	Herb	< 1
<i>Roebuckiella ciliocarpa</i>	Herb	< 1
<i>Roepera eichleri</i>	Herb	< 1
<i>Senecio</i> sp. (indet.)	Herb	< 1
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	Herb	< 1
<i>Trachymene ornata</i>	Herb	< 1
<i>Trichodesma zeylanicum</i>	Herb	< 1
<i>Wahlenbergia tumidifructa</i>	Herb	< 1
<i>Waitzia acuminata</i> var. <i>acuminata</i>	Herb	< 1

# IR10

<b>Botanist</b>	AC	<b>Date</b>	04-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 568800.29 mE 7019220.13 mN
<b>Landform</b>	Minor Creek (< 5 m)	<b>Slope</b>	Gentle
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Basalt; Banded ironstone	<b>Rock Abundance</b>	Many (30-70%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia incurvaneura</i>	Shrub (>2 m)	2
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	2
<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	10
<i>Senna artemisioides</i> subsp. <i>×sturtii</i>	Shrub (1-2 m)	< 1
<i>Dodonaea amplisemina</i>	Shrub (0-1 m)	< 1
<i>Eremophila georgei</i>	Shrub (0-1 m)	< 1
<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>	Shrub (0-1 m)	1
<i>Heliotropium ovalifolium</i>	Shrub (0-1 m)	< 1
<i>Indigofera monophylla</i> sens. lat.	Shrub (0-1 m)	< 1
<i>Pluchea dentex</i>	Shrub (0-1 m)	< 1
<i>Psyrax latifolia</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	1
<i>Senna artemisioides</i> subsp. <i>×artemisioides</i>	Shrub (0-1 m)	< 1
<i>Senna artemisioides</i> subsp. <i>×sturtii</i>	Shrub (0-1 m)	< 1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	Shrub (0-1 m)	< 1
<i>Solanum ashbyae</i>	Shrub (0-1 m)	< 1
<i>Tribulus suberosus</i>	Shrub (0-1 m)	< 1
<i>Aristida contorta</i>	Grass	< 1
<i>Cymbopogon ambiguus</i>	Grass	5
<i>Brachyscome ciliaris</i>	Herb	< 1
<i>Calandrinia</i> ? <i>ptychosperma</i>	Herb	< 1
<i>Calandrinia eremaea</i>	Herb	< 1
<i>Calocephalus knappii</i>	Herb	< 1
<i>Calotis hispidula</i>	Herb	< 1
<i>Cephalipterum drummondii</i>	Herb	< 1
<i>Chthonocephalus viscosus</i>	Herb	< 1
<i>Duperreya commixta</i>	Herb	< 1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	Herb	< 1

Name	Stratum	Percent cover (%)
<i>Euphorbia boophthona</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	1
<i>Haloragis trigonocarpa</i>	Herb	< 1
<i>Helipterum craspedioides</i>	Herb	< 1
<i>Lepidium oxytrichum</i>	Herb	< 1
<i>Myriocephalus rudallii</i>	Herb	< 1
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	Herb	< 1
<i>Phyllanthus maderaspatensis</i>	Herb	< 1
<i>Podolepis gardneri</i>	Herb	< 1
<i>Ptilotus aervoides</i>	Herb	< 1
<i>Ptilotus helipteroides</i>	Herb	< 1
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Rhodanthe charsleyae</i>	Herb	< 1
<i>Rhodanthe maryonii</i>	Herb	< 1
<i>Roebuckiella ciliocarpa</i>	Herb	< 1
<i>Senecio</i> sp. (indet.)	Herb	< 1
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Swainsona kingii</i>	Herb	< 1
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	Herb	< 1
<i>Thysanotus manglesianus</i>	Herb	< 1
<i>Trachymene cyanopetala</i>	Herb	< 1
<i>Trachymene ornata</i>	Herb	< 1
<i>Tribulus astrocarpus</i>	Herb	< 1
<i>Trichodesma zeylanicum</i>	Herb	< 1
<i>Wahlenbergia tumidifructa</i>	Herb	< 1
<i>Waitzia acuminata</i> var. <i>acuminata</i>	Herb	< 1

# IR11

<b>Botanist</b>	AC	<b>Date</b>	03-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 568434.49 mE 7019983.54 mN
<b>Landform</b>	Minor Creek (< 5 m)	<b>Slope</b>	Gentle
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Basalt; Banded ironstone	<b>Rock Abundance</b>	Many (30-70%)
<b>Vegetation Condition</b>	Very Good	<b>Disturbance</b>	Weeds (minor occurrences)
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	5
<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	10
<i>Psyrax rigidula</i>	Shrub (>2 m)	< 1
<i>Santalum lanceolatum</i>	Shrub (>2 m)	< 1
<i>Hibiscus sturtii</i> var. <i>forrestii</i>	Shrub (1-2 m)	1
<i>Dodonaea amplisemina</i>	Shrub (0-1 m)	< 1
<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>	Shrub (0-1 m)	5
<i>Heliotropium ovalifolium</i>	Shrub (0-1 m)	< 1
<i>Indigofera monophylla</i> sens. lat.	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	1
<i>Senna artemisioides</i> subsp. <i>xartemisioides</i>	Shrub (0-1 m)	1
<i>Senna artemisioides</i> subsp. <i>xsturtii</i>	Shrub (0-1 m)	< 1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	Shrub (0-1 m)	1
<i>Solanum austropiceum</i>	Shrub (0-1 m)	< 1
<i>Solanum lasiophyllum</i>	Shrub (0-1 m)	< 1
<i>Tribulus suberosus</i>	Shrub (0-1 m)	< 1
<i>Aristida contorta</i>	Grass	< 1
<i>Austrostipa trichophylla</i>	Grass	< 1
<i>Cymbopogon ambiguus</i>	Grass	5
<i>Paspalidium clementii</i>	Grass	< 1
<i>Rostraria pumila</i>	Grass	< 1
<i>Abutilon oxycarpum</i>	Herb	< 1
<i>Brachyscome ciliaris</i>	Herb	< 1
<i>Calandrinia eremaea</i>	Herb	< 1
<i>Calotis hispidula</i>	Herb	< 1
<i>Cephalipterum drummondii</i>	Herb	< 1
<i>Cheilanthes brownii</i>	Herb	< 1
<i>Convolvulus clementii</i>	Herb	< 1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	1



Name	Stratum	Percent cover (%)
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	Herb	< 1
<i>Euphorbia boophthona</i>	Herb	< 1
<i>Glycine canescens</i>	Herb	< 1
<i>Goodenia berardiana</i>	Herb	1
<i>Haloragis trigonocarpa</i>	Herb	< 1
<i>Helipterum craspedioides</i>	Herb	< 1
<i>Lepidium oxytrichum</i>	Herb	< 1
<i>Marsdenia australis</i>	Herb	< 1
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	Herb	< 1
<i>Phyllanthus maderaspatensis</i>	Herb	< 1
<i>Podolepis gardneri</i>	Herb	< 1
<i>Ptilotus aervoides</i>	Herb	< 1
<i>Ptilotus helipteroides</i>	Herb	2
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Rhodanthe charsleyae</i>	Herb	< 1
<i>Rhodanthe maryonii</i>	Herb	< 1
<i>Roepera eichleri</i>	Herb	< 1
<i>Senecio</i> sp. (indet.)	Herb	< 1
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
<i>Stenopetalum filifolium</i>	Herb	1
<i>Trachymene cyanopetala</i>	Herb	< 1
<i>Trachymene ornata</i>	Herb	< 1
<i>Trichodesma zeylanicum</i>	Herb	< 1

# IR12

<b>Botanist</b>	AC	<b>Date</b>	05-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 566527.45 mE 7017704.03 mN
<b>Landform</b>	Plain, drainage line	<b>Slope</b>	Negligible
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Common (10-30%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia pruinocarpa</i>	Tree (<10 m)	5
<i>Acacia incurvaneura</i>	Shrub (>2 m)	10
<i>Acacia incurvaneura</i> × <i>mulganeura</i>	Shrub (>2 m)	5
<i>Acacia mulganeura</i>	Shrub (>2 m)	< 1
<i>Acacia pteraneura</i>	Shrub (>2 m)	1
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	10
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (1-2 m)	5
<i>Eremophila georgei</i>	Shrub (1-2 m)	3
<i>Eremophila foliosissima</i>	Shrub (0-1 m)	5
<i>Maireana villosa</i>	Shrub (0-1 m)	1
<i>Psyrax latifolia</i>	Shrub (0-1 m)	< 1
<i>Psyrax rigidula</i>	Shrub (0-1 m)	< 1
<i>Psyrax suaveolens</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	< 1
<i>Teucrium teucriiflorum</i>	Shrub (0-1 m)	< 1
<i>Eragrostis eriopoda</i>	Grass	< 1
<i>Eriachne helmsii</i>	Grass	< 1
? <i>Rhodanthe</i> sp. (indet.)	Herb	< 1
<i>Abutilon oxycarpum</i>	Herb	< 1
<i>Calocephalus knappii</i>	Herb	< 1
<i>Calotis hispidula</i>	Herb	< 1
<i>Calotis porphyroglossa</i>	Herb	< 1
<i>Cephalopterum drummondii</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Euphorbia boophthona</i>	Herb	< 1
<i>Euphorbia drummondii</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	< 1
<i>Helipterum craspedioides</i>	Herb	< 1
<i>Hibiscus burtonii</i>	Herb	< 1
<i>Lawrencella davenportii</i>	Herb	< 1

Name	Stratum	Percent cover (%)
<i>Marsdenia australis</i>	Herb	< 1
<i>Marsdenia australis</i>	Herb	< 1
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	Herb	< 1
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Rhodanthe battii</i>	Herb	< 1
<i>Rhodanthe charsleyae</i>	Herb	< 1
<i>Rhodanthe maryonii</i>	Herb	< 1
<i>Rhodanthe propinqua</i>	Herb	< 1
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Thysanotus manglesianus</i>	Herb	< 1
<i>Trachymene ornata</i>	Herb	< 1
<i>Waitzia acuminata</i> var. <i>acuminata</i>	Herb	< 1

# IR13

<b>Botanist</b>	AC	<b>Date</b>	05-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 566867.73 mE 7017821.41 mN
<b>Landform</b>	Plain, drainage line	<b>Slope</b>	Negligible
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Common (10-30%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia pruinocarpa</i>	Tree (<10 m)	5
<i>Acacia fuscaneura</i>	Shrub (>2 m)	15
<i>Acacia incurvaneura</i> × <i>mulganeura</i>	Shrub (>2 m)	1
<i>Acacia pteraneura</i>	Shrub (>2 m)	1
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	10
<i>Grevillea berryana</i>	Shrub (>2 m)	2
<i>Psyrax latifolia</i>	Shrub (>2 m)	< 1
<i>Senna artemisioides</i> subsp. × <i>sturtii</i>	Shrub (>2 m)	< 1
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (1-2 m)	5
<i>Psyrax rigidula</i>	Shrub (1-2 m)	< 1
<i>Psyrax suaveolens</i>	Shrub (1-2 m)	< 1
<i>Santalum lanceolatum</i>	Shrub (1-2 m)	< 1
<i>Eremophila georgei</i>	Shrub (0-1 m)	5
<i>Maireana villosa</i>	Shrub (0-1 m)	1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	< 1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	< 1
<i>Eriachne helmsii</i>	Grass	< 1
<i>Brachyscome ciliaris</i>	Herb	< 1
<i>Calocephalus knappii</i>	Herb	< 1
<i>Calotis porphyroglossa</i>	Herb	< 1
<i>Cephalopterum drummondii</i>	Herb	< 1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	Herb	< 1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Euphorbia boophthona</i>	Herb	< 1
<i>Euphorbia drummondii</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	< 1
<i>Helipterum craspedioides</i>	Herb	< 1
<i>Marsdenia australis</i>	Herb	< 1
<i>Marsdenia australis</i>	Herb	< 1

<b>Name</b>	<b>Stratum</b>	<b>Percent cover (%)</b>
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	Herb	< 1
<i>Ptilotus helipteroides</i>	Herb	< 1
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Ptilotus roei</i>	Herb	< 1
<i>Rhodanthe propinqua</i>	Herb	< 1
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Thysanotus manglesianus</i>	Herb	< 1

# IR14

<b>Botanist</b>	AC	<b>Date</b>	04-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 567344.9 mE 7018661.78 mN
<b>Landform</b>	Minor Creek (< 5 m)	<b>Slope</b>	Gentle
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Many (30-70%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia incurvaneura</i>	Shrub (>2 m)	10
<i>Acacia pruinocarpa</i>	Shrub (>2 m)	< 1
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	5
<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	10
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (1-2 m)	5
<i>Grevillea berryana</i>	Shrub (1-2 m)	< 1
<i>Senna artemisioides</i> subsp. <i>×sturtii</i>	Shrub (1-2 m)	< 1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	Shrub (1-2 m)	< 1
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Shrub (0-1 m)	< 1
<i>Eremophila georgei</i>	Shrub (0-1 m)	< 1
<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>	Shrub (0-1 m)	< 1
<i>Harnieria kempeana</i> subsp. <i>muelleri</i>	Shrub (0-1 m)	5
<i>Hibiscus burtonii</i>	Shrub (0-1 m)	< 1
<i>Hibiscus sturtii</i> var. <i>forrestii</i>	Shrub (0-1 m)	< 1
<i>Indigofera monophylla</i> sens. <i>lat.</i>	Shrub (0-1 m)	< 1
<i>Indigofera monophylla</i> sens. <i>lat.</i>	Shrub (0-1 m)	< 1
<i>Psyrax rigidula</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	1
<i>Rhagodia eremaea</i>	Shrub (0-1 m)	< 1
<i>Santalum lanceolatum</i>	Shrub (0-1 m)	< 1
<i>Scaevola spinescens</i>	Shrub (0-1 m)	< 1
<i>Senna artemisioides</i> subsp. <i>×artemisioides</i>	Shrub (0-1 m)	< 1
<i>Senna artemisioides</i> subsp. <i>×sturtii</i>	Shrub (0-1 m)	< 1
<i>Sida ectogama</i>	Shrub (0-1 m)	< 1
<i>Solanum lasiophyllum</i>	Shrub (0-1 m)	< 1
<i>Teucrium teucriiflorum</i>	Shrub (0-1 m)	< 1
<i>Aristida contorta</i>	Grass	< 1
<i>Cymbopogon ambiguus</i>	Grass	1
<i>Eriachne pulchella</i> subsp. <i>pulchella</i>	Grass	< 1
<i>Monachather paradoxus</i>	Grass	< 1

Name	Stratum	Percent cover (%)
<i>Angianthus tomentosus</i>	Herb	< 1
<i>Apocynaceae</i> sp. (indet.)	Herb	< 1
<i>Calandrinia eremaea</i>	Herb	< 1
<i>Calotis hispidula</i>	Herb	< 1
<i>Calotis porphyroglossa</i>	Herb	< 1
<i>Cephalipterum drummondii</i>	Herb	< 1
<i>Convolvulus clementii</i>	Herb	< 1
<i>Duperreya commixta</i>	Herb	< 1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Euphorbia boophthona</i>	Herb	< 1
<i>Glycine canescens</i>	Herb	< 1
<i>Goodenia havilandii</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	< 1
<i>Haloragis trigonocarpa</i>	Herb	< 1
<i>Helipterum craspedioides</i>	Herb	< 1
<i>Maireana georgei</i>	Herb	< 1
<i>Maireana villosa</i>	Herb	< 1
<i>Marsdenia australis</i>	Herb	< 1
<i>Podolepis gardneri</i>	Herb	< 1
<i>Ptilotus exaltatus</i>	Herb	< 1
<i>Ptilotus gaudichaudii</i>	Herb	< 1
<i>Ptilotus helipteroides</i>	Herb	< 1
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Rhodanthe battii</i>	Herb	< 1
<i>Rhodanthe polycephala</i>	Herb	< 1
<i>Roepera eichleri</i>	Herb	< 1
<i>Sclerolaena densiflora</i>	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Swainsona kingii</i>	Herb	< 1
<i>Trichodesma zeylanicum</i>	Herb	< 1
<i>Wahlenbergia tumidifructa</i>	Herb	< 1
<i>Waitzia acuminata</i> var. <i>acuminata</i>	Herb	< 1

# IR15

<b>Botanist</b>	AC	<b>Date</b>	04-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 568233.22 mE 7019246.6 mN
<b>Landform</b>	Plain, drainage Line	<b>Slope</b>	Negligible
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Ironstone	<b>Rock Abundance</b>	Many (30-70%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia pruinocarpa</i>	Shrub (>2 m)	10
<i>Acacia pteraneura</i>	Shrub (>2 m)	30
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	5
<i>Acacia exocarpoides</i>	Shrub (1-2 m)	< 1
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (1-2 m)	5
<i>Eremophila glutinosa</i>	Shrub (1-2 m)	< 1
<i>Senna artemisioides</i> subsp. <i>×sturtii</i>	Shrub (1-2 m)	< 1
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Shrub (0-1 m)	< 1
<i>Eremophila georgei</i>	Shrub (0-1 m)	< 1
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	Shrub (0-1 m)	< 1
<i>Harnieria kempeana</i> subsp. <i>muelleri</i>	Shrub (0-1 m)	10
<i>Hibiscus</i> sp. <i>Gardneri</i> (A.L. Payne PRP 1435)	Shrub (0-1 m)	< 1
<i>Psyrax latifolia</i>	Shrub (0-1 m)	< 1
<i>Psyrax rigidula</i>	Shrub (0-1 m)	< 1
<i>Psyrax suaveolens</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	5
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	< 1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	Shrub (0-1 m)	< 1
<i>Senna</i> sp. <i>Meekatharra</i> (E. Bailey 1-26)	Shrub (0-1 m)	< 1
<i>Solanum ashbyae</i>	Shrub (0-1 m)	< 1
<i>Teucrium teucriiflorum</i>	Shrub (0-1 m)	< 1
<i>Eriachne helmsii</i>	Grass	< 1
? <i>Rhodanthe</i> sp. (indet.)	Herb	< 1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	Herb	< 1
<i>Euphorbia boophthona</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	< 1
<i>Maireana georgei</i>	Herb	< 1
<i>Marsdenia australis</i>	Herb	< 1
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Roebuckiella ciliocarpa</i>	Herb	< 1



<b>Name</b>	<b>Stratum</b>	<b>Percent cover (%)</b>
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1

# IR16

<b>Botanist</b>	AC	<b>Date</b>	05-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 566199.08 mE 7017623.58 mN
<b>Landform</b>	Plain	<b>Slope</b>	Negligible
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Common (10-30%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia incurvaneura</i>	Shrub (>2 m)	10
<i>Acacia incurvaneura</i> × <i>mulganeura</i>	Shrub (>2 m)	1
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	10
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (1-2 m)	5
<i>Eremophila foliosissima</i>	Shrub (0-1 m)	< 1
<i>Eremophila georgei</i>	Shrub (0-1 m)	1
<i>Maireana villosa</i>	Shrub (0-1 m)	< 1
<i>Psyrax latifolia</i>	Shrub (0-1 m)	< 1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	< 1
<i>Teucrium teucriiflorum</i>	Shrub (0-1 m)	< 1
<i>Eragrostis eriopoda</i>	Grass	1
<i>Goodenia tenuiloba</i>	Herb	1
<i>Helipterum craspedioides</i>	Herb	< 1
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Thysanotus manglesianus</i>	Herb	< 1

# IR17

<b>Botanist</b>	AC	<b>Date</b>	05-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 567093.83 mE 7017506.29 mN
<b>Landform</b>	Plain	<b>Slope</b>	Negligible
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Many (30-70%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia incurvaneura</i>	Shrub (>2 m)	10
<i>Acacia incurvaneura</i> × <i>mulganeura</i>	Shrub (>2 m)	5
<i>Acacia tetragonophylla</i>	Shrub (1-2 m)	< 1
<i>Eremophila foliosissima</i>	Shrub (0-1 m)	< 1
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (0-1 m)	< 1
<i>Eremophila fraseri</i>	Shrub (0-1 m)	< 1
<i>Eremophila georgei</i>	Shrub (0-1 m)	< 1
<i>Maireana villosa</i>	Shrub (0-1 m)	< 1
<i>Psyrax latifolia</i>	Shrub (0-1 m)	< 1
<i>Psyrax rigidula</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	< 1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	< 1
<i>Teucrium teucriiflorum</i>	Shrub (0-1 m)	< 1
<i>Aristida contorta</i>	Grass	< 1
<i>Eragrostis eriopoda</i>	Grass	< 1
<i>Brachyscome ciliaris</i>	Herb	< 1
<i>Calocephalus knappii</i>	Herb	< 1
<i>Cephalopterum drummondii</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Ptilotus roei</i>	Herb	< 1
<i>Rhodanthe charsleyae</i>	Herb	< 1
<i>Solanum lasiophyllum</i>	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Thysanotus manglesianus</i>	Herb	< 1

# IR18

<b>Botanist</b>	AC	<b>Date</b>	04-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 567683.61 mE 7018682.89 mN
<b>Landform</b>	Plain	<b>Slope</b>	Gentle
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Many (30-70%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia incurvaneura</i>	Shrub (>2 m)	5
<i>Acacia incurvaneura</i> × <i>mulganeura</i>	Shrub (>2 m)	2
<i>Acacia pruinocarpa</i>	Shrub (>2 m)	< 1
<i>Acacia pteraneura</i>	Shrub (>2 m)	2
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	10
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (1-2 m)	5
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	Shrub (1-2 m)	1
<i>Eremophila simulans</i>	Shrub (1-2 m)	< 1
<i>Grevillea berryana</i>	Shrub (1-2 m)	< 1
<i>Eremophila georgei</i>	Shrub (0-1 m)	< 1
<i>Psyrax suaveolens</i>	Shrub (0-1 m)	< 1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	< 1
<i>Brachyscome ciliaris</i>	Herb	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Goodenia quasilibera</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	1
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	Herb	< 1
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Ptilotus roei</i>	Herb	< 1
<i>Thysanotus manglesianus</i>	Herb	< 1
<i>Waitzia acuminata</i> var. <i>acuminata</i>	Herb	< 1

# IR19

<b>Botanist</b>	AC	<b>Date</b>	04-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 567954.2 mE 7019032.01 mN
<b>Landform</b>	Plain	<b>Slope</b>	Gentle
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Many (30-70%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia incurvaneura</i>	Shrub (>2 m)	5
<i>Acacia incurvaneura</i> × <i>mulganeura</i>	Shrub (>2 m)	2
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	20
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (1-2 m)	4
<i>Eremophila glutinosa</i>	Shrub (1-2 m)	< 1
<i>Psyrax rigidula</i>	Shrub (1-2 m)	< 1
<i>Eremophila georgei</i>	Shrub (0-1 m)	< 1
<i>Eremophila jucunda</i> subsp. <i>jucunda</i>	Shrub (0-1 m)	1
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	Shrub (0-1 m)	1
<i>Psyrax suaveolens</i>	Shrub (0-1 m)	< 1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	< 1
<i>Solanum ashbyae</i>	Shrub (0-1 m)	< 1
<i>Solanum lasiophyllum</i>	Shrub (0-1 m)	< 1
<i>Eragrostis eriopoda</i>	Grass	< 1
<i>Brachyscome ciliaris</i>	Herb	< 1
<i>Goodenia macropectra</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	2
<i>Thysanotus manglesianus</i>	Herb	< 1
<i>Waitzia acuminata</i> var. <i>acuminata</i>	Herb	< 1

# IR20

<b>Botanist</b>	AC	<b>Date</b>	04-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 569028.64 mE 7019225.19 mN
<b>Landform</b>	Plain	<b>Slope</b>	Gentle
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Many (30-70%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)

Name	Stratum	Percent cover (%)
<i>Acacia incurvaneura</i>	Shrub (>2 m)	2
<i>Acacia incurvaneura</i> × <i>mulganeura</i>	Shrub (>2 m)	2
<i>Acacia mulganeura</i>	Shrub (>2 m)	2
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	20
<i>Acacia</i> sp. Weld Range (A. Markey & S. Dillon 2994)	Shrub (>2 m)	2
<i>Acacia exocarpoides</i>	Shrub (1-2 m)	< 1
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (1-2 m)	2
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	Shrub (1-2 m)	< 1
<i>Grevillea berryana</i>	Shrub (1-2 m)	< 1
<i>Senna artemisioides</i> subsp. <i>xsturtii</i>	Shrub (1-2 m)	< 1
<i>Eremophila glutinosa</i>	Shrub (0-1 m)	< 1
<i>Eremophila jucunda</i> subsp. <i>jucunda</i>	Shrub (0-1 m)	5
<i>Hemigenia virescens</i>	Shrub (0-1 m)	< 1
<i>Psyrax latifolia</i>	Shrub (0-1 m)	< 1
<i>Psyrax suaveolens</i>	Shrub (0-1 m)	< 1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	< 1
<i>Solanum ashbyae</i>	Shrub (0-1 m)	< 1
<i>Eragrostis eriopoda</i>	Grass	< 1
<i>Monachather paradoxus</i>	Grass	< 1
<i>Erodium crinitum</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	2
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Thysanotus manglesianus</i>	Herb	< 1
<i>Waitzia acuminata</i> var. <i>acuminata</i>	Herb	< 1

# IR21

<b>Botanist</b>	AC	<b>Date</b>	04-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 567602.72 mE 7017876.73 mN
<b>Landform</b>	Plain	<b>Slope</b>	Negligible
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Calcrete; Banded ironstone	<b>Rock Abundance</b>	Many (30-70%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia ramulosa</i> var. <i>ramulosa</i>	Shrub (>2 m)	10
<i>Acacia craspedocarpa</i>	Shrub (1-2 m)	1
<i>Eremophila fraseri</i>	Shrub (1-2 m)	< 1
<i>Acacia tetragonophylla</i>	Shrub (0-1 m)	2
<i>Eremophila jucunda</i> subsp. <i>jucunda</i>	Shrub (0-1 m)	< 1
<i>Psydax rigidula</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	1
<i>Scaevola spinescens</i>	Shrub (0-1 m)	2
<i>Senna</i> ? <i>artemisioides</i> subsp. <i>xsturtii</i>	Shrub (0-1 m)	< 1
<i>Senna artemisioides</i> subsp. <i>xartemisioides</i>	Shrub (0-1 m)	< 1
<i>Solanum lasiophyllum</i>	Shrub (0-1 m)	< 1
<i>Cephalopterum drummondii</i>	Herb	< 1
<i>Maireana georgei</i>	Herb	< 1
<i>Maireana melanocoma</i>	Herb	1
<i>Maireana triptera</i>	Herb	< 1
<i>Marsdenia australis</i>	Herb	< 1
<i>Podolepis gardneri</i>	Herb	< 1
<i>Ptilotus helipteroides</i>	Herb	< 1
<i>Roepera eichleri</i>	Herb	2

# IR23

<b>Botanist</b>	AC	<b>Date</b>	05-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 567500.12 mE 7017162.84 mN
<b>Landform</b>	Plain	<b>Slope</b>	Negligible
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Calcrete; Banded ironstone	<b>Rock Abundance</b>	Many (30-70%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia craspedocarpa</i>	Shrub (>2 m)	1
<i>Acacia fuscaneura</i>	Shrub (>2 m)	2
<i>Acacia incurvaneura</i>	Shrub (>2 m)	1
<i>Acacia tetragonophylla</i>	Shrub (>2 m)	< 1
<i>Eremophila fraseri</i>	Shrub (>2 m)	1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	< 1
<i>Senna artemisioides</i> subsp. <i>×artemisioides</i>	Shrub (0-1 m)	< 1
<i>Senna artemisioides</i> subsp. <i>×sturtii</i>	Shrub (0-1 m)	< 1
<i>Solanum lasiophyllum</i>	Shrub (0-1 m)	< 1
<i>Aristida contorta</i>	Grass	< 1
<i>Enneapogon caerulescens</i>	Grass	< 1
<i>Calotis porphyroglossa</i>	Herb	< 1
<i>Cephalipterum drummondii</i>	Herb	< 1
<i>Maireana georgei</i>	Herb	< 1
<i>Marsdenia australis</i>	Herb	< 1
<i>Roepera eichleri</i>	Herb	< 1
<i>Salsola australis</i>	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Swainsona kingii</i>	Herb	< 1
<i>Trichanthodium skirrophorum</i>	Herb	< 1



# IR24

<b>Botanist</b>	AC	<b>Date</b>	05-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 567255.2 mE 7017353.01 mN
<b>Landform</b>	Plain	<b>Slope</b>	Negligible
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Common (10-30%)
<b>Vegetation Condition</b>	Excellent	<b>Disturbance</b>	None evident
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia fuscaneura</i>	Shrub (>2 m)	5
<i>Acacia incurvaneura</i> × <i>mulganeura</i>	Shrub (>2 m)	1
<i>Acacia tetragonophylla</i>	Shrub (1-2 m)	< 1
<i>Eremophila fraseri</i>	Shrub (1-2 m)	< 1
<i>Eremophila georgei</i>	Shrub (0-1 m)	< 1
<i>Eremophila macmillaniana</i>	Shrub (0-1 m)	< 1
<i>Maireana villosa</i>	Shrub (0-1 m)	< 1
<i>Psyrax latifolia</i>	Shrub (0-1 m)	< 1
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	< 1
<i>Solanum lasiophyllum</i>	Shrub (0-1 m)	< 1
<i>Aristida contorta</i>	Grass	< 1
<i>Eragrostis eriopoda</i>	Grass	< 1
<i>Chthonocephalus viscosus</i>	Herb	< 1
<i>Goodenia quasilibera</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	< 1
<i>Ptilotus gaudichaudii</i>	Herb	< 1
<i>Ptilotus roei</i>	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	< 1
<i>Trianthema glossostigmum</i>	Herb	< 1

# IR25

<b>Botanist</b>	AC	<b>Date</b>	05-Sep-19
<b>Site Type</b>	20 m x 20 m	<b>Northwest Corner</b>	50K 567699.73 mE 7019040.91 mN
<b>Landform</b>	Plain	<b>Slope</b>	Gentle
<b>Soil Colour</b>	Red-brown	<b>Soil Texture</b>	Clay Loam
<b>Rock Type</b>	Banded ironstone	<b>Rock Abundance</b>	Few (< 10%)
<b>Vegetation Condition</b>	Very Good	<b>Disturbance</b>	Weeds (minor occurrences), cattle
<b>Time since Fire</b>	No Evidence	<b>Leaf Litter Cover</b>	Low (< 10%)



Name	Stratum	Percent cover (%)
<i>Acacia pruinocarpa</i>	Tree (<10 m)	5
<i>Acacia incurvaneura</i>	Shrub (>2 m)	15
<i>Acacia ramulosa</i> var. <i>linophylla</i>	Shrub (>2 m)	15
<i>Grevillea berryana</i>	Shrub (>2 m)	< 1
<i>Acacia exocarpoides</i>	Shrub (1-2 m)	< 1
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	Shrub (1-2 m)	10
<i>Eremophila georgei</i>	Shrub (1-2 m)	5
<i>Eremophila glutinosa</i>	Shrub (1-2 m)	< 1
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	Shrub (1-2 m)	< 1
<i>Senna artemisioides</i> subsp. <i>xsturtii</i>	Shrub (1-2 m)	< 1
<i>Acacia tetragonophylla</i>	Shrub (0-1 m)	< 1
<i>Hibiscus</i> sp. <i>Gardneri</i> (A.L. Payne PRP 1435)	Shrub (0-1 m)	< 1
<i>Maireana villosa</i>	Shrub (0-1 m)	1
<i>Psyrax suaveolens</i>	Shrub (0-1 m)	< 1
<i>Ptilotus obovatus</i>	Shrub (0-1 m)	5
<i>Ptilotus schwartzii</i>	Shrub (0-1 m)	< 1
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	Shrub (0-1 m)	< 1
<i>Solanum ashbyae</i>	Shrub (0-1 m)	< 1
<i>Solanum lasiophyllum</i>	Shrub (0-1 m)	< 1
<i>Tribulus suberosus</i>	Shrub (0-1 m)	< 1
<i>Monachather paradoxus</i>	Grass	< 1
<i>Paspalidium clementii</i>	Grass	< 1
<i>Abutilon oxycarpum</i>	Herb	< 1
<i>Calandrinia eremaea</i>	Herb	< 1
<i>Calocephalus knappii</i>	Herb	< 1
<i>Calotis hispidula</i>	Herb	< 1
<i>Calotis porphyroglossa</i>	Herb	< 1
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	Herb	< 1
<i>Cuscuta planiflora</i>	Herb	< 1
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	Herb	< 1

Name	Stratum	Percent cover (%)
<i>Erodium crinitum</i>	Herb	5
<i>Euphorbia drummondii</i>	Herb	< 1
<i>Goodenia tenuiloba</i>	Herb	4
<i>Marsdenia australis</i>	Herb	< 1
<i>Nicotiana rosulata</i> subsp. <i>rosulata</i>	Herb	< 1
<i>Ptilotus polystachyus</i>	Herb	< 1
<i>Rhodanthe battii</i>	Herb	< 1
<i>Rhodanthe battii</i>	Herb	< 1
<i>Rhodanthe maryonii</i>	Herb	< 1
<i>Roebuckiella ciliocarpa</i>	Herb	5
<i>Sida</i> sp. dark green fruits (S. van Leeuwen 2260)	Herb	< 1
<i>Stenopetalum</i> sp. (indet.)	Herb	1
<i>Swainsona kingii</i>	Herb	< 1
<i>Thysanotus manglesianus</i>	Herb	< 1
<i>Trachymene ornata</i>	Herb	< 1

## APPENDIX H      SURVEY TRACK LOG

565000

566000

567000

568000

569000

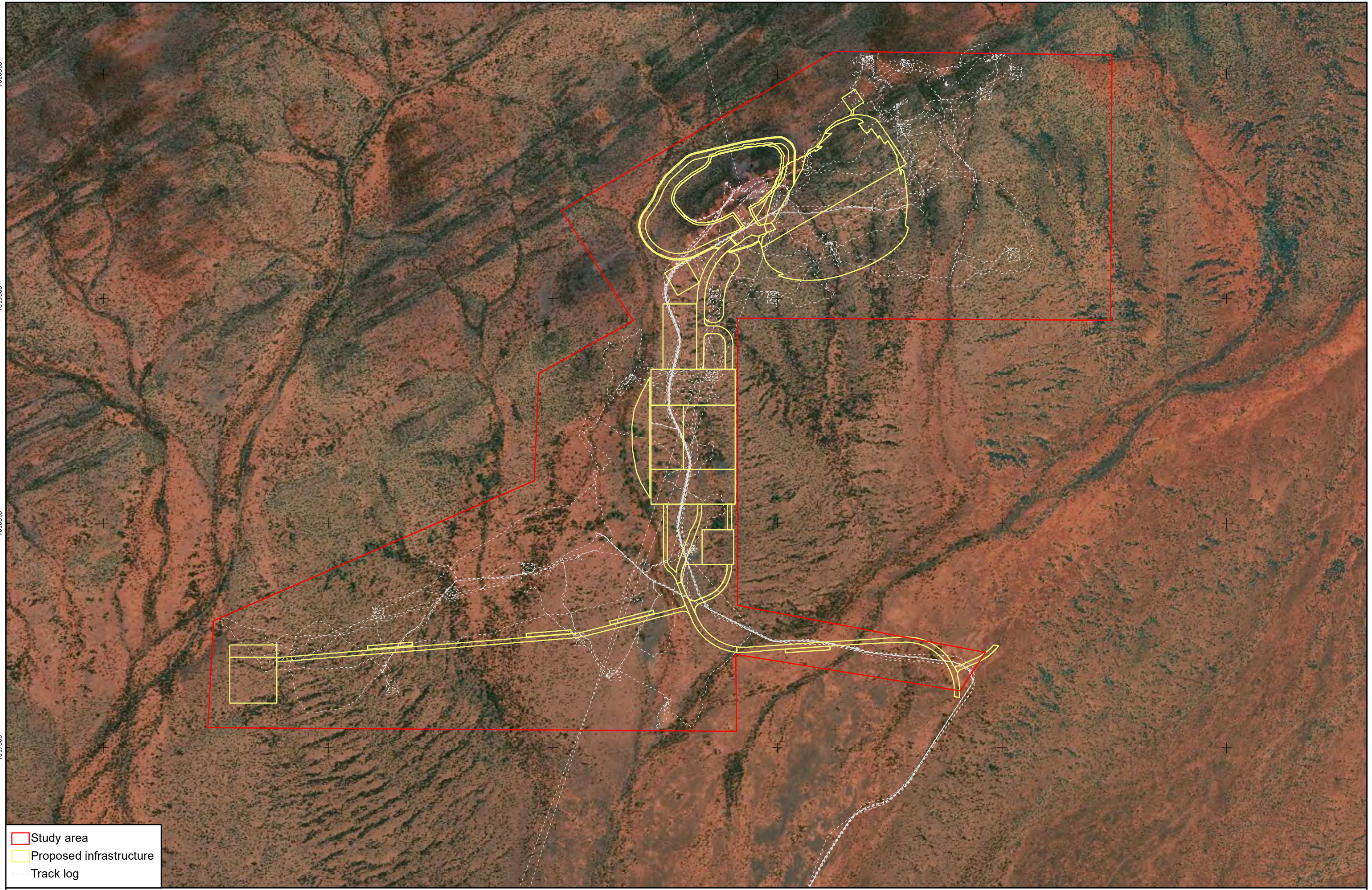
570000

7020000


7019000

7018000

7017000

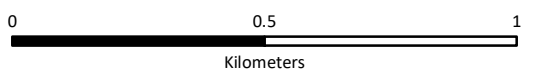


Study area  
 Proposed infrastructure  
 Track log


 Project: 1796  
 Date: 17 July 2019  
 Author: TM  
 Coordinate System: GDA 1994 MGA Zone 50  
 Projection: Transverse Mercator  
 Absolute Scale: 1:15,000 @A3

**Appendix H: Survey track log**

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



## APPENDIX I      THREATENED AND PRIORITY FLORA REPORT FORMS



# Threatened and Priority Flora Report Form

**Please complete as much of the form as possible.**

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

<b>TAXON:</b> <u>Acacia dilloniorum</u>		<b>TPFL Pop. No.:</b> _____	
<b>OBSERVATION DATE:</b> <u>3/9/2019</u>		<b>CONSERVATION STATUS:</b> <u>P3</u> <span style="float:right">New population <input checked="" type="checkbox"/></span>	
<b>OBSERVER/S:</b> <u>Andrew Craigie</u>		<b>PHONE:</b> <u>6168 7200</u>	
<b>ROLE:</b> <u>Botanist</u>		<b>ORGANISATION:</b> <u>Ecologia Environment</u>	

**DESCRIPTION OF LOCATION** (Provide at least nearest town/named locality, and the distance and direction to that place):  
Weld Range, ca. 60 km north-west of Cue.

**Reserve No.:** \_\_\_\_\_

**DISTRICT:** \_\_\_\_\_ **LGA:** Shire of Cue Land manager present:

<b>DATUM:</b>		<b>COORDINATES:</b> (If UTM coords provided, Zone is also required)		<b>METHOD USED:</b>	
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	<b>Lat / Northing:</b> <u>7020038.079</u>		No. satellites: _____		Map used: _____
WGS84 <input checked="" type="checkbox"/>	<b>Long / Easting:</b> <u>568548.6542</u>		Boundary polygon captured: <input type="checkbox"/>		Map scale: _____
Unknown <input type="checkbox"/>	<b>Zone:</b> <u>50K</u>				

**LAND TENURE:**

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

**AREA ASSESSMENT:** Edge survey  Partial survey  Full survey  Area observed (m<sup>2</sup>): \_\_\_\_\_

**EFFORT:** Time spent surveying (minutes): \_\_\_\_\_ No. of minutes spent / 100 m<sup>2</sup>: \_\_\_\_\_

**POP'N COUNT ACCURACY:** Actual  Extrapolation  Estimate

Count method: (Refer to field manual for list) \_\_\_\_\_

**WHAT COUNTED:** Plants  Clumps  Clonal stems

<b>TOTAL POP'N STRUCTURE:</b>	<b>Mature:</b>	<b>Juveniles:</b>	<b>Seedlings:</b>	<b>Totals:</b>	Area of pop (m <sup>2</sup> ): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	84			84	
Dead					

**QUADRATS PRESENT:** No. \_\_\_\_\_ Size \_\_\_\_\_ Data attached  Total area of quadrats (m<sup>2</sup>): \_\_\_\_\_

<b>Summary Quad. Totals: Alive</b>			
------------------------------------	--	--	--

**REPRODUCTIVE STATE:** Clonal  Vegetative  Flowerbud  Flower

Immature fruit  Fruit  Dehisced fruit  Percentage in flower: \_\_\_\_\_%

**CONDITION OF PLANTS:** Healthy  Moderate  Poor  Senescent

**COMMENT:** \_\_\_\_\_

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer,** Species and Communities Branch.



# Threatened and Priority Flora Report Form

<b>HABITAT INFORMATION:</b> (Check more than one box for combinations or where necessary)					
<b>LANDFORM:</b> Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	<b>ROCK TYPE:</b> Granite <input type="checkbox"/> Dolerite <input checked="" type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	<b>LOOSE ROCK:</b> (on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input checked="" type="checkbox"/>	<b>SOIL TYPE:</b> Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	<b>SOIL COLOUR:</b> Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	<b>DRAINAGE:</b> Well drained <input checked="" type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:
<b>Specific Landform Element:</b> (Refer to field manual for additional values)					
<b>CONDITION OF SOIL:</b>					
Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/> Cracked <input type="checkbox"/> Saline <input type="checkbox"/> Other:					
<b>VEGETATION CLASSIFICATION:*</b> E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.) 3. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia speckii (P4), Acacia pteraneura tall sparse shrubland 2. Eremophila glutinosa, Eremophila mackinlayi subsp. spathulata, Senna artemisioides subsp. xsturtii low sparse shrubland 3. 4.				
<b>ASSOCIATED SPECIES:</b> Other (non-dominant) spp	(Empty space for associated species)				
* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 <i>Australian Soil and Land Survey Field Handbook</i> guidelines – refer to field manual for further information and structural formation table.					
<b>CONDITION OF HABITAT:</b> Pristine <input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Degraded <input type="checkbox"/> Completely degraded <input type="checkbox"/>					
<b>COMMENT:</b>					
<b>FIRE HISTORY:</b> Last Fire: Season/Month: _____ Year: _____    Fire Intensity: High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> No signs of fire <input checked="" type="checkbox"/>					
<b>FENCING:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / repair <input type="checkbox"/> Required <input type="checkbox"/> Length req'd: _____					
<b>ROADSIDE MARKERS:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / reposition <input type="checkbox"/> Required <input type="checkbox"/> Quantity req'd: _____					
<b>OTHER COMMENTS:</b> (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)					

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database





# Threatened and Priority Flora Report Form


**DRF PERMIT/ LICENCE No:**

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

**SPECIMEN:** Collectors No: A.I.      WA Herb.       Regional Herb.       District Herb.       Other:

Craigie 1796.01

**ATTACHED:** Map       Mudmap       Photo       GIS data       Field notes       Other:

**COPY SENT TO:**      Regional Office       District Office       Other:

**Submitter of record:**      Andrew Craigie      **Role:**      Botanist

**Signature:**      \_\_\_\_\_      **Date submitted:**      20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,  
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form

**Please complete as much of the form as possible.**

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

<b>TAXON:</b> <u>Acacia speckii</u>		<b>TPFL Pop. No.:</b> _____	
<b>OBSERVATION DATE:</b> <u>3/9/2019</u>		<b>CONSERVATION STATUS:</b> <u>P3</u> <span style="float:right">New population <input checked="" type="checkbox"/></span>	
<b>OBSERVER/S:</b> <u>Andrew Craigie</u>		<b>PHONE:</b> <u>6168 7200</u>	
<b>ROLE:</b> <u>Botanist</u>		<b>ORGANISATION:</b> <u>Ecologia Environment</u>	

**DESCRIPTION OF LOCATION** (Provide at least nearest town/named locality, and the distance and direction to that place):  
Weld Range, ca. 60 km north-west of Cue.

**Reserve No.:** \_\_\_\_\_  
**DISTRICT:** \_\_\_\_\_ **LGA:** Shire of Cue Land manager present:

<b>DATUM:</b>		<b>COORDINATES:</b> (If UTM coords provided, <b>Zone</b> is also required)		<b>METHOD USED:</b>	
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	<b>Lat / Northing:</b> <u>7020025.649</u>		No. satellites: _____		Map used: _____
WGS84 <input checked="" type="checkbox"/>	<b>Long / Easting:</b> <u>568553.4459</u>		Boundary polygon captured: <input type="checkbox"/>		Map scale: _____
Unknown <input type="checkbox"/>	<b>Zone:</b> <u>50K</u>				

**LAND TENURE:**

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

**AREA ASSESSMENT:** Edge survey  Partial survey  Full survey  Area observed (m<sup>2</sup>): \_\_\_\_\_  
**EFFORT:** Time spent surveying (minutes): \_\_\_\_\_ No. of minutes spent / 100 m<sup>2</sup>: \_\_\_\_\_  
**POP'N COUNT ACCURACY:** Actual  Extrapolation  Estimate   
 Count method: (Refer to field manual for list) \_\_\_\_\_

**WHAT COUNTED:** Plants  Clumps  Clonal stems

<b>TOTAL POP'N STRUCTURE:</b>	<b>Mature:</b>	<b>Juveniles:</b>	<b>Seedlings:</b>	<b>Totals:</b>	Area of pop (m <sup>2</sup> ): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	<u>73</u>			<u>73</u>	
Dead					

**QUADRATS PRESENT:** No. \_\_\_\_\_ Size \_\_\_\_\_ Data attached  Total area of quadrats (m<sup>2</sup>): \_\_\_\_\_  
**Summary Quad. Totals:** Alive \_\_\_\_\_

**REPRODUCTIVE STATE:** Clonal  Vegetative  Flowerbud  Flower   
 Immature fruit  Fruit  Dehisced fruit  Percentage in flower: \_\_\_\_\_%

**CONDITION OF PLANTS:** Healthy  Moderate  Poor  Senescent   
**COMMENT:** \_\_\_\_\_

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. <b>Specify agent</b> where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• _____	_____	_____	_____
• _____	_____	_____	_____
• _____	_____	_____	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form

<b>HABITAT INFORMATION:</b> (Check more than one box for combinations or where necessary)					
<b>LANDFORM:</b> Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	<b>ROCK TYPE:</b> Granite <input type="checkbox"/> Dolerite <input checked="" type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/> Specify other:	<b>LOOSE ROCK:</b> (on soil surface; e.g. gravel, quartz fields) 0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input checked="" type="checkbox"/>	<b>SOIL TYPE:</b> Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/> Specify other:	<b>SOIL COLOUR:</b> Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/> Specify other:	<b>DRAINAGE:</b> Well drained <input checked="" type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/> Specify other:
<b>Specific Landform Element:</b> (Refer to field manual for additional values)					
<b>CONDITION OF SOIL:</b>					
Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/> Cracked <input type="checkbox"/> Saline <input type="checkbox"/> Other:					
<b>VEGETATION CLASSIFICATION:*</b> E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.) 3. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia speckii (P4), Acacia pteraneura tall sparse shrubland 2. Eremophila glutinosa, Eremophila mackinlayi subsp. spathulata, Senna artemisioides subsp. xsturtii low sparse shrubland 3. 4.				
<b>ASSOCIATED SPECIES:</b> Other (non-dominant) spp	(Empty space for associated species)				
* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 <i>Australian Soil and Land Survey Field Handbook</i> guidelines – refer to field manual for further information and structural formation table.					
<b>CONDITION OF HABITAT:</b> Pristine <input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Degraded <input type="checkbox"/> Completely degraded <input type="checkbox"/>					
<b>COMMENT:</b>					
<b>FIRE HISTORY:</b> Last Fire: Season/Month: _____ Year: _____    Fire Intensity: High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> No signs of fire <input checked="" type="checkbox"/>					
<b>FENCING:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / repair <input type="checkbox"/> Required <input type="checkbox"/> Length req'd: _____					
<b>ROADSIDE MARKERS:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / reposition <input type="checkbox"/> Required <input type="checkbox"/> Quantity req'd: _____					
<b>OTHER COMMENTS:</b> (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)					

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form


**DRF PERMIT/ LICENCE No:**

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

**SPECIMEN:** Collectors No: A.I.Craigie 1796.02    WA Herb.     Regional Herb.     District Herb.     Other:

**ATTACHED:** Map     Mudmap     Photo     GIS data     Field notes     Other:

**COPY SENT TO:** Regional Office     District Office     Other:

**Submitter of record:** Andrew Craigie

**Role:** Botanist

**Signature:**

**Date submitted:** 20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form

**Please complete as much of the form as possible.**

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

<b>TAXON:</b> <u>Dodonaea amplisemina</u>		<b>TPFL Pop. No.:</b> _____	
<b>OBSERVATION DATE:</b> <u>3/9/2019</u>		<b>CONSERVATION STATUS:</b> <u>P4</u> <span style="float:right">New population <input checked="" type="checkbox"/></span>	
<b>OBSERVER/S:</b> <u>Andrew Craigie</u>		<b>PHONE:</b> <u>6168 7200</u>	
<b>ROLE:</b> <u>Botanist</u>		<b>ORGANISATION:</b> <u>Ecologia Environment</u>	

**DESCRIPTION OF LOCATION** (Provide at least nearest town/named locality, and the distance and direction to that place):  
Weld Range, ca. 60 km north-west of Cue.

**Reserve No.:** \_\_\_\_\_  
**DISTRICT:** \_\_\_\_\_ **LGA:** Shire of Cue Land manager present:

<b>DATUM:</b>		<b>COORDINATES:</b> (If UTM coords provided, Zone is also required)		<b>METHOD USED:</b>	
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	<b>Lat / Northing:</b> <u>7019983.543</u>		No. satellites: _____ Map used: _____		
WGS84 <input checked="" type="checkbox"/>	<b>Long / Easting:</b> <u>568434.4904</u>		Boundary polygon captured: <input type="checkbox"/> Map scale: _____		
Unknown <input type="checkbox"/>	<b>Zone:</b> <u>50K</u>				

**LAND TENURE:**

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

**AREA ASSESSMENT:** Edge survey  Partial survey  Full survey  Area observed (m<sup>2</sup>): \_\_\_\_\_  
**EFFORT:** Time spent surveying (minutes): \_\_\_\_\_ No. of minutes spent / 100 m<sup>2</sup>: \_\_\_\_\_  
**POP'N COUNT ACCURACY:** Actual  Extrapolation  Estimate   
 Count method: (Refer to field manual for list) \_\_\_\_\_

**WHAT COUNTED:** Plants  Clumps  Clonal stems

<b>TOTAL POP'N STRUCTURE:</b>	<b>Mature:</b>	<b>Juveniles:</b>	<b>Seedlings:</b>	<b>Totals:</b>	Area of pop (m <sup>2</sup> ): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	140			140	
Dead					

**QUADRATS PRESENT:** No. \_\_\_\_\_ Size \_\_\_\_\_ Data attached  Total area of quadrats (m<sup>2</sup>): \_\_\_\_\_  
**Summary Quad. Totals:** Alive

--	--	--	--

**REPRODUCTIVE STATE:** Clonal  Vegetative  Flowerbud  Flower   
 Immature fruit  Fruit  Dehisced fruit  Percentage in flower: \_\_\_\_\_%

**CONDITION OF PLANTS:** Healthy  Moderate  Poor  Senescent   
**COMMENT:**

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form

<b>HABITAT INFORMATION:</b> (Check more than one box for combinations or where necessary)					
<b>LANDFORM:</b> Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	<b>ROCK TYPE:</b> Granite <input type="checkbox"/> Dolerite <input checked="" type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/>  Specify other:	<b>LOOSE ROCK:</b> (on soil surface; e.g. gravel, quartz fields)  0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input checked="" type="checkbox"/>	<b>SOIL TYPE:</b> Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/>  Specify other:	<b>SOIL COLOUR:</b> Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/>  Specify other:	<b>DRAINAGE:</b> Well drained <input checked="" type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/>  Specify other:
<b>Specific Landform Element:</b> (Refer to field manual for additional values)					
<b>CONDITION OF SOIL:</b>					
Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/> Cracked <input type="checkbox"/> Saline <input type="checkbox"/> Other:					
<b>VEGETATION CLASSIFICATION:*</b> E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.) 3. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia speckii (P4), Acacia pteraneura tall sparse shrubland 2. Eremophila glutinosa, Eremophila mackinlayi subsp. spathulata, Senna artemisioides subsp. xsturtii low sparse shrubland 3. 4.				
<b>ASSOCIATED SPECIES:</b> Other (non-dominant) spp	(This section is currently blank)				
* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 <i>Australian Soil and Land Survey Field Handbook</i> guidelines – refer to field manual for further information and structural formation table.					
<b>CONDITION OF HABITAT:</b> Pristine <input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Degraded <input type="checkbox"/> Completely degraded <input type="checkbox"/>					
<b>COMMENT:</b>					
<b>FIRE HISTORY:</b> Last Fire: Season/Month: _____ Year: _____    Fire Intensity: High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> No signs of fire <input checked="" type="checkbox"/>					
<b>FENCING:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / repair <input type="checkbox"/> Required <input type="checkbox"/> Length req'd: _____					
<b>ROADSIDE MARKERS:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / reposition <input type="checkbox"/> Required <input type="checkbox"/> Quantity req'd: _____					
<b>OTHER COMMENTS:</b> (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)					

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form


**DRF PERMIT/ LICENCE No:**

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

**SPECIMEN:** Collectors No: A.I.Craigie 1796.03    WA Herb.     Regional Herb.     District Herb.     Other:

**ATTACHED:** Map     Mudmap     Photo     GIS data     Field notes     Other:

**COPY SENT TO:**    Regional Office     District Office     Other:

**Submitter of record:**    Andrew Craigie

**Role:**    Botanist

**Signature:**

**Date submitted:**    20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,  
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form

**Please complete as much of the form as possible.**

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

<b>TAXON:</b> <u>Grevillea inconspicua</u>		<b>TPFL Pop. No.:</b> _____	
<b>OBSERVATION DATE:</b> <u>3/9/2019</u>		<b>CONSERVATION STATUS:</b> <u>P4</u> <span style="float:right">New population <input checked="" type="checkbox"/></span>	
<b>OBSERVER/S:</b> <u>Andrew Craigie</u>		<b>PHONE:</b> <u>6168 7200</u>	
<b>ROLE:</b> <u>Botanist</u>		<b>ORGANISATION:</b> <u>Ecologia Environment</u>	

**DESCRIPTION OF LOCATION** (Provide at least nearest town/named locality, and the distance and direction to that place):  
Weld Range, ca. 60 km north-west of Cue.

**Reserve No.:** \_\_\_\_\_  
**DISTRICT:** \_\_\_\_\_ **LGA:** Shire of Cue Land manager present:

<b>DATUM:</b>		<b>COORDINATES:</b> (If UTM coords provided, Zone is also required)		<b>METHOD USED:</b>	
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	<b>Lat / Northing:</b> <u>7019651.078</u>		No. satellites: _____ Map used: _____		
WGS84 <input checked="" type="checkbox"/>	<b>Long / Easting:</b> <u>568788.2711</u>		Boundary polygon captured: <input type="checkbox"/> Map scale: _____		
Unknown <input type="checkbox"/>	<b>Zone:</b> <u>50K</u>				

**LAND TENURE:**

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

**AREA ASSESSMENT:** Edge survey  Partial survey  Full survey  Area observed (m<sup>2</sup>): \_\_\_\_\_

**EFFORT:** Time spent surveying (minutes): \_\_\_\_\_ No. of minutes spent / 100 m<sup>2</sup>: \_\_\_\_\_

**POP'N COUNT ACCURACY:** Actual  Extrapolation  Estimate

Count method: (Refer to field manual for list) \_\_\_\_\_

**WHAT COUNTED:** Plants  Clumps  Clonal stems

<b>TOTAL POP'N STRUCTURE:</b>	<b>Mature:</b>	<b>Juveniles:</b>	<b>Seedlings:</b>	<b>Totals:</b>	Area of pop (m <sup>2</sup> ): _____ Note: Pls record count as numbers (not percentages) for database.
	Alive	19		19	
	Dead				

**QUADRATS PRESENT:** No. \_\_\_\_\_ Size \_\_\_\_\_ Data attached  Total area of quadrats (m<sup>2</sup>): \_\_\_\_\_

**Summary Quad. Totals:** Alive \_\_\_\_\_

**REPRODUCTIVE STATE:** Clonal  Vegetative  Flowerbud  Flower   
 Immature fruit  Fruit  Dehisced fruit  Percentage in flower: \_\_\_\_\_%

**CONDITION OF PLANTS:** Healthy  Moderate  Poor  Senescent

**COMMENT:** \_\_\_\_\_

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. <b>Specify agent</b> where relevant. <b>Rate current and potential threat impact:</b> N=Nil, L=Low, M=Medium, H=High, E=Extreme <b>Estimate time to potential impact:</b> S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• _____	_____	_____	_____
• _____	_____	_____	_____
• _____	_____	_____	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer,** Species and Communities Branch.





# Threatened and Priority Flora Report Form

<b>HABITAT INFORMATION:</b> (Check more than one box for combinations or where necessary)					
<b>LANDFORM:</b>  Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input checked="" type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	<b>ROCK TYPE:</b>  Granite <input type="checkbox"/> Dolerite <input checked="" type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input checked="" type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/>  Specify other: _____	<b>LOOSE ROCK:</b> <small>(on soil surface; e.g. gravel, quartz fields)</small>  0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input checked="" type="checkbox"/>	<b>SOIL TYPE:</b>  Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/>  Specify other: _____	<b>SOIL COLOUR:</b>  Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/>  Specify other: _____	<b>DRAINAGE:</b>  Well drained <input checked="" type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/>  Specify other: _____
<b>Specific Landform Element:</b> (Refer to field manual for additional values)					
<b>CONDITION OF SOIL:</b> Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/> Cracked <input type="checkbox"/> Saline <input type="checkbox"/> Other: _____					
<b>VEGETATION CLASSIFICATION:*</b> <small>E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.) 3. Isolated clumps of sedges (Mesomelaena tetragona)</small>	1. Acacia sp. Weld Range (A. Markey & S. Dillon 2994), Acacia ramulosa var. linophylla tall sparse shrubland				
	2. Eremophila mackinlayi subsp. spathulata, Ptilotus obovatus, Senna artemisioides subsp. helmsii low sparse shrubland				
	3. _____				
	4. _____				
<b>ASSOCIATED SPECIES:</b> <small>Other (non-dominant) spp</small>					
<small>* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 <i>Australian Soil and Land Survey Field Handbook</i> guidelines – refer to field manual for further information and structural formation table.</small>					
<b>CONDITION OF HABITAT:</b> Pristine <input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Degraded <input type="checkbox"/> Completely degraded <input type="checkbox"/>					
<b>COMMENT:</b>					
<b>FIRE HISTORY:</b> Last Fire: Season/Month: _____ Year: _____ Fire Intensity: High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> No signs of fire <input checked="" type="checkbox"/>					
<b>FENCING:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / repair <input type="checkbox"/> Required <input type="checkbox"/> Length req'd: _____					
<b>ROADSIDE MARKERS:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / reposition <input type="checkbox"/> Required <input type="checkbox"/> Quantity req'd: _____					
<b>OTHER COMMENTS:</b> (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)					

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form


**DRF PERMIT/ LICENCE No:**

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

**SPECIMEN:** Collectors No: A.I.Craigie 1796.03    WA Herb.     Regional Herb.     District Herb.     Other:

**ATTACHED:** Map     Mudmap     Photo     GIS data     Field notes     Other:

**COPY SENT TO:**    Regional Office     District Office     Other:

**Submitter of record:**    Andrew Craigie

**Role:**    Botanist

**Signature:**

**Date submitted:**    20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,  
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form

**Please complete as much of the form as possible.**

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<b>TAXON:</b> <u>Hemigenia virescens</u>		<b>TPFL Pop. No.:</b> _____	
<b>OBSERVATION DATE:</b> <u>3/9/2019</u>		<b>CONSERVATION STATUS:</b> <u>P3</u> <span style="float:right">New population <input checked="" type="checkbox"/></span>	
<b>OBSERVER/S:</b> <u>Andrew Craigie</u>		<b>PHONE:</b> <u>6168 7200</u>	
<b>ROLE:</b> <u>Botanist</u>		<b>ORGANISATION:</b> <u>Ecologia Environment</u>	

**DESCRIPTION OF LOCATION** (Provide at least nearest town/named locality, and the distance and direction to that place):  
Weld Range, ca. 60 km north-west of Cue.

**Reserve No.:** \_\_\_\_\_

**DISTRICT:** \_\_\_\_\_ **LGA:** Shire of Cue Land manager present:

<b>DATUM:</b>		<b>COORDINATES:</b> (If UTM coords provided, Zone is also required)		<b>METHOD USED:</b>	
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	<b>Lat / Northing:</b> <u>7019165.75</u>		No. satellites: _____ Map used: _____		
WGS84 <input checked="" type="checkbox"/>	<b>Long / Easting:</b> <u>568921.6026</u>		Boundary polygon captured: <input type="checkbox"/> Map scale: _____		
Unknown <input type="checkbox"/>	<b>Zone:</b> <u>50K</u>				

**LAND TENURE:**

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

**AREA ASSESSMENT:** Edge survey  Partial survey  Full survey  Area observed (m<sup>2</sup>): \_\_\_\_\_

**EFFORT:** Time spent surveying (minutes): \_\_\_\_\_ No. of minutes spent / 100 m<sup>2</sup>: \_\_\_\_\_

**POP'N COUNT ACCURACY:** Actual  Extrapolation  Estimate

Count method: (Refer to field manual for list) \_\_\_\_\_

**WHAT COUNTED:** Plants  Clumps  Clonal stems

<b>TOTAL POP'N STRUCTURE:</b>	<b>Mature:</b>	<b>Juveniles:</b>	<b>Seedlings:</b>	<b>Totals:</b>	Area of pop (m <sup>2</sup> ): _____ Note: Pls record count as numbers (not percentages) for database.
	Alive	37		37	
	Dead				

**QUADRATS PRESENT:** No. \_\_\_\_\_ Size \_\_\_\_\_ Data attached  Total area of quadrats (m<sup>2</sup>): \_\_\_\_\_

**Summary Quad. Totals:** Alive \_\_\_\_\_

**REPRODUCTIVE STATE:** Clonal  Vegetative  Flowerbud  Flower   
 Immature fruit  Fruit  Dehisced fruit  Percentage in flower: \_\_\_\_\_%

**CONDITION OF PLANTS:** Healthy  Moderate  Poor  Senescent

**COMMENT:** \_\_\_\_\_

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer,** Species and Communities Branch.



# Threatened and Priority Flora Report Form

<b>HABITAT INFORMATION:</b> (Check more than one box for combinations or where necessary)					
<b>LANDFORM:</b> Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input type="checkbox"/> Flat <input checked="" type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	<b>ROCK TYPE:</b> Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input checked="" type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/>  Specify other:	<b>LOOSE ROCK:</b> (on soil surface; e.g. gravel, quartz fields)  0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input checked="" type="checkbox"/>	<b>SOIL TYPE:</b> Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/>  Specify other:	<b>SOIL COLOUR:</b> Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/>  Specify other:	<b>DRAINAGE:</b> Well drained <input checked="" type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/>  Specify other:
<b>Specific Landform Element:</b> (Refer to field manual for additional values)					
<b>CONDITION OF SOIL:</b>					
Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/> Cracked <input type="checkbox"/> Saline <input type="checkbox"/> Other:					
<b>VEGETATION CLASSIFICATION:*</b> E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.) 3. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia ramulosa var. linophylla, Acacia incurvaneura, Acacia incurvaneura × mulganeura tall sparse shrubland 2. Eremophila forrestii subsp. forrestii, Eremophila jucunda subsp. jucunda, Ptilotus schwartzii low sparse shrubland 3. 4.				
<b>ASSOCIATED SPECIES:</b> Other (non-dominant) spp	(Empty space for associated species)				
* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 <i>Australian Soil and Land Survey Field Handbook</i> guidelines – refer to field manual for further information and structural formation table.					
<b>CONDITION OF HABITAT:</b> Pristine <input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Degraded <input type="checkbox"/> Completely degraded <input type="checkbox"/>					
<b>COMMENT:</b>					
<b>FIRE HISTORY:</b> Last Fire: Season/Month: _____ Year: _____    Fire Intensity: High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> No signs of fire <input checked="" type="checkbox"/>					
<b>FENCING:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / repair <input type="checkbox"/> Required <input type="checkbox"/> Length req'd: _____					
<b>ROADSIDE MARKERS:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / reposition <input type="checkbox"/> Required <input type="checkbox"/> Quantity req'd: _____					
<b>OTHER COMMENTS:</b> (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)					

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form


**DRF PERMIT/ LICENCE No:**

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

**SPECIMEN:** Collectors No: A.I.Craigie 1796.04    WA Herb.     Regional Herb.     District Herb.     Other:

**ATTACHED:** Map     Mudmap     Photo     GIS data     Field notes     Other:

**COPY SENT TO:**    Regional Office     District Office     Other:

**Submitter of record:**    Andrew Craigie

**Role:**    Botanist

**Signature:**

**Date submitted:**    20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form

**Please complete as much of the form as possible.**

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

<b>TAXON:</b> <u>Micromyrtus placoides</u>		<b>TPFL Pop. No.:</b> _____	
<b>OBSERVATION DATE:</b> <u>3/9/2019</u>		<b>CONSERVATION STATUS:</b> <u>P3</u> <span style="float:right;">New population <input checked="" type="checkbox"/></span>	
<b>OBSERVER/S:</b> <u>Andrew Craigie</u>		<b>PHONE:</b> <u>6168 7200</u>	
<b>ROLE:</b> <u>Botanist</u>		<b>ORGANISATION:</b> <u>Ecologia Environment</u>	

**DESCRIPTION OF LOCATION** (Provide at least nearest town/named locality, and the distance and direction to that place):  
Weld Range, ca. 60 km north-west of Cue.

**Reserve No.:** \_\_\_\_\_

**DISTRICT:** \_\_\_\_\_ **LGA:** Shire of Cue Land manager present:

<b>DATUM:</b>		<b>COORDINATES:</b> (If UTM coords provided, <b>Zone</b> is also required)		<b>METHOD USED:</b>	
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	<b>Lat / Northing:</b> <u>7020028.086</u>		No. satellites: _____		Map used: _____
WGS84 <input checked="" type="checkbox"/>	<b>Long / Easting:</b> <u>569038.7234</u>		Boundary polygon captured: <input type="checkbox"/>		Map scale: _____
Unknown <input type="checkbox"/>	<b>Zone:</b> <u>50K</u>				

**LAND TENURE:**

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

**AREA ASSESSMENT:** Edge survey  Partial survey  Full survey  Area observed (m<sup>2</sup>): \_\_\_\_\_

**EFFORT:** Time spent surveying (minutes): \_\_\_\_\_ No. of minutes spent / 100 m<sup>2</sup>: \_\_\_\_\_

**POP'N COUNT ACCURACY:** Actual  Extrapolation  Estimate

Count method: (Refer to field manual for list) \_\_\_\_\_

**WHAT COUNTED:** Plants  Clumps  Clonal stems

<b>TOTAL POP'N STRUCTURE:</b>	<b>Mature:</b>	<b>Juveniles:</b>	<b>Seedlings:</b>	<b>Totals:</b>
Alive	860			860
Dead				

Area of pop (m<sup>2</sup>): \_\_\_\_\_  
 Note: Pls record count as numbers (not percentages) for database.

**QUADRATS PRESENT:** No. \_\_\_\_\_ Size \_\_\_\_\_ Data attached  Total area of quadrats (m<sup>2</sup>): \_\_\_\_\_

<b>Summary Quad. Totals: Alive</b>			
------------------------------------	--	--	--

**REPRODUCTIVE STATE:** Clonal  Vegetative  Flowerbud  Flower   
 Immature fruit  Fruit  Dehisced fruit  Percentage in flower: \_\_\_\_\_%

**CONDITION OF PLANTS:** Healthy  Moderate  Poor  Senescent

**COMMENT:** \_\_\_\_\_

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. <b>Specify agent</b> where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• _____	_____	_____	_____
• _____	_____	_____	_____
• _____	_____	_____	_____



# Threatened and Priority Flora Report Form

<b>HABITAT INFORMATION:</b> (Check more than one box for combinations or where necessary)					
<b>LANDFORM:</b> Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	<b>ROCK TYPE:</b> Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input checked="" type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/>  Specify other:	<b>LOOSE ROCK:</b> (on soil surface; e.g. gravel, quartz fields)  0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input checked="" type="checkbox"/>	<b>SOIL TYPE:</b> Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/>  Specify other:	<b>SOIL COLOUR:</b> Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/>  Specify other:	<b>DRAINAGE:</b> Well drained <input checked="" type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/>  Specify other:
<b>Specific Landform Element:</b> (Refer to field manual for additional values)					
<b>CONDITION OF SOIL:</b>					
Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/> Cracked <input type="checkbox"/> Saline <input type="checkbox"/> Other:					
<b>VEGETATION CLASSIFICATION:*</b> E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.) 3. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia incurvaneura, Acacia mulganerua, Acacia ramulosa var. linophylla tall sparse shrubland 2. Eremophila glutinosa, Eremophila latrobei subsp. latrobei, Micromyrtus placoides (P3) low sparse shrubland 3. 4.				
<b>ASSOCIATED SPECIES:</b> Other (non-dominant) spp	(Empty space for associated species)				
* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 <i>Australian Soil and Land Survey Field Handbook</i> guidelines – refer to field manual for further information and structural formation table.					
<b>CONDITION OF HABITAT:</b> Pristine <input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Degraded <input type="checkbox"/> Completely degraded <input type="checkbox"/>					
<b>COMMENT:</b>					
<b>FIRE HISTORY:</b> Last Fire: Season/Month: _____ Year: _____    Fire Intensity: High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> No signs of fire <input checked="" type="checkbox"/>					
<b>FENCING:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / repair <input type="checkbox"/> Required <input type="checkbox"/> Length req'd: _____					
<b>ROADSIDE MARKERS:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / reposition <input type="checkbox"/> Required <input type="checkbox"/> Quantity req'd: _____					
<b>OTHER COMMENTS:</b> (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)					

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form


**DRF PERMIT/ LICENCE No:**

Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licencing requirements see the Threatened Flora and Wildlife Licensing pages on DPaW's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

**SPECIMEN:** Collectors No: A.I.Craigie 1796.06    WA Herb.     Regional Herb.     District Herb.     Other:

**ATTACHED:** Map     Mudmap     Photo     GIS data     Field notes     Other:

**COPY SENT TO:**    Regional Office     District Office     Other:

**Submitter of record:**    Andrew Craigie

**Role:**    Botanist

**Signature:**

**Date submitted:**    20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database





# Threatened and Priority Flora Report Form

**Please complete as much of the form as possible.**

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

<b>TAXON:</b> <u>Prostanthera petrophila</u>		<b>TPFL Pop. No.:</b> _____	
<b>OBSERVATION DATE:</b> <u>3/9/2019</u>		<b>CONSERVATION STATUS:</b> <u>P3</u> <span style="float:right;">New population <input checked="" type="checkbox"/></span>	
<b>OBSERVER/S:</b> <u>Andrew Craigie</u>		<b>PHONE:</b> <u>6168 7200</u>	
<b>ROLE:</b> <u>Botanist</u>		<b>ORGANISATION:</b> <u>Ecologia Environment</u>	

**DESCRIPTION OF LOCATION** (Provide at least nearest town/named locality, and the distance and direction to that place):  
Weld Range, ca. 60 km north-west of Cue.

**Reserve No.:** \_\_\_\_\_

**DISTRICT:** \_\_\_\_\_ **LGA:** Shire of Cue Land manager present:

<b>DATUM:</b>		<b>COORDINATES:</b> (If UTM coords provided, <b>Zone</b> is also required)		<b>METHOD USED:</b>	
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	<b>Lat / Northing:</b> <u>7019774.85</u>		No. satellites: _____ Map used: _____		
WGS84 <input checked="" type="checkbox"/>	<b>Long / Easting:</b> <u>568538.2801</u>		Boundary polygon captured: <input type="checkbox"/> Map scale: _____		
Unknown <input type="checkbox"/>	<b>Zone:</b> <u>50K</u>				

**LAND TENURE:**

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

**AREA ASSESSMENT:** Edge survey  Partial survey  Full survey  Area observed (m<sup>2</sup>): \_\_\_\_\_

**EFFORT:** Time spent surveying (minutes): \_\_\_\_\_ No. of minutes spent / 100 m<sup>2</sup>: \_\_\_\_\_

**POP'N COUNT ACCURACY:** Actual  Extrapolation  Estimate

Count method: (Refer to field manual for list) \_\_\_\_\_

**WHAT COUNTED:** Plants  Clumps  Clonal stems

<b>TOTAL POP'N STRUCTURE:</b>	<b>Mature:</b>	<b>Juveniles:</b>	<b>Seedlings:</b>	<b>Totals:</b>	Area of pop (m <sup>2</sup> ): _____ Note: Pls record count as numbers (not percentages) for database.
	Alive	51		51	
	Dead				

**QUADRATS PRESENT:** No. \_\_\_\_\_ Size \_\_\_\_\_ Data attached  Total area of quadrats (m<sup>2</sup>): \_\_\_\_\_

<b>Summary Quad. Totals: Alive</b>				
------------------------------------	--	--	--	--

**REPRODUCTIVE STATE:** Clonal  Vegetative  Flowerbud  Flower   
 Immature fruit  Fruit  Dehisced fruit  Percentage in flower: \_\_\_\_\_%

**CONDITION OF PLANTS:** Healthy  Moderate  Poor  Senescent

**COMMENT:** \_\_\_\_\_

<b>THREATS - type, agent and supporting information:</b> E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. <b>Specify agent</b> where relevant. <b>Rate current and potential threat impact:</b> N=Nil, L=Low, M=Medium, H=High, E=Extreme <b>Estimate time to potential impact:</b> S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____



# Threatened and Priority Flora Report Form

<b>HABITAT INFORMATION:</b> (Check more than one box for combinations or where necessary)					
<b>LANDFORM:</b> Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	<b>ROCK TYPE:</b> Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input checked="" type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/>  Specify other:	<b>LOOSE ROCK:</b> (on soil surface; e.g. gravel, quartz fields)  0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input checked="" type="checkbox"/>	<b>SOIL TYPE:</b> Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/>  Specify other:	<b>SOIL COLOUR:</b> Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/>  Specify other:	<b>DRAINAGE:</b> Well drained <input checked="" type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/>  Specify other:
<b>Specific Landform Element:</b> (Refer to field manual for additional values)					
<b>CONDITION OF SOIL:</b>					
Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/> Cracked <input type="checkbox"/> Saline <input type="checkbox"/> Other:					
<b>VEGETATION CLASSIFICATION:*</b> E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.) 3. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia incurvaneura, Acacia mulganerua, Acacia ramulosa var. linophylla tall sparse shrubland 2. Eremophila glutinosa, Eremophila latrobei subsp. latrobei, Micromyrtus placoides (P3) low sparse shrubland 3. 4.				
<b>ASSOCIATED SPECIES:</b> Other (non-dominant) spp	(Empty space for associated species)				
* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 <i>Australian Soil and Land Survey Field Handbook</i> guidelines – refer to field manual for further information and structural formation table.					
<b>CONDITION OF HABITAT:</b> Pristine <input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Degraded <input type="checkbox"/> Completely degraded <input type="checkbox"/>					
<b>COMMENT:</b>					
<b>FIRE HISTORY:</b> Last Fire: Season/Month: _____ Year: _____    Fire Intensity: High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> No signs of fire <input checked="" type="checkbox"/>					
<b>FENCING:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / repair <input type="checkbox"/> Required <input type="checkbox"/> Length req'd: _____					
<b>ROADSIDE MARKERS:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / reposition <input type="checkbox"/> Required <input type="checkbox"/> Quantity req'd: _____					
<b>OTHER COMMENTS:</b> (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)					

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form


**DRF PERMIT/ LICENCE No:**

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**SPECIMEN:** Collectors No: A.I.Craigie 1796.07    WA Herb.     Regional Herb.     District Herb.     Other:

**ATTACHED:** Map     Mudmap     Photo     GIS data     Field notes     Other:

**COPY SENT TO:** Regional Office     District Office     Other:

**Submitter of record:** Andrew Craigie

**Role:** Botanist

**Signature:**

**Date submitted:** 20/11/2019

Please return completed form to **Species And Communities Branch** DPaW,  
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form

**Please complete as much of the form as possible.**

For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DPaW website at <http://www.dpaw.wa.gov.au/>

<b>TAXON:</b> <u>Stenanthemum patens</u>		<b>TPFL Pop. No.:</b> _____	
<b>OBSERVATION DATE:</b> <u>3/9/2019</u>		<b>CONSERVATION STATUS:</b> <u>P1</u> <span style="float:right;">New population <input checked="" type="checkbox"/></span>	
<b>OBSERVER/S:</b> <u>Andrew Craigie</u>		<b>PHONE:</b> <u>6168 7200</u>	
<b>ROLE:</b> <u>Botanist</u>		<b>ORGANISATION:</b> <u>Ecologia Environment</u>	

**DESCRIPTION OF LOCATION** (Provide at least nearest town/named locality, and the distance and direction to that place):  
Weld Range, ca. 60 km north-west of Cue.

**Reserve No.:** \_\_\_\_\_  
**DISTRICT:** \_\_\_\_\_ **LGA:** Shire of Cue Land manager present:

<b>DATUM:</b>		<b>COORDINATES:</b> (If UTM coords provided, Zone is also required)		<b>METHOD USED:</b>	
GDA94 / MGA94 <input type="checkbox"/>	DecDegrees <input type="checkbox"/>	DegMinSec <input type="checkbox"/>	UTMs <input checked="" type="checkbox"/>	GPS <input checked="" type="checkbox"/>	Differential GPS <input type="checkbox"/> Map <input type="checkbox"/>
AGD84 / AMG84 <input type="checkbox"/>	<b>Lat / Northing:</b> <u>7019908.055</u>		No. satellites: _____ Map used: _____		
WGS84 <input checked="" type="checkbox"/>	<b>Long / Easting:</b> <u>568707.6753</u>		Boundary polygon captured: <input type="checkbox"/> Map scale: _____		
Unknown <input type="checkbox"/>	<b>Zone:</b> <u>50K</u>				

**LAND TENURE:**

Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>	Shire road reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>	Other Crown reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____	Specify other: _____

**AREA ASSESSMENT:** Edge survey  Partial survey  Full survey  Area observed (m<sup>2</sup>): \_\_\_\_\_  
**EFFORT:** Time spent surveying (minutes): \_\_\_\_\_ No. of minutes spent / 100 m<sup>2</sup>: \_\_\_\_\_  
**POP'N COUNT ACCURACY:** Actual  Extrapolation  Estimate   
 Count method: (Refer to field manual for list) \_\_\_\_\_

**WHAT COUNTED:** Plants  Clumps  Clonal stems

<b>TOTAL POP'N STRUCTURE:</b>	<b>Mature:</b>	<b>Juveniles:</b>	<b>Seedlings:</b>	<b>Totals:</b>	Area of pop (m <sup>2</sup> ): _____ Note: Pls record count as numbers (not percentages) for database.
Alive	<u>2</u>			<u>2</u>	
Dead					

**QUADRATS PRESENT:** No. \_\_\_\_\_ Size \_\_\_\_\_ Data attached  Total area of quadrats (m<sup>2</sup>): \_\_\_\_\_  
**Summary Quad. Totals:** Alive

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**REPRODUCTIVE STATE:** Clonal  Vegetative  Flowerbud  Flower   
 Immature fruit  Fruit  Dehisced fruit  Percentage in flower: \_\_\_\_\_%

**CONDITION OF PLANTS:** Healthy  Moderate  Poor  Senescent   
**COMMENT:**

THREATS - type, agent and supporting information: E.g. clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
•	_____	_____	_____
•	_____	_____	_____
•	_____	_____	_____

Please return completed form to **Species And Communities Branch DPaW,**

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

**RECORDS:** Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database



# Threatened and Priority Flora Report Form

<b>HABITAT INFORMATION:</b> (Check more than one box for combinations or where necessary)					
<b>LANDFORM:</b> Crest <input type="checkbox"/> Hill <input type="checkbox"/> Ridge <input type="checkbox"/> Outcrop <input type="checkbox"/> Slope <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Open depression <input type="checkbox"/> Drainage line <input type="checkbox"/> Closed depression <input type="checkbox"/> Wetland <input type="checkbox"/>	<b>ROCK TYPE:</b> Granite <input type="checkbox"/> Dolerite <input type="checkbox"/> Laterite <input type="checkbox"/> Ironstone <input checked="" type="checkbox"/> Limestone <input type="checkbox"/> Quartz <input type="checkbox"/>  Specify other:	<b>LOOSE ROCK:</b> (on soil surface; e.g. gravel, quartz fields)  0-10% <input type="checkbox"/> 10-30% <input type="checkbox"/> 30-50% <input type="checkbox"/> 50-100% <input checked="" type="checkbox"/>	<b>SOIL TYPE:</b> Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Clay loam <input checked="" type="checkbox"/> Light clay <input type="checkbox"/> Peat <input type="checkbox"/>  Specify other:	<b>SOIL COLOUR:</b> Red <input checked="" type="checkbox"/> Brown <input checked="" type="checkbox"/> Yellow <input type="checkbox"/> White <input type="checkbox"/> Grey <input type="checkbox"/> Black <input type="checkbox"/>  Specify other:	<b>DRAINAGE:</b> Well drained <input checked="" type="checkbox"/> Seasonally inundated <input type="checkbox"/> Permanently inundated <input type="checkbox"/> Tidal <input type="checkbox"/>  Specify other:
<b>Specific Landform Element:</b> (Refer to field manual for additional values)					
<b>CONDITION OF SOIL:</b>					
Dry <input checked="" type="checkbox"/> Moist <input type="checkbox"/> Waterlogged <input type="checkbox"/> Inundated <input type="checkbox"/> Cracked <input type="checkbox"/> Saline <input type="checkbox"/> Other:					
<b>VEGETATION CLASSIFICATION:*</b> E.g. 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.) 3. Isolated clumps of sedges (Mesomelaena tetragona)	1. Acacia rhodophloia, Acacia incurvaneura, Thryptomene decussata tall sparse shrubland 2. Ptilotus obovatus, Dodonaea pachyneura, Eremophila latrobei subsp. latrobei low sparse shrubland 3. 4.				
<b>ASSOCIATED SPECIES:</b> Other (non-dominant) spp	(Empty space for associated species)				
* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 <i>Australian Soil and Land Survey Field Handbook</i> guidelines – refer to field manual for further information and structural formation table.					
<b>CONDITION OF HABITAT:</b> Pristine <input type="checkbox"/> Excellent <input checked="" type="checkbox"/> Very good <input type="checkbox"/> Good <input type="checkbox"/> Degraded <input type="checkbox"/> Completely degraded <input type="checkbox"/>					
<b>COMMENT:</b>					
<b>FIRE HISTORY:</b> Last Fire: Season/Month: _____ Year: _____    Fire Intensity: High <input type="checkbox"/> Medium <input type="checkbox"/> Low <input type="checkbox"/> No signs of fire <input checked="" type="checkbox"/>					
<b>FENCING:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / repair <input type="checkbox"/> Required <input type="checkbox"/> Length req'd: _____					
<b>ROADSIDE MARKERS:</b> Not required <input type="checkbox"/> Present <input type="checkbox"/> Replace / reposition <input type="checkbox"/> Required <input type="checkbox"/> Quantity req'd: _____					
<b>OTHER COMMENTS:</b> (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)					

Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

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# Threatened and Priority Flora Report Form


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**SPECIMEN:** Collectors No: A.I.Craigie 1796.08    WA Herb.     Regional Herb.     District Herb.     Other:

**ATTACHED:** Map     Mudmap     Photo     GIS data     Field notes     Other:

**COPY SENT TO:** Regional Office     District Office     Other:

**Submitter of record:** Andrew Craigie

**Role:** Botanist

**Signature:**

**Date submitted:** 20/11/2019


Please return completed form to **Species And Communities Branch** DPaW,

Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983


**RECORDS:** Please forward to **Flora Administrative Officer**, Species and Communities Branch.


Record entered by: \_\_\_\_\_ Sheet No.: \_\_\_\_\_ Record Accepted in Database


## APPENDIX J FAUNA HABITAT ASSESSMENT SITE SHEETS


Site	Landform		Condition		Habitat	
HA01	Creek/Drainage Line		Very Good		Open Shrubland	
Description	Mid dense shrubland bordering minor drainage over thick leaf litter and woody debris					
% Ground Cover	Bare Soil	30				
	Litter	Moderate (10-40%)				
	Canopy Cover	30				
	Understorey	50				
Rocks	No exposed rock	X				
	<20% exposed rock					
	20-50% exposed rock					
	>50% exposed rock					
	Boulders / Rocks %					
	Surface Stones	Pebbles (0-50mm)				
Soil	Type	Clay loam				
	Colour	Red				
Habitat Features	Water Impacts	Scouring	Vegetation			
	Fire Presence	> 5 Years	Stratum	Form	Height	Species
	Woody Debris	Moderate (10-40%)	Upper	Tree	<10m	<i>Acacia pruinocarpa</i>
	Grazing		Middle	Shrub	<3m	<i>Acacia pteraneura, Acacia ramulosa var. linophylla</i> tall open shrubland
	Rock Crevices					
	Burrowing Suitability	Moderate	Ground	Grasses	<1m	<i>Eremophila forrestii subsp. forrestii, Harnieria kempeana subsp. muelleri, Ptilotus obovatus</i> low sparse shrubland.
	Large trees present					
	Tree Hollows (>10cm)					





Site	Landform		Condition			Habitat	
HA02	Plain		Very Good			Open Shrubland	
Description	Open woodland of <i>Eucalyptus wandoo</i> over grazed grasses and woody debris.						
% Ground Cover	Bare Soil	90					
	Litter	Low (< 10%)					
	Canopy Cover						
Rocks	Understorey	10					
	No exposed rock	X					
	<20% exposed rock						
	20-50% exposed rock						
	>50% exposed rock						
	Boulders / Rocks %						
Soil	Surface Stones	Pebbles (0-50mm)					
	Type	Loam					
Soil	Colour	Red					
	Water Impacts		<b>Vegetation</b>				
Habitat Features	Fire Presence	> 5 Years	<b>Stratum</b>	<b>Form</b>	<b>Height</b>	<b>Species</b>	
	Woody Debris	Low (< 10%)	Upper	Tree		<i>Acacia incurvaneura</i> , <i>Acacia fuscaneura</i> , <i>Acacia incurvaneura</i> × <i>mulganeura</i> tall sparse shrubland	
	Grazing						
	Rock Crevices		Middle	Shrub	>0.75m	<i>Eremophila georgei</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Psydrax latifolia</i> low sparse shrubland	
	Burrowing Suitability	Moderate					
	Large trees present		Ground	Grasses	0.75m		
	Tree Hollows (>10cm)						


Site	Landform		Condition			Habitat
HA03	Creek/Drainage Line		Very Good			Minor Drainage Line
Description	Open woodland of <i>Eucalyptus loxophleba</i> over grazed grasses and woody debris.					
% Ground Cover	Bare Soil	70				
	Litter	Moderate (10-40%)				
	Canopy Cover	10				
Rocks	Understorey	20				
	No exposed rock	X				
	<20% exposed rock					
	20-50% exposed rock					
	>50% exposed rock					
Soil	Boulders / Rocks %					
	Surface Stones	Cobbles (51-250mm)				
	Type	Sandy loam				
Habitat Features	Colour	Red	<b>Vegetation</b>			
	Water Impacts	Scouring	<b>Stratum</b>	<b>Form</b>	<b>Height</b>	<b>Species</b>
	Fire Presence	> 5 Years	Upper	Tree	>10m	<i>Acacia sp. Weld Range (A. Markey &amp; S. Dillon 2994), Acacia ramulosa var. linophylla</i> tall sparse shrubland
	Woody Debris	Low (< 10%)			<10m	
	Grazing		Middle	Shrub		<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Ptilotus obovatus</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> low sparse shrubland.
	Rock Crevices					
	Burrowing Suitability	Moderate	Ground	Grasses	<0.75m	
Large trees present						
Tree Hollows (>10cm)						


Site	Landform		Condition			Habitat	
HA04	Hill		Excellent			Ridge	
Description	Open woodland of <i>Eucalyptus loxophleba</i> over grazed grasses and woody debris.						
% Ground Cover	Bare Soil	40					
	Litter	Low (< 10%)					
	Canopy Cover	5					
	Understorey	10					
Rocks	No exposed rock						
	<20% exposed rock						
	20-50% exposed rock	X					
	>50% exposed rock						
	Boulders / Rocks %	50					
	Surface Stones	Boulders (>250mm)					
Soil	Type	Clay loam					
	Colour	Red					
Habitat Features	Water Impacts		<b>Vegetation</b>				
	Fire Presence	No Evidence	<b>Stratum</b>	<b>Form</b>	<b>Height</b>	<b>Species</b>	
	Woody Debris	Low (< 10%)	Upper	Tree	<5m	<i>Acacia rhodophloia</i> , <i>Acacia incurvaneura</i> , <i>Thryptomene decussata</i> tall sparse shrubland	
	Grazing		Middle	Shrub	>2m	<i>Ptilotus obovatus</i> , <i>Dodonaea pachyneura</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> low sparse shrubland.	
	Rock Crevices	Low (< 10%)					
	Burrowing Suitability	Low					
	Large trees present		Ground				
Tree Hollows (>10cm)							

Site	Landform	Condition	Habitat			
HA05	Valley	Excellent	Open Shrubland			
Description	Open woodland of <i>Eucalyptus wandoo</i> over <i>Xanthorrhoea preisii</i> and <i>Hakea preisii</i> over tussock grasses and herbs on granite outcropping and cobbles.					
% Ground Cover	Bare Soil	70				
	Litter	Low (< 10%)				
	Canopy Cover					
Rocks	Understorey	10				
	No exposed rock					
	<20% exposed rock					
	20-50% exposed rock	X				
	>50% exposed rock					
	Boulders / Rocks %	40				
Soil	Surface Stones	Cobbles (51-250mm)				
	Type	Sandy loam				
Habitat Features	Colour	Red	<b>Vegetation</b>			
	Water Impacts	Sheet runoff	<b>Stratum</b>	<b>Form</b>	<b>Height</b>	<b>Species</b>
	Fire Presence	No Evidence	Upper	Tree	<4m	<i>Acacia sp. Weld Range (A. Markey &amp; S. Dillon 2994), Acacia speckii (P4), Acacia pteraneura</i> tall sparse shrubland
	Woody Debris	Low (< 10%)				
	Grazing		Middle	Shrub	>2m	<i>Eremophila glutinosa, Eremophila mackinlayi subsp. spathulata, Senna artemisioides subsp. xsturtii</i> low sparse shrubland.
	Rock Crevices					
	Burrowing Suitability	Low	Ground			
	Large trees present					
Tree Hollows (>10cm)						


Site	Landform	Condition	Habitat			
HA06	Hill	Excellent	Ridge			
Description	Open woodland of <i>Eucalyptus wandoo</i> over <i>Xanthorrhoea preisii</i> over tussock grasses and herbs on granite outcropping and cobbles with some termitaria present.					
% Ground Cover	Bare Soil					
	Litter	Low (< 10%)				
	Canopy Cover					
Rocks	Understorey	10				
	No exposed rock					
	<20% exposed rock					
	20-50% exposed rock					
	>50% exposed rock	X				
	Boulders / Rocks %	90				
Soil	Surface Stones	Boulders (>250mm)				
	Type	Clay loam				
Habitat Features	Colour	Red	<b>Vegetation</b>			
	Water Impacts		<b>Stratum</b>	<b>Form</b>	<b>Height</b>	<b>Species</b>
	Fire Presence	No Evidence	Upper	Tree	>10m	<i>Acacia rhodophloia</i> , <i>Acacia incurvaneura</i> , <i>Thryptomene decussata</i> tall sparse shrubland
	Woody Debris	Low (< 10%)				
	Grazing		Middle	Shrub	>2m	<i>Ptilotus obovatus</i> , <i>Dodoniaea pachyneura</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> low sparse shrubland.
	Rock Crevices	Moderate (10-40%)				
	Burrowing Suitability		Ground			
	Large trees present					
Tree Hollows (>10cm)						


Site	Landform	Condition	Habitat			
HA07	Hill	Excellent	Ridge			
Description	Open woodland of <i>Eucalyptus wandoo</i> over <i>Xanthorrhoea preisii</i> over tussock grasses and herbs on granite outcropping and cobbles with some termitaria present.					
% Ground Cover	Bare Soil					
	Litter	Low (< 10%)				
	Canopy Cover					
Rocks	Understorey	11				
	No exposed rock					
	<20% exposed rock					
	20-50% exposed rock					
	>50% exposed rock	X				
	Boulders / Rocks %	91				
Soil	Surface Stones	Boulders (>250mm)				
	Type	Clay loam				
	Colour	Red				
	Water Impacts		<b>Vegetation</b>			
Habitat Features	Fire Presence	No Evidence	<b>Stratum</b>	<b>Form</b>	<b>Height</b>	<b>Species</b>
	Woody Debris	Low (< 10%)	Upper	Tree	>10m	<i>Acacia rhodophloia</i> , <i>Acacia incurvaneura</i> , <i>Thryptomene decussata</i> tall sparse shrubland
	Grazing					
	Rock Crevices	Moderate (10-40%)	Middle	Shrub	>2m	<i>Ptilotus obovatus</i> , <i>Dodonaea pachyneura</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> low sparse shrubland.
	Burrowing Suitability					
	Large trees present		Ground			
	Tree Hollows (>10cm)					


Site	Landform		Condition			Habitat
HA08	Plain		Excellent			Open Shrubland
Description	Open woodland of <i>Eucalyptus wandoo</i> over <i>Xanthorrhoea preisii</i> over tussock grasses and herbs on granite outcropping and cobbles with some termitaria present.					
% Ground Cover	Bare Soil	90				
	Litter	Low (< 10%)				
	Canopy Cover					
Rocks	Understorey	10				
	No exposed rock	X				
	<20% exposed rock					
	20-50% exposed rock					
	>50% exposed rock					
	Boulders / Rocks %					
Soil	Surface Stones	Cobbles (51-250mm)				
	Type	Loam				
Soil	Colour	Red				
	Water Impacts		<b>Vegetation</b>			
Habitat Features	Fire Presence	> 5 Years	<b>Stratum</b>	<b>Form</b>	<b>Height</b>	<b>Species</b>
	Woody Debris	Low (< 10%)	Upper	Tree	>10m	<i>Acacia incurvaneura</i> , <i>Acacia fuscaneura</i> , <i>Acacia incurvaneura</i> x <i>mulganeura</i> tall sparse shrubland
	Grazing					
	Rock Crevices		Middle	Shrub	>2m	<i>Eremophila georgei</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Psydrax latifolia</i> low sparse shrubland
	Burrowing Suitability	Moderate				
	Large trees present		Ground	Grasses	0.75m	
	Tree Hollows (>10cm)					

Site	Landform		Condition			Habitat
HA09	Creek/Drainage Line		Very Good			Minor Drainage Line
Description	Open woodland of <i>Eucalyptus wandoo</i> over <i>Xanthorrhoea preisii</i> over tussock grasses and herbs on granite outcropping and cobbles with some termitaria present.					
% Ground Cover	Bare Soil	70				
	Litter	Moderate (10-40%)				
	Canopy Cover	10				
	Understorey	20				
Rocks	No exposed rock	X				
	<20% exposed rock					
	20-50% exposed rock					
	>50% exposed rock					
	Boulders / Rocks %					
Soil	Surface Stones	Cobbles (51-250mm)				
	Type	Clay loam				
Soil	Colour	Red				
Habitat Features	Water Impacts	Minor Drainage	Vegetation			
	Fire Presence	No Evidence	Stratum	Form	Height	Species
	Woody Debris	Low (< 10%)	Upper	Tree	<5m	<i>Acacia sp. Weld Range (A. Markey &amp; S. Dillon 2994), Acacia incurvaneura, Acacia ramulosa var. linophylla</i> tall open shrubland
	Grazing					
	Rock Crevices		Middle	Shrub	<2m	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Ptilotus obovatus</i> low sparse shrubland.
	Burrowing Suitability	Moderate				
	Large trees present		Ground			
	Tree Hollows (>10cm)					



Site	Landform		Condition			Habitat
HA10	Plain		Excellent			Stony Plain
Description	Open woodland of <i>Eucalyptus wandoo</i> over <i>Xanthorrhoea preisii</i> over tussock grasses and herbs on granite outcropping and cobbles with some termitaria present.					
% Ground Cover	Bare Soil	90				
	Litter	Low (< 10%)				
	Canopy Cover					
Rocks	Understorey	10				
	No exposed rock	x				
	<20% exposed rock					
	20-50% exposed rock					
	>50% exposed rock					
	Boulders / Rocks %					
Soil	Surface Stones	Cobbles (51-250mm)				
	Type	Loam				
Soil	Colour	Red				
	Water Impacts		<b>Vegetation</b>			
Habitat Features	Fire Presence	No Evidence	<b>Stratum</b>	<b>Form</b>	<b>Height</b>	<b>Species</b>
	Woody Debris		Upper	Tree	>6m	<i>Acacia incurvaneura</i> , <i>Acacia fuscanera</i> , <i>Acacia incurvaneura</i> × <i>mulganeura</i> tall sparse shrubland
	Grazing					
	Rock Crevices		Middle	Shrub	>2m	<i>Eremophila georgei</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Psydrax latifolia</i> low sparse shrubland.
	Burrowing Suitability	Moderate				
	Large trees present	Yes	Ground			
	Tree Hollows (>10cm)					

Site	Landform	Condition	Habitat			
HA11	Plain	Excellent	Open Shrubland			
Description	Open woodland of <i>Eucalyptus wandoo</i> over <i>Xanthorrhoea preisii</i> over tussock grasses and herbs on granite outcropping and cobbles with some termitaria present.					
% Ground Cover	Bare Soil	90				
	Litter	Low (< 10%)				
	Canopy Cover					
Rocks	Understorey	5				
	No exposed rock	X				
	<20% exposed rock					
	20-50% exposed rock					
	>50% exposed rock					
	Boulders / Rocks %					
Soil	Surface Stones	Pebbles (0-50mm)				
	Type	Loam				
Soil	Colour	Red				
	Water Impacts		<b>Vegetation</b>			
Habitat Features	Fire Presence	No Evidence	<b>Stratum</b>	<b>Form</b>	<b>Height</b>	<b>Species</b>
	Woody Debris	Low (< 10%)	Upper	Tree	>10m	<i>Acacia incurvaneura</i> , <i>Acacia fuscaneura</i> , <i>Acacia incurvaneura</i> x <i>mulganeura</i> tall sparse shrubland
	Grazing					
	Rock Crevices		Middle	Shrub	>2m	<i>Eremophila georgei</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Psydrax latifolia</i> low sparse shrubland
	Burrowing Suitability	Moderate				
	Large trees present		Ground	Grasses	0.75m	
	Tree Hollows (>10cm)					

Site	Landform		Condition		Habitat	
HA12	Plain		Excellent		Open Shrubland	
Description	open mulga woodland/ acacia shrubland with <i>A aneura</i> over scattered herbs and tussock grasses					
% Ground Cover	Bare Soil	90				
	Litter	Low (< 10%)				
	Canopy Cover					
Understorey	5					
Rocks	No exposed rock	X				
	<20% exposed rock					
	20-50% exposed rock					
	>50% exposed rock					
	Boulders / Rocks %					
Soil	Surface Stones	Pebbles (0-50mm)				
	Type	Loam				
Soil	Colour	Red				
	Water Impacts		<b>Vegetation</b>			
Habitat Features	Fire Presence	No Evidence	<b>Stratum</b>	<b>Form</b>	<b>Height</b>	<b>Species</b>
	Woody Debris	Low (< 10%)	Upper	Tree	>10m	<i>Acacia incurvaneura</i> , <i>Acacia fuscaneura</i> , <i>Acacia incurvaneura</i> × <i>mulganeura</i> tall sparse shrubland
	Grazing					
	Rock Crevices		Middle	Shrub	>2m	<i>Eremophila georgei</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Psyrax latifolia</i> low sparse shrubland
	Burrowing Suitability	Moderate				
	Large trees present		Ground	Grasses	0.75m	
	Tree Hollows (>10cm)					



Biologic Environmental Survey Pty Ltd  
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Floreat, WA, 6014

15<sup>th</sup> April 2019

**Attn: Jeremy Shepherdson**

Ecotec (WA) Pty Ltd  
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Craigie WA 6025

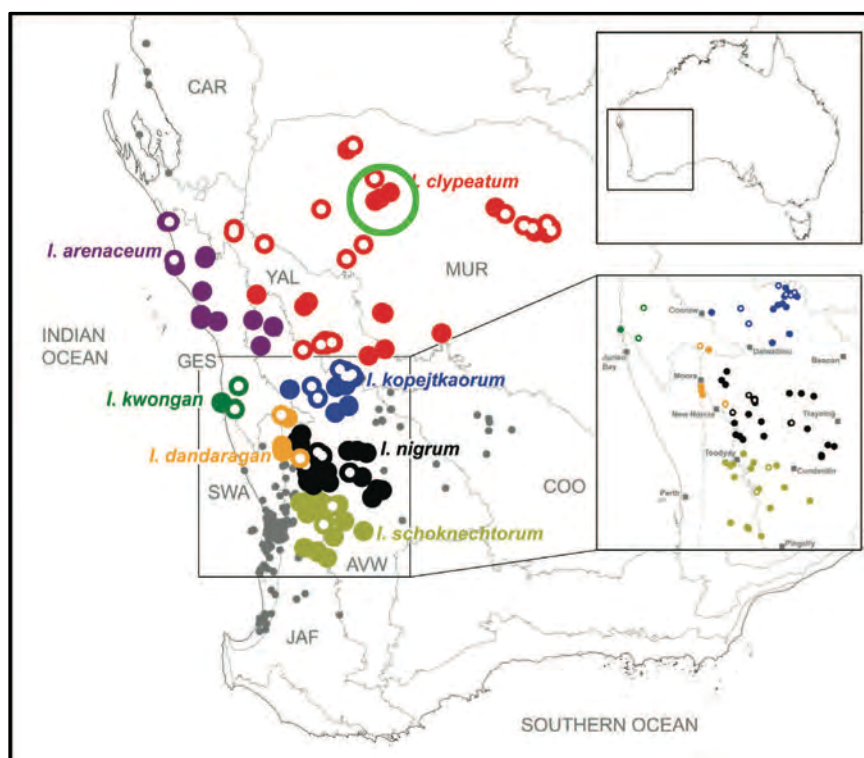
Dear Jeremy,

Ecotec (WA) Pty Ltd (Ecotec) are currently undertaking approvals for Fenix Resources Ltd (Fenix) for tenement M20/118 (the Project Area) within the Murchison bioregion, Western Australia. Ecotec has commissioned Biologic Environmental Survey Pty Ltd (Biologic) to undertake a status review of the trapdoor spider *Idiosoma nigrum* Main 1952 (shield-backed trapdoor spider) and an assessment of further survey requirements for the species, taking into account the survey work undertaken by Biologic for this species at the Project Area (Biologic, 2012). This letter presents the results of that status review and assessment.

In 2012, Biologic undertook a targeted *Idiosoma nigrum* survey at tenement M20/118 for Atlas Iron Ltd. This work provided a comprehensive assessment of the *I. nigrum* population at the Project Area taking into account previous work undertaken (Bamford, 2009; Ecologia, 2009) and the greater population throughout Weld Range. This work was required at the time as *I. nigrum* was listed under Schedule 1 of the WA Wildlife Conservation Act 1950 as Vulnerable.

In 2018, a conservation systematics review was published (Rix *et al.*, 2018) that detailed the revision of the genus *Idiosoma*. One of the results of this review was that *Idiosoma nigrum* was shown to contain multiple species and *I. nigrum* was relimited to include only those populations within the central and central-western Wheatbelt bioregion (Figure 1) (Rix *et al.*, 2018). The *Idiosoma* populations recorded through the Murchison bioregion and the northern sections of the Yalgoo bioregion, which includes the Project Area, are now regarded as *Idiosoma clypeatum* Rix and Harvey, 2018 (Figure 1), and now commonly referred to as the northern shield-backed

trapdoor spider. The review included an examination of material from Weld Range and Rix *et al.* (2018) concluded that *I. clypeatum* is the only known species from this genus in the Murchison bioregion.



**Figure 1:** The known distribution of *Idiosoma nigrum* and *I. clypeatum* (from Rix *et al.* 2018). The large green circle identifies the approximate location of the Project Area.

*Idiosoma clypeatum* has a widespread distribution in Western Australia's inland arid zone, extending from near Paynes Find, the Blue Hill Range, Kadji Kadji Nature Reserve, and Karara in the south, north and north-east to at least Coolcalalaya Homestead, Jack Hills, Albion Downs, Yakabindie, and Yeelirrie (Rix *et al.*, 2018) (Figure 1). This distribution appears to correlate strongly with an annual rainfall of less than 250 mm (Rix *et al.*, 2018) making it one of the most arid adapted species of the genus *Idiosoma*.

In 2017, *Idiosoma clypeatum* was formally assessed as 'priority 3' fauna using a standard International Union for the Conservation of Nature (IUCN) approach and is currently listed as such under the Biodiversity Conservation Act 2016 (BC Act); specially protected fauna under section 13(1). Rix *et al.* (2018) concluded that while the species' extent of occurrence of over 120,000 km<sup>2</sup> excludes it from consideration as threatened under Criterion B, a 'priority 3' recommendation was made due to the occurrence of the species in areas prospective for mining and mineral resources. Rix

*et al.* (2018) also concluded that close assessment under Criteria A and B is warranted in the future.

Priority 3 fauna are regarded as “Poorly-known species” and defined as follows;

- 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 (DBCA, 2019).

Based on this assessment, it can be concluded that the species of *Idiosoma* present within the Project Area is *Idiosoma clypeatum*, which is currently regarded as ‘priority 3’ under the BC Act. While species under this ranking are regarded as in need of further survey, the extent of survey work previously undertaken at the Project Area can be regarded as adequate for an approval.

In conclusion, further survey work is regarded as not required; however, the previous report provided by Biologic (Biologic, 2012), which also incorporated the previous survey work (Bamford, 2009; Ecologia, 2009), could be updated to reflect the current conservation status.

If you have any queries, please do not hesitate to get in contact.

Yours sincerely,

**Brad Durrant**

**Managing Director**

[Brad@biologicenv.com.au](mailto:Brad@biologicenv.com.au)

0417 998 440

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**Weld Range *Idiosoma nigrum* Survey**

**Atlas Iron Limited**

**June 2012**







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## Table of Contents

1	Introduction .....	7
1.1	Background.....	7
1.1.1	<i>Idiosoma nigrum</i> .....	7
1.2	Scope.....	10
1.3	Study Area .....	10
2	Database Review.....	14
2.1	Assessment Methods of Previous Studies .....	14
2.1.1	Ecologia SMC <i>Idiosoma nigrum</i> Survey .....	14
2.1.2	Bamford <i>Idiosoma nigrum</i> Survey .....	15
2.2	Biologic Assessment Methods.....	17
3	Results and Discussion.....	19
3.1	Previous Survey Results.....	19
3.1.1	Ecologia SMC <i>Idiosoma nigrum</i> Survey (2009b, 2010).....	19
3.1.2	Bamford <i>Idiosoma nigrum</i> Survey .....	20
3.2	Biologic Survey Results and Discussion.....	23
3.2.1	Burrow Numbers and Occurrence .....	23
3.2.2	Population Structure and Size .....	28
4	Conclusions .....	32
5	References.....	34



**LIST OF FIGURES**

Figure 1.1: Weld Range *Study Area*..... 12

Figure 1.2: Floristic Community Types (FCT) (Woodman 2008)..... 13

Figure 2.1: Ecologia (2009b; 2010) Survey Area. .... 16

Figure 2.2: Bamford (2009) and Biologic (2011) *Study Area*. .... 18

Figure 3.1: Ecologia (2009b) Survey Results..... 22

Figure 3.2: Bamford (2009) and Biologic (2011) Survey Results. .... 25

Figure 3.3: Vegetation Map of the *Study Area*; from Woodman (2008). .... 27

Figure 3.4: Vegetation Map for the Weld Range; from Ecologia (2009c)..... 29

**LIST OF TABLES**

Table 1.1: Percentage mortality over several years for each life stage; after Main (2003). .... 9

Table 1.2: Size classes for each life stage; after Main (2003)..... 9

Table 3.1: Location and burrow numbers in each cluster.....24

Table 3.2: Extrapolated population size for Bamford (2009) and Biologic (2011) data.....30



## Executive Summary

Biologic Environmental Survey (Biologic) was commissioned by Atlas Iron Limited (Atlas) to conduct a targeted *Idiosoma nigrum* Main 1952 (shield-backed trapdoor spider) survey and prepare an impact assessment for the Weld Range Project (Weld Range). Atlas's Weld Range tenement M20/118, hereafter referred to as the *Study Area*, (Figure 1.1) forms part of the Weld Range, which lies in the Murchison Biogeographic Region in the Arid zone of Western Australia. The *Study Area* is approximately 2km long and 600m wide, running in a north-east to south-west direction.

The objective of this survey report was to detail the results of Biologic's *I. nigrum* survey, consolidate these data with previous *I. nigrum* survey data in the area, report on the distribution of the species in, and adjacent to, the *Study Area* and apply a valid extrapolation to the data to allow an accurate indication of the size of the local population.

*Idiosoma nigrum* was found throughout the Weld Range but within the *Study Area* it showed a high variation in density with the north-eastern corner containing the majority of burrows recorded by both Bamford (2009) and Biologic (2011).

All three studies found a strong association with *Acacia* vegetation, although results from Bamford (2009) and Biologic (2011) data indicated a more specific association with *Acacia* sp. Weld Range (A. Markey & S. Dillon 2009). The vegetation data from Ecologia (2009c) and Woodman (2009) both show vegetation communities dominated by *A. sp.* Weld Range are widespread throughout the Weld Range. The Ecologia (2009c) vegetation data also indicates a strong likelihood that the *I. nigrum* population in the *Study Area* continues into the adjacent Weld Range area due to this association with *A. sp.* Weld Range, as it appears to form part of a population continuing to the north-east.



This connectivity with the *I. nigrum* populations adjacent to the *Study Area*, likely continues throughout much of the Weld Range, with the genetic work conducted by Ecologia (2010) indicating that gene flow in the central part of the Range (which includes the *Study Area*) appears to be continuous.

The loss of the *I. nigrum* population within the *Study Area* would be unlikely to affect the viability of the adjacent population, in either the short or long term, due to the size and likely connectivity with much of the central Weld Range.



## 1 INTRODUCTION

### 1.1 Background

Biologic Environmental Survey (Biologic) was commissioned by Atlas Iron Limited (Atlas) to conduct a targeted *Idiosoma nigrum* (shield-backed trapdoor spider) survey and prepare an impact assessment for the Weld Range Project (Weld Range). Weld Range is located on Glen Station, within the Murchison Bioregion, approximately 56 kilometres (km) north north-west of the township of Cue.

This impact assessment is based on previously completed survey work:

- Ecologia Environment (Ecologia), *Sinosteel - Weld Range Iron Ore Project. The Shield-back Spider Idiosoma nigrum Targeted Survey (2009a)*;
- Bamford Consulting Ecologists (Bamford) - *Weld Range Direct Shipping Ore Project. Targeted Shield-backed Trapdoor Spider, SRE Invertebrate and Vertebrate Fauna Survey: (2009)*,

; as well as recent *I. nigrum* survey work carried out by Biologic.

The objective of this impact assessment was to determine the level of risk to *I. nigrum* associated with the Weld Range Proposal using survey and habitat data collected by Ecologia (2009), Bamford (2009) and Biologic (2011).

#### 1.1.1 *Idiosoma nigrum*

*Idiosoma nigrum* is regarded as one of the most arid-adapted mygalomorph spiders in Australia (Main 1982). This adaptability has allowed the species to survive the aridification of Western Australia (Main 1982), particularly in the arid Murchison Region where its distribution is now restricted to some Banded Ironstone Formation (BIF) ranges and breakaways. In particular, it is the species' unique abdomen that is the greatest adaptation, a highly sclerotized "shield" that



reduces water loss through evaporation and provides protection by allowing the individual to “plug” the inside of the burrow (also known as phragmosing) to stop predators entering. Other characteristics that have increased the species ability to survive in arid environments include building deep burrows, up to 32cm (DEWHA 2011), that allow greater control over temperature and humidity, “twig-lining” burrows to increase foraging capacity (DEWHA 2011) and larger eyes and longer legs which give a greater ability to capture prey.

Despite these adaptations, this species has biological characteristics that impinge on its ability to reproduce and disperse, characteristics that are common in short-range endemic (SRE) species, i.e. species that have limited distributions (Harvey 2002). These biological traits include:

- time to reach maturity: typically five to six years for both males and females, during which there is a high mortality rate (Main 2003) (Table 1.1);
- low dispersal capabilities: emergent spiderlings generally establish a burrow within several centimetres of the matriarch female (as they lack the ability to disperse aerially), forming distinct clusters (Main 1982, 2003);
- low genetic flow: gene flow is facilitated by the dispersal of males when sexual maturity is reached but appears to only occur over small distances, possibly no greater than 500m (B. Main 2010 pers. comm.); and
- limited fecundity: it is likely that mature females only reproduce every second year, and then only until they are around 20 years of age (Main 2003).

Much of the ecological and biological information for *I. nigrum* was collected as part of a study at East Yorkrakine Nature Reserve over several years (Main 2003). This also included establishing the size classes for emergent spiderlings,



juveniles and adults using trapdoor and lumen (internal diameter of a burrow) sizes (Table 1.2).

**Table 1.1: Percentage mortality over several years for each life stage; after Main (2003).**

	1989/ 1990	1990/ 1991	1991/ 1992	1992/ 1993	1993/ 1994	Average
<b>Emergents</b>	85%	65%	25%	57%	50%	<b>56%</b>
<b>Juveniles</b>	30%	36%	77%	39%	33%	<b>43%</b>
<b>Adults</b>	30%	36%	19%	40%	20%	<b>29%</b>

**Table 1.2: Size classes for each life stage; after Main (2003).**

	<b>Emergents</b>	<b>Juveniles</b>	<b>Adults</b>
<b>Door (mm)</b>	≤ 14	15 – 20	≥ 21
<b>Lumen (mm)</b>	≤ 10	11 – 14	≥ 15
<b>Age (years)</b>	< 1	1 – 5 or 6	> 5 or 6

*Idiosoma nigrum* is listed under Schedule 1 of the WA *Wildlife Conservation Act 1950* as Vulnerable. The species is currently known from the central and northern Wheatbelt, and the coastal and interior Midwest, extending into the north-eastern Goldfields. Within the Wheatbelt, the species is in decline largely due to land fragmentation and degradation (Main 1987, 1991; Yen 1995) primarily through cropping, grazing and salinisation. In the Midwest and Goldfields, populations rarely occur away from the ranges and breakaways,





making them highly isolated and can be confidently regarded as separate populations with little, if any, gene flow.

## 1.2 Scope

To conduct a survey for *I nigrum*, consolidate previous survey data for *I nigrum* and:

- ground-truth any changes to the population density of *I. nigrum* in the *Study Area*;
- provide a more robust dataset to allow a valid extrapolation of *I. nigrum* numbers; and
- complete a detailed report on the distribution of *I. nigrum* burrows within the *Study Area*.

This survey was conducted within the Environmental Protection Authority (EPA) framework guidelines relevant to fauna survey work (EPA 2002; 2004).

## 1.3 Study Area

Atlas's Weld Range tenement M20/118 (Figure 1.1) forms part of the Weld Range, which lies in the Murchison Biogeographic Region in the Arid zone of Western Australia. The *Study Area* is approximately 2km long and 600m wide, running in a north-east to south-west direction.

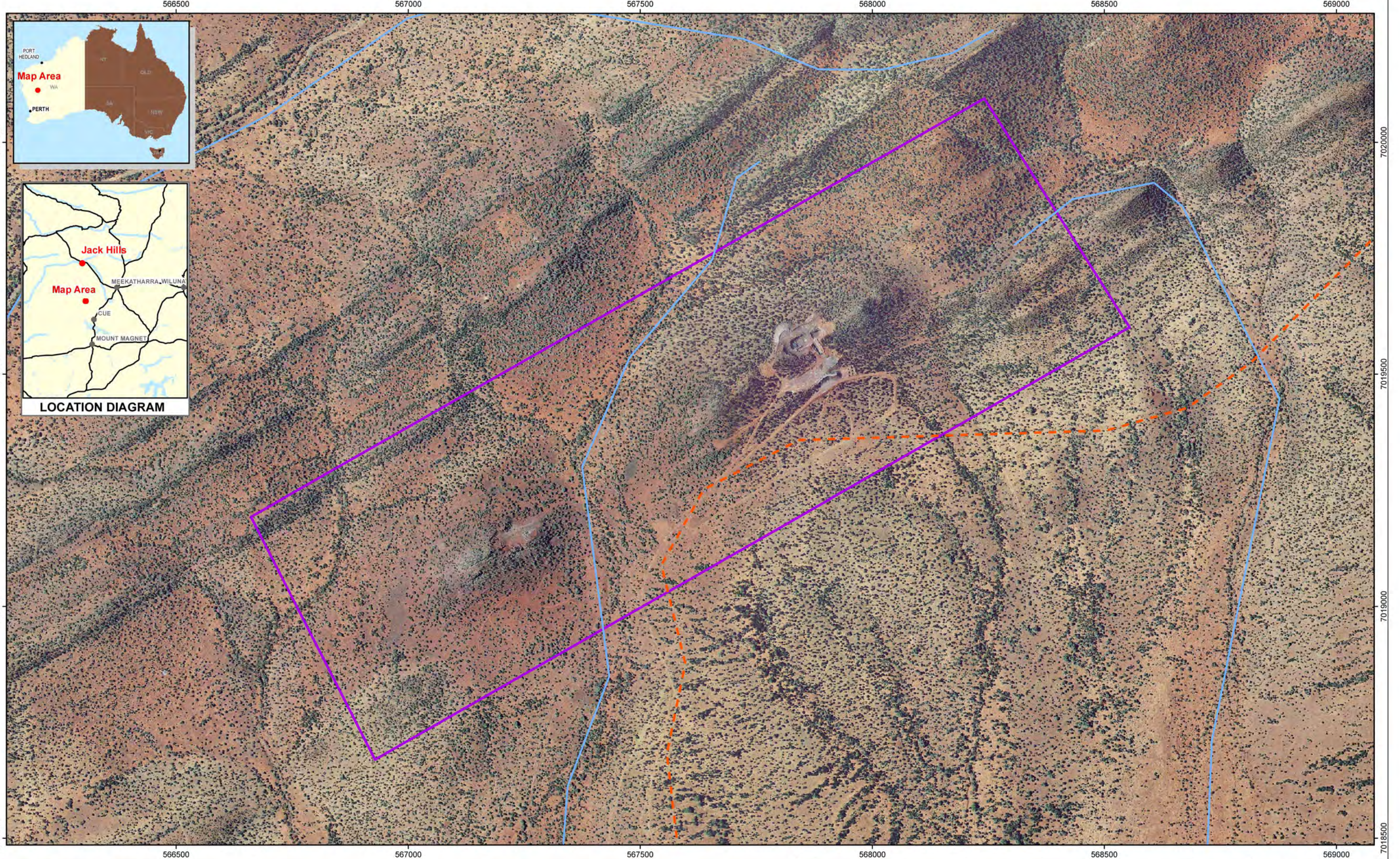
The *Study Area* consists of ironstone ridges, valleys, lower slopes, plains and minor drainage lines with some outcropping along the ridges. Although mostly intact, there is an excavated mine pit in the central ridge area, along with several cleared tracks and cleared pads.

In 2008, Woodman Environmental Consulting (Woodman) conducted a flora and vegetation assessment of the *Study Area*. Five Floristic Community Types (FCT) were identified from the *Study Area* (Figure 1.2):

- FCT 5: Open tall shrubland of *Acacia aneura* with emergent low trees of *Acacia pruinocarpa* over open mid shrubland of *Thryptomene decussate*,

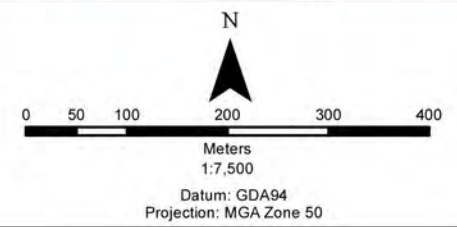


- Eremophila latrobei* subsp. *latrobei* over sparse low shrubland of *Sida* sp. *excedentifolia* (J.L. Egan 1925) over open low forbland of *Goodenia tenuiloba*, *Goodenia macroplectra* and *Monachather paradoxus*. Occurs on Lower slopes, flats and outwashes, occasionally upper and mid slopes.
- FCT 6a: Open tall shrubland of *Acacia aneura* and *Acacia ramulosa* var. *linophylla* over sparse mid shrubland of *Ptilotus obovatus* over open low forbland of *Goodenia tenuiloba* and *Monachather paradoxus*. Occurs on Lower slopes, flats and outwashes, occasionally upper and mid slopes.
  - FCT 6b: Open tall shrubland of *Acacia aneura* and *Acacia ramulosa* var. *linophylla* over open mid shrubland of mixed *Eremophila* spp. over open to sparse low shrubland of *Ptilotus obovatus* over open low forbland of *Cheilanthes sieberi*, *Goodenia tenuiloba* and *Monachather paradoxus*. Occurs on Upper and mid slopes, occasionally lower xlopes.
  - FCT 7: Open tall shrubland of *Acacia aneura* with emergent low trees of *Acacia pruinocarpa*, over low shrubland of *Ptilotus obovatus* and *Eremophila* spp. over open low forbland of *Goodenia tenuiloba*, *Lepidium oxytrichum* and *Enneapogon caerulescens*. Occurs on Steep upper slopes, hill crests.
  - FCT 8: Open tall shrubland of *Acacia* sp. Weld Range (A. Markey & S. Dillon 2994) and *Acacia speckii* over open mid shrubland of *Eremophila mackinlayi* subsp. *spathulata* and mixed *Senna* spp. over open low shrubland of *Ptilotus obovatus* and *Heliotropium ovalifolium* over open low forbland of *Goodenia tenuiloba*, *Velleia glabrata* and *Ptilotus helipteroides*. Generally occurs on mid and lower slopes, occasionally upper slopes to crests, creeklines and colluvial fans.



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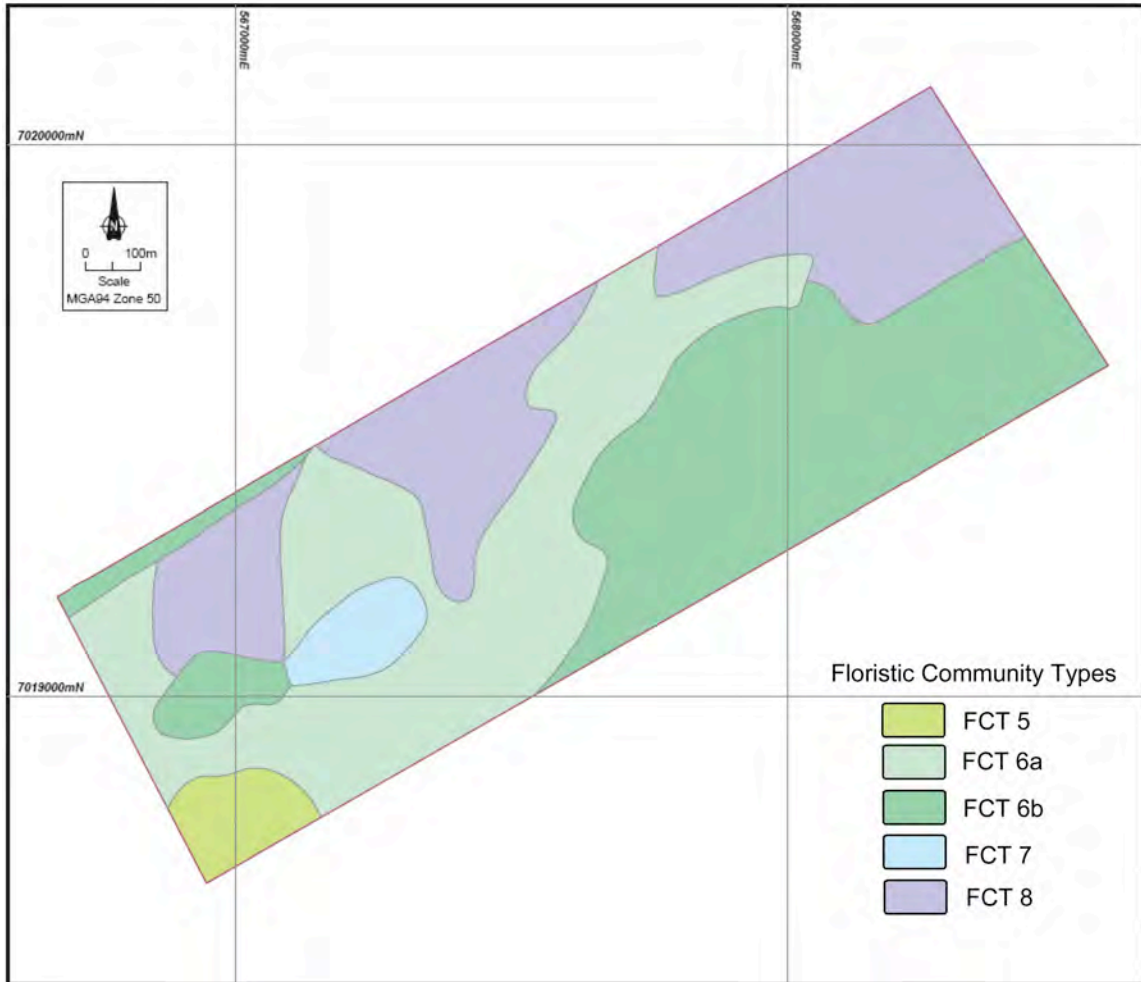
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Figure 1.1  
**Weld Range Study Area**

- Legend**
- Study Area
  - Track
  - Watercourse

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Figure 1.2: Floristic Community Types (FCT) (Woodman 2008)





## 2 DATABASE REVIEW

A search of the Department of Environment and Conservation's (DEC) *Naturemap* was conducted for records of *I. nigrum* in the vicinity of Weld Range. A radius of 40km was searched, with the *Study Area* used as the centroid, which covered the entire length of Weld Range.

The search revealed 1529 records of *I. nigrum*, all confined to Weld Range and extending along the entire length (ca. 60km). All records were collected in 2007, 2009 and 2010 indicating they are likely to have been all recorded as part of Sinosteel Midwest Corporation Ltd's (SMC) Weld Range Iron Ore Project (2009a), which is discussed in more detail in Section 2.2.

Beyond the Weld Range the closest record of *I. nigrum*, according to *Naturemap*, is Jack Hills, approximately 100km to the north.

### 2.1 Assessment Methods of Previous Studies

Two *I. nigrum* surveys have previously taken place in the vicinity of the *Study Area*.

#### 2.1.1 Ecologia SMC *Idiosoma nigrum* Survey

The first survey was conducted by Ecologia for SMC's Weld Range Iron Ore Project (Ecologia 2009a; 2009b; 2010). *Idiosoma nigrum* was first recorded at Weld Range during SMC's baseline SRE survey (Ecologia 2009a), which prompted a targeted *I. nigrum* survey (Ecologia 2009b), followed by a population genetic study targeting the species (Ecologia 2010).

The survey was conducted across all five sections of Weld Range (Figure 2.1) and covered a total area of 76 hectares (ha). Seventy-five randomly placed 100m x 100m (1ha) quadrats were placed evenly throughout the five sections. Each quadrat was surveyed using five 100m long transects, effectively covering the entire 1ha quadrat.



Data were collected for each transect when burrows were recorded, including burrow measurements and activity, soil type, aspect, leaf litter cover and vegetation. This habitat preference information was then used to extrapolate areas of suitable habitat throughout Weld Range and, in turn, estimate the size of the populations of *I. nigrum* in each section.

A population genetic study was conducted using specimens taken during the previous survey, covering three different sections of Weld Range (Figure 2.1), two in the southern part of Weld Range (Madoonga and W6) and one at Weld Range North (which was further divided into two sites; Northern Ridge and Central Ridge).

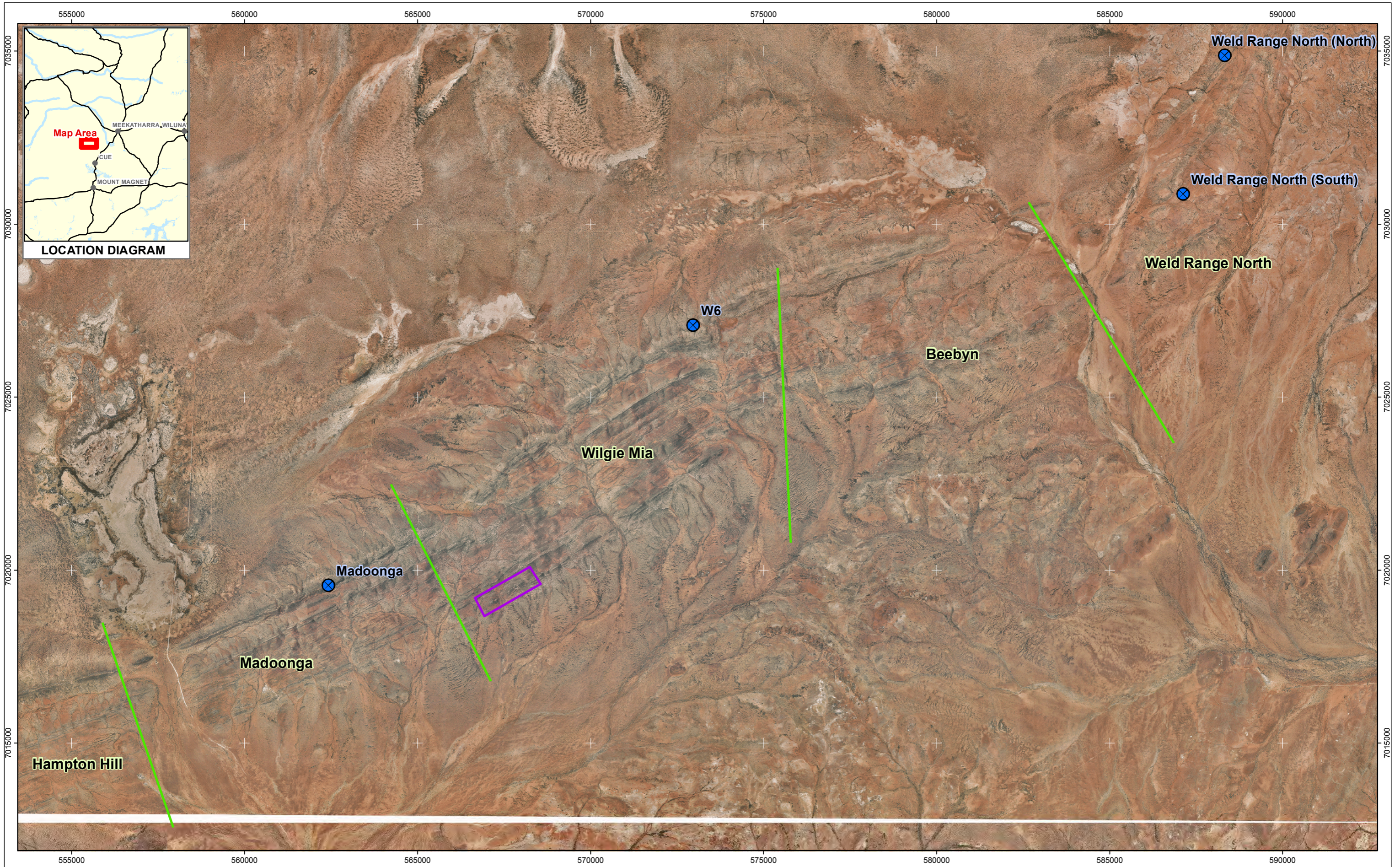
For further details on the assessment methods, please refer to Ecologia (2009b and 2010).

### 2.1.2 Bamford *Idiosoma nigrum* Survey

The second survey was conducted by Bamford Consulting Ecologists in September 2009. Twelve transects were chosen which covered all major vegetation types and landscape features (hill crests, upper slopes, mid slopes, lower slopes and surrounding plains). A series of 10m x 10m quadrats were surveyed intensively along each transect, at approximately 50m intervals, covering a total of 12,300m<sup>2</sup> (1.23ha) (Figure 2.2).

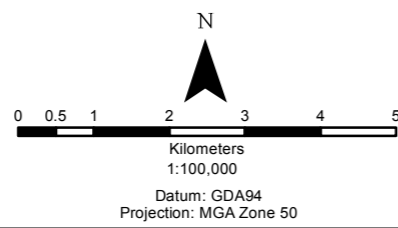
Burrow measurements and activity were recorded, as well as soil, vegetation and landscape data. This data was used, in conjunction with vegetation mapping by Woodman (2009) to extrapolate population size for the *Study Area*.

For further details on the assessment methods, please refer to Bamford (2009).



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**Ecologia (2009b;2010) Survey Area**

**Legend**

- Study Area
- Ecologia Survey Sections (2009b)
- ⊗ Ecologia Genetics Study Populations (2010)

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## 2.2 Biologic Assessment Methods

Targeted searches for *I. nigrum* were conducted in the *Study Area* on the 25<sup>th</sup> and 26<sup>th</sup> of September 2011. Six transects were run between the north-eastern and south-western boundaries (Figure 2.2), covering all major vegetation and habitat types in the *Study Area*. Areas of high disturbance or habitats where spiders would not be found were avoided. Altogether, approximately 11,500m of transects were surveyed to a width of two metres giving a total survey area of approximately 23,000m<sup>2</sup> (2.3ha). The numbers of trees visited were also recorded, to a total number of 1,117 across all transects.

Each transect was surveyed to a width of two metres and ran from tree to tree so as to maximise the possibility of finding burrows. When a burrow was located a radius of two metres was surveyed to record all burrows within the cluster.

Each burrow had measurements taken, internal diameter (lumen) and external diameter (trap door), twig lining type (what type of phylloides used), activity (active, sealed or inactive) and topographical position and vegetation characteristics.

Population size was estimated using the following:

$(A_f / A_s) \times N_s = N_f$ , where:

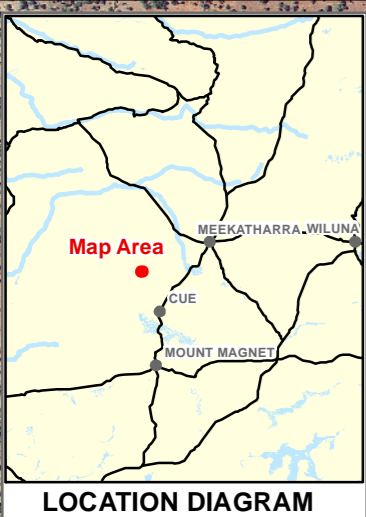
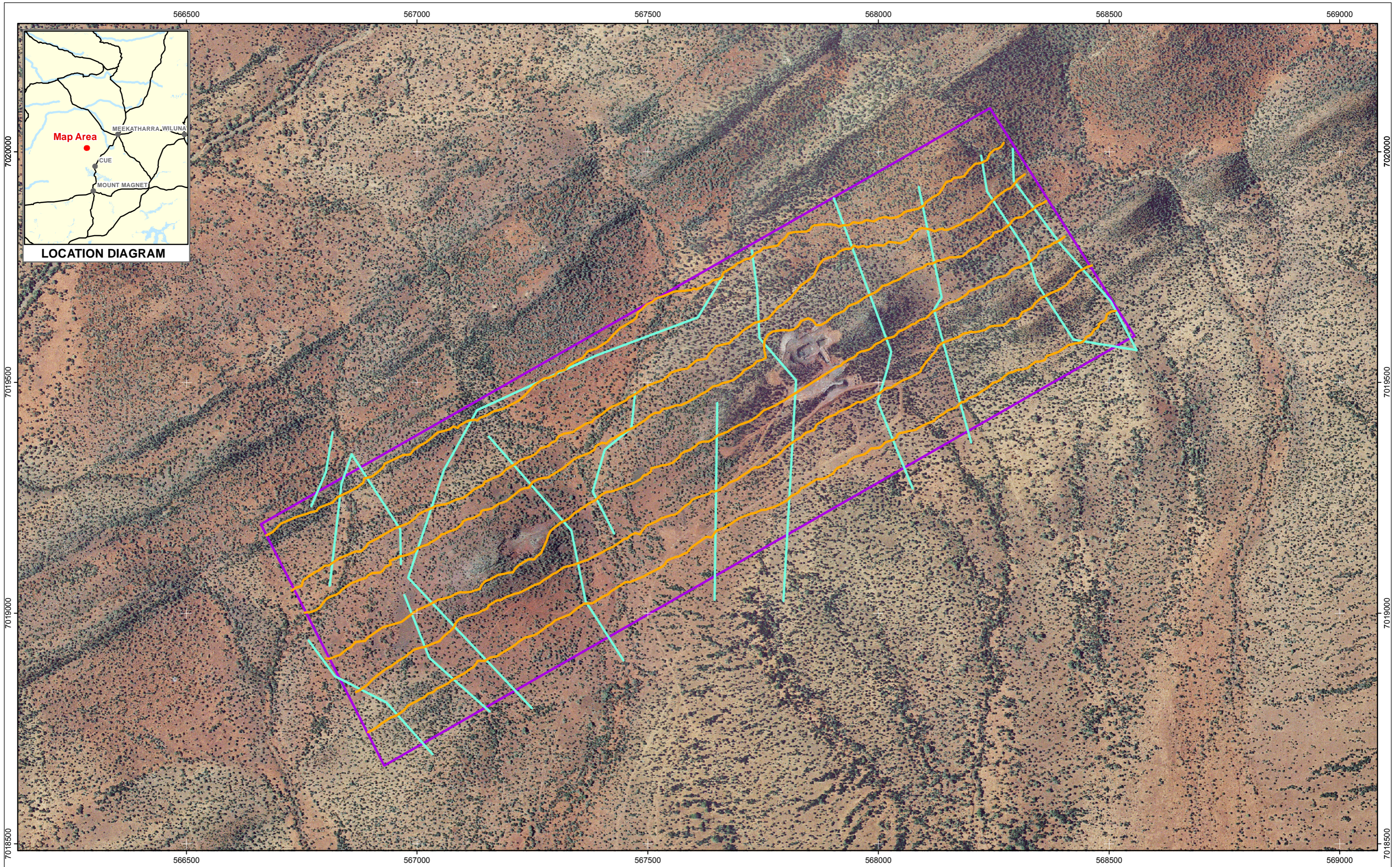
$A_f$  = the area (ha) of the favourable habitat in the *Study Area*, based on Woodman (2008);

$A_s$  = the area (ha) of the transects searched;

$N_s$  = the number of burrows within the transects (search area); and

$N_f$  = the number of estimated burrows within the favourable habitat.





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**Bamford (2009) and Biologic (2011)  
Study Area**

**Legend**

- Study Area
- Biologic Transects (2011)
- Bamford Transects (2009)

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### 3 RESULTS AND DISCUSSION

#### 3.1 Previous Survey Results

##### 3.1.1 Ecologia SMC *Idiosoma nigrum* Survey (2009b, 2010)

A total of 1708 burrows of *I. nigrum* were recorded from the five sections of the Weld Range *Study Area* (Figure 3.1). This study found that all *I. nigrum* burrows were found within the boundaries of drainage lines and underneath *Acacia* vegetation (*A. aneura* var. *aneura*, *A. ramulosa* var. *imophylla* and *A. sp.* Weld Range). All burrows were found on the southern aspect of the range, except in one section (Weld Range North) which has a north-south orientation. Results show that the hilltops were the least likely habitat to have *I. nigrum* burrows, with the slopes and plains the most likely. Similarly, habitats without clayey soil or rock were least likely to have *I. nigrum* burrows, compared to those that have a combination of these two soil characteristics, although the presence of sand also appears to reduce the likelihood.

Population numbers varied amongst the sections, ranging from 658 burrows at Weld Range North to 170 burrows at Hampton Hill. Likewise the population structure varied within each section, with the populations at Weld Range North and Hampton Hill regarded as growing populations, due to the higher numbers of emergents and juveniles to adults, which compared to the deficit of juveniles at the Madoonga and Wilgie Mia sections.. It was concluded that these two latter populations are in decline because of this deficit.

The effective population sizes were smallest for Beebyn ( $274 \pm 197$ ), Hampton Hill ( $439 \pm 126$ ) and Madoonga ( $642 \pm 250$ ), and it was concluded that they may be regarded as being in danger of genetic inbreeding if the population sizes decreased further. The population sizes at Weld Range North ( $1078 \pm 456$ ) and Wilgie Mia ( $2387 \pm 436$ ) were both considered well above the short-term and long-term requirements to maintain an effective population, although it was



cautioned that the deficit of juveniles at Wilgie Mia may impact upon that if it continues.

The genetic study conducted at Weld Range (Ecologia 2010) found significant population subdivision between the Weld Range South sites and the Weld Range North sites, no subdivision between the two Weld Range North sites and a small subdivision between the two Weld Range South sites. It was concluded that while distance does play a part in creating genetic distance, the geographical barrier (in this case a break in the range, likely created by a drainage line) separating Weld Range North and Weld Range South (indicated on Figure 3.1 as the line separating the Weld Range North and Beebyn sections) plays a very significant role. It was also suggested that as a similar geographical barrier exists at the southern end of Weld Range, separating Weld Range South and Hampton Hill (indicated on Figure 3.1 just to the east of the line separating the Hampton Hill and Madoonga sections), these populations will likely have a similar level of subdivision to that between Weld Range North and Weld Range South. Ecologia (2010) concluded that it is highly likely that there are three distinct populations at Weld Range (Hampton Hill, Weld Range South and Weld Range North) with little genetic variation within each population, likely due to the lack of geographical barriers.

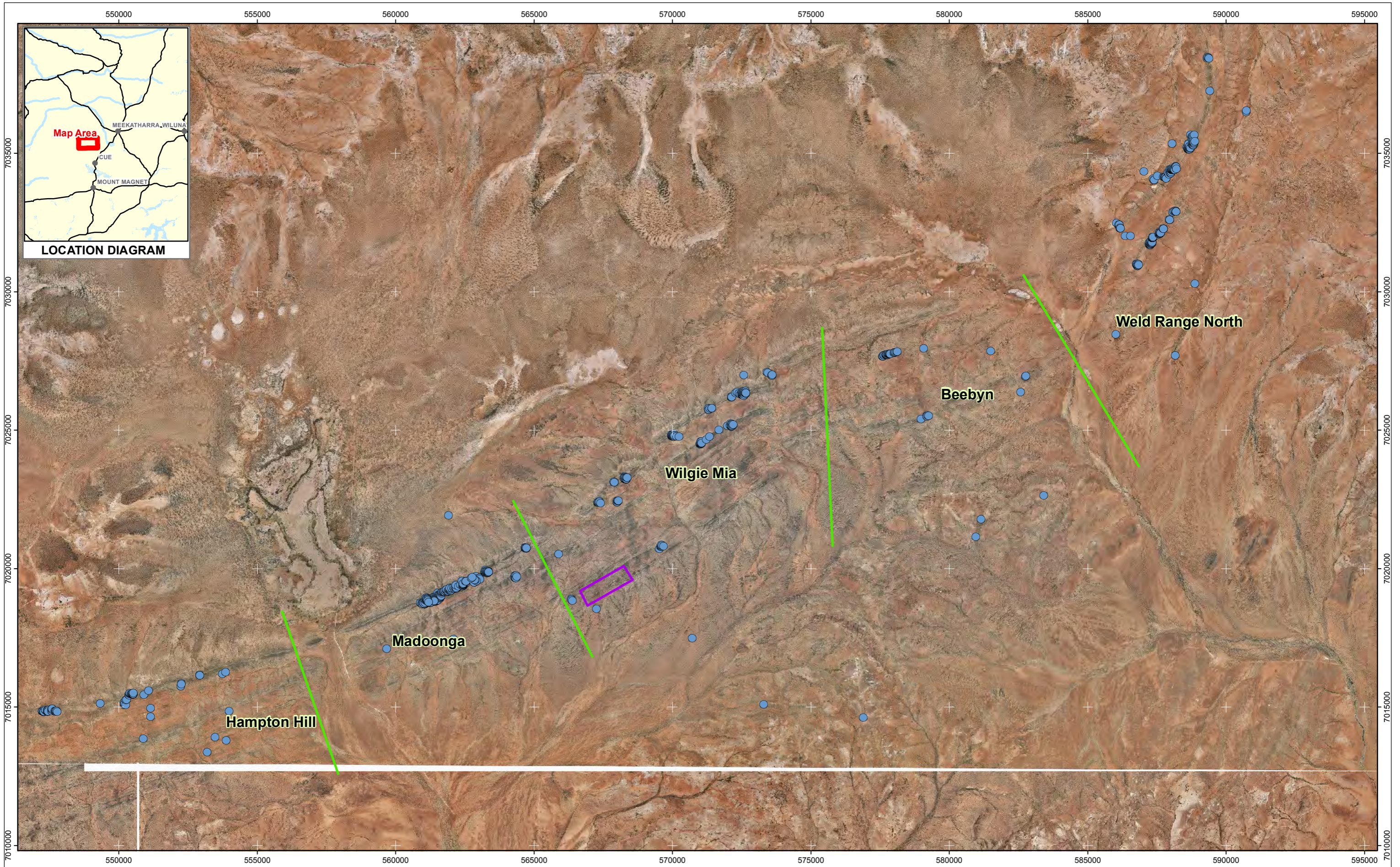
### 3.1.2 Bamford *Idiosoma nigrum* Survey

A total of 135 burrows (113 active) of *I. nigrum* were recorded in the *Study Area*, plus an additional ten burrows between quadrats (Figure 3.2). Of the 123 quadrats only 19 had active burrows recorded in them.

The majority of the burrows were recorded in the north-east section of the *Study Area*, largely confined to the mid and lower slopes of the adjacent valley and the valley floor within the drainage line. The majority of the burrows (90) were also found associated with *A. sp.* Weld Range and within floristic community FCT 8, described as: Open tall shrubland of *A. sp.* Weld Range (A. Markey & S.Dillon



2994) and *A. speckii* over open mid shrubland of *Eremophila mackinlayi* subsp. *spathulata* and mixed *Senna* spp. over open low shrubland of *Ptilotus obovatus* and *Heliotropium ovalifolium* over open low forbland of *Goodenia tenuiloba*, *Velleia glabrata* and *Ptilotus heliperoides*. Thirty nine burrows were recorded associated with *A. aneura*. Burrows were





also concentrated in areas of gravelly-loam soil and were not recorded in very rocky areas (generally upper slopes and crests) and areas with a lot of clay (lower slopes and plain).

The population structure recorded in the *Study Area* showed a higher number of emergent and juveniles to adults, suggesting a growing population. The extrapolated population size was determined as being 595 spiders/ha, based on the density in occupied areas and ignoring areas where spiders were not found. A conservative estimate of the amount of suitable habitat in the *Study Area* was set at 23%, based on 23% of the quadrats searched containing spiders. These figures were used to formulate a minimum population size in the *Study Area* of 14,994 spiders.

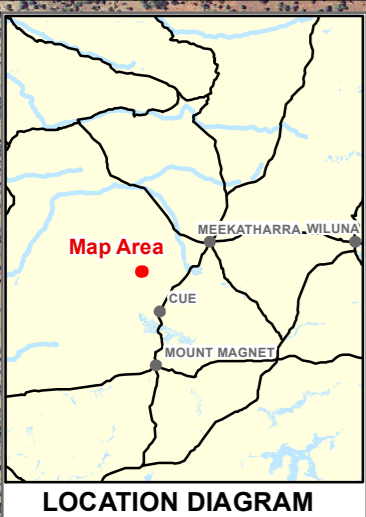
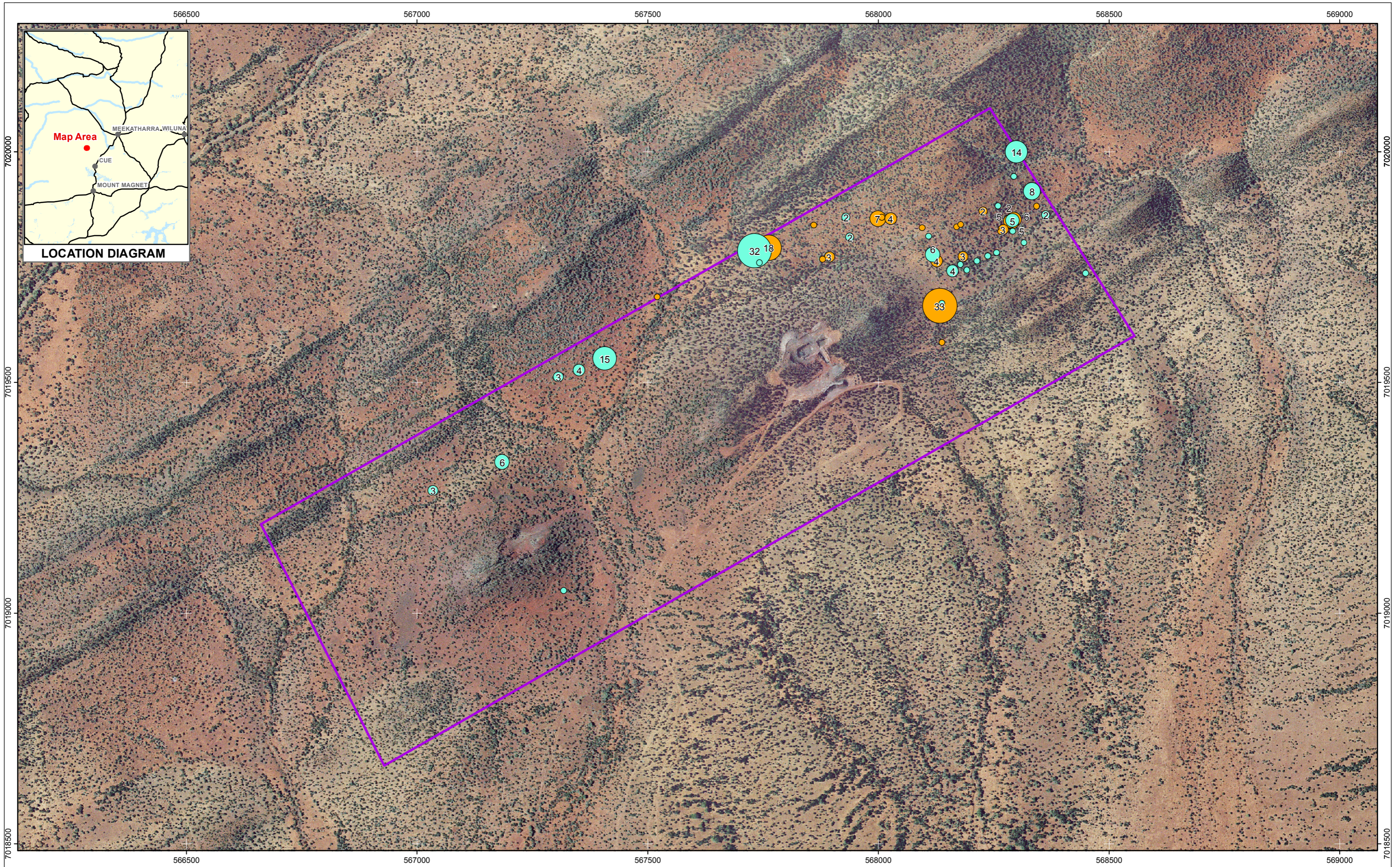
## 3.2 Biologic Survey Results and Discussion

### 3.2.1 Burrow Numbers and Occurrence

A total of 105 burrows of *I. nigrum* (104 active and 17 of those sealed) were recorded in the *Study Area* (Figure 3.2). The burrows were recorded in 23 distinct clusters in the *Study Area*, with 10 of these consisting of only one burrow and the two largest clusters consisting of 18 and 33 burrows. The average number of burrows in a cluster was 4-5 burrows (Table 3.1). The *Study Area* was divided into four sections based on the occurrence of *A. sp.* Weld Range (Figure 3.3); three separate sections where *A. sp.* Weld Range occurs (WR1, WR2 and WR3) and the remainder of the *Study Area* (Non-WR). The occurrence of each cluster in relation to these sections is also in Table 3.1).

**Table 3.1: Location and burrow numbers in each cluster.**

Cluster number	Easting	Northing	Burrow numbers	Vegetation section
Cluster 1	568138	7019587	1	Non-WR
Cluster 2	568134	7019666	33	WR3
Cluster 3	568343	7019882	1	WR3
Cluster 4	568290	7019847	5	WR3
Cluster 5	568294	7019853	6	WR3
Cluster 6	568288	7019851	2	WR3
Cluster 7	568286	7019849	5	WR3
Cluster 8	568271	7019831	3	WR3
Cluster 9	568265	7019827	1	WR3
Cluster 10	568184	7019773	3	WR3
Cluster 11	568127	7019763	4	WR3
Cluster 12	567894	7019772	3	WR3
Cluster 13	567879	7019767	1	WR3
Cluster 14	567521	7019685	1	WR2
Cluster 15	567763	7019792	18	WR3
Cluster 16	567860	7019841	1	WR3
Cluster 17	567999	7019855	7	WR3
Cluster 18	568008	7019858	1	WR3
Cluster 19	568027	7019855	4	WR3
Cluster 20	568095	7019835	1	WR3
Cluster 21	568170	7019837	1	WR3
Cluster 22	568179	7019842	1	WR3
Cluster 23	568227	7019871	2	WR3



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**Survey Results**

**Legend**

- Study Area
- Biologic (2011) *Idiosoma nigrum* cluster
- Bamford (2009) *Idiosoma nigrum* cluster

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Only one cluster (Cluster 1; consisting of one burrow) was found outside of floristic community FCT 8 (Non-WR). This was located on the southern slope in the *A. aneura* dominated community FCT 6b. This burrow was the only one recorded that used thin phyllodes (from *A. aneura*) for the twig lines of the trapdoor, all other burrows were associated with *A. sp.* Weld Range, which has wider phyllodes.

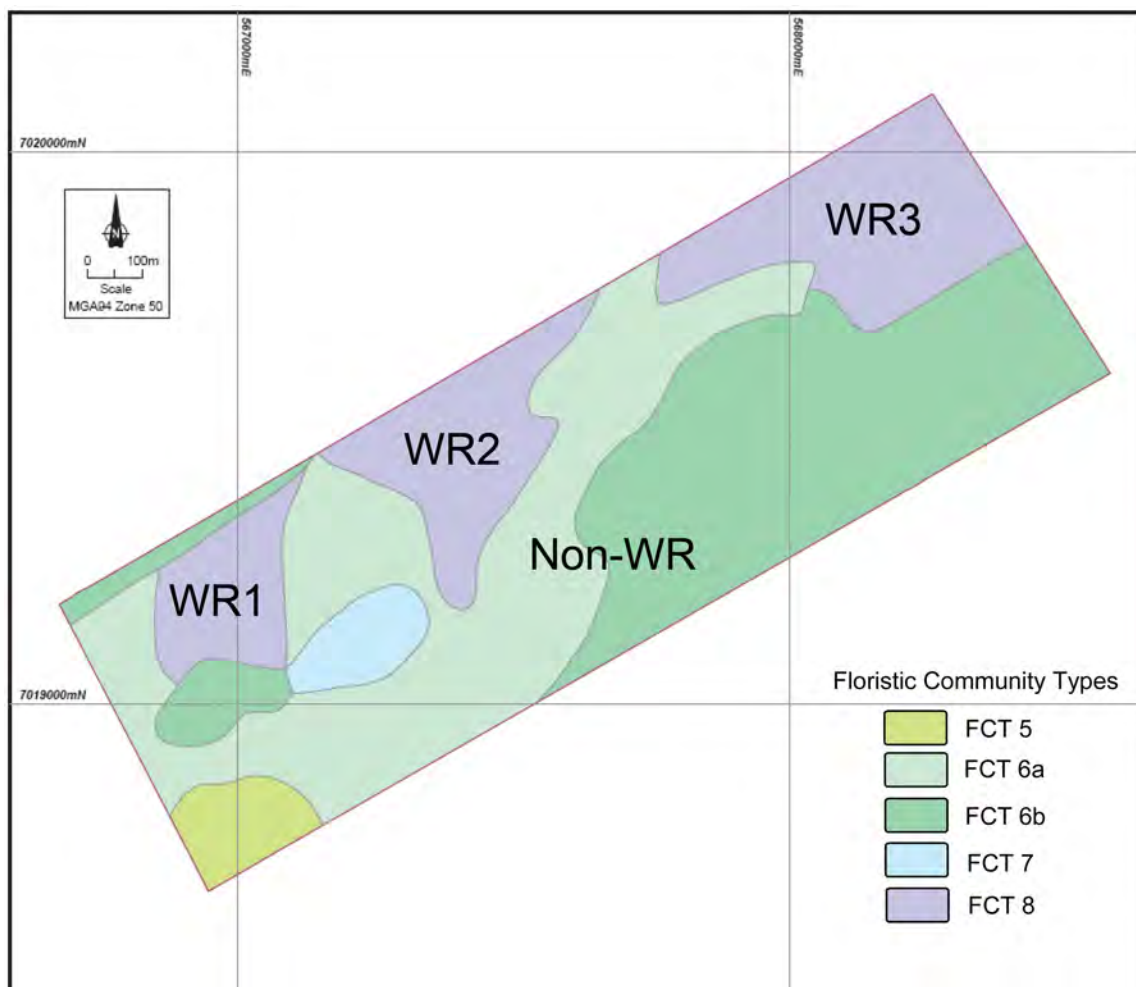
As well, the majority of burrows were recorded on the mid and lower slopes of the valley in the north-eastern part of the *Study Area*, and within the most eastern occurrence of FCT 8 (WR3) (Figure 3.2). There were three Clusters outside of this WR3;

- Cluster 1: as mentioned above, in Non-WR;
- Cluster 2: 33 burrows recorded on the boundary of FCT 8 (WR3), but on a flat, upper slope of the *Study Area*, separated from the remainder of WR3; and
- Cluster 14: 1 burrow within the central occurrence of FCT 8 (WR2), on the outskirts of the flat drainage area.

Floristic survey work conducted by Ecologia (2009c) across Weld Range appears to show two types of *A. sp.* Weld Range communities occurring alongside the *Study Area*, community 4a and 4b (Figure 3.4). It should be noted that this study does not cover the *Study Area* but does cover 75% of the boundary, allowing reasonable assumptions to be made, in conjunction with the vegetation surveys carried out by Woodman (2008) (Figure 3.3). Vegetation community 4a (*A. sp.* Weld Range and *A. aneura* var. *macrocarpa* open tall shrubland over *Eremophila macmillianiana* and mixed *Senna* spp. open shrubland over *Ptilotus obovatus* open low shrubland) borders much of the northern and western extent of the *Study Area* and is the dominant community throughout the range, interrupted largely by the stoney ridge tops (which are dominated by *A. aneura*) and drainage lines dominated by the second *A. sp.* Weld Range community (4b).



Figure 3.3: Vegetation Map of the Study Area; from Woodman (2008).



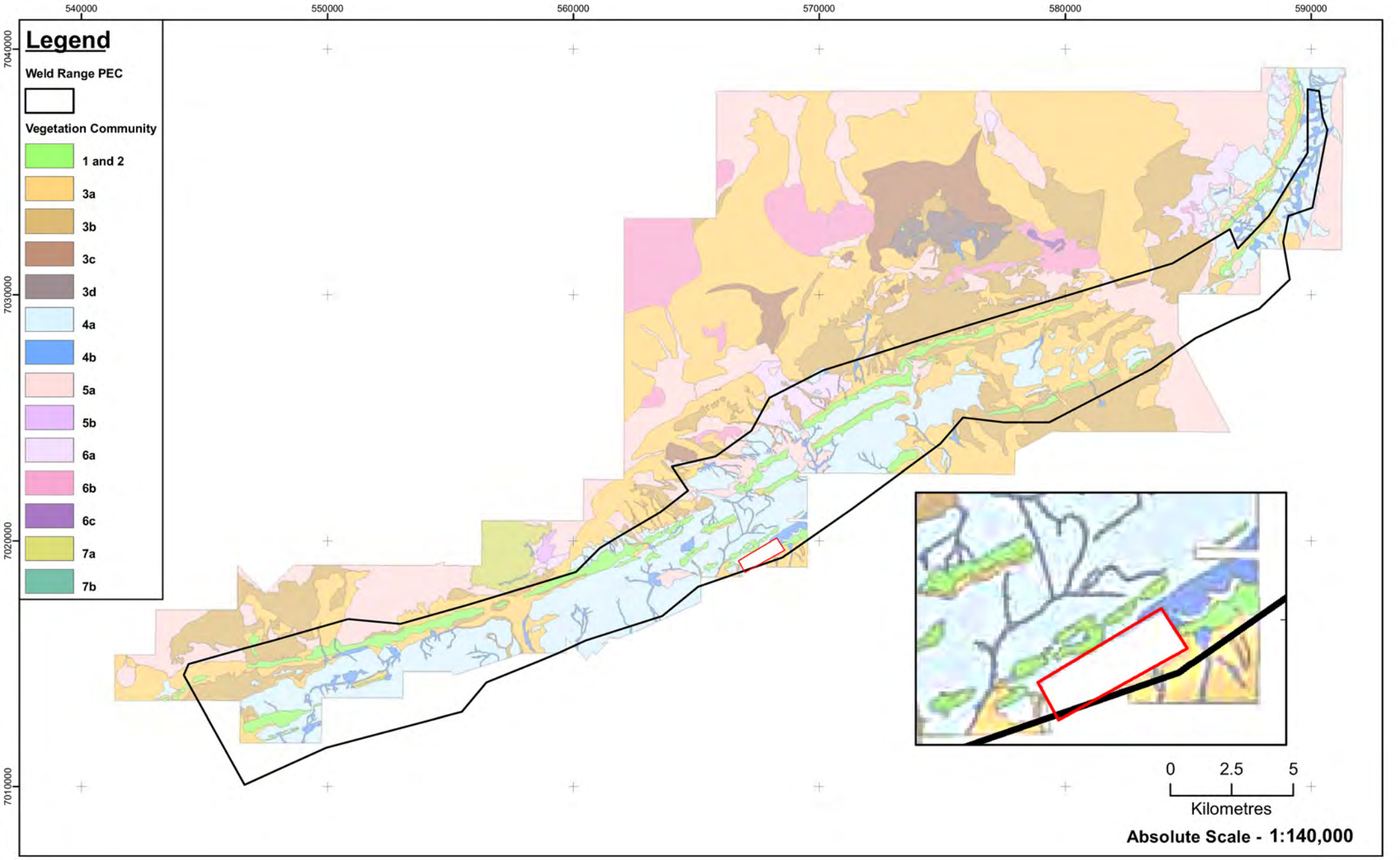
This latter community (4b: *A. sp.* Weld Range and *A. speckii* shrubland over mixed *Senna* spp. sparse shrubland over *Grevillea inconspicua* and *Dodonaea amplisemina* open shrubland over *Cymbopogon ambiguous* sparse tussock grassland) appears to be the one most closely connected to section WR3, where the dense *I. nigrum* population of the Study Area occurs. Community 4b is also found throughout Weld Range, although covering smaller areas and largely discontinuous with each other, compared to community 4a. Where community 4a connects with the Study Area, appears to be one of the larger continuous occurrences of this community on Weld Range (Figure 3.4). This indicates it is



very likely that the population of *I. nigrum*, in the north-eastern corner of the *Study Area*, continues for at least another two kilometres to the north-east, and that its occurrence in the *Study Area* is the edge of a large local population of at least 52ha (based on Ecologia's vegetation mapping). Using this data it appears likely that the burrows recorded in the *Study Area* constitute a maximum of 27% of this population.

### 3.2.2 Population Structure and Size

Based on the lumen measurements of non-sealed burrows (88 burrows) there were 17 emergent burrows, 16 juvenile burrows and 55 adult burrows, giving a ratio of 1:1 for emergent and juveniles, and less than 1:1 for non-adults and adults. This deficit of emergents and juveniles may indicate a declining population, which contrasts with Bamford (2009), which appeared to show a growing population. This difference is more likely an artefact of sampling, where the Bamford (2009) survey may have managed to record more emergent and/or juveniles due to a greater amount of survey time or greater intensity survey work within quadrats. Emergent burrows are also more easily seen just after they have burrowed into the ground, so this may have been a factor.





The size of the population within the *Study Area* was extrapolated from the available data and compared to the estimated population sizes given by Bamford (2009). The Bamford data were also subjected to the same extrapolation method as the Biologic data, to allow a direct comparison.

The three occurrences of FCT 8 are dealt with separately (WR1, WR2 and WR3) (Table 3.1 and Figure 3.3), due to the differences in population densities. The rest of the *Study Area* (Non-WR) is treated as likely to have the same density of burrows throughout.

**Table 3.2: Extrapolated population size for Bamford (2009) and Biologic (2011) data.**

	Bamford Data (2009)				Biologic Data (2011)		
	Total Area (ha) (A <sub>f</sub> )	Burrow Numbers (N <sub>s</sub> )	Search Area (ha) (A <sub>s</sub> )	Estimated. Burrow Numbers (N <sub>f</sub> )	Burrow Numbers (N <sub>s</sub> )	Search Area (ha) (A <sub>s</sub> )	Estimated. Burrow Numbers (N <sub>f</sub> )
WR1	6.38	3	0.228	84	0	0.134	0
WR2	8.2	22	0.286	631	1	0.132	62
WR3	13.68	88	0.582	2,069	103	0.350	4,025
Non-WR	80.74	8	2.350	275	1	1.681	48
<b>Total</b>	<b>109</b>	121	3.446	<b>3,059</b>	105	2.297	<b>4,135</b>

The estimated population sizes for the *Study Area* vary between the two data sets (3,059 for the Bamford data and 4,135 for the Biologic data) but are both much lower than the original Bamford estimate (14,994 spiders) (Table 3.1). This difference is largely due to the original Bamford estimate being based on a more



generalised approach, where all favourable habitat was treated as having the same density of active burrows, which both sets of survey data clearly show is not the case.

Using the Biologic population data, and the extrapolated area of vegetation community 4b adjoining the *Study Area* (as discussed in Section 3.2.1), it is estimated that the population of *I. nigrum* connected to, and occurring in, the *Study Area* is around 14,907 spiders, of which 27% occurs within the *Study Area*.

Beyond this it appears likely that the *Study Area* population is part of the Central Weld Range population, as identified by Ecologia (2010).



#### 4 CONCLUSIONS

The work that has been carried out in the *Study Area* shows that the majority of the *I. nigrum* population occurring within the *Study Area* is concentrated in the north-eastern corner. This area is dominated by a vegetation community of predominantly *A. sp. Weld Range*, which also occurs in two other sections in the *Study Area*. The other two occurrences of this population have much lower densities of spiders, likely owing to increased disturbance and exposure. Results from the flora survey work conducted by Ecologia (2009c) shows it is likely that these two vegetation community (4a) occurrences are a different type of *A. sp. Weld Range* community to that in the north-eastern corner (community 4b).

Vegetation community results from Ecologia (2009c) also show it is highly likely that this north-eastern occurrence of *A. sp. Weld Range* extends well beyond the *Study Area*, which also illustrates the high level of connectivity between the *Study Area* and the rest of Weld Range. The genetic work on *I. nigrum*, conducted by Ecologia (2010), demonstrates that gene flow within the central part of Weld Range (which includes the *Study Area*) is largely uninterrupted, indicating dispersal between individuals within this area.

The *I. nigrum* population in the *Study Area* is quite dense, compared to others in Weld Range, and is comparable to Weld Range North. The population age class structure conflicts with the Bamford (2009) data that described a growing population, while the Biologic data showed a stable, or potentially declining, population, but sampling differences between the two surveys may explain this difference. Given the lack of disturbance in the area, and the robust size and density of the population, it is more likely that it is growing rather than declining.

The *Study Area* contains approximately 4,135 burrows (extrapolated from 105 active burrows) and is part of a local *I. nigrum* population of approximately 14,907 burrows that continues to the north-east of the *Study Area*. This is largely



based on what appears to be a close association with *A. sp.* Weld Range. The vegetation survey and genetic work by Ecologia (2009c and 2010 respectively) also show that this local population is likely to be part of the greater Central Weld Range population, as identified by Ecologia (2010).

The loss of the *I. nigrum* community within the *Study Area* would be unlikely to affect the long term viability of the local *I. nigrum* population (which would be reduced by approximately 27%) due to the size and connectivity of the population outside the *Study Area*, both at a local population level and as part of the Central Weld Range population.





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**Appendix A: *Idiosoma nigrum* burrow data (Biologic 2012)**

Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 01	active	568138	7019587	25.7	17.7	<i>Acacia aneura</i>	Thin ( <i>Acacia aneura</i> )
Cluster 02	inactive	568134	7019666	18.9		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568134	7019666	14.7	10.2	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568134	7019666	26	17.7	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568134	7019666	12.5	11.7	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568134	7019666	14.4	11.8	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568134	7019666	14.1	10.4	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568134	7019666	16.5	11.4	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 02	active	568134	7019666	23.9	17.7	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568139	7019663	23.7	18.2	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568139	7019663	23.8	18.6	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568139	7019663	12.2	7.7	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568139	7019663	27.2	18.7	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568133	7019664	21.8	16.7	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568133	7019664	30	22.6	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568133	7019664	15.3	9.1	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 02	active	568133	7019664	14.1	11.8	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568133	7019664	10.9	8.1	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	sealed	568133	7019660	8.2		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	sealed	568133	7019660	6.7		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568133	7019660	25.1	19.1	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	sealed	568133	7019660	10		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568131	7019658	12.6	7.9	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568127	7019658	17.7	11.3	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 02	active	568127	7019658	16.6	12.3	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568127	7019658	25.2	16.8	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568133	7019657	24.8	17.2	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	sealed	568133	7019657	9.7		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568133	7019657	16.1	13	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568133	7019657	23.6	18.3	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568133	7019657	25.9	17.4	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568133	7019657	25.2	18.4	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 02	sealed	568135	7019656	7.6		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 02	active	568135	7019656	15	9.6	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 03	active	568343	7019882	27.8	17.4	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 04	active	568290	7019847	25.6	17.9	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 04	active	568290	7019847	16.4	12.2	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 04	active	568290	7019847	22.8	17.6	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 04	active	568290	7019847	13.6	10.5	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 04	active	568290	7019847	20.6	17.3	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 05	active	568294	7019853	24.4	17.9	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 05	active	568294	7019853	15	11.7	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 05	active	568294	7019853	24	19	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 05	active	568294	7019853	24.9	18.8	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 05	active	568294	7019853	26.7	19.7	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 05	sealed	568294	7019853	16.8		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 06	active	568288	7019851	19.8	13.7	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 06	sealed	568288	7019851	20.6		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)





Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 07	active	568286	7019849	23.6	18.1	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 07	active	568286	7019849	12.4	8.6	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 07	sealed	568286	7019849	12.5		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 07	active	568286	7019849	22.6	17.4	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 07	active	568286	7019849	11.8	8.5	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 08	active	568271	7019831	24.1	18.1	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 08	active	568271	7019831	11.7	7.2	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 08	active	568271	7019831	22.6	16.6	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 09	sealed	568265	7019827	11.2		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 10	sealed	568184	7019773	28.2		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 10	sealed	568184	7019773	14.7		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 10	active	568184	7019773	18.9	12.9	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 11	active	568127	7019763	25.5	18.6	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 11	sealed	568127	7019763	20.3		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 11	active	568127	7019763	12.1	8.1	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 11	active	568127	7019763	27.3	18.2	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 12	active	567894	7019772	20.8	16.4	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 12	active	567894	7019772	25.8	19	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 12	active	567894	7019772	26	19.6	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 13	active	567879	7019767	21.5	14.2	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 14	active	567521	7019685	25.3	18.3	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	26.1	20	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	22	18.5	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	24.3	21.1	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 15	active	567763	7019792	17.8	11.5	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	9.8	7.5	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	11	8.2	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	sealed	567763	7019792	12.4		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	11.5	8.9	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	23.8	18.6	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	sealed	567763	7019792	12		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	sealed	567763	7019792	18.9		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 15	sealed	567763	7019792	18.5		<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	23.1	14.9	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	12.1	7.1	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	22	17.6	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	13.9	12.4	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	24.7	18.1	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 15	active	567763	7019792	25.3	23.3	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 16	active	567860	7019841	25.9	19.7	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 17	active	567999	7019855	26.7	25.1	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 17	active	567999	7019855	25.3	19.4	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 17	active	567999	7019855	14.4	8.9	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 17	active	567999	7019855	28.7	25.7	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 17	active	567999	7019855	23.8	17.9	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 17	active	567999	7019855	22.9	21.9	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 17	active	568008	7019858	22.8	21.1	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 18	active	568008	7019858	22.8	17.6	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 19	active	568027	7019855	22.5	20.5	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 19	active	568027	7019855	25.7	23.3	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 19	active	568027	7019855	28.1	23.1	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 19	active	568027	7019855	17.8	14.5	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 20	active	568095	7019835	24.2	18.9	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 21	active	568170	7019837	24.5	18.6	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 22	active	568179	7019842	24.3	18.2	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)
Cluster 23	active	568227	7019871	22.1	16	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



Cluster	Activity	Easting	Northing	External diameter (lid) (mm)	Internal diameter (lumen) (mm)	Vegetation type	Phyllode type
Cluster 23	sealed	568227	7019871	25.9	18	<i>Acacia</i> sp. Weld Range	Thick ( <i>Acacia</i> sp. Weld Range)



# BEEBYN-W11 IRON ORE PROJECT TARGETED BIOLOGICAL SURVEY

**JULY 2024**

Revision 0



Prepared by  
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## CONTENTS

1.0	Introduction.....	1
2.0	Existing Environment.....	4
2.1	Climate.....	4
2.2	Interim Biogeographic Regionalisation for Australia.....	5
2.3	Flora and Vegetation .....	5
2.3.1	Flora .....	5
2.3.2	Vegetation.....	9
2.4	Fauna .....	13
2.4.1	Fauna habitat .....	14
3.0	Methodology .....	18
3.1	Personnel.....	18
3.2	Desktop review.....	18
3.3	Field survey.....	18
3.4	Limitations .....	19
4.0	Results .....	21
4.1	Flora.....	21
4.1.1	<i>Beyeria lapidicola</i> – Priority 1 .....	25
4.1.2	<i>Euphorbia sarcostemmoides</i> – Priority 1 .....	26
4.1.3	<i>Stenanthemum mediale</i> – Priority 1 .....	26
4.1.4	<i>Micromyrtus placoides</i> – Priority 3 .....	27
4.1.5	<i>Prostanthera petrophila</i> – Priority 3 .....	29
4.1.6	<i>Verticordia jamiesonii</i> – Priority 3.....	30
4.1.7	<i>Acacia speckii</i> – Priority 4.....	30
4.1.8	Other species of interest.....	31
4.2	Vegetation .....	31
4.3	Fauna and habitat.....	54
4.3.1	Shield-backed trapdoor spider.....	54
4.3.2	Malleefowl .....	57
5.0	Discussion .....	59
5.1	Flora and vegetation.....	59
5.2	Fauna and habitat.....	59
6.0	References .....	61

## FIGURES

Figure 1.1: The Beebyn W11 Project location.....	2
Figure 1.2: The proposed layout of the Beebyn W11 Project.....	3
Figure 2.1: Climatic data for the project area.....	4
Figure 2.2: Rainfall data for the project area during 2024. ....	5
Figure 2.3: Previously recorded Priority flora locations within the proposed Beebyn-W11 project area. ....	7
Figure 2.4: Previous Priority flora records within the proposed Beebyn-W11 infrastructure area. ....	8
Figure 2.5: Previously recorded vegetation types associated with the project area. ....	11
Figure 2.6: Previously recorded vegetation types associated with the infrastructure area.....	12
Figure 2.7: Database search records of conservation significant fauna within 30 km of the project area. ....	16
Figure 2.8: Fauna habitat in the project area (APM 2023). ....	17
Figure 4.1: Priority flora recorded during the survey - overview. ....	22
Figure 4.2: Priority flora recorded during the survey – mine area. ....	23
Figure 4.3: Track logs of the survey area. ....	24
Figure 4.4: Vegetation mapping survey points. ....	38
Figure 4.5: Vegetation types mapped within the survey area – map 1 of 14.....	39
Figure 4.6: Vegetation types mapped within the survey area – map 2 of 14.....	40
Figure 4.7: Vegetation types mapped within the survey area – map 3 of 14.....	41
Figure 4.8: Vegetation types mapped within the survey area – map 4 of 14.....	42
Figure 4.9: Vegetation types mapped within the survey area – map 5 of 14.....	43
Figure 4.10: Vegetation types mapped within the survey area – map 6 of 14.....	44
Figure 4.11: Vegetation types mapped within the survey area – map 7 of 14.....	45
Figure 4.12: Vegetation types mapped within the survey area – map 8 of 14.....	46
Figure 4.13: Vegetation types mapped within the survey area – map 9 of 14.....	47
Figure 4.14: Vegetation types mapped within the survey area – map 10 of 14.....	48
Figure 4.15: Vegetation types mapped within the survey area – map 11 of 14.....	49
Figure 4.16: Vegetation types mapped within the survey area – map 12 of 14.....	50
Figure 4.17: Vegetation types mapped within the survey area – map 13 of 14.....	51
Figure 4.18: Vegetation types mapped within the survey area – map 14 of 14.....	52
Figure 4.19: Vegetation types mapped within the survey area – vegetation descriptions. ....	53
Figure 4.19: Locations of <i>Idiosoma clypeatum</i> burrows recorded during the survey. ....	56
Figure 4.20: Locations of Malleefowl mounds recorded during the survey.....	58

## TABLES

Table 2.1: Conservation significant flora recorded and potentially occurring in the project area.....	6
Table 2.2: Vegetation types identified in the project area. ....	10
Table 2.3: Fauna habitat recorded in the study area.....	14
Table 2.4: Conservation significant fauna likelihood of occurrence.....	15
Table 3.1: Study limitations. ....	19
Table 4.1: Priority flora recorded during the survey.....	21
Table 4.3: Vegetation types recorded during the survey. ....	32

## APPENDICES

**Appendix 1:** Conservation codes for Western Australian flora and fauna

**Appendix 2:** Flora species recorded during the survey

**Appendix 3:** Vegetation site descriptions

## 1.0 INTRODUCTION

Fenix Beebyn Pty Ltd (Fenix) is proposing to develop the Beebyn-W11 Iron Ore Project (the Project), approximately 600 km north-east of Perth and 85 km south-west of Meekatharra in the Mid-West Region of Western Australia (Figure 1.1 and Figure 1.2).

Sinosteel Midwest Corporation Limited (SMC) is the registered holder of Mining Lease 51/869. In October 2023, Fenix signed a binding agreement with SMC securing the exclusive right to mine and export up to 10 million dry metric tonnes of iron ore from the high-grade Beebyn-W11 iron ore deposit in the Weld Range (Fenix 2023).

Flora and fauna surveys have been completed in and around the project area and the wider Weld Range. The project area and surrounds have been quite extensively covered by prior biological surveys. The most recent survey, undertaken by Animal Plant Mineral (APM) in November 2023, included flora and vegetation and basic terrestrial fauna survey of most of the project area (APM 2024); however, did not cover the full project area due to revisions of the proposed disturbance footprint after that survey was completed.

Prior to the APM survey, Ecologia Environment Pty Ltd (*ecologia*) conducted Level 2 flora and vegetation surveys of the project area and surrounds between 2006 and 2009 (*ecologia* 2010a); as well as a targeted conservation significant flora survey of exploration drilling in the area.

Fenix engaged Ecotec (WA) Pty Ltd (Ecotec) to undertake a targeted flora, vegetation and fauna habitat survey of the project area. The purpose of the survey was to:

- undertake a targeted survey for conservation significant flora and fauna habitat within the project area
- confirm the presence and identity of *Hibiscus ?krichauffianus*
- refine the vegetation mapping as defined by APM (2024) and *ecologia* (2010a)
- undertake a targeted survey for *Idiosoma clypeatum* burrows within the project area
- refine the fauna habitat mapping as defined by APM (2024)
- prepare a report outlining the findings of the assessment.

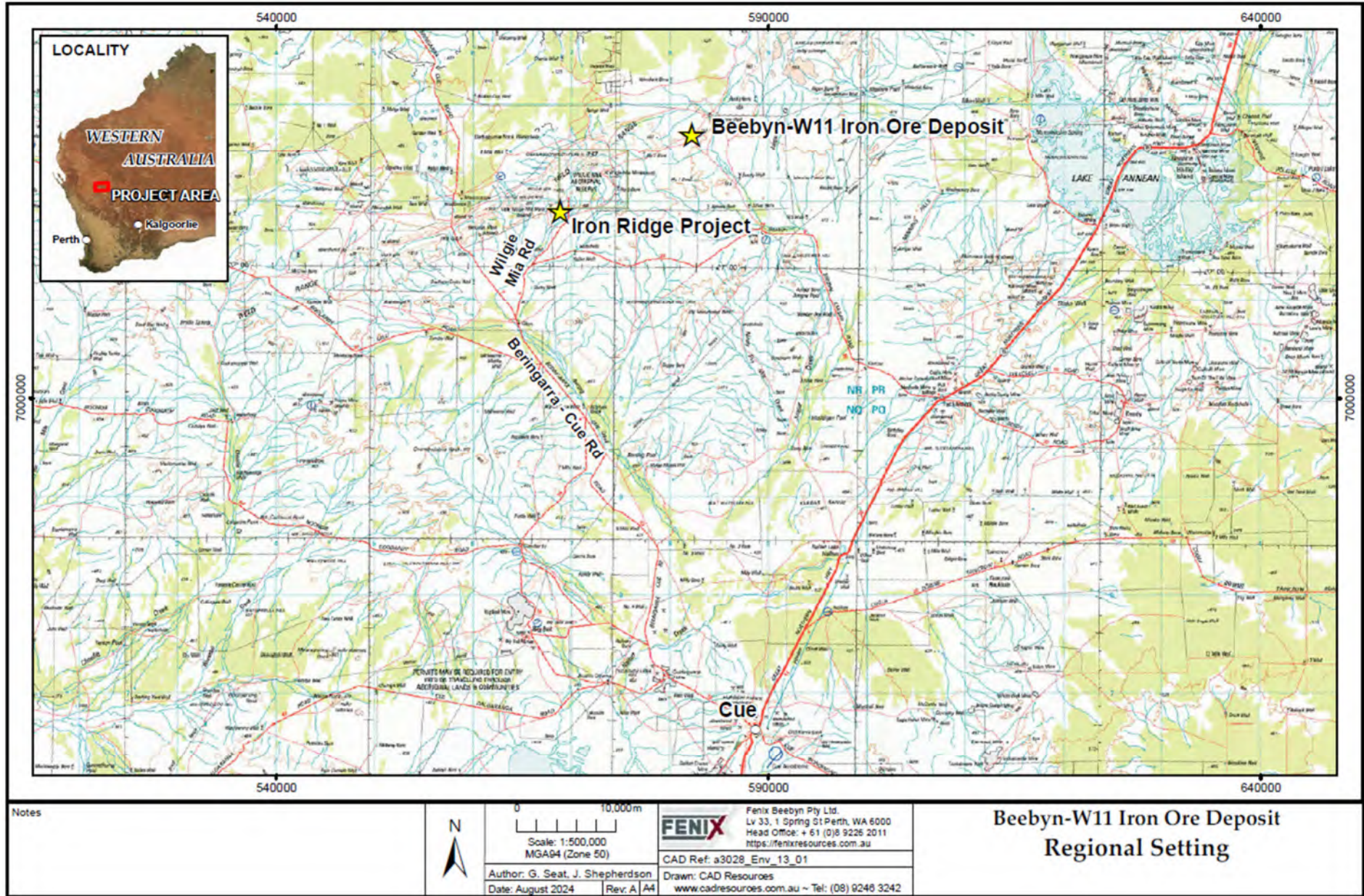


Figure 1.1: The Beebyn W11 Project location.

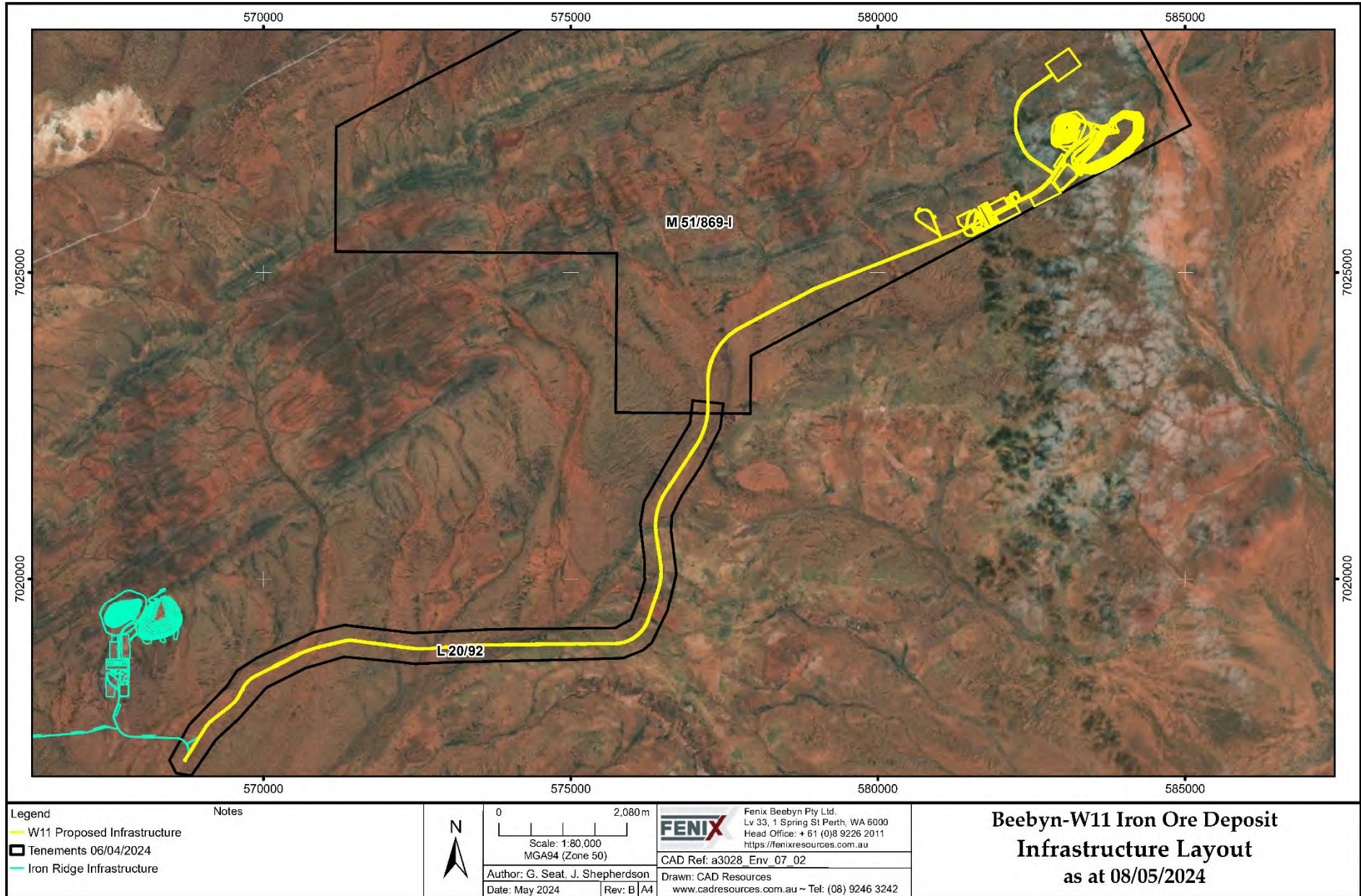


Figure 1.2: The proposed layout of the Beebyn W11 Project.

## 2.0 EXISTING ENVIRONMENT

### 2.1 Climate

The Project is located in the arid climatic region of Western Australia, characterised by low rainfall and high evaporation. According to the Bureau of Meteorology (BoM), the mean maximum daily temperature in Meekatharra (approximately 73 km north-east of the Project area) is 36.7°C, with a mean minimum daily temperature of 22.3°C. The hottest month is January, with a mean maximum temperature of 38.4°C. The coldest month is July with a mean minimum temperature of 7.5°C and a mean maximum of 19.3°C.

The mean annual rainfall (1948 – 2023) at Meekatharra Airport (BoM weather station # 7045) is 232.2 mm. Average annual evaporation ranges from 2800 mm to 3200 mm (BoM 2024).

Figure 2.1 provides climatic data relevant to the project area (BoM 2024).

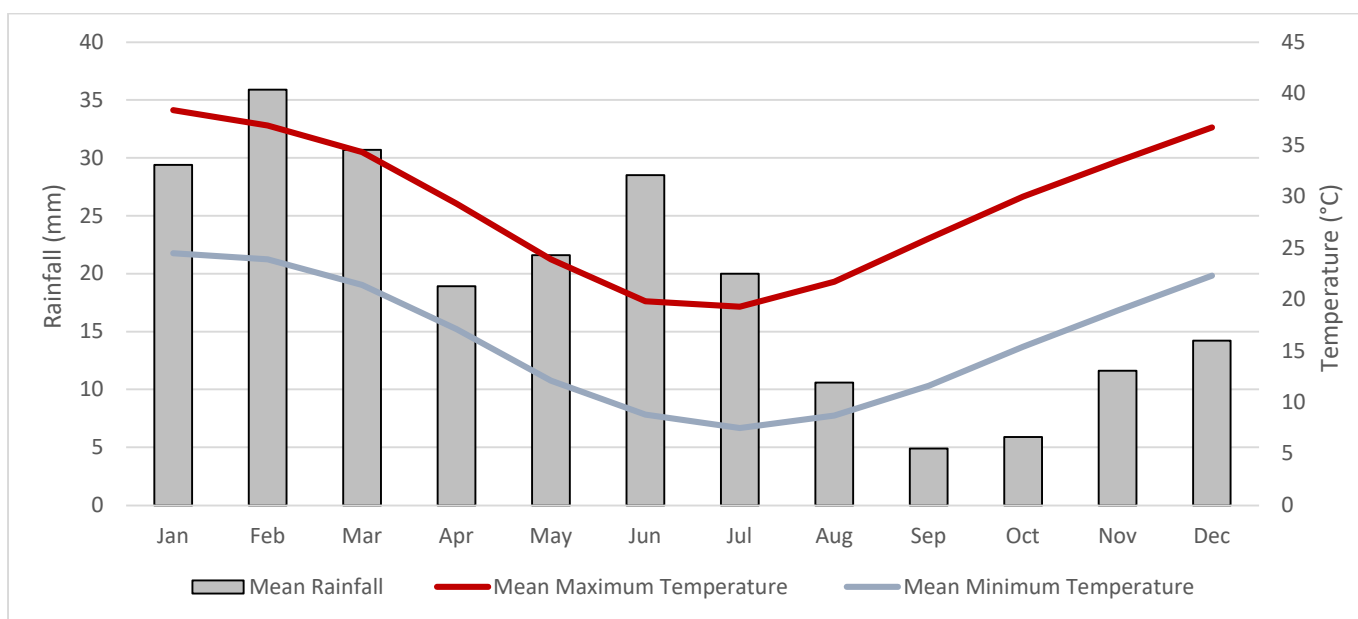


Figure 2.1: Climatic data for the project area.

Rainfall recorded during 2024 up to the time of survey is presented in Figure 2.2. A total of 196 mm of rainfall was recorded to July 2024, marginally above the long term average of 185.2 mm for the same period.

Annual rainfall had been well below the mean from 2019-2021 resulting in widespread die off of vegetation across the region. Rainfall in 2022 was above average and then marginally below average in 2023, however the rainfall patterns were not typical, with much of the rainfall occurring at different times to usual. 2024 appears to be following this atypical rainfall pattern with higher than usual rainfall during the winter months.



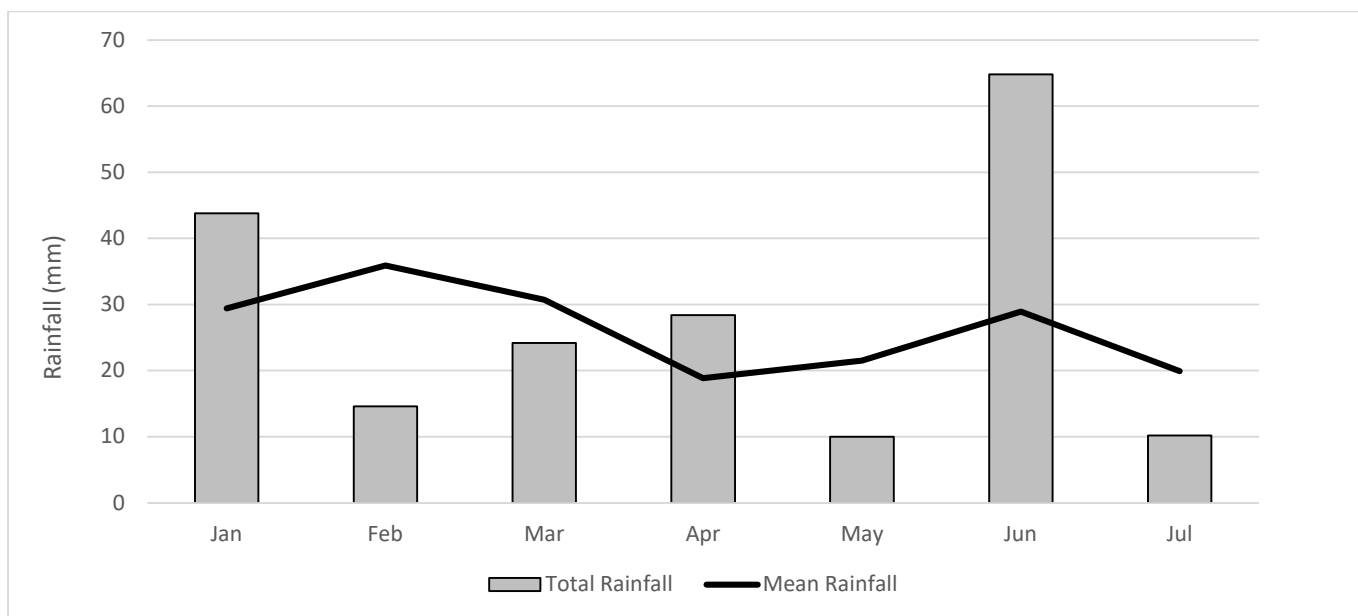


Figure 2.2: Rainfall data for the project area during 2024.

## 2.2 Interim Biogeographic Regionalisation for Australia

The Interim Biogeographic Regionalisation for Australia (IBRA) classifies the Australian continent into regions or bioregions on the basis of similar geology, landform, vegetation, fauna and climate characteristics. The project area is situated within the Murchison Bioregion according to IBRA 7 and is situated in the Western Murchison subregion (MUR2), close to the boundary of the Eastern Murchison subregion (MUR1).

The MUR2 subregion is described by Desmond et. al. (in DAWE 2019) as follows:

*“Mulga low woodlands, often rich in ephemerals (usually with bunch grasses), on outcrop and fine textured Quaternary alluvial and eluvial surfaces (extensive hardpan wash plains that dominate and characterise the subregion) mantling granitic and greenstone strata of the northern part of the Yilgarn Craton. Surfaces associated with the occluded drainage occur throughout with hummock grasslands on Quaternary sandplains, saltbush shrublands on calcareous soils and Halosarcia low shrublands on saline alluvia. Contains the headwaters of the Murchison and Wooramel Rivers, which drain the subregion westwards to the coast. Arid climate with bimodal rainfall that usually falls in winter. The subregional area is 7,847,996 ha.”* (DAWE 2019b).

The West Murchison subregion is in the northern end of the Yilgarn Craton, which experiences an arid climate with bimodal rainfall that usually falls in the winter months. The Western Murchison subregion is characterised by Mulga low woodlands on outcrop and fine textured Quaternary alluvial and eluvial surfaces mantling granitic and greenstone strata (Desmond et al. 2001, in DAWE 2019). Quaternary plains contain hummock grasslands, saltbush shrublands on calcareous soils and *Halosarcia* low shrublands on saline alluvia.

## 2.3 Flora and Vegetation

### 2.3.1 Flora

Previous database searches indicate that a total of 28 conservation significant flora taxa have been recorded within a 30 km area around the project site. The database search results indicate that no Threatened flora species have been recorded in the area. Definitions of the conservation codes used in the table are included as Appendix 1.

The surveys undertaken by *ecologia* recorded 393 vascular flora taxa from 57 families and 140 genera within the Beebyn-W11 area and surrounding region; including six introduced species and 24 Priority listed flora species, as listed by the Department of Biodiversity and Conservation (DBCA).

No Threatened species were recorded (*ecologia* 2010a).

APM (2024) recorded 77 vascular flora taxa from 21 families and 40 genera. The reduction in taxa recorded when compared to the earlier surveys is due to timing of the survey, the region having been in drought conditions for several years and the prevalence of goats, which have had a significant impact on the vegetation.

No Threatened species were recorded; however, a single potential record of the Priority 3 listed species *Hibiscus krichauffianus* was recorded. Due to seasonal conditions, insufficient material was available to definitively determine the species. *Hibiscus krichauffianus* is common in the central parts of Australia and the Queensland mid coast. The nearest known record is approximately 250 km south west of the project area, with most records in WA from the Pilbara. The species has not previously been recorded in the Murchison Region (APM 2024).

Table 2.1 provides a summary of the conservation significant flora recorded during survey work, as well as those species considered to be possible inhabitants of the immediate project area. Species that were considered as unlikely to occur following the survey by APM (2024) are not included in this summary table.

**Table 2.1: Conservation significant flora recorded and potentially occurring in the project area.**

Species	Conservation Status	Likelihood of occurrence
<i>Acacia dilloniorum</i>	P1	Possible – suitable habitat exists in the project area, no known records in immediate vicinity.
<i>Beyeria lapidicola</i>	P1	Recorded ( <i>ecologia</i> 2010b)
<i>Euphorbia sarcostemmoides</i>	P1	Possible – suitable habitat exists in the project area
<i>Stenanthemum mediale</i>	P1	Possible - suitable habitat exists in the project area, no known records in immediate vicinity.
<i>Stenanthemum patens</i>	P1	Recorded ( <i>ecologia</i> 2010b)
<i>Acacia burrowsiana</i>	P3	Possible – suitable habitat exists in the project area
<i>Hemigenia virescens</i>	P3	Possible - suitable habitat exists in the project area, no known records in immediate vicinity.
<i>Hibiscus ?krichauffianus</i>	P3	Tentative record (APM 2024)
<i>Homalocalyx echinulatus</i>	P3	Possible - suitable habitat exists in the project area, previous records in immediate vicinity ( <i>ecologia</i> 2010b)
<i>Micromyrtus placoides</i>	P3	Recorded ( <i>ecologia</i> 2010b)
<i>Prostanthera petrophila</i>	P3	Recorded ( <i>ecologia</i> 2010b)
<i>Sauropus</i> sp. Woolgorong (M. Officer s.n. 10/8/94)	P3	Possible - suitable habitat exists in the project area, no known records in immediate vicinity
<i>Tribulus adelacanthus</i>	P3	Possible - previous records known from the Northern extent of the Weld Range
<i>Verticordia jamiesonii</i>	P3	Recorded ( <i>ecologia</i> 2010b)
<i>Acacia speckii</i>	P4	Recorded ( <i>ecologia</i> 2010b)
<i>Dodonaea amplisemina</i>	P4	Recorded ( <i>ecologia</i> 2010b)
<i>Grevillea inconspicua</i>	P4	Possible - suitable habitat exists in the project area, no known records in immediate vicinity.

The distribution of Priority species recorded historically and in the APM (2024) survey in relation to the proposed development infrastructure is shown on Figure 2.3 and Figure 2.4.

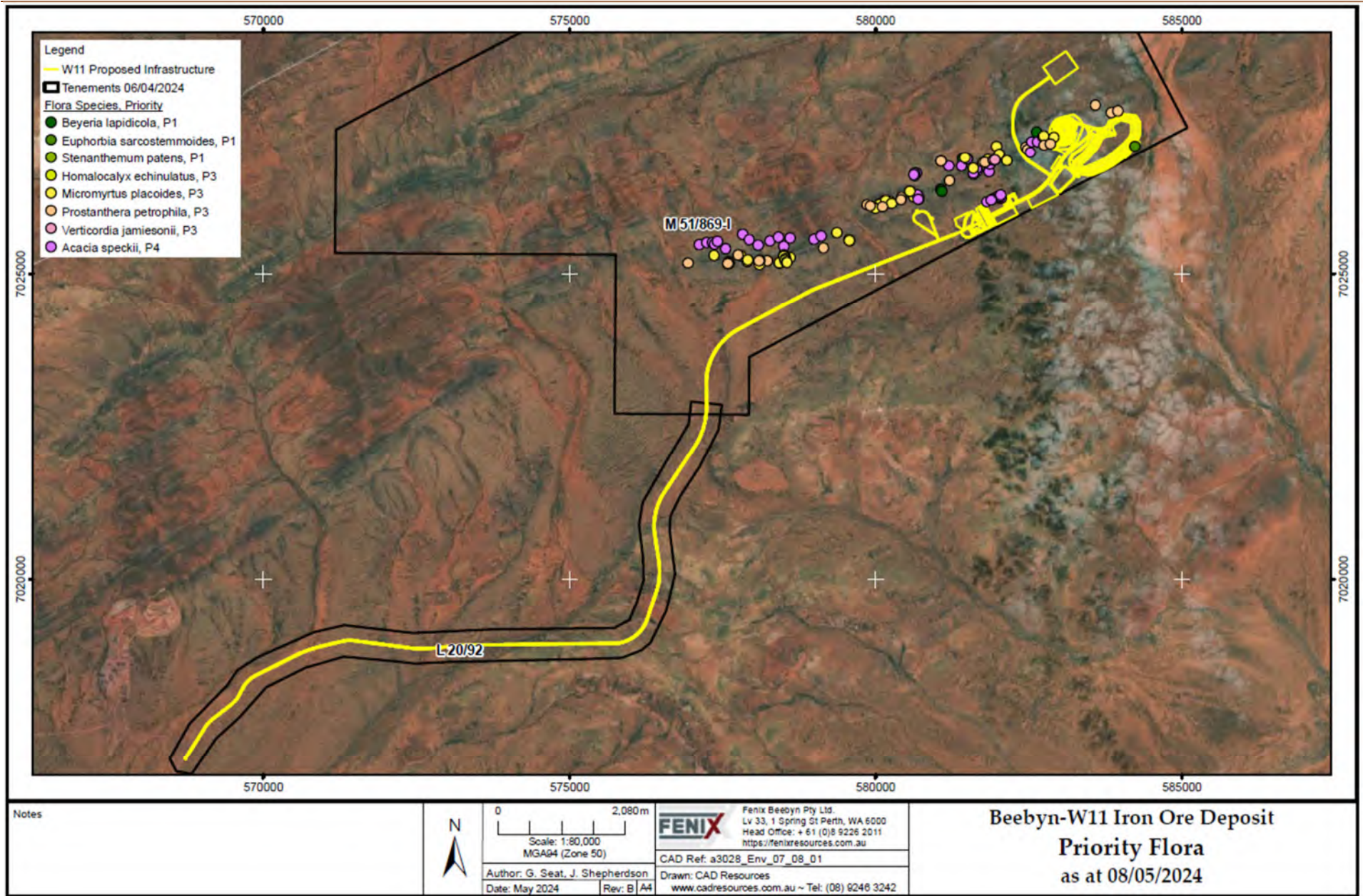


Figure 2.3: Previously recorded Priority flora locations within the proposed Beebyn-W11 project area.

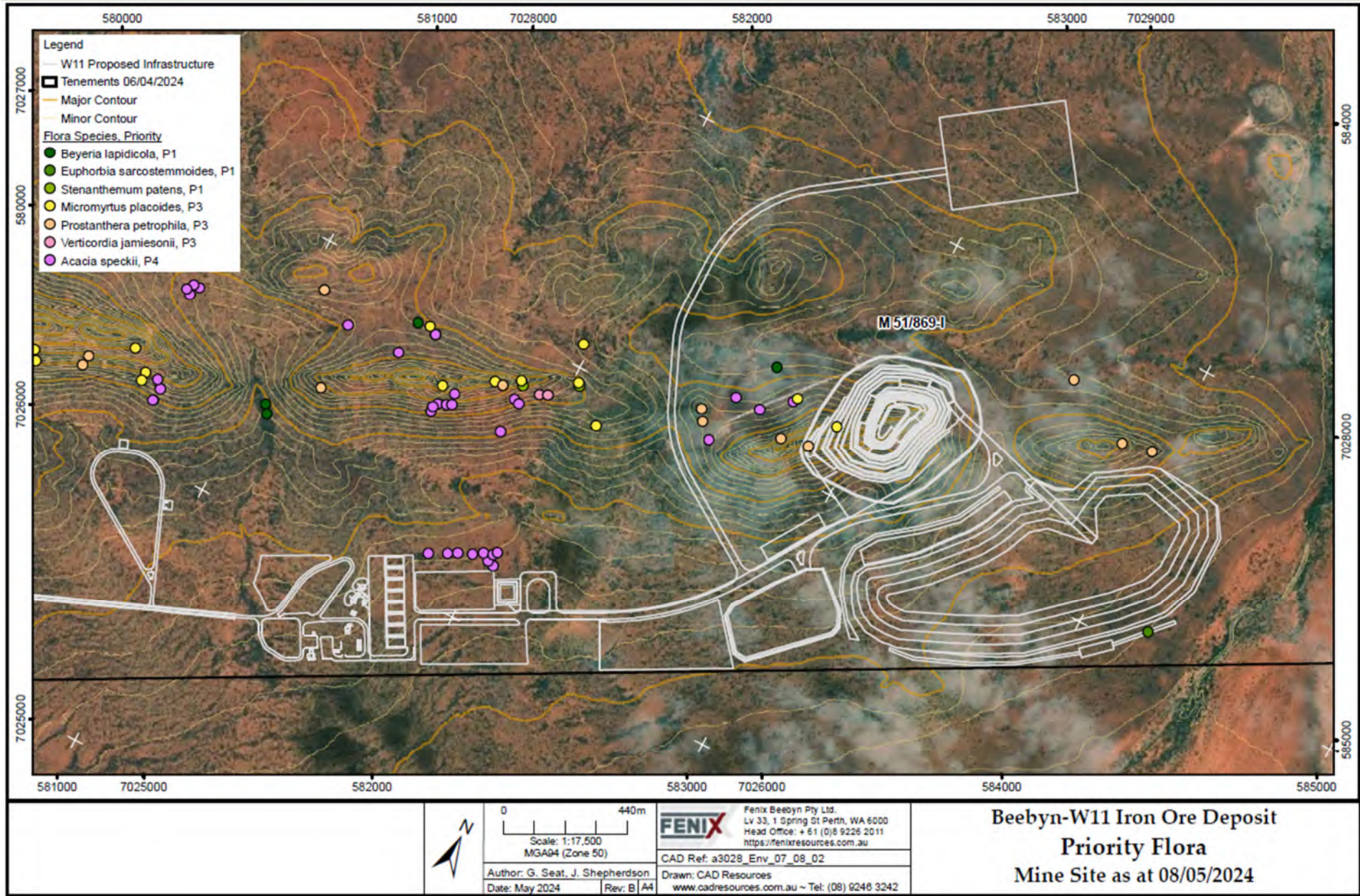


Figure 2.4: Previous Priority flora records within the proposed Beebyn-W11 infrastructure area.

### 2.3.2 Vegetation

APM (2024) recorded three vegetation types within the project area, which generally corresponded with the floristic communities described by Markey and Dillon (2008) and *ecologia* (2009a). The vegetation types described in the APM report are listed in Table 2.2 and have been recorded over the length of the Weld Range in the DEC survey (Markey and Dillon 2008). Figure 2.5 and Figure 2.6 show the distribution of vegetation types within the project area.

No State (DBCA) or Commonwealth (EPBC Act) listed Threatened Ecological Communities (TECs) occur within the project area. The project area partly coincides with the Priority 1 Priority Ecological Community (PEC) Weld Range Vegetation Complexes (banded ironstone formation) (DBCA 2019). Figure 2.5 shows the PEC boundary and vegetation in relation to the proposed project layout. The PEC boundary defined by DBCA includes a 500 m “administrative buffer”, which includes some vegetation types that do not align with the PEC description. The Weld Range PEC occupies an area of 20,073 ha, with the project area (excluding existing exploration disturbance) coinciding with less than 1.1% of this area.

*ecologia* (2009a) identified Communities 1 and 2 as being of conservation significance due to their restricted occurrence outside the area identified as a PEC, and of local significance due to the high number of taxa which were locally restricted to them. These communities predominantly occurred on BIF ridges. The APM (2024) mapped vegetation type 2a aligns with Community 2 as identified by *ecologia*.

Table 2.2: Vegetation types identified in the project area.

Code	Landform	Description	Soil type and surface geology
2a <sup>2</sup>	BIF outcrops	Scattered low <i>Acacia aneura</i> , <i>Psyrax latifolia</i> and <i>Acacia pruinocarpa</i> over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Thryptomene decussata</i> and <i>Philotheca brucei</i> mid sparse shrubland with <i>Ptilotus obovatus</i> , <i>Dodonaea pachyneura</i> and <i>Dysphania rhadinostachya</i> low sparse shrubland.	Light red sandy clay loam; BIF outcrops and rocklands on moderate to steep hillslopes.
3a <sup>2</sup>	Gravelly plains	<i>Acacia aneura</i> , <i>A. ramulosa</i> subsp. <i>linophylla</i> and <i>Acacia mulganeura</i> tall sparse shrubland over <i>Eremophila punicea</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Eremophila margarethae</i> mid sparse shrubland with <i>Ptilotus obovatus</i> , <i>Eragrostis eriopoda</i> and ? <i>Swainsona purpurea</i> scattered low groundcover.	Red to red-brown clay loam to sandy clay loam with ironstone gravel to small stones at the surface; sandy outwash and gravelly plains and footslopes of BIF ranges, on gentle mid and lower slopes.
3a <sup>1</sup>	Sandy outwash plains	+/- <i>Corymbia lenziana</i> scattered medium trees over <i>Acacia. ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> sparse tall shrubland over mixed <i>Eremophila</i> spp. open mid shrubland over scattered low shrubs of <i>Ptilotus obovatus</i> over mixed open tussock grassland.	Sandy outwash and gravelly plains and footslopes of BIF ranges.
3b <sup>2</sup>	Sandy outwash plains	<i>Acacia aneura</i> , <i>Acacia pruinocarpa</i> and <i>Acacia ramulosa</i> var <i>linophylla</i> low open woodland over <i>Eremophila forrestii</i> ssp <i>forrestii</i> , <i>Eremophila latrobei</i> and <i>Grevillea obliquistigma</i> mid open shrubland and <i>Ptilotus obovatus</i> , <i>Sida calyxhymenia</i> and <i>Abutilon cryptopetalum</i> sparse low shrubs.	Lower slopes and outwashes of ironstone colluvium; drainage lines and low-lying areas on sandy outwash plains.
3b <sup>1</sup>	Sandy outwash plains	<i>Acacia pruinocarpa</i> scattered trees over <i>A. aneura</i> woodland over <i>A. ramulosa</i> var. <i>linophylla</i> and <i>A. aneura</i> shrubland over mixed <i>Eremophila</i> closed shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> open low shrubland.	Drainage lines and low lying areas on sandy and outwash plains.
4a <sup>1</sup>	Granite/dolerite slopes and plains	<i>Acacia</i> sp. Weld Range and <i>A. aneura</i> var. <i>microcarpa</i> open tall shrubland over <i>Eremophila macmillaniana</i> and mixed <i>Senna</i> spp. open mid shrubland over <i>Ptilotus obovatus</i> var. <i>obovatus</i> open low shrubland.	Undulating scree plains and mid to low slopes of granite and dolerite.
5a <sup>1</sup>	Various	<i>Acacia</i> low woodland over <i>Solanum ashbyae</i> / <i>lasiophyllum</i> and <i>Ptilotus obovatus</i> var. <i>obovatus</i> low shrubland over mixed low tussock grassland.	Ridge tops and upper slopes of BIF ridges, low lying semi saline flats, riparian areas and ironstone scree flat plains.
D	Disturbed – clear of vegetation		

<sup>1</sup> - ecologia (2010b)<sup>2</sup> – APM (2024)

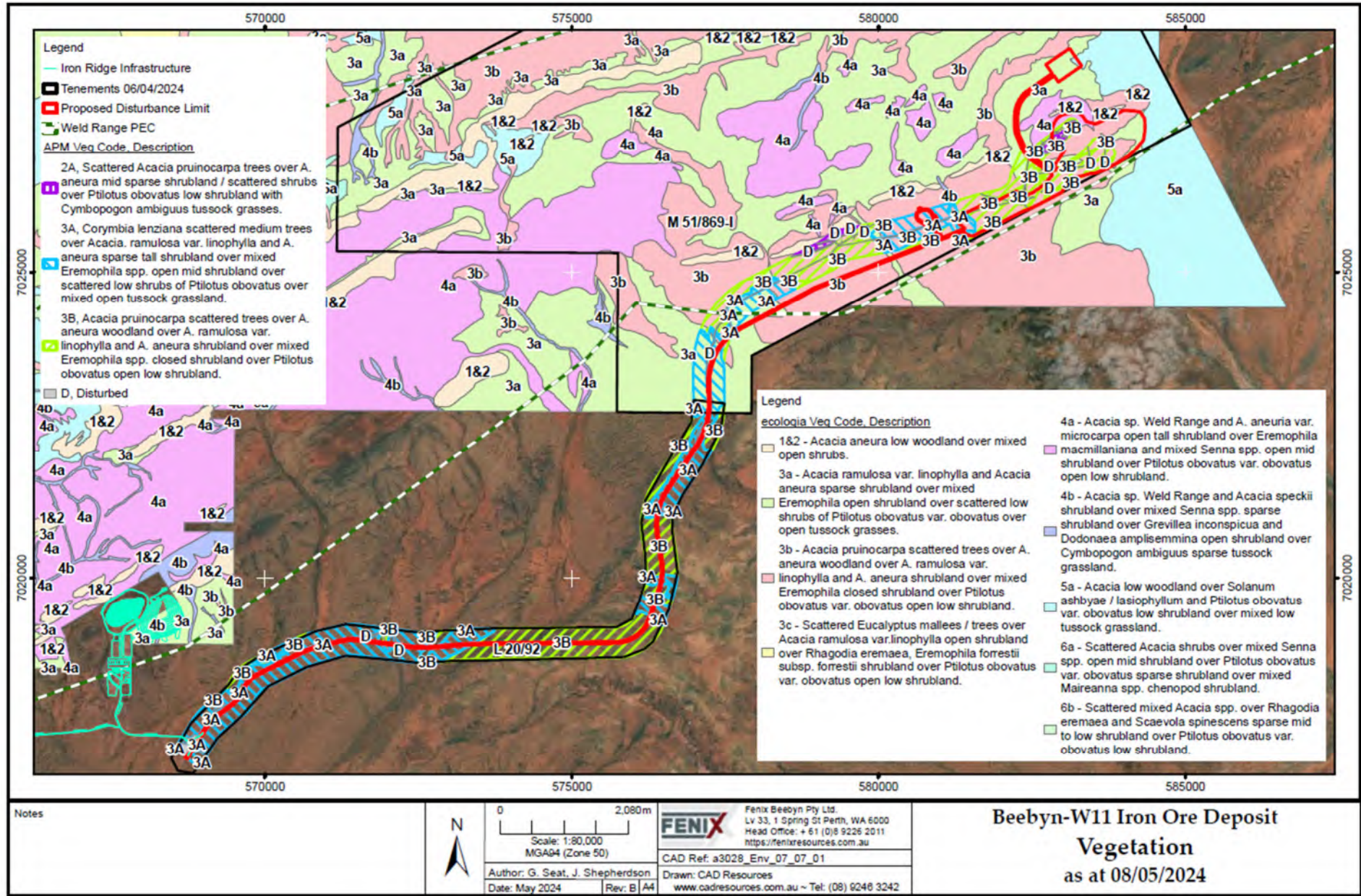


Figure 2.5: Previously recorded vegetation types associated with the project area.

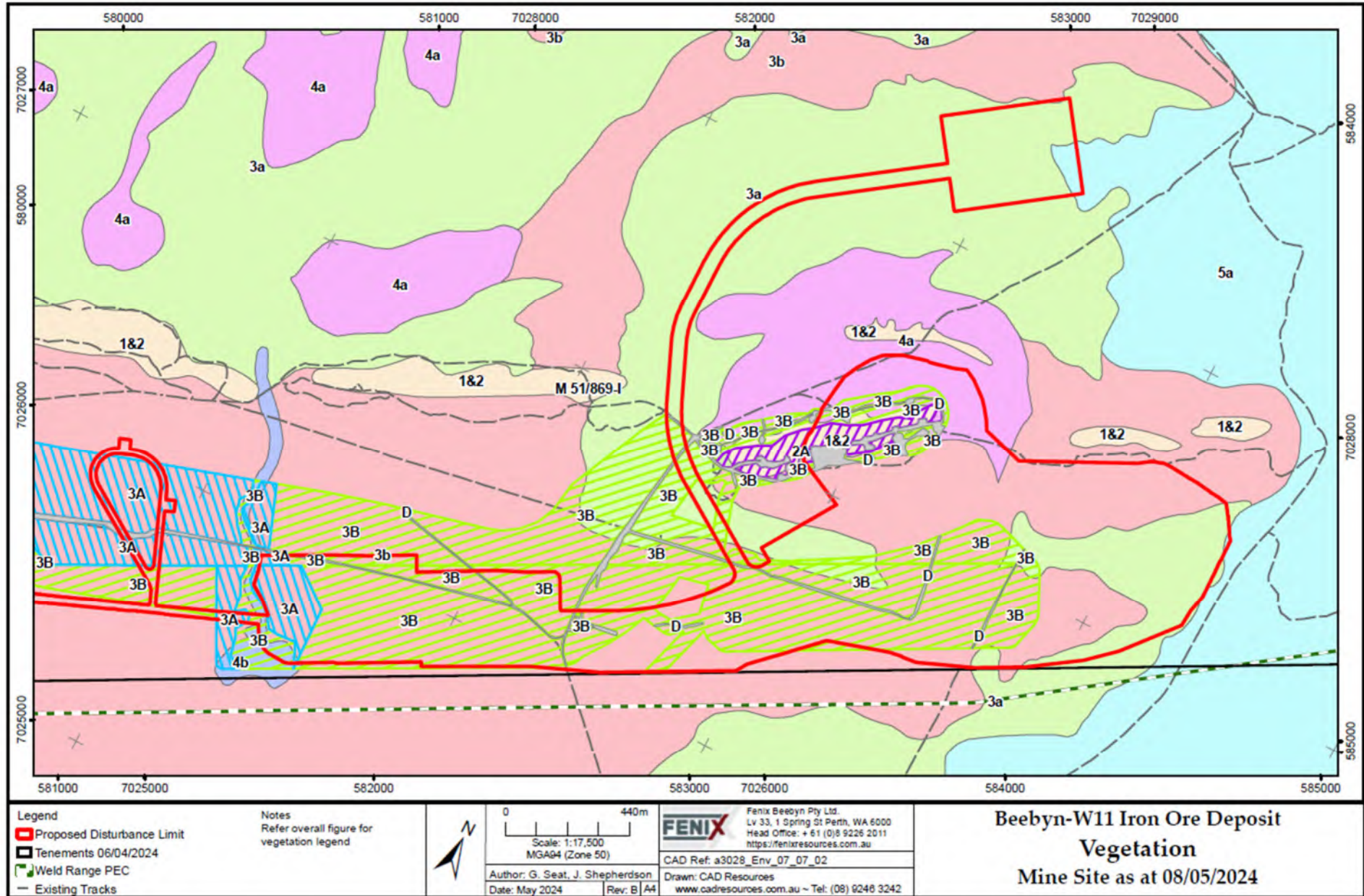


Figure 2.6: Previously recorded vegetation types associated with the infrastructure area.



## 2.4 Fauna

The surveys undertaken by *ecologia* (2010a) recorded 148 vertebrate species in and around the project area, including 80 bird species, 44 reptiles, 23 mammals (17 native and six introduced) and one amphibian.

Twenty vertebrate fauna species and two invertebrate species of conservation significance were identified from database searches of a 30 km radius from the study area including seven mammals, 11 birds and two reptiles (APM 2024). Species listed as Marine or species not known to inhabit terrestrial environments are considered very unlikely to inhabit the project area and have been excluded. Table 2.4 provides a summary of those conservation significant species occurring or likely to occur within the Project area. Previously recorded locations of conservation significant fauna are presented in Figure 2.7.

At the Weld Range, the long-tailed dunnart has been recorded on exposed rock and stony soils with hummock grasses and shrubs, flat-topped hills, lateritic plateaus, sandstone ranges and breakaways, generally with a vegetation of sparse mulga over spinifex (*ecologia* 2010a). Within the project area, APM (2024) found suitable habitat exists in the Banded Ironstone and Drainage Line habitats.

Old, inactive malleefowl mounds have been recorded in the project area; however, mounds may last decades after abandonment and the presence of inactive mounds is not a reliable indication of current presence. The species is not expected to be a resident at Weld Range but may persist in surrounding areas of dense unburnt habitat (APM 2024).

The project area is on the northernmost extent of malleefowl distribution at this longitude in WA, and the closest records are over 50 km to the south. A sandy substrate and abundance of leaf litter are clear requirements for the construction of the birds' incubator-nests (Benshemesh 2007, in APM 2024). Soils in the disturbance footprint have a reasonably high clay content and litter was sparse to absent, except in the narrow Drainage Lines. The quality of the habitat for foraging and nest building are generally low, except in small patches of higher quality habitat in or near the larger drainage features low in the plains (APM 2024).

The project area contains some large trees that may be suitable for development of hollows by the Southern whiteface (a bird listed as Vulnerable); however, the area is previously disturbed with grazing impacts from both the Beebyn Station and feral goats, and historic clearing for mining exploration. The understory is sparse and the litter layer sparse to absent, but thicker in narrow bands around the drainage lines. Due to the poor condition of the understory, the area is unlikely to host habitat critical to the survival of the Southern whiteface (APM 2024).

Suitable foraging habitat for the grey falcon is present within the area, however no suitable nesting habitat is present and preferred nesting habitat is not available in the surrounding local area. Known records are more than 50 km away and whilst the grey falcon may occasionally visit the locality, it is unlikely to provide an important habitat for this species (APM 2024).

The Western spiny-tailed skink typically resides in family groups in coarse woody debris, such as fallen log piles (Bradley et. al 2022) or burrows under boulders and exfoliated sheets of granite. This species is generally easy to detect as the animals use a communal latrine which persists for many months even when the animals are concealed or absent. The species was not recorded in the project area during the fauna survey undertaken by APM (2024).

The West Coast mulga slider has previously been recorded in the Weld Range, including locations close to the project area; however, APM (2024) found the habitats within the project area were generally of poor quality. Leaf litter is scarce within the project area and soils are degraded and likely poor for burrowing. Higher quality microhabitats occur in the Drainage Line habitat however, soils may be too stony to be suitable.

*ecologia* conducted a targeted *Idiosoma nigrum* survey at Weld Range (*ecologia* 2010b), which included a collection of detailed data on the spider's demography, population structure and habitat preference. A total of 76 ha was surveyed for *Idiosoma nigrum*, with 1,708 burrows found, all within the boundaries of drainage lines and underneath Acacia vegetation, predominately on the southern face of hill slopes. Within the Beebyn-W11 project area, 393 burrows were recorded, with an estimated population size of  $274 \pm 197$  individuals (*ecologia* 2010b).

Biologic Environmental Survey Pty Ltd (Biologic) undertook a status review of the species in April 2019 and confirmed that the trapdoor spider found in the Weld Range area is now regarded as *Idiosoma clypeatum*, a Priority 3 species under the WA Biodiversity Conservation Act (Biologic 2019).

Intensive targeted surveys have previously been conducted throughout the Weld Range when the northern shield-backed trapdoor spider was regarded as *I. nigrum* and listed as a Vulnerable species under the *WA Wildlife Conservation Act 1950*. Over 1800 trapdoor burrows have been identified from database searches, the majority of which are from within the Weld Range. Biologic (2012) estimated the population size of *I. clypeatum* across the Weld Range to be more than 14,000 individuals.

### 2.4.1 Fauna habitat

APM (2024) identified four main habitat types in the project area, described in Table 2.3 and shown on Figure 2.8. The habitat types are similar to those identified at the nearby Iron Ridge project (*ecologia* 2020a).

**Table 2.3: Fauna habitat recorded in the study area.**

Habitat type	APM study area (ha)	Project area (ha)
Acacia Sand Plains	500.5	28.9
Banded Ironstone Ridge	6.1	3.3
Drainage Line	186.1	7.0
Mulga Woodland on Hill Slope	333.0	91.6
Disturbed	30.5	8.7
Not mapped (portion of M51/869)	-	122.6
<b>Total</b>	<b>1,056.2</b>	<b>262.1</b>

*Acacia Sand Plains* habitat occurs predominantly on the lower slopes of the study area, where the haul road is proposed to be developed. Associated soils include sandy to lightly rocky clay loam.

*Mulga Woodland on Hill Slope* habitat is dominated by *Acacia pruinocarpa* trees and *Acacia aneura* shrublands over on sandy or stony clay loam on hill slopes and is the most widespread habitat present in the area. This habitat type provides suitable substrates, vegetation and habitat to support the Priority 3 (BC Act) northern shield-backed trapdoor spider. This habitat is considered widespread in the Weld Range area.

*Drainage Line* habitat provides suitable habitat for the west coast mulga slider. Known from the arid interior of the Midwest of WA and endemic to the Murchison bioregion, this species has previously been recorded within Weld Range in leaf litter fringing drainage lines.

*Banded Ironstone Ridge* habitat occurs in a small portion in the north of the project area and is the least widespread habitat present in the area. The long-tailed dunnart has been recorded from widely scattered localities in the arid zone where it inhabits rugged, rocky areas, such as this habitat type. It typically occurs on plateaus near breakaways and scree slopes, and on rugged boulder-strewn scree slopes. Widely separated populations occur in the Pilbara, Murchison, Gibson Desert, southern Carnarvon Basin and in the Western MacDonnell Ranges (Northern Territory). The species was once considered rare but has recently been shown to be relatively common and widespread within rocky habitats, especially banded iron formation ranges within the Midwest.

Approximately 122 ha were not covered in the survey undertaken by APM; however, based on the surveyed area, this unmapped portion was expected to be *Mulga Woodland on Hill Slope* habitat.

Table 2.4: Conservation significant fauna likelihood of occurrence.

Common name	Scientific name	EPBC status	WA status	Comments	Likelihood of occurrence
<b>Mammals</b>					
Bilby	<i>Macrotis lagotis</i>	VU	VU	The local record has a low level of certainty and was recorded in 1984.	Unlikely
Black-flanked rock-wallaby	<i>Petrogale lateralis lateralis</i>	EN	EN	Historical local record is a fossilised specimen	Unlikely
Brush-tailed mulgara	<i>Dasyercus blythi</i>		P4	Historical local record is a fossilised specimen	Unlikely
Ghost bat	<i>Macroderma gigas</i>	VU	VU	Historical local record is a fossilised specimen	Unlikely
Gould's mouse	<i>Pseudomys gouldii</i>	VU	VU	Historical local record is a fossilised specimen	Unlikely
Greater stick-nest rat	<i>Leporillus conditor</i>	VU	CD	Historical local record is a fossilised specimen	Unlikely
Long-tailed dunnart	<i>Antechinomys longicaudata</i>		P4	Suitable habitat present in the BIF	Recorded
<b>Birds</b>					
Curlew sandpiper	<i>Calidris ferruginea</i>	CR, MI	CR	No suitable habitat present	Unlikely
Fork-tailed swift	<i>Apus pacificus</i>	MI	IA	Potential to overfly the area	Possible
Grey falcon	<i>Falco hypoleucos</i>	VU	VU	Suitable foraging habitat present. No suitable nesting habitat.	Possible
Grey wagtail	<i>Motacilla cinerea</i>	MI	MI	No suitable habitat present	Unlikely
Malleefowl	<i>Leipoa ocellata</i>	VU	VU	Inactive mounds have been recorded	Possible
Night parrot	<i>Pezoporus occidentalis</i>	EN	CR	No suitable habitat present	Unlikely
Pectoral sandpiper	<i>Calidris melanotos</i>	MI	IA	No suitable habitat present	Unlikely
Peregrine falcon	<i>Falco peregrinus</i>		OS	Foraging habitat present	Possible
Sharp-tailed sandpiper	<i>Calidris acuminata</i>	VU, MI	IA	No suitable habitat present	Unlikely
Southern whiteface	<i>Aphelocephala leucopsis</i>	VU	-	All habitats suitable, project area unlikely to host habitat critical to survival.	Possible
Yellow wagtail	<i>Motacilla flava</i>	MI	MI	No suitable habitat present	Unlikely
<b>Reptiles</b>					
West coast mulga slider	<i>Lerista eupoda</i>		P1	Suitable habitat is present in the Mulga Woodland on Hill Slope habitat.	Possible
Western spiny-tailed skink	<i>Egernia stokesii badia</i>	EN	VU	Suitable habitat may be present	Possible
<b>Invertebrate</b>					
Northern shield-backed trapdoor spider	<i>Idiosoma clypeatum</i>		P3	Recorded within the study area, then identified as <i>I. nigrum</i>	Recorded
Shield-backed trapdoor spider	<i>Idiosoma nigrum</i>	VU	EN	All specimens in the Murchison region determined to be <i>I. clypeatum</i>	Unlikely

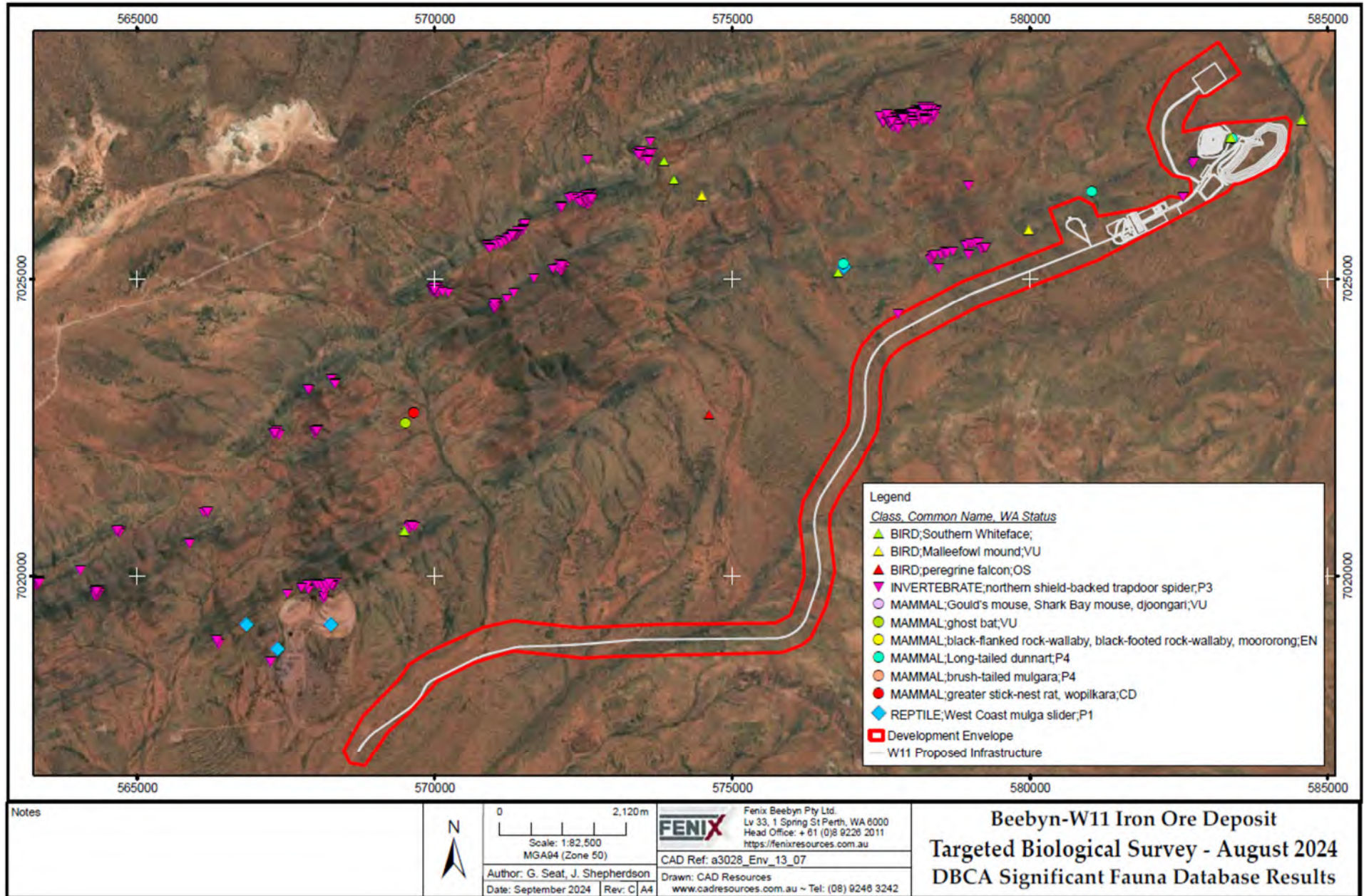


Figure 2.7: Database search records of conservation significant fauna within 30 km of the project area.

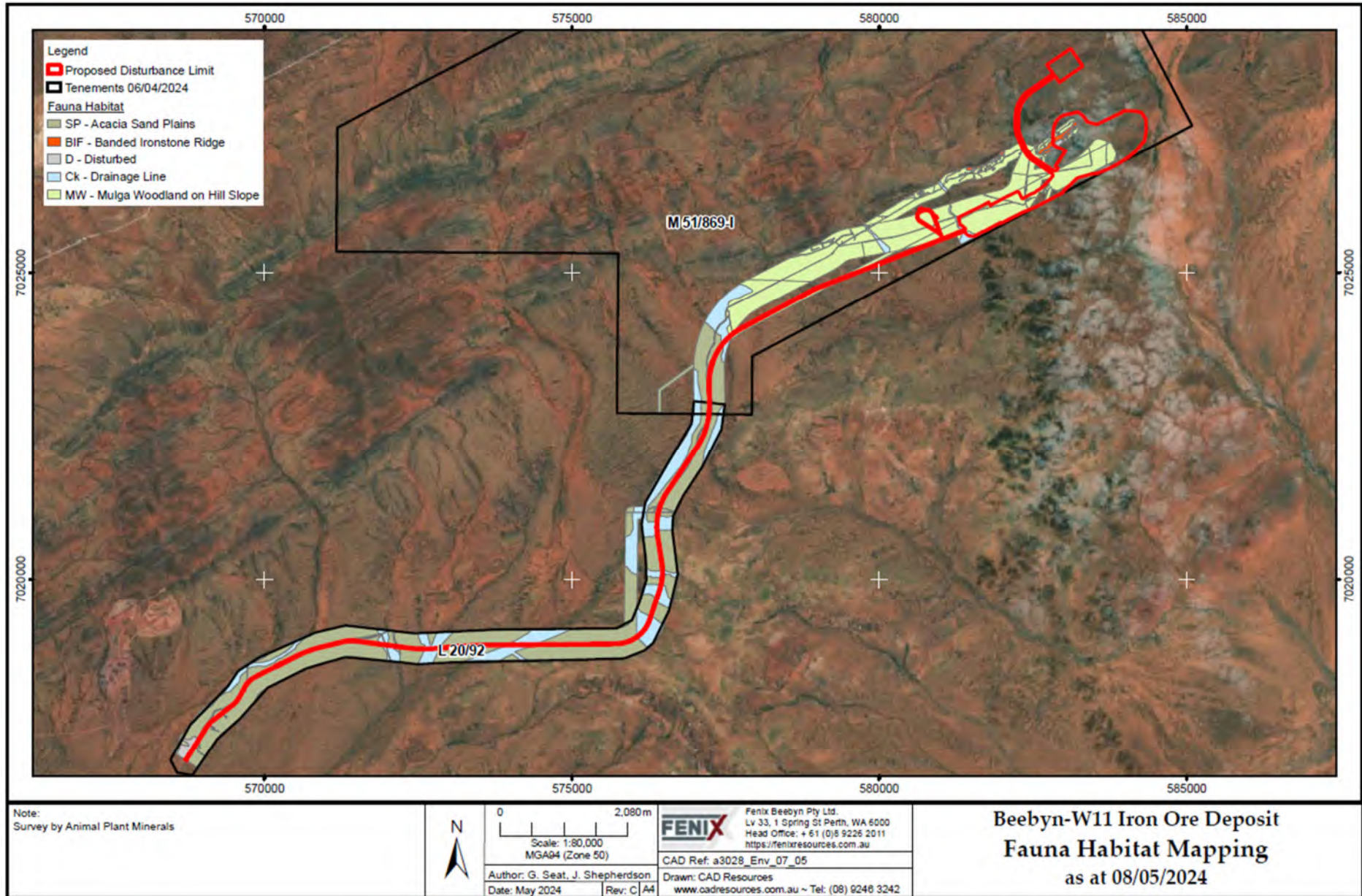


Figure 2.8: Fauna habitat in the project area (APM 2023).

## 3.0 METHODOLOGY

### 3.1 Personnel

The survey work was undertaken by botanist Jenny Borger and biologist/environmental consultant Jeremy Shepherdson.

Jenny has more than 20 years' experience as a botanist and specialises in flora of the Midwest Region. She has undertaken and been involved in numerous surveys of the Weld Range and surrounding region for clients including Sinosteel Midwest Corporation Ltd, Fenix Resources and DBCA. Jenny is very familiar with the flora of this area, including each of the conservation significant species that have been previously recorded.

Jeremy has over 25 years' experience as a biologist and environmental consultant across Western Australia. He has extensive experience in biological surveys, including targeted surveys for conservation significant species such as the malleefowl, spiny-tailed skink and shield-backed trapdoor spiders. He is competent in identification of flora, fauna and fauna habitat with considerable experience in the Midwest Region.

### 3.2 Desktop review

Prior to undertaking this survey, available information from previous surveys and database searches was reviewed, the results of which are detailed in Sections 2.3 and 2.4.

Descriptions and photos of each of the previously recorded Priority flora were printed for reference in the field if needed. Previous vegetation mapping and recorded locations of Priority flora was loaded into hand held GPS units for ground truthing.

### 3.3 Field survey

The field survey was undertaken from the 29<sup>th</sup> July to 3<sup>rd</sup> August 2024 and involved:

- a targeted survey for conservation significant flora within the project area
- confirming the presence and identity of *Hibiscus ?krichauffianus*
- refining and expanding the vegetation mapping as defined by APM (2024) and *ecologia* (2010a)
- a targeted survey for conservation significant fauna within the project area, including *Idiosoma clypeatum* burrows and malleefowl (*Leipoa ocellata*) mounds
- refining and expanding the fauna habitat mapping as defined by APM (2024)

72 survey points (20 x 20 m quadrats and relevés) were used for vegetation sampling. At each point, the following information was recorded:

- GPS location and survey date
- physical features (landform, elevation, soil type, ground surface cover, litter, rock type)
- vegetation condition as described for the Eremaean province (EPA 2016)
- dominant growth form, height, cover, and species for each strata (upper, mid and ground) compatible with NVIS Level 6 (ESCAVI 2003)
- level and nature of disturbances (e.g. weed presence, fire, and time since last fire, impacts from grazing, vegetation clearing, erosion)
- list of all species within the quadrat including weeds and listing species average height and cover.

Plants unable to be determined in the field were collected for later identification using relevant taxonomic keys and/or compared against specimens at the WA Herbarium.

The locations of previously recorded conservation significant flora and fauna were revisited and a species search and population count (if species present) undertaken. Areas of suitable habitat (as identified in Table 2.1 and Table 2.4) were also targeted for each conservation significant species with a possible or higher likelihood (as identified in Table 2.1 and Table 2.4) of occurring in the survey area.

Fauna habitat assessments were performed at each vegetation survey point. Descriptive data was recorded including soil type, landform and disturbances.

### 3.4 Limitations

An assessment of survey-specific issues and limitations for flora (EPA 2016) and fauna (EPA 2020) is detailed in Table 3.1.

**Table 3.1: Study limitations.**

Aspect	Constraint?	Comment
Availability of contextual information at a regional and local scale (EPA 2016 and 2020)	No	Detailed surveys have been undertaken in the project area (APM 2024, <i>ecologia</i> 2010a and b, <i>ecologia</i> 2009) and surrounds ( <i>ecologia</i> 2020a and b, Biologic 2012, Bamford 2009). This information was adequate to provide appropriate contextual information for the current survey.
Competency/experience of the team carrying out the survey, including experience in the bioregion surveyed (EPA 2016 and 2020)	No	The survey personnel have more than 20 years' experience undertaking surveys in Western Australia and have worked in the Murchison Bioregion since 2005.
Scope of the survey, e.g. were faunal groups excluded from the survey (EPA 2020)	No	The fauna scope was to target conservation significant fauna (including <i>Idiosoma clypeatum</i> ) and verify fauna habitat mapping. This aspect was not a limitation.
Proportion of flora recorded and/or collected, any identification issues (EPA 2016)	No	Climatic conditions prior to the survey were average, with 75 mm rainfall received in the two months prior to the survey, resulting in many species flowering and easily identifiable. A minor number of specimens were not identified to the species level due to being sterile, none of these are expected to be flora of conservation significance.
Was the appropriate area fully surveyed (effort and extent) (EPA 2016 and 2020)	No	The area was surveyed fully.
Access restrictions within the survey area (EPA 2016 and 2020)	No	The survey area was accessible by vehicle and foot.
Survey timing, rainfall, season of survey (EPA 2016 and 2020)	No	The survey was undertaken in late Winter, and most perennials were flowering. The survey area is within the Eremaean botanical province. Recommended timing for flora and vegetation survey is 6-8 weeks post wet season (March – June) for primary survey, and a dry season survey (after winter rainfall if available) for supplementary survey (EPA 2016). The timing of the field survey is within the period recommended for supplementary surveys and coincides with the flowering period of many of the regions flora.  Rainfall at Meekatharra during 2024 was above average (185.2 mm), with 196 mm received up to the time of survey,

Aspect	Constraint?	Comment
		including 75 mm in the two months prior to the survey (June and July). The overall condition of the vegetation was quite healthy.
Disturbance that may have affected the results of survey such as fire, flood or clearing (EPA 2016 and 2020)	No	Some historical disturbance was noted throughout the survey area; however, did not affect the results of the survey.
Problems with data and analysis, including sampling biases (EPA 2020)	No.	There were no data problems and this aspect was not a limitation.



## 4.0 RESULTS

### 4.1 Flora

A total of 151 species of flora were recorded within the survey area, from 35 Families and 77 Genera. One introduced (weed) species, *Oxalis ?corniculata* was recorded in one location (Site 49, Figure 4.4). The full list of species recorded is presented in Appendix 2.

Prior locations of Priority flora were investigated to determine whether the previously recorded individuals were still present. In some locations no specimens of the previously recorded Priority species could be located. On the exposed upper portions of BIF ridge there was evidence of vegetation death, likely resulting from several years of low rainfall, and it was considered likely that the previously recorded individuals had died. In other locations plant species very similar in appearance were located but the Priority species could not be. It is possible that the similar species were mistakenly identified as the Priority species if there were no flowering parts present at the time of the previous surveys.

The survey recorded seven DBCA Priority listed species in the project area, as outlined in Table 4.1 and shown in Figure 4.1 and Figure 4.2. No Threatened flora were recorded. Definitions of the conservation codes used in the table are included as Appendix 1.

Track logs of the surveyed area are presented in Figure 4.3.

**Table 4.1: Priority flora recorded during the survey.**

Species	Conservation Code	Number of locations	Number of individuals
<i>Beyeria lapidicola</i>	P1	2	100
<i>Euphorbia sarcostemmoides</i>	P1	1	1
<i>Stenanthemum mediale</i>	P1	102	264
<i>Micromyrtus placoides</i>	P3	61	1,075
<i>Prostanthera petrophila</i>	P3	18	108
<i>Verticordia jamiesonii</i>	P3	8	147
<i>Acacia speckii</i>	P4	25	51

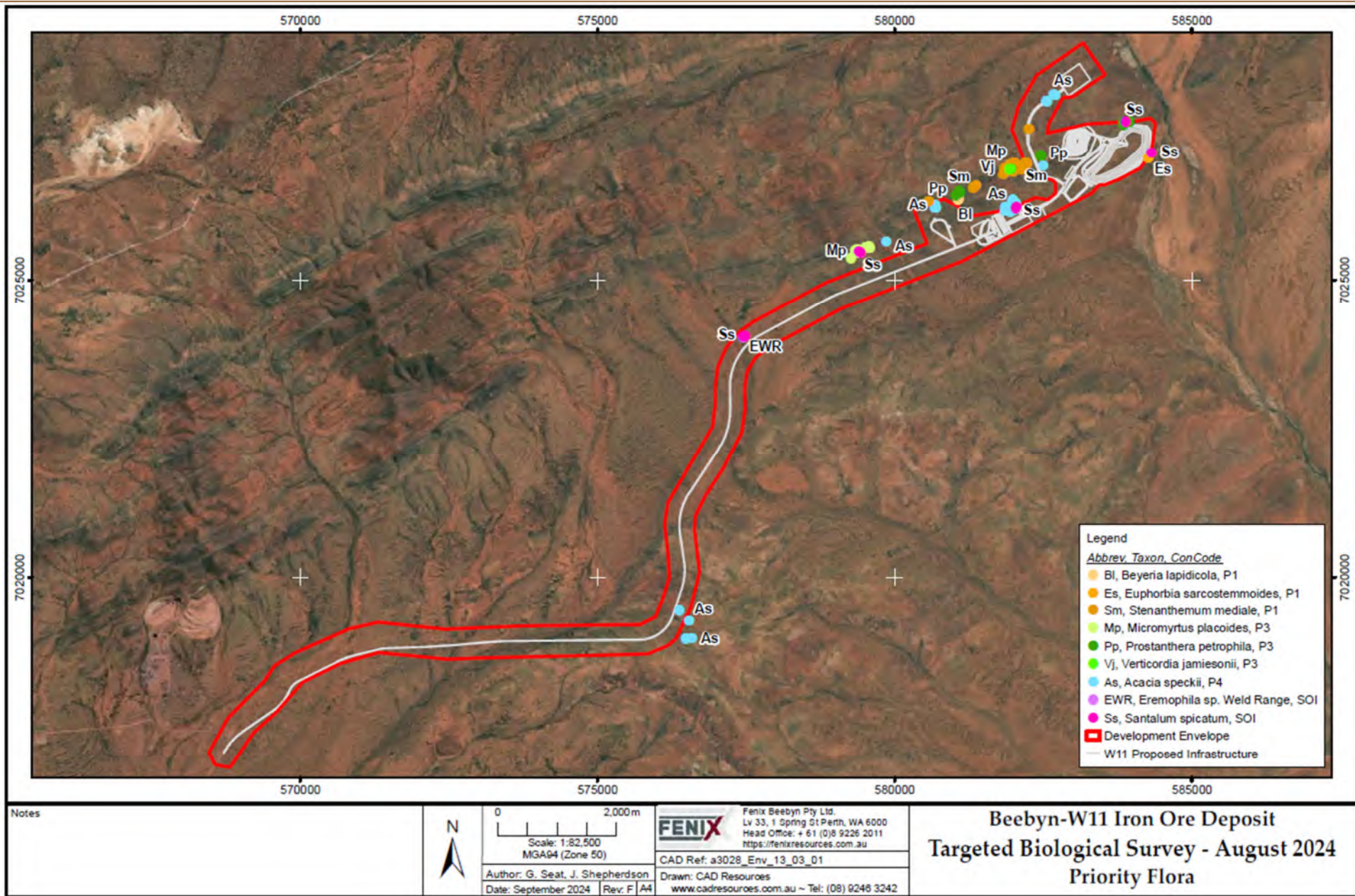


Figure 4.1: Priority flora recorded during the survey - overview.

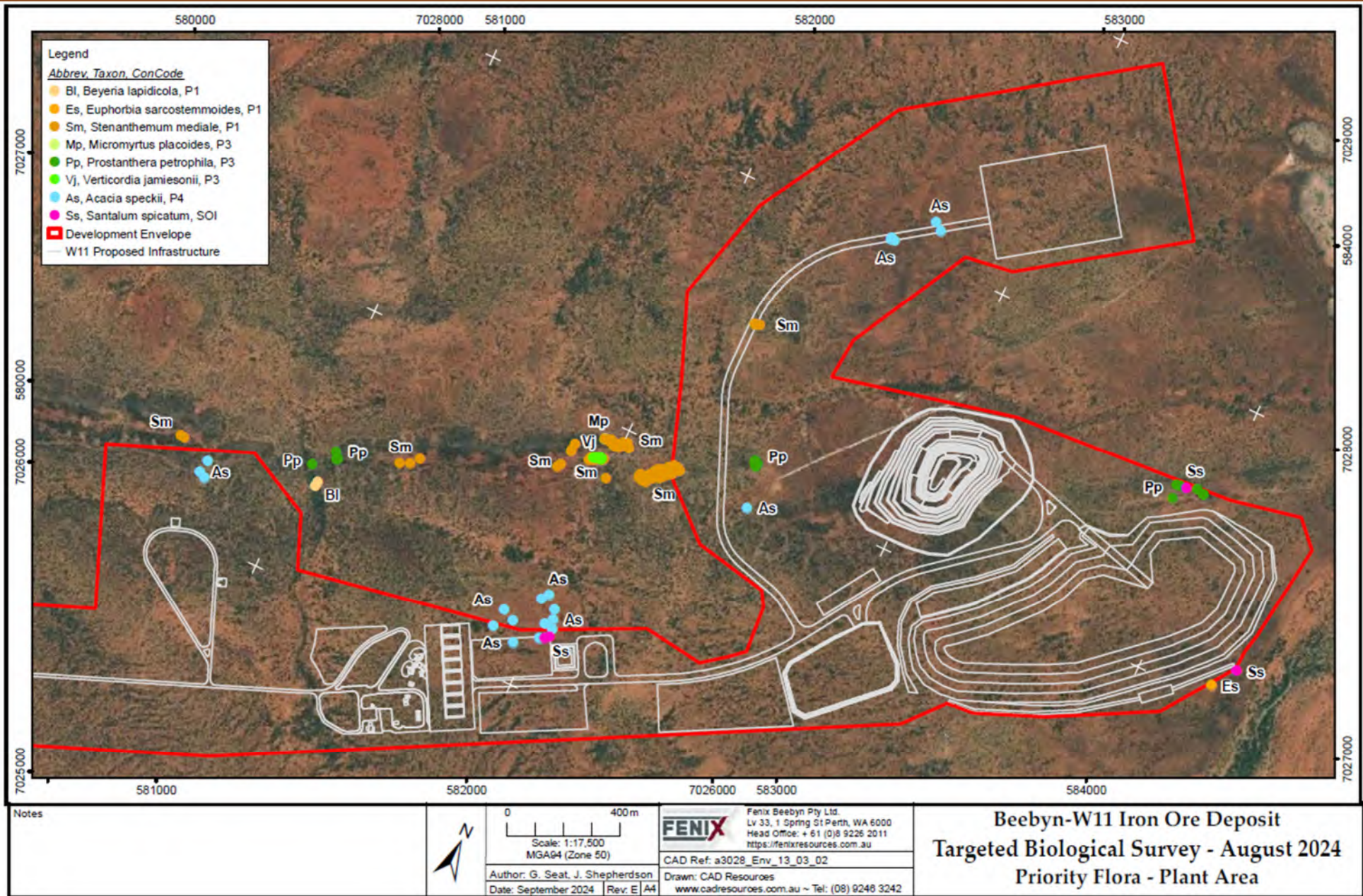


Figure 4.2: Priority flora recorded during the survey – mine area.

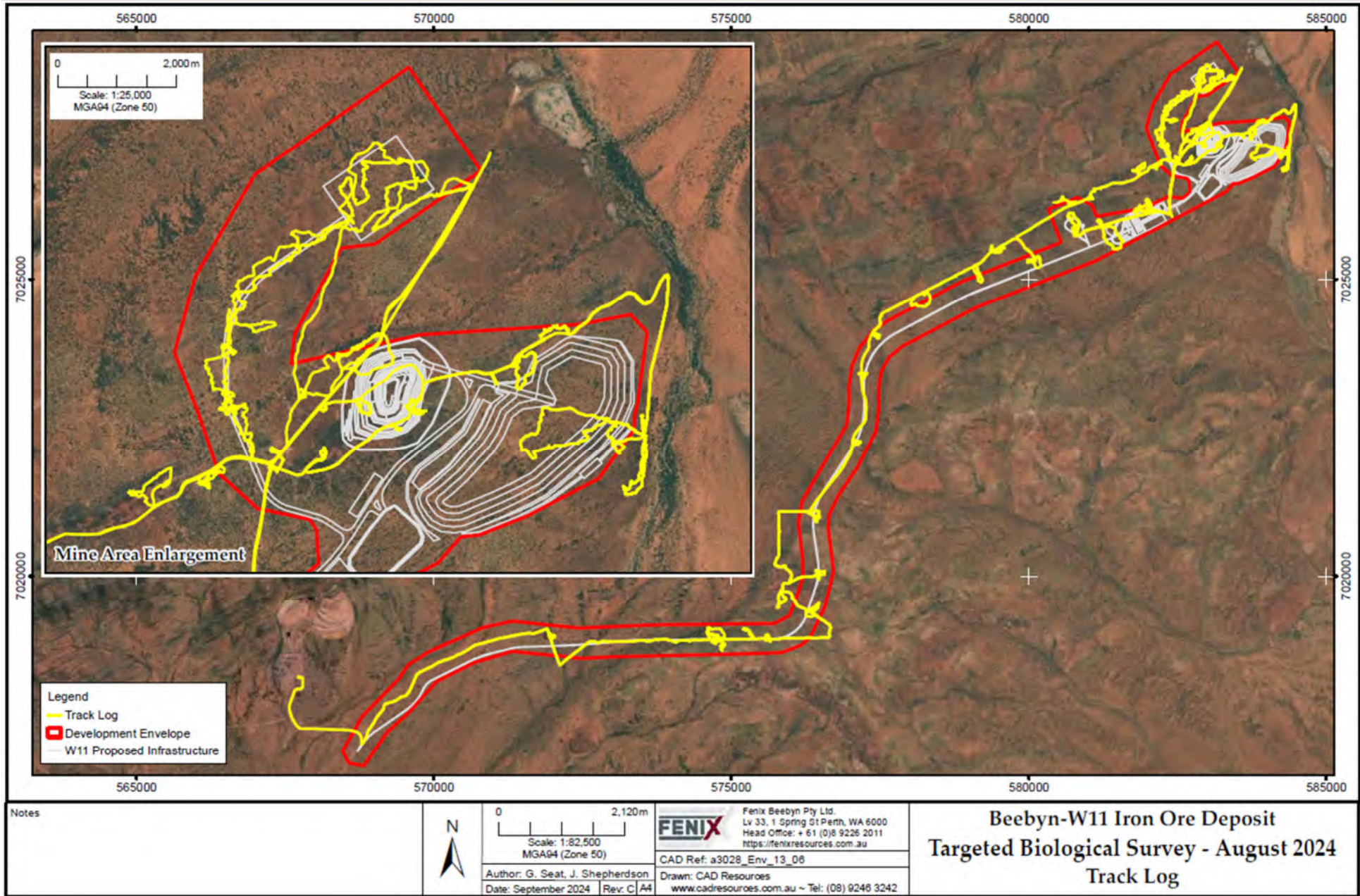


Figure 4.3: Track logs of the survey area.

#### 4.1.1 *Beyeria lapidicola* – Priority 1

*Beyeria lapidicola* is a much branched shrub growing to 1.6 m high with resinous and sticky stems and leaves. The branches are pale, yellow-green becoming grey or black and leaves are narrow oblong, have three ribs on the under surface and are hairy between the ribs (*ecologia* 2012). This species has a known range of approximately 450 km (Western Australian Herbarium 1998–) and typically occurs on sand over banded ironstone or dry creek beds with sandy clay and fine gravel.

Prior recorded locations of *B. lapidicola* were investigated and in most cases plants were found to be dead or absent. A large previously recorded population in a creek line to the north (upstream) of the proposed infrastructure area was found to be healthy with more than 100 individuals present.

Within the Beebyn-W11 project area, no individuals were recorded within the proposed disturbance footprint with more than 100 plants present outside the development envelope. It is quite likely that *Beyeria lapidicola* will be present in other larger creek lines in the surrounding area. These are avoided by the proposed development.



Photograph 4.1: Numerous dead shrubs in the vicinity of one of the previously recorded *B. lapidicola* locations.



Photograph 4.2: *B. lapidicola* and its preferred habitat.

#### 4.1.2 *Euphorbia sarcostemmoides* – Priority 1

*Euphorbia sarcostemmoides* is an erect, multi-stemmed, semi-succulent shrub growing to 2 m high. The preferred habitat for this species is sandstone ridges and quartzite hills (Western Australian Herbarium 1998–), however has been recorded on flat plains at Weld Range (ecologia 2012). *Euphorbia sarcostemmoides* has been recorded in both Western Australia and the Northern Territory, over a range of approximately 1,200 km.

A single individual was recorded in the W11 area during previous surveys and was found alive during this survey on the flat plain to the south of the proposed footprint (Photograph 4.3). A search of the surrounding area failed to find any additional specimens. The single individual is located close to, but outside the proposed footprint of a topsoil stockpile.



Photograph 4.3: The single *E. sarcostemmoides* plant, found growing within a dead shrub.

#### 4.1.3 *Stenanthemum mediale* – Priority 1

*Stenanthemum mediale* is a shrub growing to 0.35 m high and has a known range of over 250 km (Western Australian Herbarium 1998–). The leaves are small, egg shaped with hairs on the under surface. This species can be confused with the more common *S. patens*, which has hairs on the upper surface, or both surfaces, of the leaf. The flowers of *S. mediale* are white, small, hairy tubular flowers primarily flowering in April – August.

Previously recoded locations of *S. patens* were investigated and found to be *S. mediale*, which was found to be abundant but quite localised along the ridge to the south-west of the proposed pit.

Within the Beebyn-W11 project area, more than 250 individuals were recorded, four of which will be impacted by the proposed development.



Photograph 4.4: *Stenanthemum mediale* growing on ridge habitat.

#### 4.1.4 *Micromyrtus placoides* – Priority 3

*Micromyrtus placoides* is a shrub growing to 2.3 m, sometimes widely spreading with several stems or branches from the base (Western Australian Herbarium 1998–), occurring within the Murchison and Yalgoo IBRA bioregions (Eastern Murchison, Western Murchison and Talling subregions). It has a relatively restricted distribution from near Cue (Weld Range), south-west to Talling Peak. It occurs extensively across Weld Range in a variety of habitats including undulating plains, dry creek beds, hill slopes and ridges, on red-orange or orange-yellow sandy clay, coarse gravel, BIF, laterite, quartz and basalt (Western Australian Herbarium 1998–).

A targeted survey undertaken in 2020 estimated 33,724 individuals occur at Weld Range (*ecologia* 2020c). Over 25,000 individuals have also been recorded at Talling Peak (*ecologia* 2020b), around 250 km south-west of the project area.

Prior locations of recorded *M. placoides* in the vicinity of the proposed W11 project were investigated and in several instances the plants were found to be dead (Photograph 4.5) or no longer present, particularly on the higher and more exposed positions on the BIF ridges. In some locations *Micromyrtus sulphurea* (Photograph 4.6) appears to have been mistakenly recorded as *M. placoides*. The two species are very similar without buds or flowers.

Several new locations of healthy and flowering *M. placoides* were recorded during the survey including patches of young plants (Photograph 4.7) and individuals having emerged in rehabilitated exploration disturbance (Photograph 4.8).

Within the Beebyn-W11 project area, over 1000 individuals were recorded, all outside the proposed disturbance footprint.



Photograph 4.5: Dead vegetation at a previously recorded *M. placoides* location on an exposed section of BIF ridge.



Photograph 4.6: *Micromyrtus sulphurea* may have been mistakenly recorded as *M. placoides* in some locations.





Photograph 4.7: One of the locations recorded during this survey with more than 90 *M. placoides* plants growing beneath an Acacia shrub.



Photograph 4.8: *M. placoides* growing in rehabilitated exploration disturbance.

#### 4.1.5 *Prostanthera petrophila* – Priority 3

*Prostanthera petrophila* is a spreading shrub growing to 1.5 m high with densely hairy branches and white flowers usually produced in August. This species typically grows on lateritic soils and has a known distribution of approximately 350 km (Western Australian Herbarium 1998–).

In several locations previously recorded *P. petrophila* were dead or no longer present. In some locations individuals appeared to have died off and were recovering (Photograph 4.9) following rainfall in the months before the survey, and in other locations *P. petrophila* individuals were healthy, in good numbers and flowering (Photograph 4.10).

Within the Beebyn-W11 project area, 108 individuals were recorded from 18 locations, with 17 individuals located within the proposed disturbance footprint.



Photograph 4.9: Dead *Prostanthera petrophila* plants around a recovering plant on BIF ridge.



Photograph 4.10: *Prostanthera petrophila* in flower.

#### 4.1.6 *Verticordia jamiesonii* – Priority 3

*Verticordia jamiesonii* is a shrub growing to 0.6 m high with white/pink flowers between September and October. The preferred habitat for this species is sand or clay on lateritic breakaways and it has a known range of over 350 km (Western Australian Herbarium 1998–).

The previously recorded population was located and appeared to be in good health, although not flowering at the time of this survey.

Within the Beebyn-W11 project area, all 147 individuals were recorded outside the proposed disturbance footprint.

#### 4.1.7 *Acacia speckii* – Priority 4

*Acacia speckii* is a bushy, rounded shrub or tree growing up to 3 m high, on rocky soils over granite, basalt or dolerite (Western Australian Herbarium 1998–). At Weld Range, this species has been observed to occur across the mid-sloped rocky hills and near drainage lines (ecologia 2012). *Acacia speckii* has a known range of over 150 km, between Meekatharra and Cue, with disjunct populations recorded further south in Yalgoo.

Many of the previously recorded locations of *Acacia speckii* appear to have been misidentification of *Acacia ramulosa* var. *linophylla*, which is very similar in appearance and more common in the area. Within the Beebyn-W11 project area, 25 individuals were recorded within the proposed disturbance footprint and 26 outside.

#### 4.1.8 Other species of interest

Despite searches being undertaken in the areas of previous *Hibiscus ?krichauffianus* records (as recorded by APM), this species was not found during the survey, nor were any species that are similar in appearance.

*Santalum spicatum* (Sandalwood) is a slow-growing, long-lived small woody tree or shrub, with a known range extending across most of Western Australia (Western Australian Herbarium 1998–). Sandalwood is economically valuable and is commercially harvested for the aromatic oils contained in the heartwood. As the heartwood extends throughout the tree, the whole tree (including roots) is removed and processed. This commercial use is considered a threat to populations and therefore, Sandalwood is listed as a Vulnerable species on the IUCN Red List (International Union for the Conservation of Nature 2024).

27 individuals of Sandalwood were recorded during the survey, two of which occur within the proposed disturbance footprint.

*Eremophila* sp. Weld Range is a dense, hairy, grey shrub growing to 1.5 m high with flattened, shortly hairy leaves to and mauve to purple flowers. This species is known from a range of approximately 150 km, including at the Weld Range on upper slopes and drainage lines of rocky hills (Brown and Buirchell, 2021). *Eremophila* sp. Weld Range is not of conservation significance, however, has a relatively restricted distribution and is only known from three lodged specimens within WA (FloraBase 1998-).

Two *Eremophila* sp. Weld Range individuals were recorded during the survey (Photograph 4.11), in a single location in a drainage depression in *Acacia pruinocarpa* and mulga forest (vegetation type 12), outside of the proposed disturbance footprint.






Photograph 4.11: *Eremophila* sp. Weld Range.




## 4.2 Vegetation




A total of 72 survey points were used for vegetation mapping and their locations are shown in Figure 4.4. Vegetation site descriptions are included in Appendix 3.




The survey refined the six vegetation types recorded by APM (2024) into 16 vegetation types, described in Table 4.2 and shown in Figure 4.5 to Figure 4.18. Vegetation condition of the survey area was considered 'Good' with historically disturbed areas (generally the western end and central survey areas) considered 'Poor' or 'Completely Degraded'.



Table 4.2: Vegetation types recorded during the survey.

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)	Photo
1	<p><i>Acacia pruinocarpa</i> open woodland or isolated trees over <i>Acacia aptaneura</i>, <i>A. caesaneura</i>, <i>A. craspedocarpa</i> tall sparse shrubland over <i>Eremophila fraseri</i> subsp. <i>fraseri</i>, <i>Acacia tetragonophylla</i>, <i>Rhagodia eremaea</i>, <i>Teucrium teucriiflorum</i> sparse shrubland over <i>Ptilotus obovatus</i>, <i>Menkea villosula</i>, <i>Goodenia tenuiloba</i> low sparse to open shrubland; understory denser under pockets of trees.</p> <p>Landform: Stony plains and lower slopes</p> <p>CSF: <i>Euphorbia sarcostemmoides</i> P1</p> <p>Not representative of PEC.</p>	71.4	48.4	
2	<p><i>Acacia pruinocarpa</i> mostly absent; <i>Harnieria kempeana</i> subsp. <i>muelleri</i>, <i>Acacia</i> sp. Weld Range occasional <i>Acacia incurvaneura</i>, <i>A. pteraneura</i>, <i>Acacia aptaneura</i>, <i>Grevillea berryana</i> tall open shrubland over <i>A. ramulosa</i> var. <i>linophylla</i>, <i>Ptilotus rotundifolius</i>, <i>Eremophila fraseri</i> subsp. <i>fraseri</i>, <i>E. glutinosa</i>, <i>E. forrestii</i> subsp. <i>forrestii</i> sparse shrubland over <i>Eragrostis eriopoda</i>, <i>Ptilotus aervoides</i>, <i>Erodium cygnorum</i>, low sparse tussock grassland.</p> <p>Landform: lower to upper midslopes on south facing colluvial outwash slopes; stony and gravel mantles</p> <p>Representative of PEC – aligns with Community 3 identified by Markey &amp; Dillion (2008)</p>	37.1	30.0	
3	<p><i>Acacia ramulosa</i> var. <i>linophylla</i>, <i>A. rhodophloia</i> isolated tall shrubs over <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>E. latrobei</i> subsp. <i>latrobei</i>, <i>Acacia ramulosa</i> var. <i>linophylla</i>, <i>Harnieria kempeana</i> subsp. <i>muelleri</i>, <i>Sida</i> sp. Golden calyces glabrous open shrubland over <i>Erodium cygnorum</i>, <i>Goodenia tenuiloba</i></p> <p>Landform: Hills; mostly mid to upper slopes; south aspect</p> <p>Representative of PEC – aligns with Community 5 identified by Markey &amp; Dillion (2008)</p>	62.2	45.4	



Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)	Photo
4	<p><i>Acacia pruinocarpa</i>, <i>A. incurvaneura</i> isolated trees over <i>Eremophila latrobei</i> subsp. <i>latrobei</i>, <i>Dodonaea pachyneura</i>, <i>Philotheca brucei</i> subsp. <i>brucei</i>, <i>Prostanthera petrophila</i>, <i>Tribulus suberosus</i> open shrubland over <i>Ptilotus obovatus</i>, <i>Micromyrtus sulphurea</i>, <i>Eremophila latrobei</i> subsp. <i>latrobei</i>, <i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>, <i>Stylidium longibracteatum</i>, <i>Goodenia tenuiloba</i>, <i>Hysterobaeckea occlusa</i> low open shrubland/ low open forbland.</p> <p>Representative of PEC – aligns with Communities 1b and 2 identified by Markey &amp; Dillion (2008)</p>	8.4	5.7	
5	<p><i>Acacia incurvaneura</i> low open woodland/ tall sparse shrubland over <i>Acacia</i> sp. Weld Range, <i>Eremophila macmillaniana</i> tall sparse shrubland over <i>Eremophila macmillaniana</i>, <i>Senna glaucifolia</i>, <i>Ptilotus rotundifolius</i> open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>E. macmillaniana</i>, <i>Hibiscus sturtii</i> low sparse shrubland over <i>Maireana melanocoma</i>, <i>Ptilotus aervoides</i>, <i>Goodenia tenuiloba</i> low sparse chenopod shrubland.</p> <p>Landform: Hill; BIF ridge and upper slopes, moderate to steep slopes; &gt; 80 % rock, boulders, rock outcrops</p> <p>CSF: <i>Acacia speckii</i> P4</p> <p>Representative of PEC – aligns with Community 5 identified by Markey &amp; Dillion (2008)</p>	46.3	29.5	
6	<p><i>Acacia incurvaneura</i>, <i>A. pruinocarpa</i>, <i>A. fuscaneura</i> low woodland over <i>Acacia ramulosa</i> var. <i>linophylla</i>, <i>Psydrax latifolia</i> tall open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>E. georgei</i>, <i>Rhagodia eremaea</i>, <i>Senna artemisioides</i> subsp. <i>xsturtii</i>, <i>S. glutinosa</i> subsp. <i>xluerssenii</i> shrubland over <i>Erodium cygnorum</i>, <i>Tetragonia cristata</i>, <i>Isoetopsis graminifolia</i>, <i>Menkea villosula</i>, <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> low forbland.</p> <p>Landform: Drainage lines and depressions; lower to midslopes; water gaining areas</p> <p>Not representative of PEC.</p>	60.1	24.3	

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)	Photo
7	<p><i>Acacia incurvaneura</i>, <i>A. sp.</i> Weld Range, <i>A. speckii</i> tall sparse shrubland over <i>Ptilotus rotundifolius</i>, <i>Eremophila fraseri</i>, <i>E. latrobei</i>, <i>Senna artemisioides</i> subsp. <i>helmsii</i> sparse shrubland over <i>Sida ectogama</i>, <i>Ptilotus aervoides</i>, <i>P. schwartzii</i>, <i>Erodium cygnorum</i> low sparse shrubland.</p> <p>Landform: Hill; Midslopes; dolerite; very rocky, minor outcrops</p> <p>CSF: <i>Acacia speckii</i> P4</p> <p>Representative of PEC – aligns with Community 6 identified by Markey &amp; Dillion (2008)</p>	37.5	3.7	
8	<p><i>Acacia incurvaneura</i>, <i>A. pruinocarpa</i> tall open shrubland over <i>Acacia ramulosa</i>, <i>Eremophila latrobei</i>, <i>Scaevola spinescens</i>, <i>Senna glaucifolia</i>, sparse shrubland over <i>Eremophila latrobei</i>, <i>Stenanthemum mediale</i>, <i>Sida ectogama</i>, <i>Micromyrtus sulphurea</i> low sparse shrubland.</p> <p>Landform: Low hill; minor outcrops</p> <p>CSF: <i>Stenanthemum mediale</i> P1</p> <p>Representative of PEC – aligns with Community 2 identified by Markey &amp; Dillion (2008)</p>	16.7	1.8	
9	<p>a) Patches of <i>Acacia pruinocarpa</i> low woodland over <i>Acacia incurvaneura</i>, <i>A. ramulosa</i> var. <i>linophylla</i> tall open shrubland over <i>Eremophila simulans</i> subsp. <i>simulans</i>, <i>E. georgei</i>, <i>E. forrestii</i> subsp. <i>forrestii</i> open shrubland over <i>Eragrostis eriopoda</i>, <i>Paspalidium basicladum</i>, <i>Ptilotus obovatus</i> low sparse tussock grassland.</p> <p>b) Tall open shrubland of <i>Acacia incurvaneura</i> and <i>A. ramulosa</i> var. <i>linophylla</i> over sparse shrubland over low sparse tussock grassland</p> <p>c) Mulga low woodlands further away from disturbance areas</p> <p>Landform: Hardpan plain lower catchment</p> <p>Not representative of PEC.</p>	231.0	66.3	

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)	Photo
10	<p><i>Acacia incurvaneura</i>, <i>A. caesaneura</i>, <i>A. pruinocarpa</i>, <i>A. ramulosa</i> var. <i>linophylla</i>, <i>Grevillea berryana</i>, low open woodland/ tall open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>Senna artemisioides</i> subsp. <i>filifolia</i>, <i>Acacia</i> spp. open shrubland over <i>Eremophila jucunda</i> subsp. <i>jucunda</i>, <i>E. forrestii</i> subsp. <i>forrestii</i>, <i>E. simulans</i> subsp. <i>simulans</i>, <i>Sida ectogama</i>, <i>S. sp.</i> Golden calyces glabrous, <i>Ptilotus schwartzii</i>, <i>Eragrostis eriopoda</i> low sparse shrubland.</p> <p>Landform: Low gravel hills Not representative of PEC.</p>	129.5	9.1	
11	<p>a) <i>Acacia pruinocarpa</i>, <i>A. incurvaneura</i> open forest over <i>Glycine canescens</i>, <i>Santalum spicatum</i>, <i>Psydrax latifolia</i> vineland over <i>Acacia ramulosa</i> var. <i>linophylla</i>, <i>Glycine canescens</i>, <i>Psydrax latifolia</i>, <i>Eremophila forrestii</i> subsp. <i>hastieana</i>, <i>E. georgei</i> open shrubland over <i>Sida ectogama</i>, <i>Ptilotus obovatus</i>, <i>Glycine canescens</i>, <i>Rhagodia eremaea</i> low shrubland</p> <p>b) <i>Acacia pruinocarpa</i>, <i>A. incurvaneura</i> open forest over <i>Psydrax suaevoleus</i> low open woodland over <i>Eremophila forrestii</i> subsp. <i>hastieana</i>, <i>E. georgei</i>, <i>Sida ectogama</i>, <i>Glycine canescens</i> shrubland over <i>Ptilotus obovatus</i>, <i>Eremophila georgei</i>, <i>Acacia incurvaneura</i> low open shrubland.</p> <p>Landform: Alluvial plain; broad unincised drainage line. Not representative of PEC.</p>	11.3	1.6	
12	<p><i>Acacia incurvaneura</i>, <i>A. caesaneura</i>, <i>A. pruinocarpa</i> low woodland/ <i>A. tetragonophylla</i>, <i>A. craspedocarpa</i>, <i>Psydrax latifolia</i> tall open shrubland/ <i>Eremophila forrestii</i> var. <i>forrestii</i> or var. <i>hastieana</i>, <i>A. ramulosa</i>, <i>Eremophila georgei</i> shrubland/ <i>Sida ectogama</i>, <i>Cheilanthes sieberi</i> low shrubland.</p> <p>Landform: Drainage lines lower catchment, plains; often associated with VC11 Not representative of PEC.</p>	89.2	6.6	

Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)	Photo
13	<p>Groves: <i>Acacia pruinocarpa</i> low isolated trees over <i>Acacia incurvaneura</i>, <i>A. tetragonophylla</i> tall sparse shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i>, <i>A. incurvaneura</i>, <i>Eremophila forrestii</i> subsp. <i>forrestii</i>, <i>E. latrobei</i> subsp. <i>latrobei</i>, <i>E. georgei</i> open shrubland over <i>Eremophila georgei</i>, <i>E. foliosissima</i>, <i>Ptilotus schwartzii</i>, <i>Stenopetalum filifolium</i>, <i>Menkea villosula</i>, <i>Isoetopsis graminifolia</i> low open forbland</p> <p>Stony plain: <i>Acacia aptaneura</i> tall sparse shrubland over <i>Acacia tetragonophylla</i>, <i>A. ramulosa</i> var. <i>linophylla</i> <i>Eremophila fraseri</i> subsp. <i>fraseri</i> sparse shrubland over <i>Eremophila jucunda</i> subsp. <i>jucunda</i> or <i>E. compacta</i> or <i>E. punicea</i>, <i>Ptilotus schwartzii</i>, <i>Solanum lasiophyllum</i>, <i>Eragrostis eriopoda</i>, <i>Monachather paradoxus</i> low isolated to sparse shrubs and grass tussocks.</p> <p>Landform: Ironstone gravel plain</p> <p>Not representative of PEC.</p>	410.3	33.7	
14	<p><i>Acacia aptaneura</i>, <i>A. grasbyi</i> low open woodland over <i>Eremophila pantonii</i>, <i>Acacia aptaneura</i>, <i>Senna glaucifolia</i> sparse shrubland over <i>Maireana thesioides</i>, <i>M. triptera</i>, <i>Senna glaucifolia</i> low open chenopod shrubland.</p> <p>Not representative of PEC.</p>	9.4	0.7	



Vegetation Code	Description	Area of Development Envelope (ha)	Area of Disturbance Footprint (ha)	Photo
15	<p><i>Acacia aneura</i>, <i>A. sp. Weld Range</i> tall isolated shrubs over <i>Eremophila macmillaniana</i>, <i>Acacia sp. Weld Range</i>, <i>Acacia speckii</i> sparse shrubland over <i>Cephalopterum drummondii</i>, <i>Sida ectogama</i>, <i>Aristida contorta</i> low sparse forbland.</p> <p>CSF: <i>Acacia speckii</i> P4</p> <p>Representative of PEC – aligns with Community 6 identified by Markey &amp; Dillion (2008)</p>	43.5	3.5	
16	<p><i>Acacia pteraneura</i>, <i>A. fuscaneura</i> tall open shrubland over <i>Acacia fuscaneura</i>, <i>Grevillea deflexa</i>, <i>Eremophila fraseri</i> subsp. <i>fraseri</i> sparse shrubland over <i>Calytrix desolata</i>, <i>Grevillea deflexa</i> low sparse shrubland over <i>Calytrix desolata</i>, <i>Grevillea deflexa</i> low sparse shrubland over <i>Cymbopogon ambiguus</i> low sparse tussock grassland.</p> <p>Not representative of PEC.</p>	24.2	2.2	
CL	Cleared areas	20.9	8.8	-
<b>Total</b>		<b>1,309.2</b>	<b>321.4</b>	-

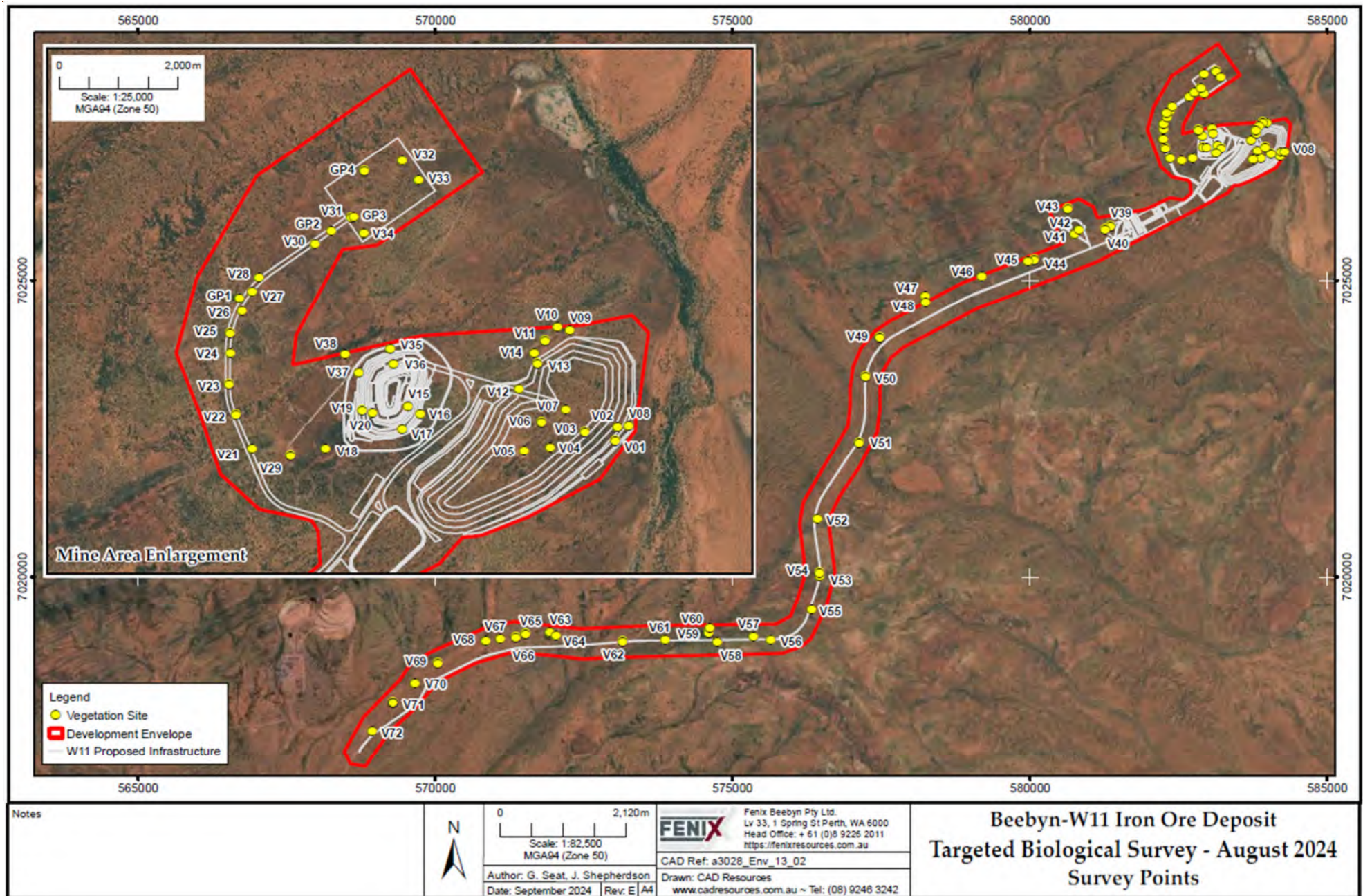


Figure 4.4: Vegetation mapping survey points.

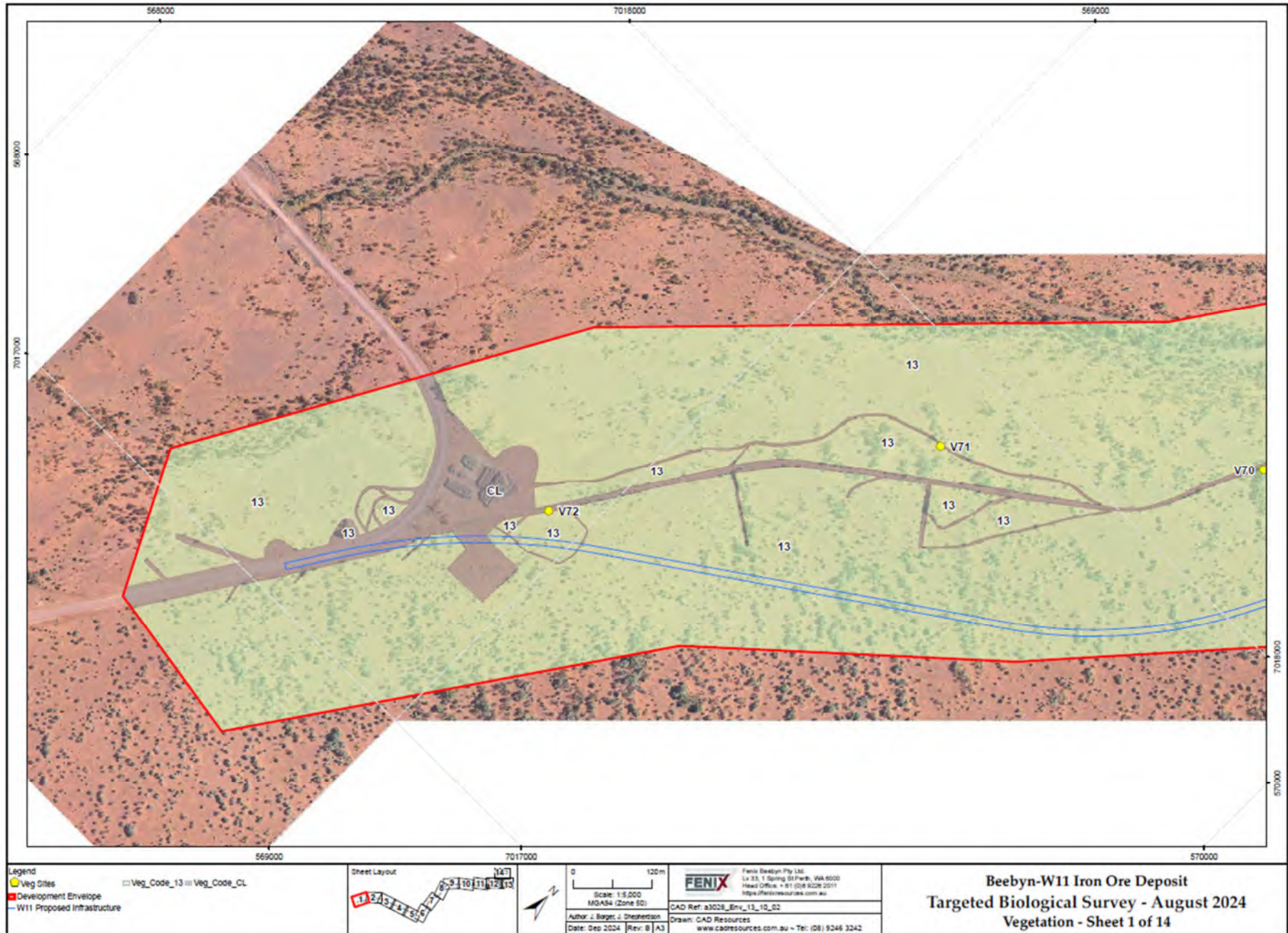


Figure 4.5: Vegetation types mapped within the survey area – map 1 of 14.

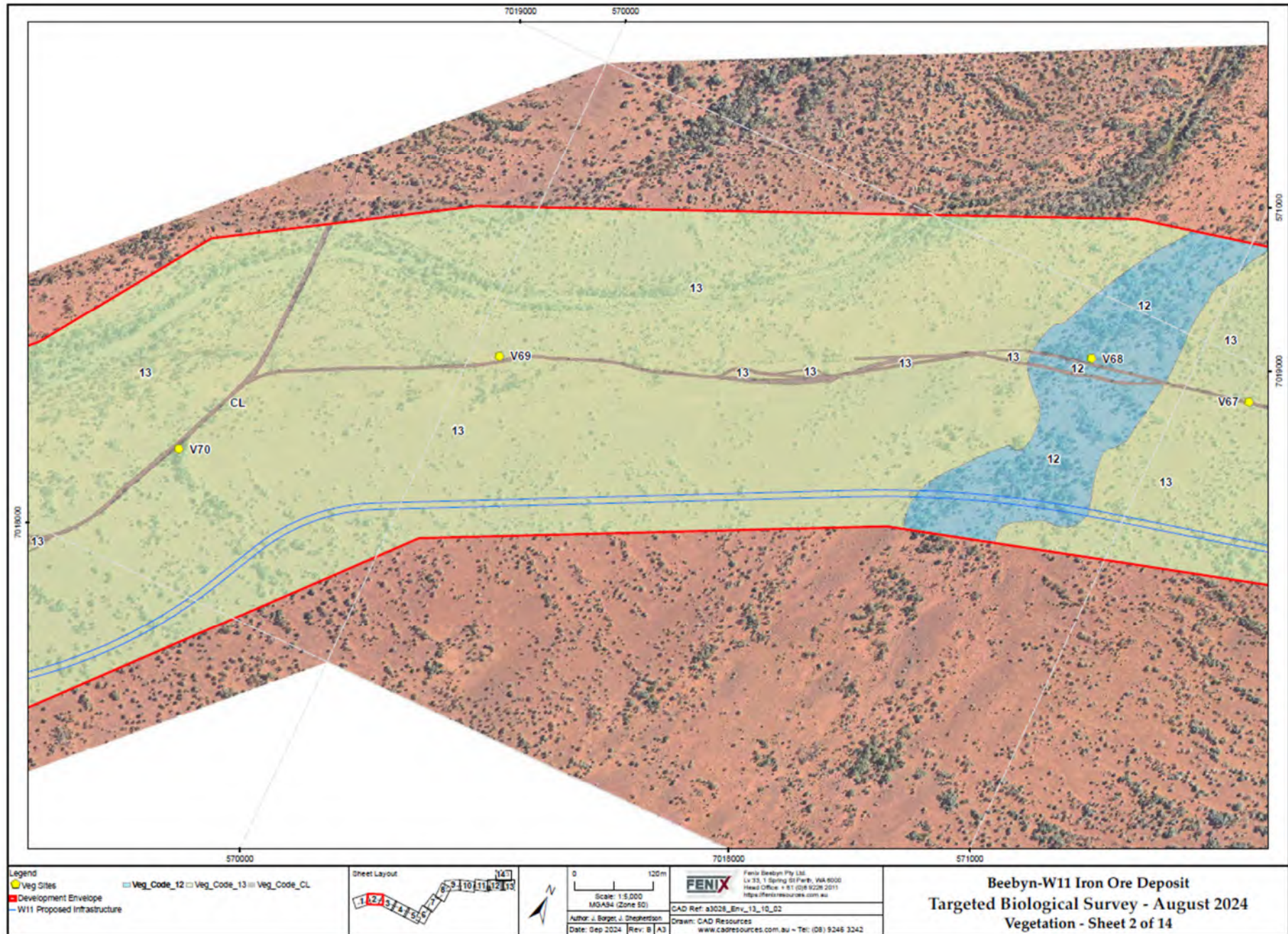


Figure 4.6: Vegetation types mapped within the survey area – map 2 of 14.

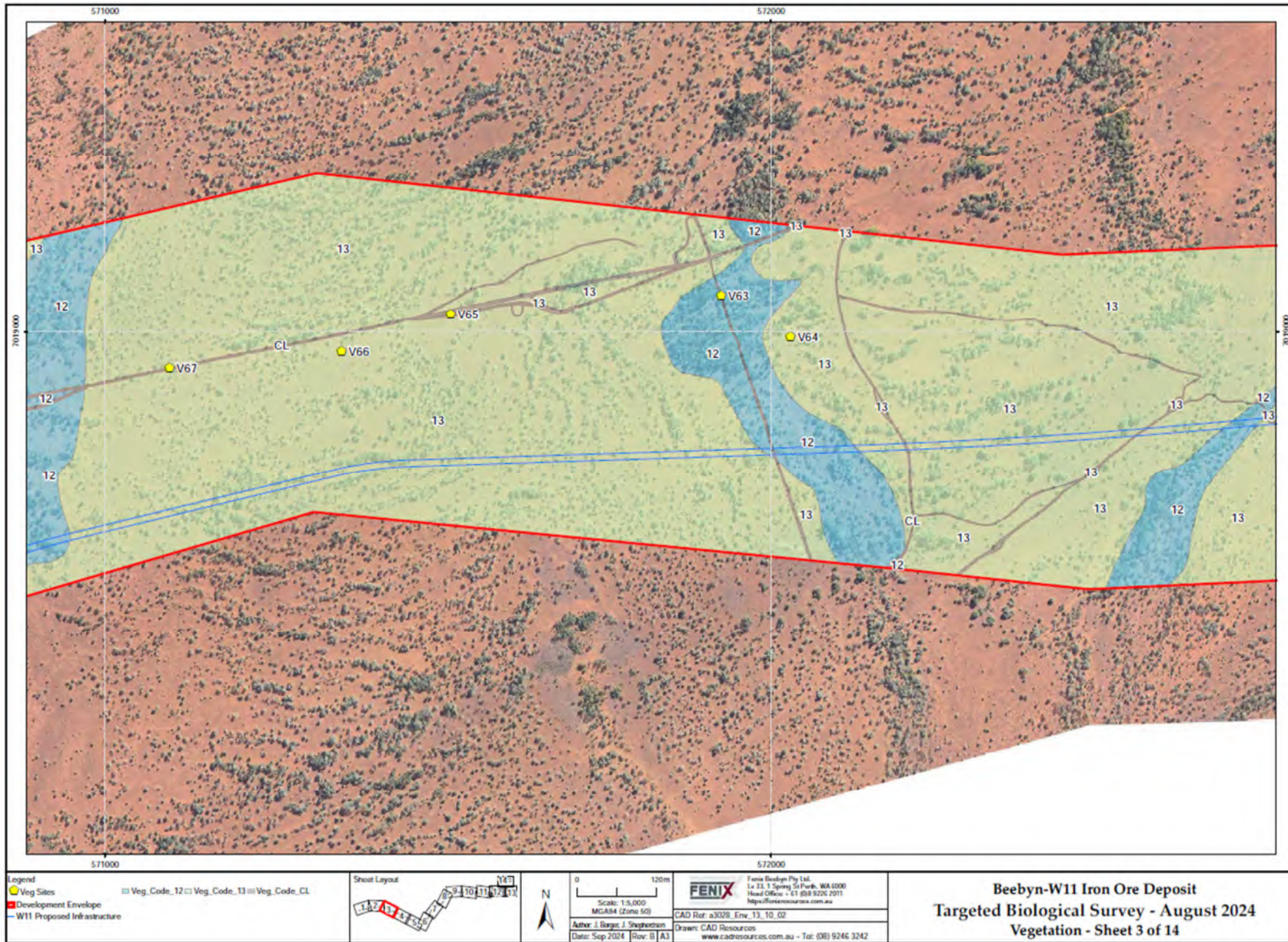


Figure 4.7: Vegetation types mapped within the survey area – map 3 of 14.

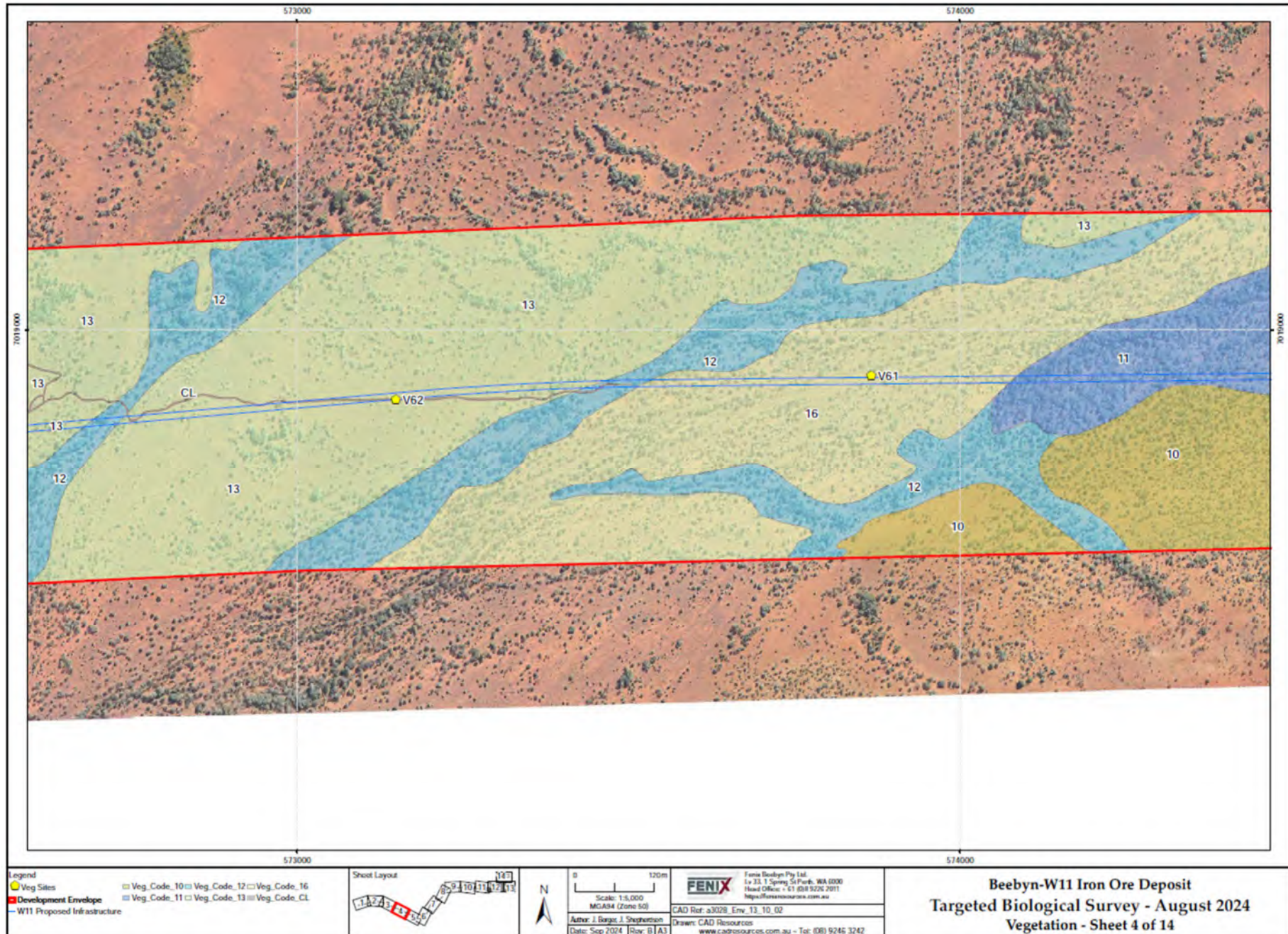


Figure 4.8: Vegetation types mapped within the survey area – map 4 of 14.

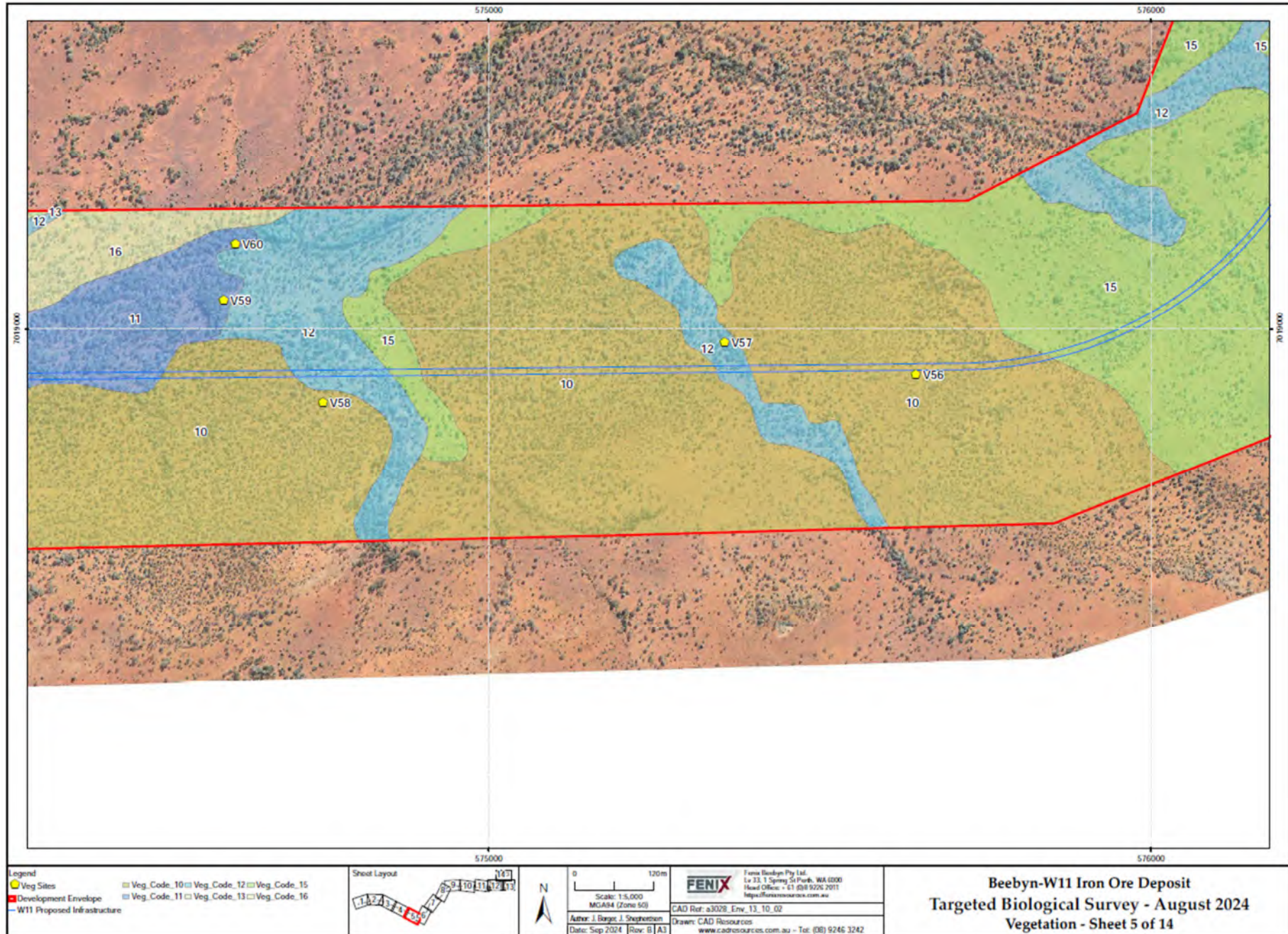


Figure 4.9: Vegetation types mapped within the survey area – map 5 of 14.

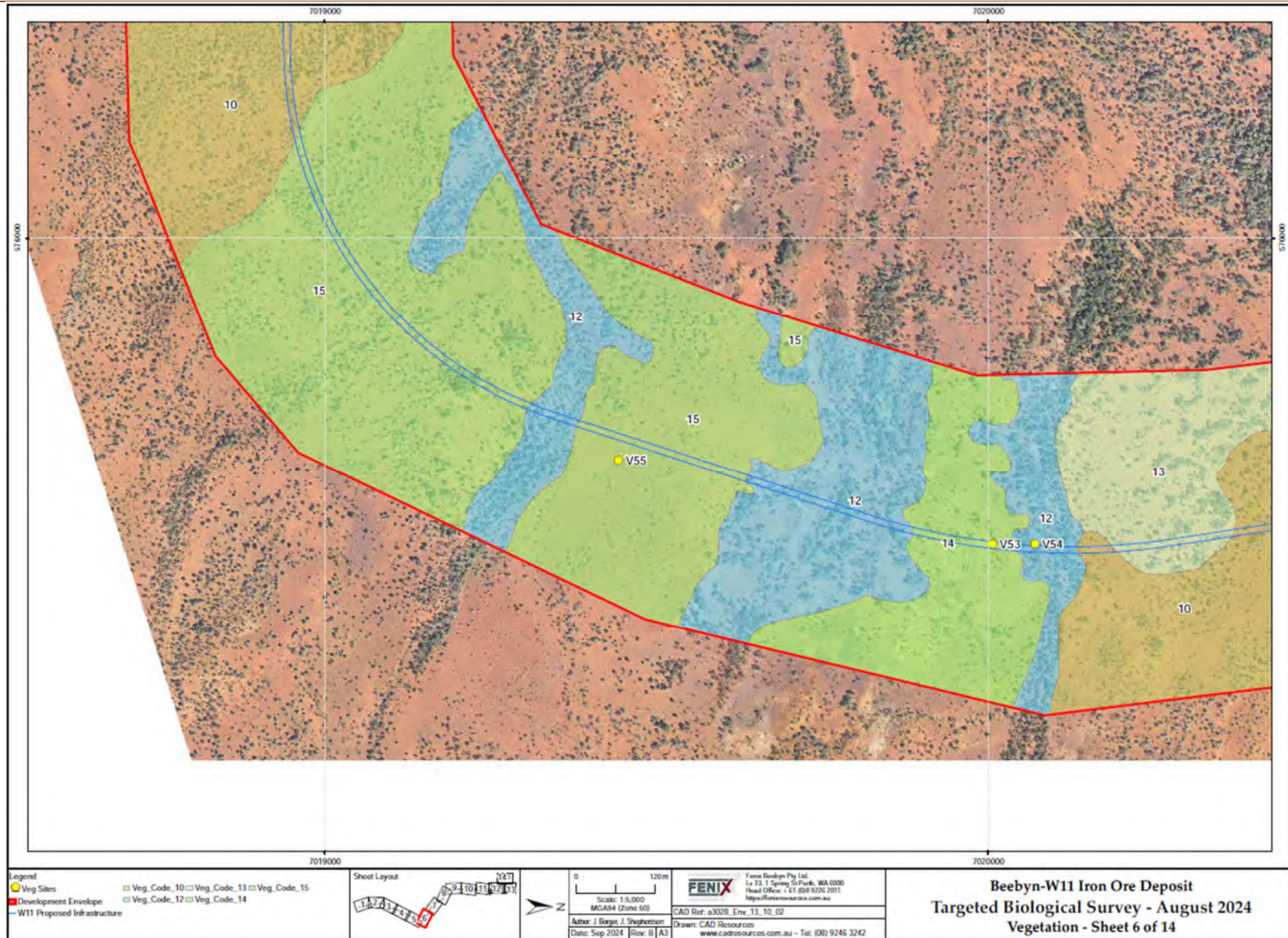


Figure 4.10: Vegetation types mapped within the survey area – map 6 of 14.



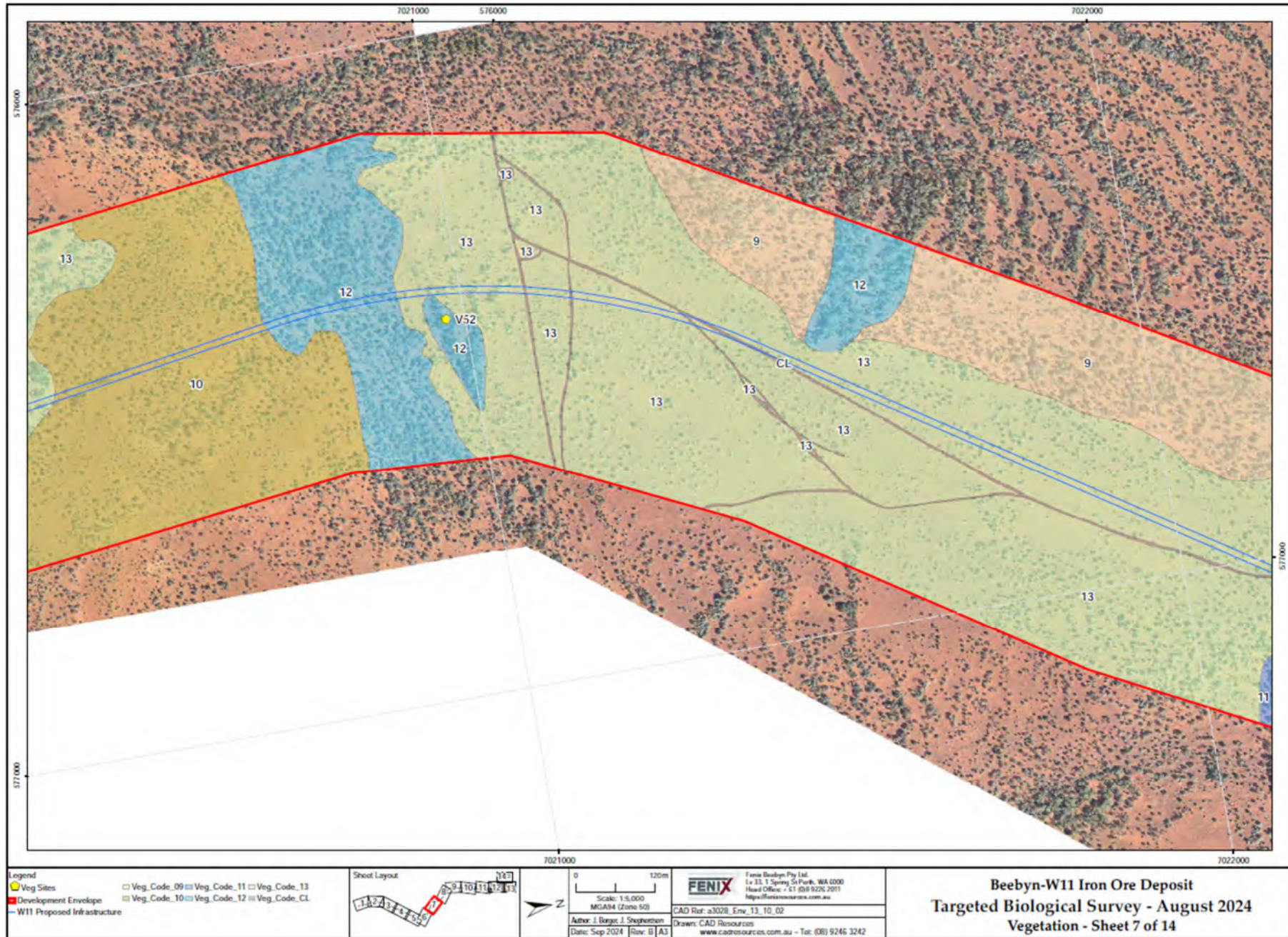


Figure 4.11: Vegetation types mapped within the survey area – map 7 of 14.

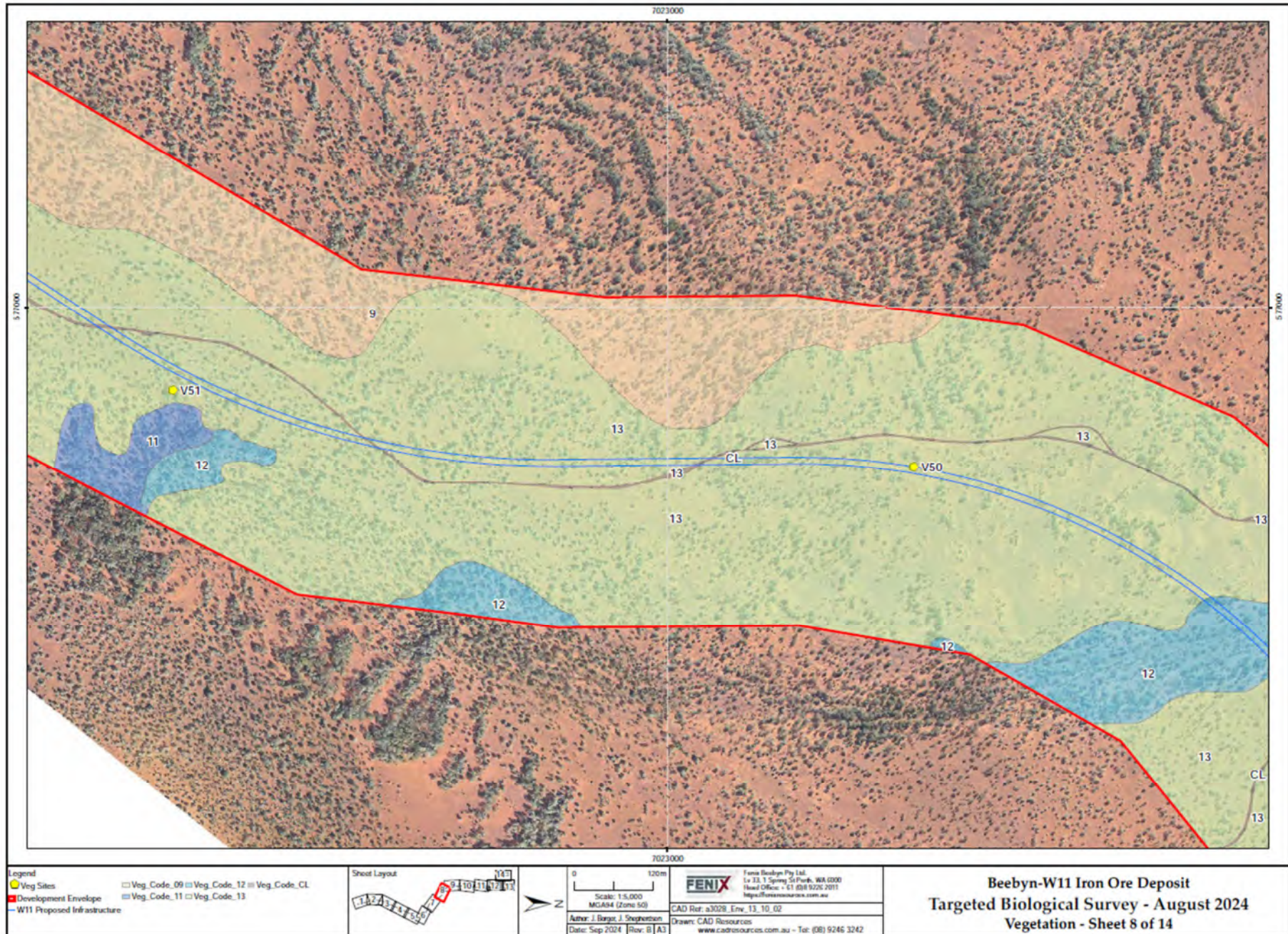


Figure 4.12: Vegetation types mapped within the survey area – map 8 of 14.

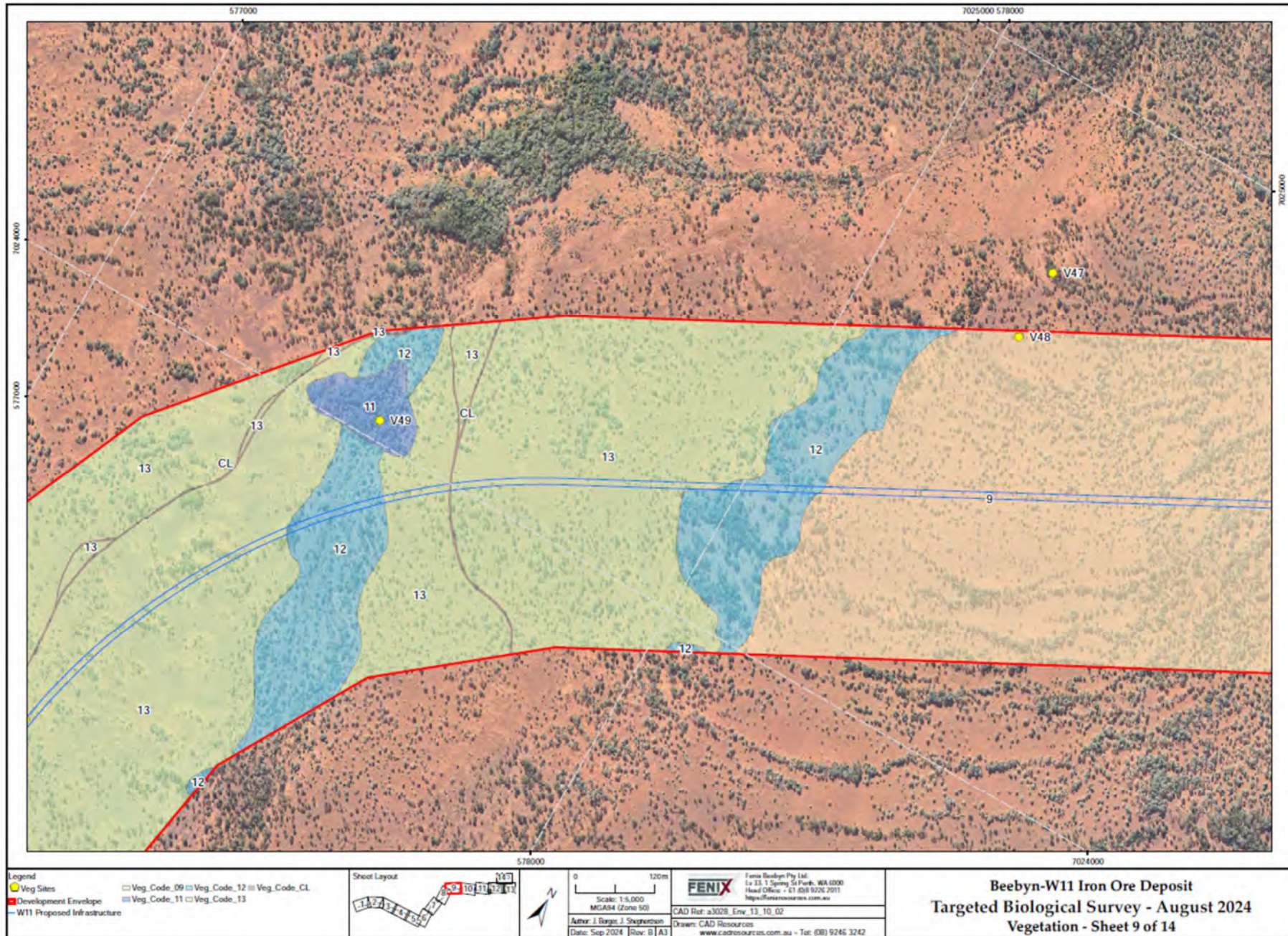


Figure 4.13: Vegetation types mapped within the survey area – map 9 of 14.

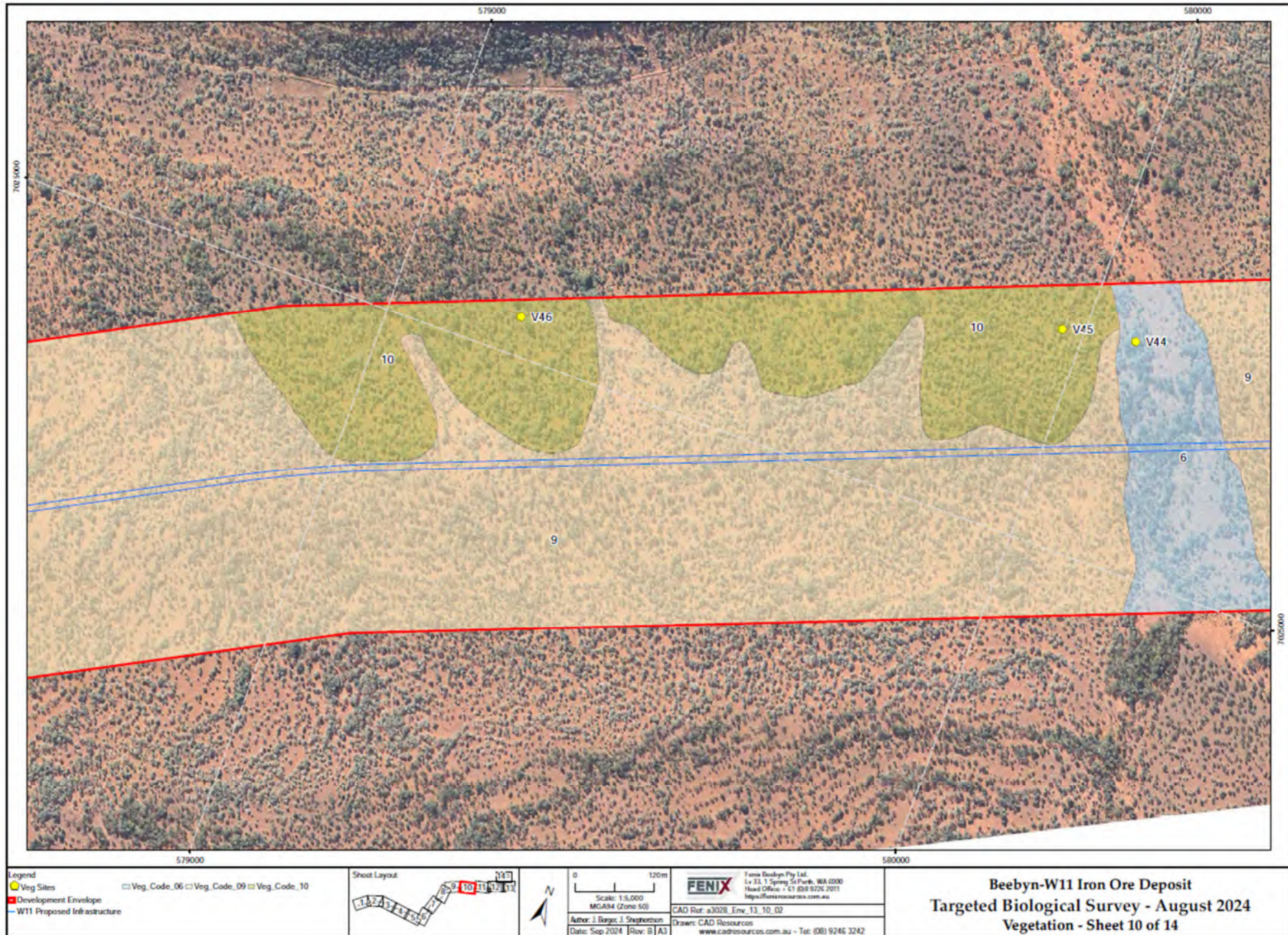


Figure 4.14: Vegetation types mapped within the survey area – map 10 of 14.

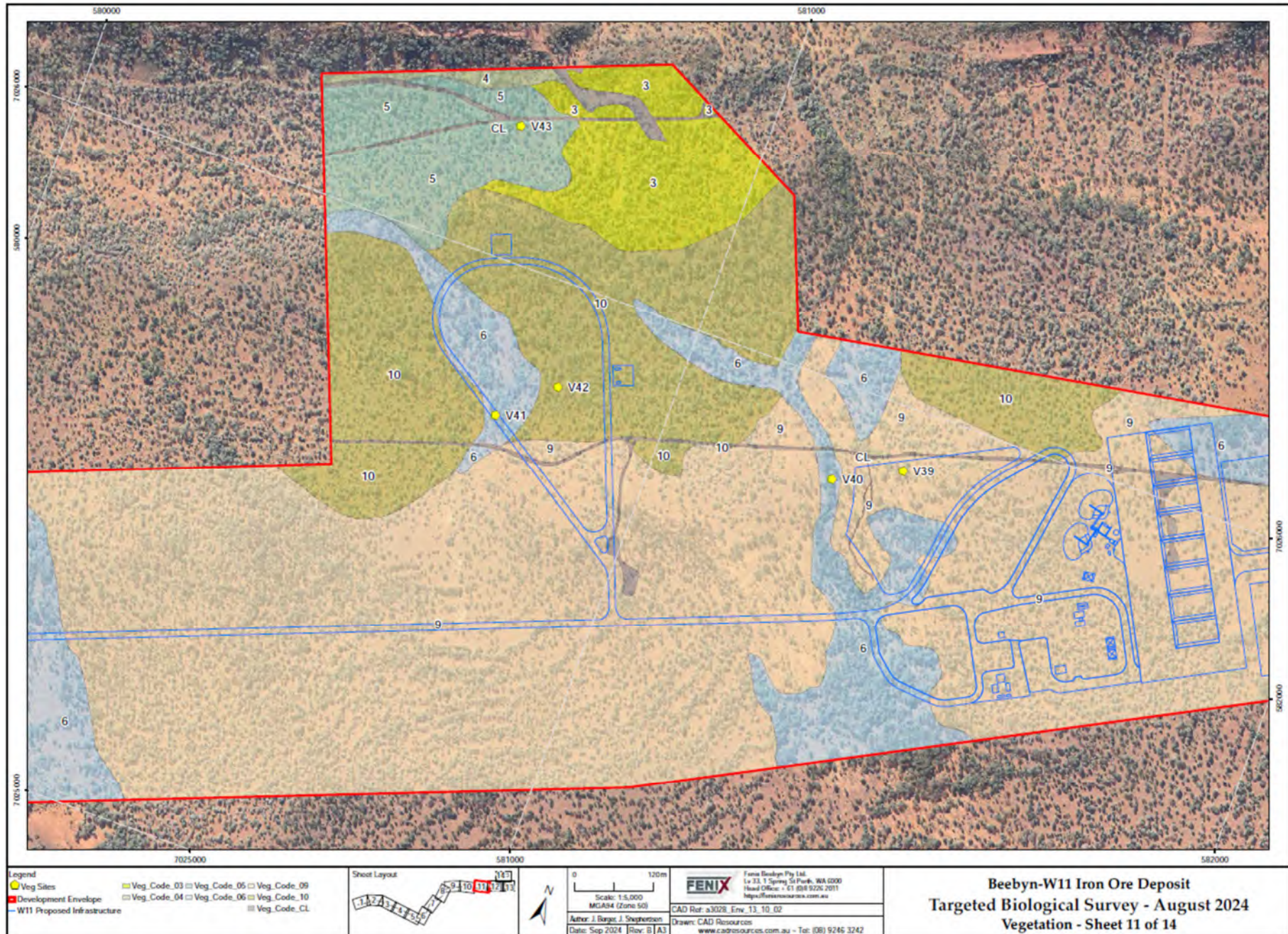


Figure 4.15: Vegetation types mapped within the survey area – map 11 of 14.

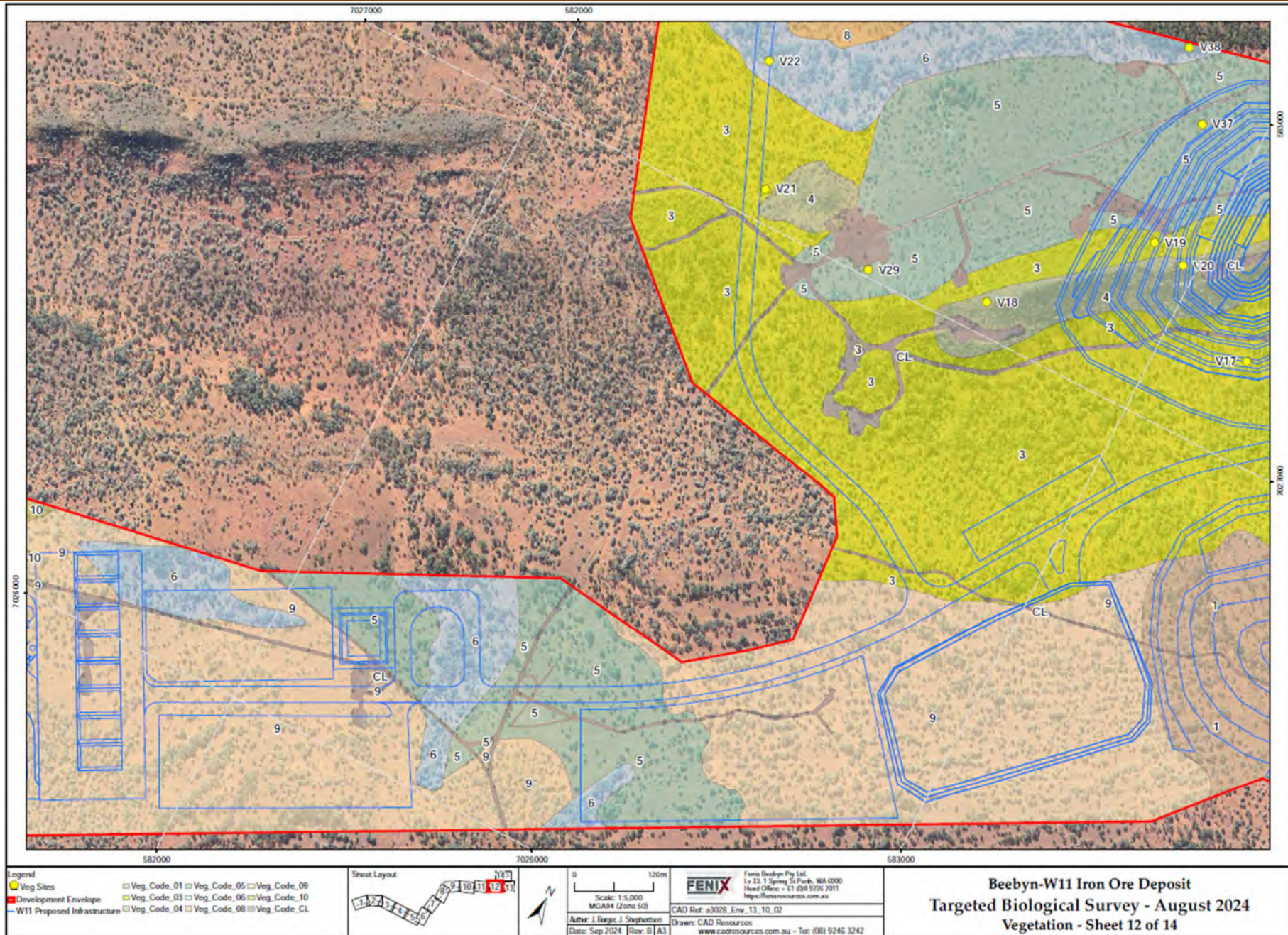


Figure 4.16: Vegetation types mapped within the survey area – map 12 of 14.

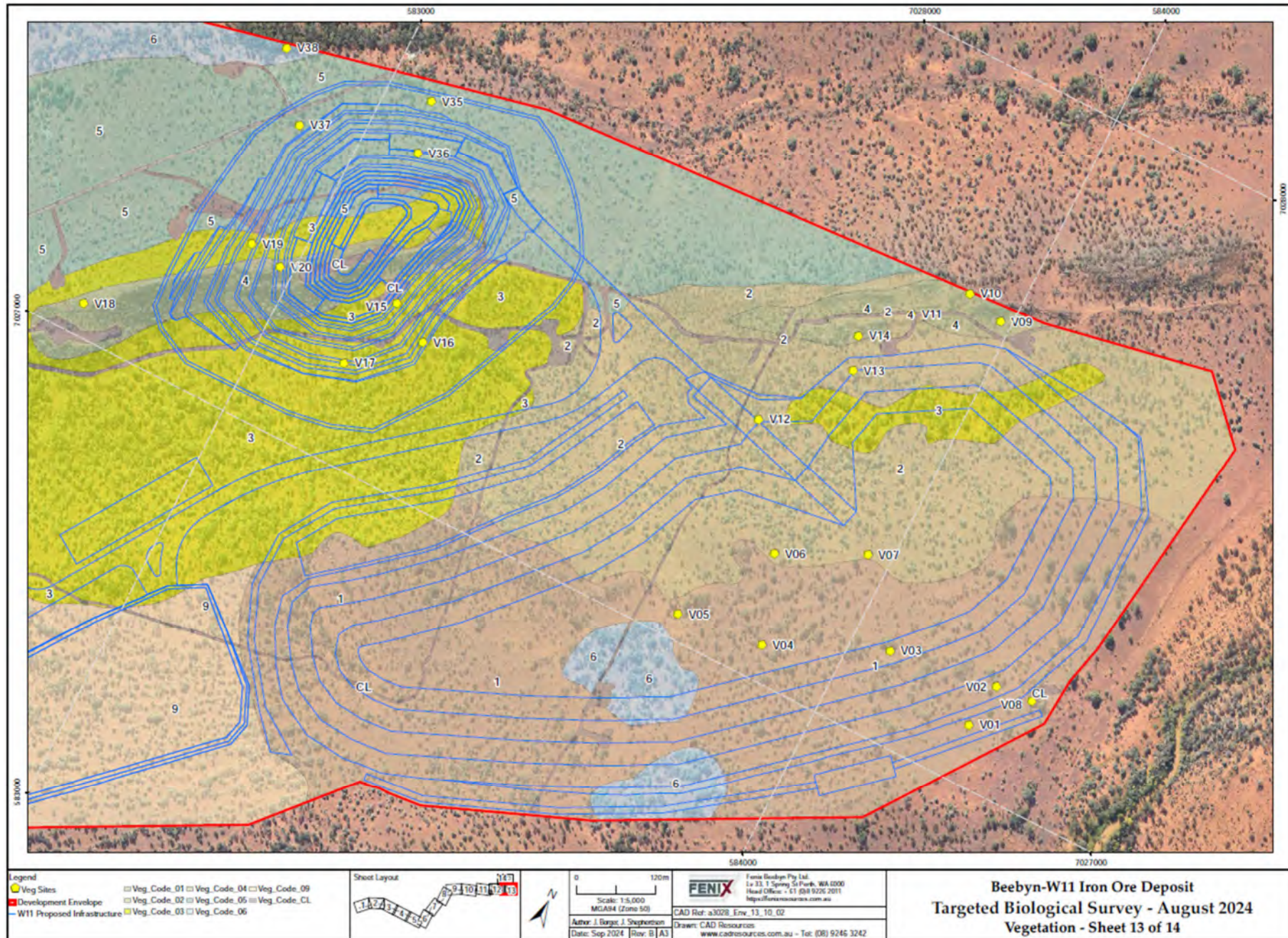


Figure 4.17: Vegetation types mapped within the survey area – map 13 of 14.

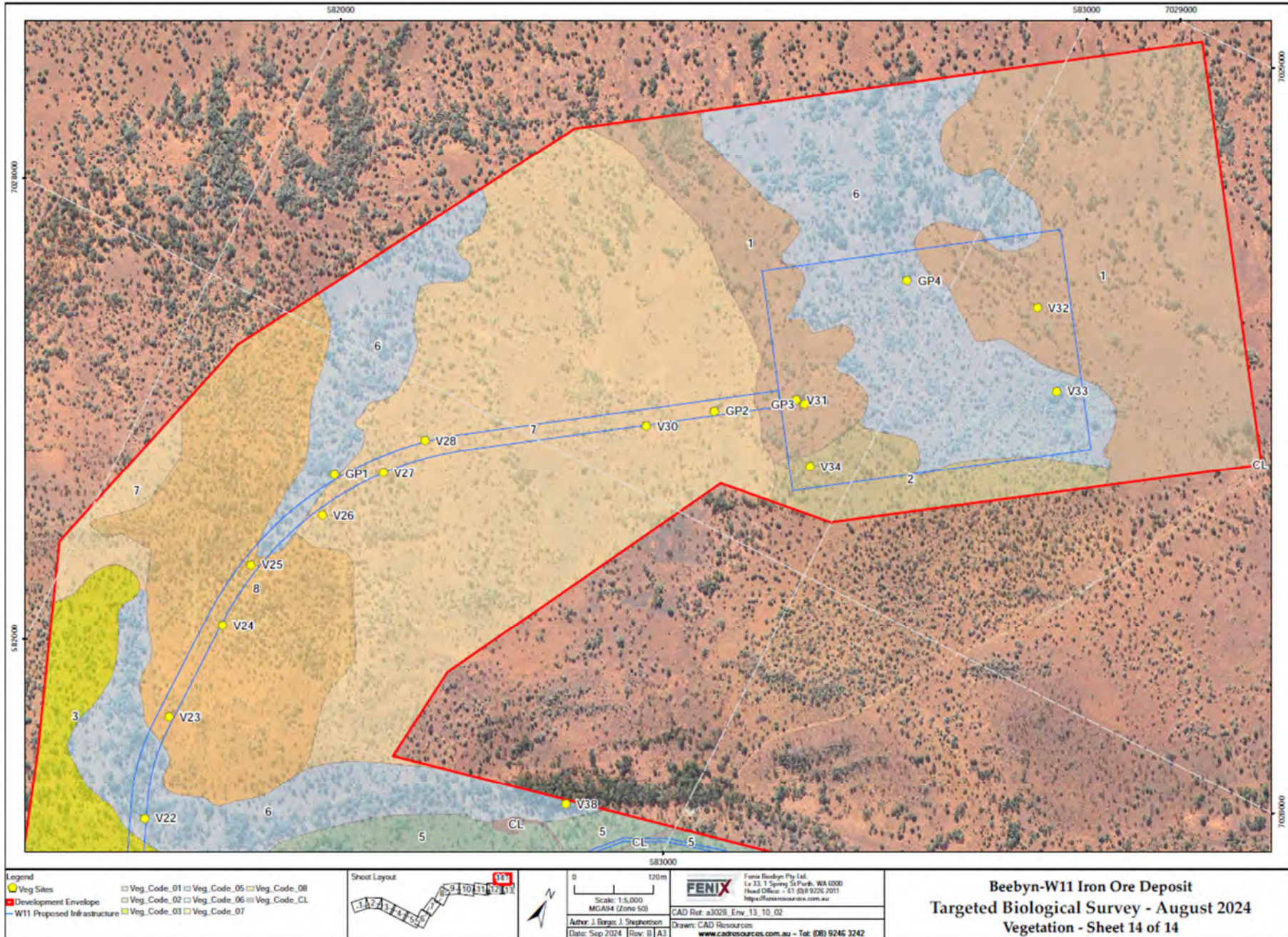


Figure 4.18: Vegetation types mapped within the survey area – map 14 of 14.



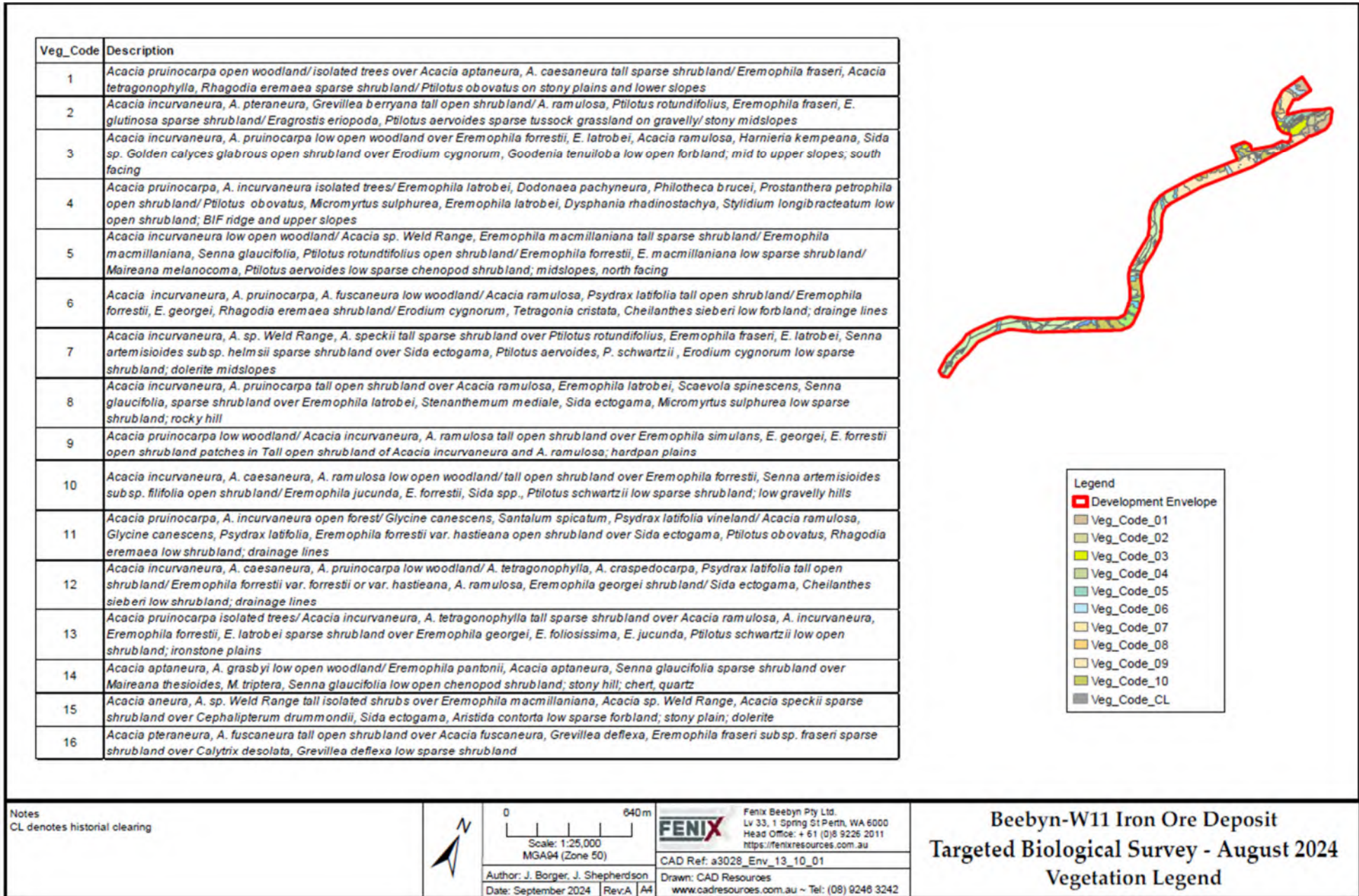


Figure 4.19: Vegetation types mapped within the survey area – vegetation descriptions.

### 4.3 Fauna and habitat

Fauna habitat mapping aligned with that recorded by APM (2024). The approximately 122 ha of the proposed disturbance footprint not surveyed by APM was assessed in this survey and determined to align with the Mulga Woodland on Hill Slope and Acacia Sand Plain habitat as described by APM (2024) and detailed in Section 2.4.1.

#### 4.3.1 Shield-backed trapdoor spider

A number of previous records of, then *Idiosoma nigrum*, now *I. clypeatum* exist within the footprint and are associated mainly with south-facing slopes. These areas were investigated and no sign of trapdoor burrows could be located at the time of the survey.

Recent experience has found that shield-back trapdoor spider burrows in this region are associated with drainage lines and denser stands of Acacia where the soil has a higher moisture content. The amount and type of leaf litter present appears to be an important factor. Typically, burrows are located beneath Acacia trees and shrubs in areas where there is evidence of surface water sheet flow (Photograph 4.12), or in denser vegetation adjacent to ephemeral drainage (Photograph 4.13).

Searches were undertaken of each of the main areas of Drainage Line habitat, which is present from the western end of the W11 infrastructure area and along the haul road route. Eleven active and five abandoned *Idiosoma clypeatum* burrows were recorded during the survey. None were located within the proposed disturbance footprint. The location of recorded burrows in relation to the proposed disturbance is presented in Figure 4.20.

Shield-back trapdoor spider burrows are very difficult to find and it is highly likely that many more burrows are present in suitable habitat across the project area. There is abundant suitable habitat in the surrounding region and *I. clypeatum* is known to be widespread across the Murchison and Yalgoo bioregions.



Photograph 4.12: Evidence of sheet flow. Trapdoor burrows were found beneath the trees in the background.



**Photograph 4.13: Acacia thicket adjacent to a drainage line. Numerous trapdoor burrows were found in this area.**



**Photograph 4.14: An active trapdoor burrow found adjacent to the proposed haul road route.**

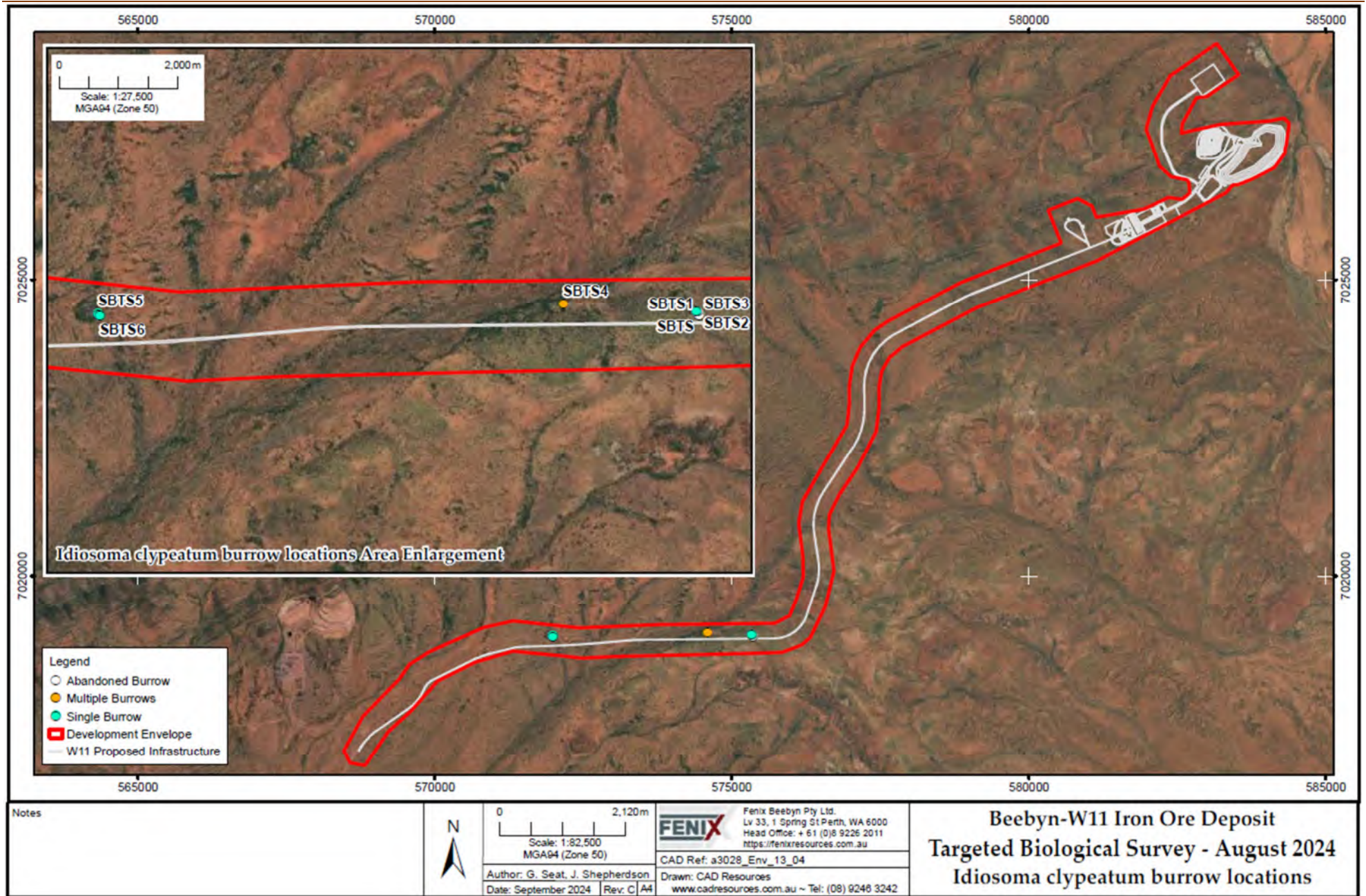


Figure 4.20: Locations of *Idiosoma clypeatum* burrows recorded during the survey.

### 4.3.2 Malleefowl

Database searches have returned several records of malleefowl (*Leipoa ocellata*) mounds in the vicinity of the W11 project. Nine possible extinct (long unused and unlikely to be used again) malleefowl mounds were recorded during the survey (Figure 4.21). While it is considered reasonably likely that the structures observed are long-extinct mounds, it is possible that some are former rabbit warrens or even geologic formations. If they were constructed by malleefowl they have not been used for decades.

The W11 project area is likely to have supported malleefowl in the past but is now at the northern extent of the species' range. Suitable habitat requirements include dense vegetation with abundant leaf litter, which is used to fill the mounds to incubate the eggs as it composts. The survey area now lacks much of the understorey biomass that was once present and is therefore lacking in leaf litter, food resources and cover provided by denser vegetation. Photograph 4.15 and Photograph 4.16 show two of the possible former mounds with open vegetation and near absence of leaf litter in the surrounding area.



Photograph 4.15: A possible long-extinct malleefowl mound at the eastern end of the project area.



Photograph 4.16: A possible long-extinct malleefowl mound at the central part of the project area.

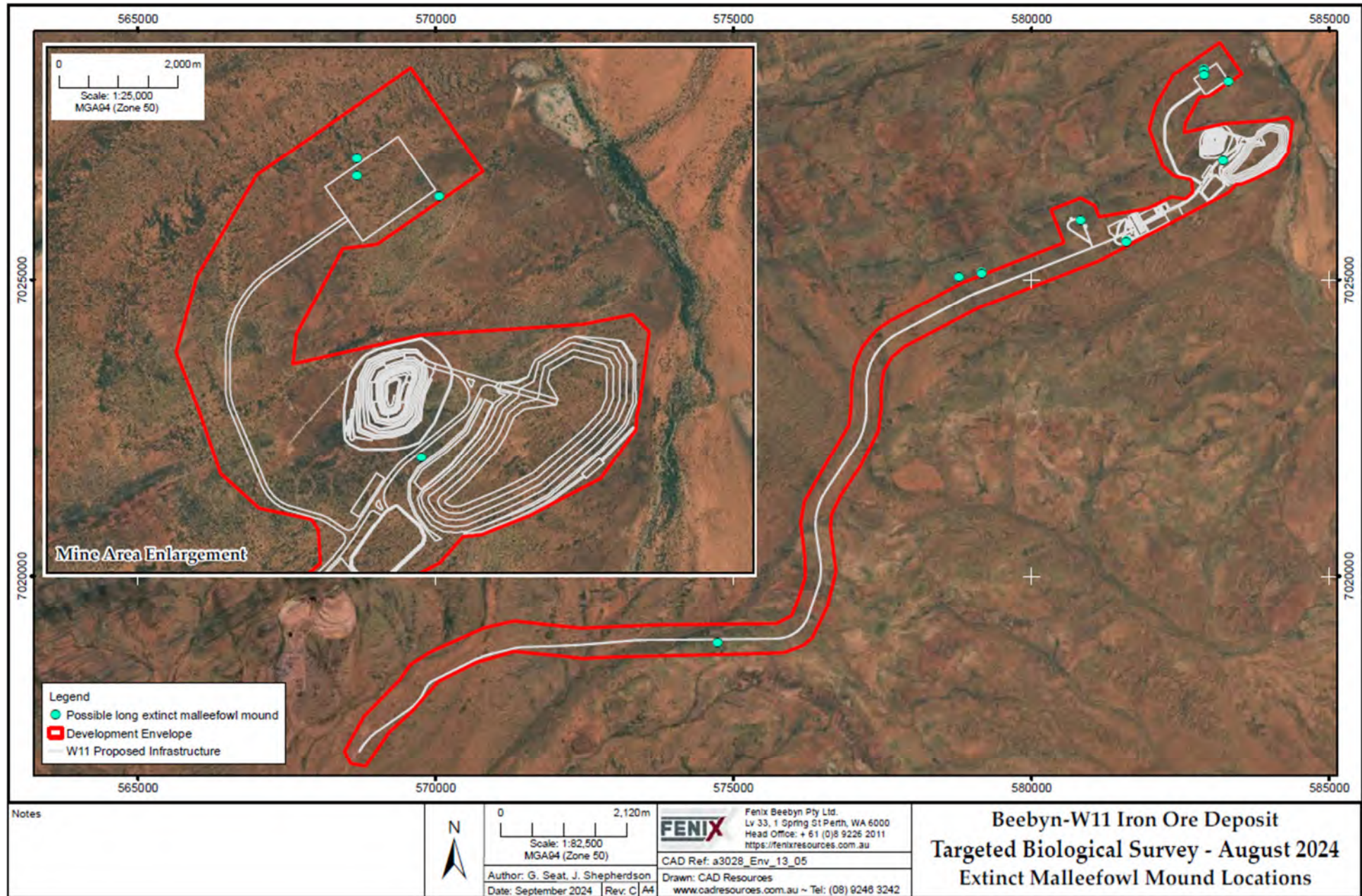


Figure 4.21: Locations of Malleefowl mounds recorded during the survey.

## 5.0 DISCUSSION

### 5.1 Flora and vegetation

Seven species of Priority flora were recorded during the survey, all of which have a known distribution of at least 150 km. Of these, three will be impacted by the proposed development:

- *Stenanthemum mediale* (P1)
- *Prostanthera petrophila* (P3)
- *Acacia speckii* (P4)

Impact to these species from the proposed development is expected to be minimal, with four individuals of *Stenanthemum mediale*, 17 individuals of *Prostanthera petrophila* and 25 individuals of *Acacia speckii* occurring within the proposed disturbance footprint. As discussed in Section 4.1, all three species have a wide distribution and it is likely that additional individuals also occur elsewhere across the Weld Range, including the unsurveyed areas adjacent to the development envelope.

Although rainfall for 2024 up to the time of survey was slightly above average, rainfall in the region has been below average for much of the previous eight years (BoM 2024). This has likely resulted in the loss of *Prostanthera petrophila* and *Micromyrtus placoides* individuals on the BIF ridges, with previous records not located. There were many long dead, low shrubs present in these areas that were likely *Micromyrtus placoides*, however were unable to be identified due to lack of vegetative material.

No *Hibiscus ?krichauffianus* individuals were recorded during the survey. It is likely that the individuals of this species previously recorded by APM (2024) have since senesced or were misidentified due to lack of reproductive material present at the time of the APM survey. Prior to the survey described in this report, the project area had received average rainfall for the year (refer to Section 2.1), with the flora in good condition and many species reproductive (flowering, fruiting) and therefore more easily identifiable.

The vegetation types recorded during the survey are typical of the Weld Range area and align with those described by Markey and Dillon (2008). Vegetation types 2, 3, 4, 5, 7, 8 and 15 correspond to the known Priority 1 Weld Range Vegetation Complexes (banded ironstone formation) PEC, as delineated by DBCA (2019). As discussed in Section 2.3.2, the PEC boundary defined by DBCA includes a 500 m “administrative buffer”, which includes some vegetation types that do not align with the PEC description. The Weld Range PEC occupies an area of 20,073 ha, with the project area (excluding existing exploration disturbance) coinciding with less than 1.1% of this area.

Vegetation condition ranged from ‘Very Good’ to ‘Completely Degraded’. Most of the disturbance was a result of moderate to heavy grazing impact from goats and euro, and historically heavy grazing by sheep that has degraded the land and made it compacted and susceptible to sheet erosion. Historical pastoral grazing has also resulted in the loss of palatable shrubs, grasses and forbs, and a low recruitment of perennial species.

### 5.2 Fauna and habitat

Fauna habitat mapping generally aligned with that recorded by APM (2024). The approximately 122 ha of the proposed disturbance footprint not surveyed by APM was determined to align with the Mulga Woodland on Hill Slope and Acacia Sand Plain habitat as described by APM (2024) and detailed in Section 2.4.1.

Eleven active and five abandoned *Idiosoma clypeatum* burrows were recorded during the survey, all within Drainage Line habitat and outside the proposed disturbance footprint. Previous records of *I. clypeatum* (then *Idiosoma nigrum*) were investigated and no sign of trapdoor burrows could be located at the time of the survey.

As outlined in Section 4.3.1, recent experience has found that shield-back trapdoor spider burrows in this region are associated with drainage lines and denser stands of Acacia where the soil has a higher moisture content. The amount and type of leaf litter present appears to be an important factor. Typically, burrows are located beneath Acacia trees

and shrubs in areas where there is evidence of surface water sheet flow or in denser vegetation adjacent to ephemeral drainage.

Shield-back trapdoor spider burrows are very difficult to find and it is highly likely that many more burrows are present in suitable habitat across the project area. There is abundant suitable habitat in the surrounding region and *I. clypeatum* is known to be widespread across the Murchison and Yalgoo bioregions.

The malleefowl mounds recorded in the project area are extinct and unlikely to be used again. A sandy substrate and abundance of leaf litter are clear requirements for the construction of the birds' incubator-nests (Benshemesh 2007, in APM 2024). Soils in the disturbance footprint have a reasonably high clay content and litter was sparse to absent, except in the narrow Drainage Lines. The quality of the habitat for foraging and nest building are generally low, except in small patches of higher quality habitat in or near the larger drainage features low in the plains (APM 2024). No mounds were recorded in this habitat and malleefowl are unlikely to occur in the project area, given the lack of suitable understorey available for foraging and predator protection, primarily as a result of heavy grazing from goats when the pastoral station was stocked.



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## Appendix 1

### Conservation Codes and Definitions

## Conservation codes for Western Australian flora and fauna (BC Regulations 2018).

Code	Definition
<b>T</b>	<p><b>Threatened species</b></p> <p>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).</p> <p>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.</p> <p>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.</p> <p>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.</p>
<b>CR</b>	<p><b>Critically endangered species</b></p> <p>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”.</p> <p>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.</p>
<b>EN</b>	<p><b>Endangered species</b></p> <p>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”.</p> <p>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.</p>
<b>VU</b>	<p><b>Vulnerable species</b></p> <p>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.</p>
	<p><b>Extinct species</b></p> <p>Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.</p>
<b>EX</b>	<p><b>Presumed extinct species</b></p> <p>Species where “there is no reasonable doubt that the last member of the species has died”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).</p> <p>Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.</p>
<b>EW</b>	<p><b>Extinct in the wild species</b></p> <p>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).</p>

	<p>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.</p>
	<p><b><u>Specially protected species</u></b></p> <p>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.</p> <p>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.</p>
MI	<p><b>Migratory species</b></p> <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>
CD	<p><b>Species of special conservation interest (conservation dependent fauna)</b></p> <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>
OS	<p><b>Other specially protected species</b></p> <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>
	<p><b><u>Priority species</u></b></p> <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.</p> <p>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.</p> <p>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.</p>
P1	<p><b>Priority 1: Poorly-known species</b></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</p>

	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.
<b>P2</b>	<p><b>Priority 2: Poorly-known species</b></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>
<b>P3</b>	<p><b>Priority 3: Poorly-known species</b></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>
<b>P4</b>	<p><b>Priority 4: Rare, Near Threatened and other species in need of monitoring</b></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>

**Conservation codes for species listed under the Environmental Protection and Biodiversity Conversation Act 1999**

Status	Definition
<b>Extinct</b>	There is no reasonable doubt that the last member of the species has died.
<b>Extinct in the wild</b>	It is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range, or It 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.
<b>Critically Endangered</b>	It is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
<b>Endangered</b>	It is not critically endangered; and It is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
<b>Vulnerable</b>	It is not critically endangered or endangered; and It is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
<b>Conservation dependant</b>	The species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or The following subparagraphs are satisfied: - The species is a species of fish - The species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised - The plan of management is in force under a law of the Commonwealth or of a State or Territory - Cessation of the plan of management would adversely affect the conservation status of the species.
<b>Threatened Ecological Communities</b>	
<b>Critically Endangered</b>	If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).
<b>Endangered</b>	If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).
<b>Vulnerable</b>	If, at that time, an ecological community is not critically endangered or endangered, but is facing a high risk of extinction in the wild in the medium-term future (indicative timeframe being the next 50 years).

## Appendix 2

### Flora species list



Family	Scientific Name	Status
Acanthaceae	<i>Harnieria kempeana subsp. muelleri</i>	
Aizoaceae	<i>Tetragonia cristata</i>	
Amaranthaceae	<i>Ptilotus aevroides</i>	
	<i>Ptilotus exaltatus</i>	
	<i>Ptilotus obovatus</i>	
	<i>Ptilotus polystachyus</i>	
	<i>Ptilotus rotundifolius</i>	
	<i>Ptilotus schwartzii</i>	
Apocynaceae	<i>Leichhardtia australis</i>	
	<i>Vincetoxicum lineare</i>	
Asparagaceae	<i>Arthropodium sp.</i>	
	<i>Thysanotus manglesianus</i>	
Asteraceae	<i>Brachyscome iberidifolia</i>	
	<i>Calotis multicaulis</i>	
	<i>Cephalipterum drummondii</i>	
	<i>Chthonocephalus pseudevax</i>	
	<i>Helipterum craspedioides</i>	
	<i>Isoetopsis graminifolia</i>	
	<i>Lawrencella davenportii</i>	
	<i>Panaetia lessonii</i>	
	<i>Rhodanthe ?sterilescens (in bud)</i>	
	<i>Rhodanthe sp.</i>	
	<i>Waitzia acuminata</i>	
Brassicaceae	<i>Lepidium oxytrichum</i>	
	<i>Menkea villosula</i>	
	<i>Stenopetalum anfractum</i>	
	<i>Stenopetalum filifolium</i>	
Celastraceae	<i>Stackhousia muricata</i>	
Chenopodiaceae	<i>Dysphania rhadinostachya subsp. rhadinostachya</i>	
	<i>Enchylaena tomentosa</i>	
	<i>Eriochiton sclerolaenoides</i>	
	<i>Maireana carnosa</i>	
	<i>Maireana georgei</i>	
	<i>Maireana melanocoma</i>	
	<i>Maireana sp.</i>	
	<i>Maireana thesioides</i>	
	<i>Maireana triptera</i>	
	<i>Rhagodia eremaea</i>	
	<i>Sclerolaena diacantha</i>	
	<i>Sclerolaena eurotioides</i>	
	<i>Sclerolaena fusiformis</i>	
	<i>Sclerolaena sp.</i>	
Crassulaceae	<i>Crassula colorata var. acuminata</i>	
Euphorbiaceae	<i>Euphorbia boophthona</i>	
	<i>Euphorbia sarcostemmoides</i>	
	<i>Beyeria lapidicola</i>	P1

Family	Scientific Name	Status
Fabaceae	<i>Acacia aneura</i>	
	<i>Acacia aptaneura</i>	
	<i>Acacia caesaneura</i>	
	<i>Acacia craspedocarpa</i>	
	<i>Acacia fuscaneura</i>	
	<i>Acacia grasbyi</i>	
	<i>Acacia incurvaneura</i>	
	<i>Acacia mulganeura</i>	
	<i>Acacia pruinocarpa</i>	
	<i>Acacia pteraneura</i>	
	<i>Acacia ramulosa</i> var. <i>linophylla</i>	
	<i>Acacia rhodophloia</i>	
	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>	
	<i>Acacia</i> sp. <i>Weld Range</i>	
	<i>Acacia speckii</i>	P4
	<i>Acacia tetragonophylla</i>	
	<i>Chorizema genistoides</i>	
	<i>Glycine canescens</i>	
	<i>Senna artemisioides</i> subsp. <i>artemisioides</i>	
	<i>Senna artemisioides</i> subsp. <i>filifolia</i>	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>		
<i>Senna artemisioides</i> subsp. <i>xsturtii</i>		
<i>Senna glaucifolia</i>		
<i>Senna glutinosa</i> subsp. <i>chatelainiana</i>		
<i>Senna glutinosa</i> subsp. <i>xluerssenii</i>		
<i>Senna</i> sp. <i>Meekatharra</i>		
<i>Senna symonii</i>		
Geraniaceae	<i>Erodium cygnorum</i>	
Goodeniaceae	<i>Goodenia berardiana</i>	
	<i>Goodenia tenuiloba</i>	
	<i>Scaevola spinescens</i>	
Haloragaceae	<i>Haloragis odontocarpa</i>	
Lamiaceae	<i>Prostanthera petrophila</i>	
	<i>Teucrium teucriiflorum</i>	
Malvaceae	<i>Abutilon</i> sp.	
	<i>Androcalva luteiflora</i>	
	<i>Brachychiton gregorii</i>	
	<i>Hibiscus</i> sp.	
	<i>Hibiscus sturtii</i>	
	<i>Sida calyxhymenia</i>	
	<i>Sida ectogama</i>	
<i>Sida</i> sp. <i>Golden calyces glabrous</i>		
Marsileaceae	<i>Marsilea hirsuta</i>	
Montiaceae	<i>Calandrinia</i> sp.	
Myrtaceae	<i>Calytrix desolata</i>	
	<i>Hysterobaeckea occlusa</i>	

Family	Scientific Name	Status
Myrtaceae	<i>Micromyrtus placoides</i>	P3
	<i>Micromyrtus sulphurea</i>	
	<i>Thryptomene decussata</i>	
	<i>Verticordia jamiesonii</i>	P3
Oxalidaceae	<i>Oxalis ?corniculata*</i>	Weed
Pittosporaceae	<i>Pittosporum angustifolium</i>	
Poaceae	<i>Amphipogon caricinus</i> var. <i>caricinus</i>	
	<i>Aristida contorta</i>	
	<i>Austrostipa elegantissima</i>	
	<i>Cymbopogon ambiguus</i>	
	<i>Eragrostis dielsii</i>	
	<i>Eragrostis eriopoda</i>	
	<i>Eragrostis falcata</i>	
	<i>Monachather paradoxus</i>	
	<i>Paspalidium basicladum</i>	
	<i>Thyridolepis multiculmis</i>	
Portulacaceae	<i>Portulaca oleracea</i>	
Proteaceae	<i>Grevillea berryana</i>	
	<i>Grevillea deflexa</i>	
	<i>Hakea lorea</i>	
	<i>Hakea preissii</i>	
Pteridaceae	<i>Cheilanthes lasiophyllum</i>	
	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	
	<i>Cheilanthes</i> sp.	
Rhamnaceae	<i>Stenanthemum mediale</i>	P1
Rubiaceae	<i>Psydrax latifolia</i>	
	<i>Psydrax rigidula</i>	
	<i>Psydrax suaveolens</i>	
Rutaceae	<i>Philothea brucei</i> subsp. <i>brucei</i>	
Santalaceae	<i>Santalum spicatum</i>	R
Sapindaceae	<i>Dodonaea pachyneura</i>	
Scrophulariaceae	<i>Eremophila compacta</i>	
	<i>Eremophila eriocalyx</i>	
	<i>Eremophila exilifolia</i>	
	<i>Eremophila foliosissima</i>	
	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	
	<i>Eremophila forrestii</i> subsp. <i>hastieana</i>	
	<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	
	<i>Eremophila georgei</i>	
	<i>Eremophila gilesii</i>	
	<i>Eremophila glutinosa</i>	
	<i>Eremophila granitica</i>	
	<i>Eremophila jucunda</i> subsp. <i>jucunda</i>	
	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	
	<i>Eremophila mackinlayi</i> subsp. <i>spathulata</i>	
<i>Eremophila macmillaniana</i>		

<b>Family</b>	<b>Scientific Name</b>	<b>Status</b>
Scrophulariaceae	<i>Eremophila pantonii</i>	
	<i>Eremophila punicea</i>	
	<i>Eremophila serrulata</i>	
	<i>Eremophila simulans subsp. simulans</i>	
	<i>Eremophila sp. Weld Range</i>	
	<i>Eremophila spathulata</i>	
Solanaceae	<i>Nicotiana obliqua</i>	
	<i>Nicotiana rosulata</i>	
	<i>Solanum lasiophyllum</i>	
Stylidiaceae	<i>Stylidium longibracteatum</i>	
Zygophyllaceae	<i>Roepera lobulata</i>	
	<i>Roepera sp.</i>	
	<i>Tribulus suberosus</i>	

## Appendix 3

### Vegetation site descriptions

Fenix Beebyn-W11 Haul Road, Pit, WRD and Gravel Pit site descriptions

NVIS foliage cover codes.

Cover Characteristics					
Foliage cover	70 – 100	30 – 70	10 – 30	< 10	~ 0 (<2)
Crown cover	>80	50 – 80	20 – 50	0.25 – 20	<0.25
% cover	>80	50 – 80	20 – 50	0.25 - <20	<0.25
Cover code	d	c	i	r	bi

Height classes defined for the NVIS.


Height		Growth Form				
Height Class	Height Range (m)	Tree	Shrub, chenopod shrub	Tree mallee, mallee shrub	Tussock grass	Bryophyte, lichen
8	>30	Tall	N/A	N/A	N/A	N/A
7	10 – 30	Mid	N/A	Tall	N/A	N/A
6	< 10	Low	N/A	Mid	N/A	N/A
5	<3	N/A	N/A	Low	N/A	N/A
4	>2	N/A	Tall	N/A	Tall	N/A
3	1 – 2	N/A	Mid	N/A	Tall	N/A
2	0.5 – 1	N/A	Low	N/A	Mid	Tall
1	< 0.5	N/A	Low	N/A	Low	Low

Summary of NVIS strata codes.

NVIS stratum code	NVIS sub-stratum	Description	Growth forms	Height classes
U	U1	Tallest stratum	Tree, tree mallees (mallee shrubs)	8, 7, 6, (5)
	U2	Sub-canopy layer, second tree layer		
	U3	Sub-canopy layer, third tree layer		
M	M1	Tallest shrub layer	Shrubs, low trees, mallee shrubs, low shrubs, vines	(6), 5, 4, 3
	M2	Next shrub layer		
	M3	Third shrub layer		
G	G1	Tallest ground species	Grasses, forbs, sedges, rushes, vines, lichens, low shrubs	(4, 3), 2, 1
	G2	Ground		

Growth Form Codes used in descriptions

T	Tree	U	Samphire shrub	F	Forb
M	Mallee	Z	Heath shrub	E	Fern
S	Shrub	G	Tussock grass	L	Vine
R	Rush	V	Sedge	B	Bryophyte (moss, liverwort)
C	Chenopod shrub	K	Epiphyte	N	Lichen

V 1 30/07/2024 WRD area			
GPS: 584216 E/ 7027089 N Elevation: 499 m		Landform: Stony plain, very gentle slope aspect east Proposed WRD east end	
Land surface: Yellowish red silty clay loam; surface rock (BIF, quartz 2 – 10 cm, 30 – 40 %; gravel 20 – 30 %); litter 2 – 10 %			
Condition & disturbances: Poor; pastoral impacts – grazing, tracks; active erosion			
NVIS 6: U1^ <i>Acacia pruinocarpa</i> \Acacia\^tree\7\bi; U2^ <i>Acacia aptaneura</i> , <i>A. pruinocarpa</i> \Acacia\^tree\6\l; M1^ <i>Acacia aptaneura</i> , <i>A. craspedocarpa</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> \Acacia\^shrub, tree\4\l; M2^ <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Senna symonii</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Sida ectogama</i> \Eremophila\^shrub\2\bi; G1^ <i>Ptilotus obovatus</i> , <i>Enchylaena tomentosa</i> , <i>Goodenia tenuiloba</i> , <i>Erodium cygnorum</i> , <i>Eragrostis eriopoda</i> \Ptilotus\^shrub, chenopod shrub, forb\1\i			
Vegetation: <i>Acacia pruinocarpa</i> isolated trees over <i>Acacia aptaneura</i> , <i>A. pruinocarpa</i> low open woodland over <i>Acacia aptaneura</i> , <i>A. craspedocarpa</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> tall sparse shrubland over <i>Ptilotus obovatus</i> , <i>Enchylaena tomentosa</i> , <i>Goodenia tenuiloba</i> low sparse shrubland			
Height (m)	Crown cover %	Habit	Species
8 – 12	< 2	T	<i>Acacia pruinocarpa</i>
4 – 8	2 – 10	T	<i>Acacia aptaneura</i> , <i>A. pruinocarpa</i>
2 – 4	2 – 10	S, T	<i>Acacia aptaneura</i> , <i>A. craspedocarpa</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i>
0.5 – 1	< 2	S	<i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Senna symonii</i> , <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> , <i>Sida ectogama</i>
< 0.5	10 – 20	S, C, F	<i>Ptilotus obovatus</i> , <i>Enchylaena tomentosa</i> , <i>Goodenia tenuiloba</i> , <i>Erodium cygnorum</i> , <i>Eragrostis eriopoda</i>
Other species: <i>Acacia caesaneura</i> , <i>A. incurvaneura</i> , <i>A. tetragonophylla</i> , <i>Euphorbia sarcostemmoides</i> , <i>Monachather paradoxus</i> , <i>Rhagodia eremaea</i>			
<i>Acacia aptaneura</i> <i>Acacia caesaneura</i> <i>Acacia craspedocarpa</i> <i>Acacia incurvaneura</i> <i>Acacia pruinocarpa</i> <i>Acacia tetragonophylla</i> <i>Enchylaena tomentosa</i> <i>Eragrostis eriopoda</i> <i>Eremophila fraseri</i> subsp. <i>fraseri</i> <i>Eremophila mackinlayi</i> subsp. <i>spathulata</i> <i>Erodium cygnorum</i> <i>Euphorbia sarcostemmoides</i> P1 <i>Goodenia tenuiloba</i> <i>Monachather paradoxus</i> <i>Ptilotus obovatus</i> <i>Rhagodia eremaea</i> <i>Senna symonii</i> (sterile; tentative) <i>Sida ectogama</i>			

V 2 30<sup>th</sup> July 2024 WRD area

GPS: 584227 E/ 7027159 N  
Elevation: 499 m

Landform: Stony plain; denser patch of vegetation

Land surface: Yellowish red silty clay loam

Condition & disturbances: Good; many germinating forbs; pastoral impacts

NVIS 6: U1+^ *Acacia pruinocarpa* \Acacia\^tree\6\i; M1^ *Acacia tetragonophylla*, *A. caesaneura*, *A. aptaneura* \Acacia\^shrub\4\i; M2^ *Eremophila fraseri* subsp. *fraseri*, *Acacia tetragonophylla* \Eremophila\^shrub\3\i; G1^ *Ptilotus obovatus*, *Sida ectogama*, *Rhagodia eremaea*, *Acacia tetragonophylla*, *Eremophila fraseri* subsp. *fraseri* \Ptilotus\^shrub, chenopod shrub\1\c; G2^ *Menkea villosula*, *Crassula colorata* var. *acuminata*, *Stenopetalum anfractum*, *Aristida contorta*, *Leichhardtia australis* \Menkea\^forb, tussock grass, climber\1\c



Vegetation: *Acacia pruinocarpa* open woodland over *Acacia tetragonophylla*, *A. caesaneura*, *A. aptaneura* tall sparse shrubland over *Eremophila fraseri* subsp. *fraseri*, *Acacia tetragonophylla* sparse shrubland over *Ptilotus obovatus*, *Sida ectogama*, *Rhagodia eremaea* low open shrubland over *Menkea villosula*, *Crassula colorata* var. *acuminata*, *Stenopetalum anfractum* low forbland

Height (m)	Crown cover %	Habit	Species
8 – 10	10 – 30	T	<i>Acacia pruinocarpa</i>
2 – 3	2 – 10	S	<i>Acacia tetragonophylla</i> , <i>A. caesaneura</i> , <i>A. aptaneura</i>
1 – 2	2 – 10	S	<i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Acacia tetragonophylla</i>
0.3 – 0.6	20 – 30	S, C	<i>Ptilotus obovatus</i> , <i>Sida ectogama</i> , <i>Rhagodia eremaea</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i>
< 0.2	40 – 60	F, G, L	<i>Menkea villosula</i> , <i>Crassula colorata</i> var. <i>acuminata</i> , <i>Stenopetalum anfractum</i> , <i>Aristida contorta</i> , <i>Leichhardtia australis</i>

*Acacia aptaneura*  
*Acacia caesaneura*  
*Acacia pruinocarpa*  
*Acacia tetragonophylla*  
*Aristida contorta*  
*Crassula colorata* var. *acuminata*  
*Eremophila fraseri* subsp. *fraseri*  
*Leichhardtia australis*  
*Menkea villosula*  
*Ptilotus obovatus*  
*Rhagodia eremaea*  
*Stenopetalum anfractum*  
*Sida ectogama*





V3 30 <sup>th</sup> July 2024 7.56 am WRD area Relevé	
GPS: 584060 E/ 7027134 N Elevation: 501 m	Landform: Gently sloping stony plain; aspect east
Land surface: Yellowish red silty clay loam; surface rock 10 – 30 %	
Condition & disturbances: Good within patch; poor to degraded in surrounding areas	
Vegetation: <i>Acacia pruinocarpa</i> , <i>A. aptaneura</i> low open woodland over <i>Acacia pruinocarpa</i> , <i>A. aptaneura</i> , <i>A. tetragonophylla</i> tall sparse shrubland over <i>Acacia caesaneura</i> , <i>A. tetragonophylla</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> isolated shrubs over <i>Ptilotus obovatus</i> , <i>Maireana</i> sp., <i>Enchylaena tomentosa</i> , <i>Ptilotus schwartzii</i> low sparse shrubland	
Other species: <i>Scaevola spinescens</i> , <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Ptilotus rotundifolius</i>	
	
Low woodland patch within sparse shrubland area	
<i>Acacia aptaneura</i> <i>Acacia caesaneura</i> <i>Acacia pruinocarpa</i> <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> <i>Acacia tetragonophylla</i> <i>Enchylaena tomentosa</i>	<i>Eremophila fraseri</i> subsp. <i>fraseri</i> <i>Maireana</i> sp. <i>Ptilotus obovatus</i> <i>Ptilotus rotundifolius</i> <i>Ptilotus schwartzii</i> <i>Scaevola spinescens</i>

V4 30<sup>th</sup> July 2024 8.09 am WRD area

GPS: 583884 E/ 7027054 N  
Elevation: 504 m

Landform: Low rise; stony, gentle slope; aspect east

Land surface: Yellowish red silty clay loam; surface rock 2 – 10 cm (BIF, chert, quartz, 10 – 20 %); gravel (30 – 40 %); litter < 5 %; fallen timber < 2 %

Condition & disturbances: Poor; lacking understory; pastoral impacts

NVIS 6: U1^ *Acacia pruinocarpa*\Acacia\ ^tree\6\bi; M1+^ *Acacia aptaneura*, *A. pruinocarpa*\Acacia\ ^shrub, tree\4\i; M2^ *Acacia tetragonophylla*, *A. pruinocarpa*, *Eremophila fraseri* subsp. *fraseri*\Acacia\ ^shrub\3\bi; G1^ *Acacia pruinocarpa*, *Eremophila fraseri* subsp. *fraseri*, *Acacia aptaneura*, *Ptilotus obovatus*, *P. schwartzii*\Acacia\ ^shrub\2\r


Vegetation: *Acacia pruinocarpa* isolated trees over *Acacia aptaneura*, *A. pruinocarpa* tall open shrubland over *Acacia tetragonophylla*, *A. pruinocarpa*, *Eremophila fraseri* subsp. *fraseri* isolated shrubs over *Acacia pruinocarpa*, *Eremophila fraseri* subsp. *fraseri*, *Acacia aptaneura* low sparse shrubland


Height (m)	Crown cover %	Habit	Species
10	< 2	T	<i>Acacia pruinocarpa</i>
3 – 8	10 – 20	S, T	<i>Acacia aptaneura</i> , <i>A. pruinocarpa</i>
1 – 2	< 2	S	<i>Acacia tetragonophylla</i> , <i>A. pruinocarpa</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i>
< 1	2 – 10	S	<i>Acacia pruinocarpa</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Acacia aptaneura</i> , <i>Ptilotus obovatus</i> , <i>P. schwartzii</i>

Other species: *Acacia craspedocarpa*


*Acacia aptaneura*  
*Acacia craspedocarpa*  
*Acacia pruinocarpa*  
*Acacia tetragonophylla*  
*Eremophila fraseri* subsp. *fraseri*  
*Ptilotus obovatus*  
*Ptilotus schwartzii*




V5 30 <sup>th</sup> July 2024 8.20 am WRD area Relevé	
GPS: 583750 E/ 7027038 N Elevation: 506 m	Landform: Low hill; lower slope; colluvial outwash; aspect south
Land surface: Yellowish red silty clay loam; surface rock < 10 %	
Condition & disturbances: Good; lot of pastoral disturbances; erosion active	
Vegetation: <i>Acacia aneura</i> tall open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> low isolated shrubs (0.5 – 1 m) over <i>Maireana</i> sp., <i>Enchylaena tomentosa</i> , <i>Eragrostis eriopoda</i> , <i>Erodium cygnorum</i> low sparse chenopod shrubland	
<i>Acacia aneura</i> <i>Enchylaena tomentosa</i> <i>Eragrostis eriopoda</i> <i>Eremophila forrestii</i> subsp. <i>forrestii</i> <i>Erodium cygnorum</i> <i>Maireana</i> sp.	


V6 30 <sup>th</sup> July 2024 WRD area 8.30 am Relevé	
GPS: 583838 E/ 7027185 N Elevation:	Landform: Lower slope of outwash slope; colluvium
Land surface: Yellowish red silty clay loam; surface rock 2 – 10 cm 10 – 20 %, gravel 10 – 20 %; litter < 10 %; fallen timber < 2 %	
Condition & disturbances: Poor; moderate to high pastoral impacts, old tracks; rabbits, regeneration very low	
Vegetation: <i>Acacia aptaneura</i> , <i>A. incurvaneura</i> , <i>A. caesaneura</i> tall open shrubland over <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> isolated shrubs over <i>Helipterum craspedioides</i> , <i>Erodium cygnorum</i> , <i>Eragrostis eriopoda</i> , <i>Acacia caesaneura</i> low sparse forbland	
V6 & V7 species list <i>Acacia aptaneura</i> <i>Acacia caesaneura</i> <i>Acacia incurvaneura</i> <i>Acacia ramulosa</i> var. <i>linophylla</i> <i>Eragrostis eriopoda</i> <i>Eremophila fraseri</i> subsp. <i>fraseri</i> <i>Erodium cygnorum</i> <i>Helipterum craspedioides</i> <i>Ptilotus aevroides</i> (V7) <i>Ptilotus rotundifolius</i> (V7)	

V7 30 <sup>th</sup> July 2024 WRD area Relevé	
GPS: 583984 E/ 7027248 N Elevation:	Landform: Plain; gentle slope aspect south east WRD area
Land surface:	
Condition & disturbances: Poor; pastoral impacts; erosion moderate	
Vegetation: <i>Acacia aptaneura</i> , <i>A. caesaneura</i> tall sparse shrubland over <i>Acacia aptaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Ptilotus rotundifolius</i> sparse shrubland over <i>Eragrostis eriopoda</i> , <i>Ptilotus aervoides</i> low open tussock grassland	

V8 30 <sup>th</sup> July 2024 rehabilitation site WRD area			
GPS: 584284 E/ 7027164 N Elevation: 500		Landform: Plain; gentle slope; aspect south east	
Land surface: Yellowish red gritty clay loam; surface rock (hardpan, other) 60 – 80 %; bare ground < 20 %			
Condition & disturbances: Good; historic drill location that has been rehabilitated (ripped); recruitment and growth good			
NVIS 6: G1+^ <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Acacia pruinocarpa</i> , <i>Enchylaena tomentosa</i> , <i>Cymbopogon ambiguus</i> \Ptilotus\^shrub, chenopod shrub, tussock grass\2\i; G2^ <i>Cephalopterum drummondii</i> , <i>Maireana triptera</i> , <i>Menkea villosula</i> , <i>Ptilotus obovatus</i> \Cephalopterum\^forb, chenopod shrub, shrub\1\bi			
Vegetation: <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Acacia pruinocarpa</i> low open shrubland over <i>Cephalopterum drummondii</i> , <i>Maireana triptera</i> , <i>Menkea villosula</i> isolated low forbs and chenopod shrubs			
Height (m)	Crown cover %	Habit	Species
0.2 – 0.8	20 – 30	S, C, G	<i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Acacia pruinocarpa</i> , <i>Enchylaena tomentosa</i> , <i>Cymbopogon ambiguus</i>
< 0.2	< 2	F, C, S	<i>Cephalopterum drummondii</i> , <i>Maireana triptera</i> , <i>Menkea villosula</i> , <i>Ptilotus obovatus</i>
Other species (outside/ edges): <i>Acacia aneura</i> , <i>Cheilanthes</i> sp., <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Psyrax latifolia</i> , <i>Santalum spicatum</i>			
<i>Acacia aneura</i> (edge) <i>Acacia pruinocarpa</i> <i>Cephalopterum drummondii</i> <i>Cheilanthes</i> sp. (edge) <i>Cymbopogon ambiguus</i> <i>Enchylaena tomentosa</i> <i>Eremophila fraseri</i> subsp. <i>fraseri</i> (edge) <i>Maireana triptera</i> <i>Menkea villosula</i> <i>Psyrax latifolia</i> (edge) <i>Ptilotus obovatus</i> <i>Rhagodia eremaea</i> <i>Santalum spicatum</i> R (edge)			

V8b 30 <sup>th</sup> July 2024 Relevé WRD area	
GPS: 584261 E/ 7026852 N Elevation: 498 m	Landform: Stony plain; south side of WRD area Area searched for <i>Euphorbia sarcostemmoides</i>
Land surface: Yellowish red silty clay loam; surface rock (BIF, chert, quartz) 10 – 20 %; litter < 5 %; fallen timber < 2 %	
Condition & disturbances: Poor; pastoral impacts high; sheet erosion; rabbits; many drought deaths and part crown deaths; condition of woodland patches – good	
Vegetation: Woodland patch – <i>Acacia pruinosa</i> , <i>Acacia aptaneura</i> low woodland over <i>Teucrium teucriiflorum</i> , <i>Vincetoxicum lineare</i> , <i>Senna glutinosa</i> subsp. <i>xluerssenii</i> , <i>Psydrax suaveolens</i> shrubland over <i>Maireana georgei</i> low open chenopod shrubland over <i>Lepidium oxytrichum</i> , <i>Erodium cygnorum</i> , <i>Menkea villosula</i> , <i>Goodenia tenuiloba</i> , <i>Isoetopsis graminifolia</i> low forbland	
Vegetation: Stony plain – <i>Acacia aptaneura</i> low isolated trees over <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Senna glaucifolia</i> sparse shrubland over <i>Ptilotus aervoides</i> , <i>Goodenia tenuiloba</i> , <i>Erodium cygnorum</i> low sparse forbland	
<b>Stony plain</b> <i>Acacia aptaneura</i> <i>Acacia ramulosa</i> var. <i>linophylla</i> <i>Eremophila fraseri</i> subsp. <i>fraseri</i> <i>Erodium cygnorum</i> <i>Goodenia tenuiloba</i> <i>Ptilotus aervoides</i> <i>Senna glaucifolia</i>	
<b>Woodland patch</b> <i>Acacia aptaneura</i> <i>Acacia pruinocarpa</i> <i>Erodium cygnorum</i> <i>Goodenia tenuiloba</i> <i>Isoetopsis graminifolia</i> <i>Lepidium oxytrichum</i> <i>Maireana georgei</i> <i>Menkea villosula</i> <i>Psydrax suaveolens</i> <i>Senna glutinosa</i> subsp. <i>xluerssenii</i> <i>Teucrium teucriiflorum</i> <i>Vincetoxicum lineare</i>	No image

**V9 30<sup>th</sup> July 2024 WRD east area**

GPS: 583983 E/ 7027651 N		Landform: Hill; ridge, upper slope; aspect south	
Elevation: 515 m		Rocky scree slope	
Land surface: Shallow yellowish red silty clay loam; surface rock (BIF, chert) 60 – 80 %			
Condition & disturbances: Very good; pastoral impacts lower; forbs – many germinating			
NVIS 6: U1+^ <i>Acacia aptaneura</i> \Acacia\^shrub\4\i; M1^ <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>E. glutinosa</i> , <i>E. spathulata</i> , <i>Acacia aptaneura</i> , <i>Ptilotus rotundifolius</i> \Eremophila\^shrub\3\i; G1^ <i>Helipterum craspedioides</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Nicotiana rosulata</i> \Helipterum\^forb, fern\1\i			
Vegetation: <i>Acacia aptaneura</i> tall open shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>E. glutinosa</i> , <i>E. spathulata</i> open shrubland over <i>Helipterum craspedioides</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Nicotiana rosulata</i> low sparse forbland			
Height (m)	Crown cover %	Habit	Species
4 – 6	10 – 20	S	<i>Acacia aptaneura</i>
0.9 – 1.5	20 – 30	S	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>E. glutinosa</i> , <i>E. spathulata</i> , <i>Acacia aptaneura</i> , <i>Ptilotus rotundifolius</i>
< 0.2	2 – 10	F, E	<i>Helipterum craspedioides</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Nicotiana rosulata</i>
<i>Acacia aptaneura</i> <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> <i>Eremophila latrobei</i> subsp. <i>latrobei</i> <i>Eremophila glutinosa</i> <i>Eremophila spathulata</i> <i>Nicotiana rosulata</i> <i>Ptilotus rotundifolius</i>			

**V10 30<sup>th</sup> July 2024 Relevé**

GPS: 583922 E/ 7027668 N  
Elevation: 524 m

Landform: BIF Ridge; massive BIF outcrops; moderate to steep slopes north and south  
North edge of Beebyn Prescribed area

Land surface: Skeletal yellowish red silty clay loam; surface rock > 90 %; litter < 10 %

Condition & disturbances: Very good to excellent; low pastoral impacts; drought impacts – several deaths of small shrubs; healthy new growth from recent rains

Vegetation: *Acacia incurvaneura* isolated tall shrubs over *Thryptomene decussata*, *Eremophila latrobei* subsp. *latrobei*, *Eremophila glutinosa*, *Dodoniaea pachyneura*, *Acacia incurvaneura* open shrubland over *Micromyrtus sulphurea*, *Prostanthera petrophila*, *Hysterobaeckea occlusa*, *Thryptomene decussata* low open shrubland over *Stylidium longibracteatum*, *Dysphania rhadinostachya* subsp. *rhadinostachya*, *Cheilanthes lasiophyllum* low open forbland

Other species: *Santalum spicatum* (low tree), *Acacia pruinocarpa* (low tree), *Brachyscome iberidifolia*, *Amphipogon caricinus* var. *caricinus*

*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Amphipogon caricinus* var. *caricinus*  
*Brachyscome iberidifolia*  
*Cheilanthes lasiophyllum*  
*Dodoniaea pachyneura*  
*Dysphania rhadinostachya* subsp. *rhadinostachya*  
*Eremophila glutinosa*  
*Eremophila latrobei* subsp. *latrobei*  
*Hysterobaeckea occlusa*  
*Micromyrtus sulphurea*  
*Prostanthera petrophila*  
*Santalum spicatum*  
*Stylidium longibracteatum*  
*Thryptomene decussata*

Bottom image: *Prostanthera petrophila* habitat; massive BIF outcrop



V11 11.30 am 30<sup>th</sup> July 2024

GPS: 583701 E/ 7027463 N Elevation: 523 m	Landform: Hill; upper slope; aspect south east; colluvial outwash slope, moderate slope
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Land surface: Yellowish red silty clay loam; surface rock 30 – 40 %; litter < 5 %; fallen timber < 2 %

Condition & disturbances: Poor to good; pastoral Impacts; drought impacts – few deaths

NVIS 6: U1+^ *Acacia fuscaneura*, *A. pteraneura*, *A. sp. Weld Range*, *Thryptomene decussata*\Acacia\  
^shrub\4\; M1^ *Acacia pteraneura*, *Eremophila latrobei* subsp. *latrobei*, *Senna glaucifolia*,  
*Thryptomene decussata*\Acacia\<^shrub\3\; M2^ *Eremophila glutinosa*, *E. forrestii* subsp. *forrestii*,  
*Ptilotus obovatus*, *Harnieria kempeana* subsp. *muelleri*\Eremophila\2\; G1^ *Erodium cygnorum*,  
*Helipterum craspedioides*, *Monachather paradoxus*, *Harnieria kempeana* subsp. *muelleri*\Erodium\  
^forb, tussock grass, shrub\1\bi

Vegetation: *Acacia fuscaneura*, *A. pteraneura*, *A. sp. Weld Range* tall open shrubland over *Acacia pteraneura*, *Eremophila latrobei* subsp. *latrobei*, *Senna glaucifolia* sparse shrubland over *Eremophila glutinosa*, *E. forrestii* subsp. *forrestii*, *Ptilotus obovatus* low sparse shrubland

Height (m)	Crown cover %	Habit	Species
2 – 6	10 – 30	S	<i>Acacia fuscaneura</i> , <i>A. pteraneura</i> , <i>A. sp. Weld Range</i> , <i>Thryptomene decussata</i>
1 – 2	2 – 10	S	<i>Acacia pteraneura</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Senna glaucifolia</i> , <i>Thryptomene decussata</i>
0.2 – 1	2 – 10	S	<i>Eremophila glutinosa</i> , <i>E. forrestii</i> subsp. <i>forrestii</i> , <i>Ptilotus obovatus</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i>
< 0.2	< 2	F, G, S	<i>Erodium cygnorum</i> , <i>Helipterum craspedioides</i> , <i>Monachather paradoxus</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i>

Other species: *Grevillea berryana*, *Philotheca brucei* subsp. *brucei* (on minor BIF outcrop), *Acacia tetragonophylla*

- Acacia fuscaneura*
- Acacia pteraneura*
- Acacia sp. Weld Range*
- Acacia tetragonophylla*
- Eremophila forrestii* subsp. *forrestii*
- Eremophila glutinosa*
- Eremophila latrobei* subsp. *latrobei*
- Erodium cygnorum*
- Grevillea berryana*
- Harnieria kempeana* subsp. *muelleri*
- Helipterum craspedioides*
- Monachather paradoxus*
- Philotheca brucei* subsp. *brucei*
- Ptilotus obovatus*
- Senna glaucifolia*
- Thryptomene decussata*





**V12 30<sup>th</sup> July 2024 WRD area north**

GPS: 583725 E/ 7027355 N  
Elevation: 514 m

Landform: Hill; lower midslope; colluvium; aspect south

Land surface: Surface rock (mostly gravel, 2 – 5 % 2 – 10 cm) 10 – 20 %; cryptogams (lichen) 50 – 60 %

Condition & disturbances: Poor; pastoral impacts moderate to high; active erosion

NVIS 6: U1+^ *Acacia fuscaneura*, *A. pteraneura* \Acacia\^shrub, tree\4\i; M1^ *Acacia ramulosa* var. *linophylla*, *A. fuscaneura* \Acacia\^shrub\3\i; G1^ *Solanum lasiophyllum*, *Ptilotus obovatus*, *Eragrostis eriopoda* \Solanum\^shrub, tussock grass\1\bi

Vegetation: *Acacia fuscaneura*, *A. pteraneura* tall open shrubland over *Acacia ramulosa* var. *linophylla*, *A. fuscaneura* sparse shrubland

Height (m)	Crown cover %	Habit	Species
2 – 6	10 – 30	S, T	<i>Acacia fuscaneura</i> , <i>A. pteraneura</i>
1 – 2	2 – 10	S	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>A. fuscaneura</i>
< 0.5	< 2	S, G	<i>Solanum lasiophyllum</i> , <i>Ptilotus obovatus</i> , <i>Eragrostis eriopoda</i>

Other species: *Ptilotus rotundifolius*, *Eremophila glutinosa*

*Acacia fuscaneura*  
*Acacia pteraneura*  
*Acacia ramulosa* var. *linophylla*  
*Eragrostis eriopoda*  
*Eremophila glutinosa*  
*Ptilotus obovatus*  
*Ptilotus rotundifolius*  
*Solanum lasiophyllum*



V13  
GPS: 583819 E/ 7027484 N  
*isolated Acacia pruinocarpa* starting, towards east

Several *Harnieria kempeana*, *Goodenia tenuiloba*, *Isoetopsis graminifolia*

V14  
GPS: 583802 E/ 7027535 N  
Landform: Hill; minor BIF outcrop; upper slope; aspect south  
Condition: good; several drought deaths

*Acacia fuscaneura* low isolated trees over *Acacia fuscaneura*, *A. rhodophloia* tall sparse shrubland over *Eremophila latrobei* subsp. *latrobei*, *Philotheca brucei* subsp. *brucei*, *Grevillea berryana* sparse shrubland over *Brachyscome iberidifolia* low sparse forbland



**V15 30<sup>th</sup> July 2024 Pit area**

GPS: 583160 E/ 7027264 N  
Elevation: 538 m

Landform: Hill; BIF; colluvial outwash slope; aspect south east;  
BIF ridge to north

Land surface: Yellowish red silty clay loam; surface rock – variable (due to level of disturbance)

Condition & disturbances: Degraded with good patches; significant areas disturbed through historic mining activities; erosion active in some areas

Vegetation: *Acacia pruinocarpa* isolated trees over *Acacia pteraneura*, *A. aptaneura* tall open shrubland over *Dodonaea pachyneura* sparse shrubland over *Eremophila latrobei* subsp. *latrobei*, *Ptilotus obovatus*, *Harnieria kempeana* subsp. *muelleri*, *Sida* sp. Golden calyces, *Maireana* sp. low sparse to open shrubland

Other species: *Eremophila forrestii* subsp. *forrestii*

*Acacia aptaneura*  
*Acacia pruinocarpa*  
*Acacia pteraneura*  
*Dodonaea pachyneura*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila latrobei* subsp. *latrobei*  
*Harnieria kempeana* subsp. *muelleri*  
*Maireana* sp.  
*Ptilotus obovatus*  
*Sida* sp. Golden calyces glabrous



V16 30<sup>th</sup> July 2024 Pit area

GPS: 583222 E/ 7027228 N  
Elevation: 532 m

Landform: Hill; midslope; moderate slope; aspect SE

Land surface: Yellowish red silty clay loam; surface rock 60 – 70 % (2 – 10 cm BIF, quartz, chert – 10 – 20 %; gravel 40 – 60 %); litter < 10 %; fallen timber < 2 %

Condition & disturbances: Good; pastoral and mining impacts; erosion active; drought impacts; low shrubs and groundcover grasses, forbs mainly under groups of taller shrubs or trees

NVIS 6: U1<sup>^</sup> *Acacia pruinocarpa* \Acacia\^tree\6\bi; M1+<sup>^</sup> *Acacia aptaneura*, *A. rhodophloia*, *A. pruinocarpa* \Acacia\^shrub\4\i; M2<sup>^</sup> *Thryptomene decussata*, *Acacia ramulosa* var. *linophylla*, *A. pruinocarpa* \Thryptomene\^shrub\3\r; G1<sup>^</sup> *Sida* sp. *Golden calyces*, *Harnieria kempeana* subsp. *muelleri*, *Thyridolepis multiculmis*, *Eragrostis eriopoda*, *Goodenia tenuiloba* \Sida\^shrub, tussock grass, forb\2\r

Vegetation: *Acacia pruinocarpa* low isolated trees over *Acacia aptaneura*, *A. rhodophloia*, *A. pruinocarpa* tall open shrubland over *Thryptomene decussata*, *Acacia ramulosa* var. *linophylla*, *A. pruinocarpa* sparse shrubland over *Sida* sp. *Golden calyces*, *Harnieria kempeana* subsp. *muelleri*, *Thyridolepis multiculmis* low sparse shrubland

Height (m)	Crown cover %	Habit	Species
8 – 10	< 2	T	<i>Acacia pruinocarpa</i>
3 – 6	10 – 30	S	<i>Acacia aptaneura</i> , <i>A. rhodophloia</i> , <i>A. pruinocarpa</i>
1 – 2	2 – 10	S	<i>Thryptomene decussata</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>A. pruinocarpa</i>
< 1	2 – 10	S, G, F	<i>Sida</i> sp. <i>Golden calyces</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Thyridolepis multiculmis</i> , <i>Eragrostis eriopoda</i> , <i>Goodenia tenuiloba</i>

Other species: *Grevillea berryana*, *Eremophila glutinosa*

*Acacia aptaneura*  
*Acacia pruinocarpa*  
*Acacia ramulosa* var. *linophylla*  
*Acacia rhodophloia*  
*Eragrostis eriopoda*  
*Eremophila glutinosa*  
*Goodenia tenuiloba*  
*Grevillea berryana*  
*Harnieria kempeana* subsp. *muelleri*  
*Sida* sp. *Golden calyces* glabrous  
*Thryptomene decussata*  
*Thyridolepis multiculmis*



V17 30<sup>th</sup> July 2024 Pit area 1.45 pm

GPS: 583130 E/ 7027147 N  
Elevation: 527 m

Landform: Hill; midslope; gentle slope; aspect SE

Land surface: Yellowish red fine sandy clay loam; surface rock 10 – 20 %; litter < 10 %; fallen timber < 5 %; bare ground – patches of washed sand/ sandy loam 10 – 30 %

Condition & disturbances: Good – pastoral impacts; moderate mining impacts in broader area – some sedimentation from erosion along track; grasses mostly absent; some larger cleared areas adjacent

NVIS 6: U1+ ^ Acacia incurvaneura\Acacia\^tree, shrub\6\i; M1^ Acacia ramulosa var. linophylla, A. rhodophloia\Acacia\^shrub\4\bi; M2^ Eremophila forrestii subsp. forrestii, E. latrobei subsp. latrobei, Harnieria kempeana subsp. muelleri, Eremophila fraseri subsp. fraseri, Abutilon sp. \Eremophila\^shrub\3\i; G1^ Brachyscome iberidifolia, Erodium cygnorum, Goodenia tenuiloba, Cheilanthes sieberi subsp. sieberi



Vegetation: Acacia incurvaneura low woodland over Acacia ramulosa var. linophylla, A. rhodophloia isolated tall shrubs over Eremophila forrestii subsp. forrestii, E. latrobei subsp. latrobei, Harnieria kempeana subsp. muelleri open shrubland over Brachyscome iberidifolia, Erodium cygnorum, Goodenia tenuiloba, Cheilanthes sieberi subsp. sieberi low open forbland

Height (m)	Crown cover %	Habit	Species
6 – 9	25 – 30	T, S	<i>Acacia incurvaneura</i>
2 – 4	< 2	S	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>A. rhodophloia</i>
0.5 – 1.5	20 – 30	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Abutilon</i> sp.
< 0.3	10 – 20	F, E	<i>Brachyscome iberidifolia</i> , <i>Erodium cygnorum</i> , <i>Goodenia tenuiloba</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>

Other species: *Acacia pruinocarpa*, *Ptilotus rotundifolius*

*Abutilon* sp.  
*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Acacia ramulosa* var. *linophylla*  
*Acacia rhodophloia*  
*Brachyscome iberidifolia*  
*Cheilanthes sieberi* subsp. *sieberi*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila fraseri* subsp. *fraseri*  
*Eremophila latrobei* subsp. *latrobei*  
*Erodium cygnorum*  
*Goodenia tenuiloba*  
*Harnieria kempeana* subsp. *muelleri*  
*Ptilotus rotundifolius*



V18 30 <sup>th</sup> July 2024 Pit area			
GPS: 582740 E/ 7027049 N Elevation: 555 m		Landform: BIF ridge; upper slope; aspect north/ south steep sides; gentle to west; very steep to east > crest	
Land surface: Skeletal soils; surface rock (BIF, quartz) small rocks to boulders, 80 – 90 %			
Condition & disturbances: Very good; some mining activities on lower slope – clearing for drill locations and access tracks; signs of rabbits in broader area			
NVIS 6: M1 <sup>^</sup> <i>Thryptomene decussata</i> , <i>Acacia pruinocarpa</i> \Thryptomene\^shrub, tree\4\; M2 <sup>^</sup> <i>Acacia aptaneura</i> , <i>Thryptomene decussata</i> \Acacia\^shrub\3\; M3 <sup>^</sup> <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> , <i>Dodonaea pachyneura</i> , <i>Tribulus suberosus</i> \Eremophila\^shrub\2\; G1 <sup>^</sup> <i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i> , <i>Erodium cygnorum</i> , <i>Helipterum craspedioides</i> , <i>Goodenia tenuiloba</i> , <i>Stenopetalum anfractum</i> \Dysphania \^forb\1\i			
Vegetation: <i>Thryptomene decussata</i> , <i>Acacia pruinocarpa</i> tall isolated shrubs over <i>Acacia incurvaneura</i> , <i>Thryptomene decussata</i> isolated shrubs over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> , <i>Dodonaea pachyneura</i> , <i>Tribulus suberosus</i> low open shrubland over <i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i> , <i>Erodium cygnorum</i> , <i>Helipterum craspedioides</i> low open forbland			
Height (m)	Crown cover %	Habit	Species
2 – 4	2 – 10	S, T	<i>Thryptomene decussata</i> , <i>Acacia pruinocarpa</i>
1 – 2	2 – 10	S	<i>Acacia incurvaneura</i> , <i>Thryptomene decussata</i>
0.3 – 1	10 – 30	S	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus obovatus</i> , <i>Dodonaea pachyneura</i> , <i>Tribulus suberosus</i>
< 0.3	20 – 30	F, S, G	<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i> , <i>Erodium cygnorum</i> , <i>Helipterum craspedioides</i> , <i>Goodenia tenuiloba</i> , <i>Stenopetalum anfractum</i> , <i>Micromyrtus sulphurea</i> , <i>Monachather paradoxus</i>
Other species: <i>Eremophila glutinosa</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i> , <i>Senna glutinosa</i> subsp. <i>chatelainiana</i>			
<i>Acacia incurvaneura</i> <i>Acacia pruinocarpa</i> <i>Dodonaea pachyneura</i> <i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i> <i>Eremophila glutinosa</i> <i>Eremophila latrobei</i> subsp. <i>latrobei</i> <i>Erodium cygnorum</i> <i>Goodenia tenuiloba</i> <i>Helipterum craspedioides</i> <i>Micromyrtus sulphurea</i> <i>Monachather paradoxus</i> <i>Philotheca brucei</i> subsp. <i>brucei</i> <i>Ptilotus obovatus</i> <i>Senna glutinosa</i> subsp. <i>chatelainiana</i> <i>Stenopetalum anfractum</i> <i>Tribulus suberosus</i> <i>Thryptomene decussata</i>			
		Image > east	
			
		Image > west; gently sloping platform	

**V19 30<sup>th</sup> July 2024 Pit area**

GPS: 582925 E/ 7027244 N  
Elevation: 547 m

Landform: BIF ridge; upper slope; moderate to steep slope;  
rocky scree slope; aspect north

Land surface: Shallow yellowish red silty clay loam; surface rock (BIF, quartz, chert) ^ 40 cm, > 80 %;  
litter < 10 %; fallen timber < 2 %

Condition & disturbances: Very good; historic mining activities adjacent – drill location, tunnel

NVIS 6: U1+^ *Acacia incurvaneura*, *A. pruinocarpa* \Acacia\^tree, shrub\6\i; M1^ *Eremophila latrobei* subsp. *latrobei*, *Tribulus suberosus*, *Psydrax latifolia*, *Ptilotus obovatus*, *Eremophila macmillaniana* \Eremophila\^shrub\2\i; G1^ *Erodium cygnorum*, *Dysphania rhadinostachya* subsp. *rhadinostachya*, *Lepidium oxytrichum*, *Goodenia tenuiloba*, *Paspalidium basicladum* \Erodium\^forb, tussock grass \1\i

Vegetation: *Acacia incurvaneura*, *A. pruinocarpa* low woodland over *Eremophila latrobei* subsp. *latrobei*, *Tribulus suberosus*, *Psydrax latifolia* low open shrubland over *Erodium cygnorum*, *Dysphania rhadinostachya* subsp. *rhadinostachya*, *Lepidium oxytrichum* low open forbland

Height (m)	Crown cover %	Habit	Species
5 – 9	20 – 30	T, S	<i>Acacia incurvaneura</i> , <i>A. pruinocarpa</i>
0.5 – 1.2	10 – 30	S	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Tribulus suberosus</i> , <i>Psydrax latifolia</i> , <i>Ptilotus obovatus</i> , <i>Eremophila macmillaniana</i>
< 0.3	10 – 15	F, G, S	<i>Erodium cygnorum</i> , <i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i> , <i>Lepidium oxytrichum</i> , <i>Goodenia tenuiloba</i> , <i>Paspalidium basicladum</i> , <i>Ptilotus obovatus</i>

*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Dysphania rhadinostachya* subsp. *rhadinostachya*  
*Eremophila latrobei* subsp. *latrobei*  
*Eremophila macmillaniana*  
*Erodium cygnorum*  
*Goodenia tenuiloba*  
*Lepidium oxytrichum*  
*Paspalidium basicladum*  
*Psydrax latifolia*  
*Ptilotus obovatus*  
*Tribulus suberosus*



**V20 30<sup>th</sup> July 2024 Pit area**

GPS: 582979 E/ 7027232 N Elevation: 559 m	Landform: Hill, BIF ridge; outcrops; hill trends NE – SW; aspect NW, SE; steep upper slopes and narrow ridge
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Land surface: Skeletal pockets of reddish yellow silty clay loam; surface rock – outcrop and boulders > 90 %

Condition & disturbances: Excellent; low impacts

NVIS 6: U1<sup>^</sup> *Acacia pruinocarpa*, *A. incurvaneura* \Acacia\^tree, shrub\6\bj; M1+<sup>^</sup> *Eremophila latrobei* subsp. *latrobei*, *Dodonaea pachyneura*, *Philotheca brucei* subsp. *brucei* \Eremophila\^shrub\3\i; G1<sup>^</sup> *Ptilotus obovatus*, *Eremophila latrobei* subsp. *latrobei*, *Goodenia tenuiloba*, *Dysphania rhadinostachya* subsp. *rhadinostachya*, *Erodium cygnorum* \Ptilotus\^shrub, forb\1\c


Vegetation: *Acacia pruinocarpa*, *A. incurvaneura* low isolated trees to low open woodland over *Eremophila latrobei* subsp. *latrobei*, *Dodonaea pachyneura*, *Philotheca brucei* subsp. *brucei* open shrubland over *Ptilotus obovatus*, *Eremophila latrobei* subsp. *latrobei*, *Goodenia tenuiloba* low shrubland

Height (m)	Crown cover %	Habit	Species
6 – 9	2 (– 5)	T, S	<i>Acacia pruinocarpa</i> , <i>A. incurvaneura</i>
1 – 2	10 – 30	S	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Dodonaea pachyneura</i> , <i>Philotheca brucei</i> subsp. <i>brucei</i>
< 0.5	30 – 40	S, F, G	<i>Ptilotus obovatus</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Goodenia tenuiloba</i> , <i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i> , <i>Erodium cygnorum</i> , <i>Sclerolaena</i> sp., <i>Paspalidium basicladum</i> , <i>Harnieria kempeana</i> subsp. <i>muelleri</i>

*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Dodonaea pachyneura*  
*Dysphania rhadinostachya* subsp. *rhadinostachya*  
*Erodium cygnorum*  
*Eremophila latrobei* subsp. *latrobei*  
*Goodenia tenuiloba*  
*Harnieria kempeana* subsp. *muelleri*  
*Paspalidium basicladum*  
*Philotheca brucei* subsp. *brucei*  
*Ptilotus obovatus*  
*Sclerolaena* sp.



**V21 31<sup>st</sup> July 2024 Gravel pit access**

GPS: 582366 E/ 7027049 N Elevation: 524 m		Landform: Hill; midslope, valley; gentle slope, aspect NNE	
Land surface: Yellowish red silty clay loam; surface rock (BIF, quartz) 2 – 5 %; litter 20 – 30 % (under shrubs); fallen timber 2 – 4 %			
Condition & disturbances: Very good; historic mining and recent pastoral impacts; old track, overgrown; sheet erosion			
NVIS 6: U1^ <i>Acacia incurvaneura</i> , <i>A. caesaneura</i> , <i>A. pruinocarpa</i> , <i>A. craspedocarpa</i> \Acacia\ ^tree, shrub\6\; M1+^ <i>Acacia incurvaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Senna glaucifolia</i> \Acacia\ ^shrub\ 4\; M2^ <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Tribulus suberosus</i> , <i>Eremophila georgei</i> \Eremophila\ 3\; G1^ <i>Erodium cygnorum</i> , <i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i> \Erodium\ ^forb, tussock grass\1\			
Vegetation: <i>Acacia incurvaneura</i> , <i>A. caesaneura</i> , <i>A. pruinocarpa</i> low open woodland over <i>Acacia incurvaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Senna glaucifolia</i> tall open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Tribulus suberosus</i> , <i>Eremophila georgei</i> open shrubland over <i>Erodium cygnorum</i> , <i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i> low open forbland			
Height (m)	Crown cover %	Habit	Species
4 – 7	2 – 10	T, S	<i>Acacia incurvaneura</i> , <i>A. caesaneura</i> , <i>A. pruinocarpa</i> , <i>A. craspedocarpa</i>
2 – 4	10 – 30	S	<i>Acacia incurvaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Senna glaucifolia</i>
1 – 2	10 – 30	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Tribulus suberosus</i> , <i>Eremophila georgei</i>
< 0.3	10 – 30	F, G	<i>Erodium cygnorum</i> , <i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i>
<i>Acacia caesaneura</i> <i>Acacia craspedocarpa</i> <i>Acacia incurvaneura</i> <i>Acacia pruinocarpa</i> <i>Acacia ramulosa</i> var. <i>linophylla</i> <i>Eragrostis eriopoda</i> <i>Eremophila forrestii</i> subsp. <i>forrestii</i> <i>Eremophila georgei</i> <i>Erodium cygnorum</i> <i>Monachather paradoxus</i> <i>Senna glaucifolia</i> <i>Tribulus suberosus</i>			



V22 31<sup>st</sup> July 2024 Gravel pit access

GPS: 582283 E/ 7027224 N  
Elevation: 523 m

Landform: Hill; midslope, unincised drainage line

Land surface: Yellowish red fine sandy clay loam; surface rock < 1 %; litter ^ 20 cm, 40 – 50 %; fallen timber < 1 %

Condition & disturbances: Very good; pastoral impacts; overgrown track; erosion (low) and sedimentation; rabbits

NVIS 6: U1+ ^ *Acacia fuscaneura*, *A. pruinocarpa* \Acacia\ ^tree, shrub\6\; M1 ^ *Acacia ramulosa* var. *linophylla*, *Senna glutinosa* subsp. *xluerssenii*, *Psydrax latifolia* \Acacia\ ^shrub, tree\4\; M2 ^ *Eremophila forrestii* subsp. *forrestii*, *E. georgei*, *Rhagodia eremaea*, *Eremophila gilesii*, *E. latrobei* subsp. *latrobei* \Eremophila\ ^shrub\3\; G1 ^ *Erodium cygnorum*, *Isoetopsis graminifolia*, *Menkea villosula*, *Cheilanthes sieberi* subsp. *sieberi*, *Chthonocephalus pseudevax* \Erodium\ ^forb\1\c

Vegetation: *Acacia fuscaneura*, *A. pruinocarpa* low woodland over *Acacia ramulosa* var. *linophylla*, *Senna glutinosa* subsp. *xluerssenii*, *Psydrax latifolia* tall open shrubland over *Eremophila forrestii* subsp. *forrestii*, *E. georgei*, *Rhagodia eremaea* shrubland over *Erodium cygnorum*, *Isoetopsis graminifolia*, *Menkea villosula* low forbland

Height (m)	Crown cover %	Habit	Species
5 – 8	20 – 30	T, S	<i>Acacia fuscaneura</i> , <i>A. pruinocarpa</i>
2 – 4	20 – 30	S, T	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Senna glutinosa</i> subsp. <i>xluerssenii</i> , <i>Psydrax latifolia</i>
1 – 2	30 – 40	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Rhagodia eremaea</i> , <i>Eremophila gilesii</i> , <i>E. latrobei</i> subsp. <i>latrobei</i>
< 0.5	50 – 60	F, E, S	<i>Erodium cygnorum</i> , <i>Isoetopsis graminifolia</i> , <i>Menkea villosula</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Chthonocephalus pseudevax</i> , <i>Panaetia lessonii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>

*Acacia fuscaneura*  
*Acacia pruinocarpa*  
*Acacia ramulosa* var. *linophylla*  
*Cheilanthes sieberi* subsp. *sieberi*  
*Chthonocephalus pseudevax*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila georgei*  
*Eremophila gilesii*  
*Eremophila latrobei* subsp. *latrobei*  
*Erodium cygnorum*  
*Isoetopsis graminifolia*  
*Menkea villosula*  
*Panaetia lessonii*  
*Psydrax latifolia*  
*Rhagodia eremaea*  
*Senna glutinosa* subsp. *xluerssenii*



**V23 31<sup>st</sup> July 2024 Gravel pit access 8.14 am**

GPS: 582246 E/ 7027377 N Elevation: 526 m	Landform: Low gravelly hill, midslope; gentle to moderate slope; aspect south
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Land surface: Yellowish red silty clay loam; surface rock (gravel, chert, BIF, quartz) > 90 %; litter < 5 %; fallen timber < 1 %; bare ground < 2 %

Condition & disturbances: Degraded to poor; pastoral impacts, rabbits

NVIS 6: U1<sup>^</sup> *Acacia aptaneura*, *A. pruinocarpa* \Acacia\^tree, shrub\6\r; M1<sup>^</sup> *Senna glaucifolia*, *Scaevola spinescens*, *Acacia aptaneura* \Senna\^shrub\3\r; G1<sup>^</sup> *Maireana melanocoma*, germinating forbs, *Eremophila forrestii* subsp. *forrestii*, *E. compacta* \Maireana\^chenopod shrub, forb, shrub\1\r

Vegetation: *Acacia aptaneura*, *A. pruinocarpa* low open woodland over *Senna glaucifolia*, *Scaevola spinescens*, *Acacia aptaneura* sparse shrubland over *Maireana melanocoma*, germinating forbs, *Eremophila forrestii* subsp. *forrestii* low sparse chenopod shrubland

Height (m)	Crown cover %	Habit	Species
4 – 8	2 – 10	T, S	<i>Acacia aptaneura</i> , <i>A. pruinocarpa</i>
1 – 1.5	2 – 10	S	<i>Senna glaucifolia</i> , <i>Scaevola spinescens</i> , <i>Acacia aptaneura</i>
0.1 – 0.3	2 – 10	C, F, S	<i>Maireana melanocoma</i> , germinating forbs, <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. compacta</i>

Other species: *Dodonaea pachyneura*, *Grevillea berryana*, *Sida ectogama*, *Micromyrtus sulphurea*, *Solanum lasiophyllum*, *Thryptomene decussata*

- Acacia aptaneura*
- Acacia pruinocarpa*
- Dodonaea pachyneura*
- Eremophila compacta*
- Eremophila forrestii* subsp. *forrestii*
- Grevillea berryana*
- Maireana melanocoma*
- Micromyrtus sulphurea*
- Scaevola spinescens*
- Senna glaucifolia*
- Sida ectogama*
- Solanum lasiophyllum*
- Thryptomene decussata*



**V24 31<sup>st</sup> July 2024 Gravel pit access**

GPS: 582255 E/ 7027536 N  
Elevation: 529 m

Landform: Low hill; upper slope; gravelly hill; aspect north, gentle to moderate slope

Land surface: Yellowish red silty clay loam; surface rock (gravel) > 90 %

Condition & disturbances: Good; pastoral impacts, rabbits; minor erosion

NVIS 6: U1+^ *Acacia incurvaneura*, *A. pruinocarpa*, *A. aptaneura* \Acacia\ ^shrub, tree\4\i; M1^ *Acacia ramulosa* var. *linophylla*, *Eremophila latrobei* subsp. *latrobei*, *Acacia incurvaneura* \Acacia\ ^shrub\3\i; M2^ *Eremophila latrobei* subsp. *latrobei*, *Acacia incurvaneura*, *Senna glaucifolia*, *Stenanthemum patens*, *Eremophila compacta*, *Sida ectogama* \Eremophila\ ^shrub\2\i; G1^ *Ptilotus schwartzii*, *Eragrostis eriopoda* \Ptilotus\ ^shrub, tussock grass\1\i

Vegetation: *Acacia incurvaneura*, *A. pruinocarpa*, *A. aptaneura* tall open shrubland over *Acacia ramulosa* var. *linophylla*, *Eremophila latrobei* subsp. *latrobei*, *Acacia incurvaneura* sparse shrubland over *Eremophila latrobei* subsp. *latrobei*, *Acacia incurvaneura*, *Senna glaucifolia* low sparse shrubland

Height (m)	Crown cover %	Habit	Species
4 – 6	10 – 30	S, T	<i>Acacia incurvaneura</i> , <i>A. pruinocarpa</i> , <i>A. aptaneura</i>
1 – 2	2 – 10	S	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Acacia incurvaneura</i>
0.2 – 1	2 – 10	S	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Acacia incurvaneura</i> , <i>Senna glaucifolia</i> , <i>Stenanthemum patens</i> , <i>Eremophila compacta</i> , <i>Sida ectogama</i>
< 0.2	<2	S, G	<i>Ptilotus schwartzii</i> , <i>Eragrostis eriopoda</i>

Other species: *Eremophila glutinosa* (becoming dominant downslope), *Grevillea berryana*

*Acacia aptaneura*  
*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Acacia ramulosa* var. *linophylla*  
*Eragrostis eriopoda*  
*Eremophila compacta*  
*Eremophila glutinosa*  
*Eremophila latrobei* subsp. *latrobei*  
*Grevillea berryana*  
*Ptilotus schwartzii*  
*Senna glaucifolia*  
*Sida ectogama*  
*Stenanthemum patens* P1



**V25 31<sup>st</sup> July 2024 Gravel pit access**

GPS: 582252 E/ 7027637 N  
Elevation: 520 m

Landform: Hill; lower slope, valley with broad drainage line

Land surface: Reddish yellow (7.5YR6/6) fine sandy clay loam; surface rock (gravel) 30 – 40 %;

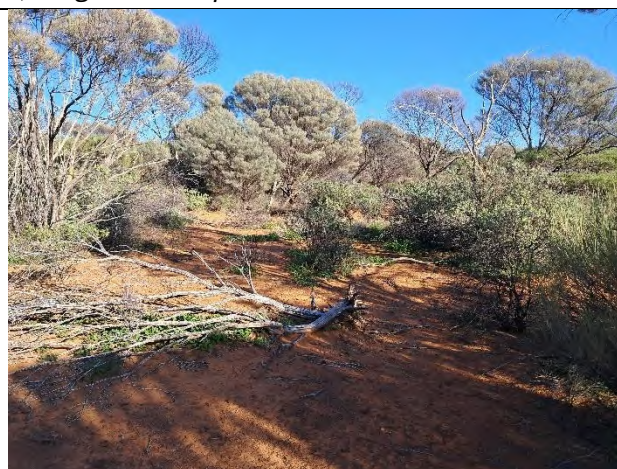
Condition & disturbances:

NVIS 6: U1+^ *Acacia incurvaneura*, *A. fuscaneura*, *A. sp. Weld Range*, *Grevillea berryana*\Acacia\  
^tree, shrub\6\; M1^ *Eremophila forrestii* subsp. *forrestii*, *Acacia ramulosa* var. *linophylla*, *Senna*  
*glaucifolia*\Eremophila\  
^shrub\3\; M2^ *Eremophila forrestii* subsp. *forrestii*, *E. glutinosa*, *Sida*  
*ectogama*, *Solanum lasiophyllum*, *Thysanotus manglesianus*\Eremophila\  
^shrub, climber\  
2\; G1^  
*Erodium cygnorum*, *Eragrostis eriopoda*\Erodium\  
^forb, tussock grass

Vegetation: *Acacia incurvaneura*, *A. fuscaneura*, *A. sp. Weld Range* low woodland over *Eremophila*  
*forrestii* subsp. *forrestii*, *Acacia ramulosa* var. *linophylla*, *Senna artemisioides* subsp. *xsturtii* open  
shrubland over *Eremophila forrestii* subsp. *forrestii*, *E. glutinosa*, *Sida ectogama* low sparse  
shrubland over *Erodium cygnorum*, *Eragrostis eriopoda* low open forbland

Height (m)	Crown cover %	Habit	Species
4 – 8	10 – 30	T, S	<i>Acacia incurvaneura</i> , <i>A. fuscaneura</i> , <i>A. sp. Weld Range</i> , <i>Grevillea berryana</i>
1 – 2	10 – 30	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Senna artemisioides</i> subsp. <i>xsturtii</i>
0.3 – 1	2 – 10	S, L	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. glutinosa</i> , <i>Sida ectogama</i> , <i>Solanum lasiophyllum</i> , <i>Thysanotus manglesianus</i>
< 0.3	10 – 20	F, G	<i>Erodium cygnorum</i> , <i>Eragrostis eriopoda</i>

*Acacia fuscaneura*  
*Acacia incurvaneura*  
*Acacia ramulosa* var. *linophylla*  
*Acacia sp. Weld Range*  
*Eragrostis eriopoda*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila glutinosa*  
*Erodium cygnorum*  
*Grevillea berryana*  
*Senna artemisioides* subsp. *xsturtii*  
*Sida ectogama*  
*Solanum lasiophyllum*  
*Thysanotus manglesianus*



Downslope from description site – erosion moderate with erosion gullies, sheet erosion and areas of deposition

Other species:  
*Brachyscome iberidifolia*  
*Psyrax latifolia*  
*Psyrax suaveolens*



**V26 31<sup>st</sup> July 2024 8.55 am Gravel pit access**

GPS: 582314 E/ 7027752 N Elevation: 522 m	Landform: Stony hill; midslope; aspect north; gentle slope
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Land surface: Yellowish red silty clay loam; surface rock (BIF, chert, quartz, 3 – 10 cm) 40 – 60 %; litter < 5 %; fallen timber < 1 %; bare ground 20 – 30 %

Condition & disturbances: Good; pastoral impacts, rabbits, sheet erosion; drought impacts – some deaths, and part crown deaths

NVIS 6: U1+^ *Acacia incurvaneura*, *A. sp. Weld Range* \Acacia\^shrub\4\; M1^ *Ptilotus rotundifolius*, *Eremophila forrestii* subsp. *forrestii*, *Scaevola spinescens*, *Eremophila glutinosa*, *Acacia ramulosa* var. *linophylla* \Ptilotus\^shrub\3\; G1^ *Ptilotus aervoides*, *P. schwartzii*, *Erodium cygnorum*, *Eremophila forrestii* subsp. *forrestii* \Ptilotus\^shrub, forb\1\bi

Vegetation: *Acacia incurvaneura*, *A. sp. Weld Range* tall sparse shrubland over *Ptilotus rotundifolius*, *Eremophila forrestii* subsp. *forrestii*, *Scaevola spinescens* sparse shrubland over *Ptilotus aervoides*, *P. schwartzii*, *Erodium cygnorum* low sparse shrubland

Height (m)	Crown cover %	Habit	Species
4 – 6	2 – 10	S	<i>Acacia incurvaneura</i> , <i>A. sp. Weld Range</i>
1 – 2	2 – 10	S	<i>Ptilotus rotundifolius</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Scaevola spinescens</i> , <i>Eremophila glutinosa</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
< 0.3	< 2	S, F	<i>Ptilotus aervoides</i> , <i>P. schwartzii</i> , <i>Erodium cygnorum</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i>

Other species: *Senna artemisioides* subsp. *helmsii*, *S. artemisioides* subsp. *xsturtii*

*Acacia incurvaneura*  
*Acacia ramulosa* var. *linophylla*  
*Acacia sp. Weld Range*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila glutinosa*  
*Erodium cygnorum*  
*Ptilotus aervoides*  
*Ptilotus rotundifolius*  
*Ptilotus schwartzii*  
*Scaevola spinescens*  
*Senna artemisioides* subsp. *helmsii*  
*Senna artemisioides* subsp. *xsturtii*



Opportunistic site; downslope from V26  
 GPS582302 E/ 7027815 N 520 m

Broad drainage line, unincised  
*Acacia incurvaneura* woodland over  
*Eremophila georgei*, *E. forrestii* subsp. *forrestii*,  
*Acacia ramulosa* var. *linophylla* open  
 shrubland over *Erodium cygnorum*,  
*Paspalidium basicladum* low sparse forbland



**V27 31<sup>st</sup> July 2024 Gravel pit access Relevé**

GPS: 582366 E/ 7027851 N Elevation: 524 m	Landform: Hill, midslope; change from valley to stony slope; aspect NW
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Land surface: Surface rock 20 – 40 %

Condition & disturbances: Good; pastoral impacts; drought impacts

Vegetation: *Acacia pruinocarpa*, *A. caesaneura*, *A. incurvaneura*, *A. sp. Weld Range* tall open shrubland over *Eremophila latrobei* subsp. *latrobei*, *Ptilotus rotundifolius*, *E. fraseri* subsp. *fraseri*, *E. glutinosa*, *Senna artemisioides* subsp. *helmsii*, *Acacia tetragonophylla*, *Sida ectogama* sparse shrubland over *Hibiscus sturtii* low isolated shrubs

*Eremophila fraseri* subsp. *fraseri* becoming more common as changes to stony hillslope

<i>Acacia caesaneura</i>	<i>Eremophila glutinosa</i>
<i>Acacia incurvaneura</i>	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>
<i>Acacia pruinocarpa</i>	<i>Hibiscus sturtii</i>
<i>Acacia sp. Weld Range</i>	<i>Ptilotus rotundifolius</i>
<i>Acacia tetragonophylla</i>	<i>Senna artemisioides</i> subsp. <i>helmsii</i>
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	<i>Sida ectogama</i>

**V28 31<sup>st</sup> July 2024 9.16 am Gravel pit access**

GPS: 582432 E/ 7027922 N Elevation: 521 m	Landform: Hill, stony surface; gentle to moderate; aspect NW
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Land surface: Yellowish red silty clay loam; surface rock (BIF, dolerite, quartz, 2 – 10 cm) 40 – 60 %; litter < 2 %; fallen timber < 2 %

Condition & disturbances: Poor; pastoral impacts, drought impacts – *Acacia ramulosa* shrub died; patches of germinating forbs

NVIS 6: U1+^*Acacia incurvaneura*, *A. sp. Weld Range*\Acacia\^shrub\4\bi; M1^ *Eremophila fraseri* subsp. *fraseri*, *A. speckii*\Eremophila\^shrub\3\bi; G1^ *Goodenia tenuiloba*, *Ptilotus schwartzii*\Goodenia\^forb, shrub\1\r


Vegetation: *Acacia incurvaneura*, *A. sp. Weld Range* tall isolated shrubs over *Eremophila fraseri* subsp. *fraseri*, *A. speckii* isolated shrubs over *Goodenia tenuiloba*, *Ptilotus schwartzii* low sparse forbland

Height (m)	Crown cover %	Habit	Species
3 – 6	< 2	S	<i>Acacia incurvaneura</i> , <i>A. sp. Weld Range</i>
1 – 2	< 2	S	<i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>A. speckii</i>
< 0.3	2 – 10	F, S	<i>Goodenia tenuiloba</i> , <i>Ptilotus schwartzii</i>

*Acacia incurvaneura*  
*Acacia speckii* P4  
*Acacia sp. Weld Range*  
*Eremophila fraseri* subsp. *fraseri*  
*Goodenia tenuiloba*  
*Ptilotus schwartzii*



**V29 31<sup>st</sup> July 2024 Gravel pit access**

GPS: 582559 E/ 7028011 N Elevation: 519 m		Landform: Hill; stony with small outcrops of dolerite; gentle slope; aspect NW	
Land surface: Reddish brown clay loam; surface rock (dolerite – boulders, outcrop; BIF, chert rocks 2 – 20 cm) 60 – 80 %; litter < 10 %; fallen timber < 2 %			
Condition & disturbances: Pastoral impacts; drought impacts – deaths and part crown deaths; <i>Acacia speckii</i> with moderate to high crown death (2 deaths)			
NVIS 6: M1+^ <i>Acacia speckii</i> , <i>A. sp. Weld Range</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> \Acacia\ 4i; M2^ <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus rotundifolius</i> \Eremophila\ ^shrub\3\r; G1^ <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>E. compacta</i> , <i>Sida ectogama</i> \Eremophila\ ^shrub\2\r; G2^ <i>Cephalopterum drummondii</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Maireana georgei</i> \Cephalopterum\ ^forb, shrub, chenopod shrub\1\bi			
Vegetation: <i>Acacia speckii</i> , <i>A. sp. Weld Range</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> tall open shrubland over <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus rotundifolius</i> sparse shrubland over <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>E. compacta</i> , <i>Sida ectogama</i>			
Height (m)	Crown cover %	Habit	Species
2 – 3.5	10 – 20	S	<i>Acacia speckii</i> , <i>A. sp. Weld Range</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i>
1 – 2	2 – 10	S	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Ptilotus rotundifolius</i>
0.2 – 0.8	2 – 10	S	<i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>E. compacta</i> , <i>Sida ectogama</i>
< 0.2	< 2	F, S, C	<i>Cephalopterum drummondii</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Maireana georgei</i>
<i>Acacia speckii</i> P4 <i>Acacia sp. Weld Range</i> <i>Cephalopterum drummondii</i> <i>Eremophila compacta</i> <i>Eremophila fraseri</i> subsp. <i>fraseri</i> <i>Eremophila latrobei</i> subsp. <i>latrobei</i> <i>Maireana georgei</i> <i>Ptilotus rotundifolius</i> <i>Sida ectogama</i>			

**V30 31<sup>st</sup> July 2024 Gravel pit access**

GPS: 582687 E/ 7028093 N  
Elevation: 511 m

Landform: Hill; lower slope; gentle sloping stony plain with dolerite outcrops; aspect NNW

Land surface: Reddish brown clay loam; surface rock (dolerite boulders and outcrop; BIF, chert, quartz rocks) > 70 %; litter < 5%; fallen timber < 2 %

Condition & disturbances: Good; pastoral impacts; rabbits; drought impacts

NVIS 6: U1+^ *Acacia incurvaneura*, *A. aptaneura*\Acacia\^tree\6\; M1^ *Senna artemisioides* subsp. *helmsii*, *Eremophila fraseri* subsp. *fraseri*\Senna\^shrub\; G1^ *Sida ectogama*, *Eremophila latrobei* subsp. *latrobei*, *Maireana georgei*\Sida\^shrub, chenopod shrub\2\bi; G2^ *Erodium cygnorum*\Erodium\^forb\1\bi

Vegetation: *Acacia incurvaneura*, *A. aptaneura* low open woodland over *Senna artemisioides* subsp. *helmsii*, *Eremophila fraseri* subsp. *fraseri* sparse shrubland over *Sida ectogama*, *Eremophila latrobei* subsp. *latrobei*, *Maireana georgei* low isolated shrubs

Height (m)	Crown cover %	Habit	Species
4 – 6	2 – 10	T	<i>Acacia incurvaneura</i> , <i>A. aptaneura</i>
1 – 2	2 – 10	S	<i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i>
0.2 – 0.8	< 2	S, C	<i>Sida ectogama</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Maireana georgei</i>
< 0.2	< 2	F	<i>Erodium cygnorum</i>

Other species: *Acacia speckii*

*Acacia aptaneura*  
*Acacia incurvaneura*  
*Acacia speckii* P4  
*Eremophila fraseri* subsp. *fraseri*  
*Eremophila latrobei* subsp. *latrobei*  
*Erodium cygnorum*  
*Maireana georgei*  
*Senna artemisioides* subsp. *helmsii*  
*Sida ectogama*




Opportunistic site

GPS: 582768 E/ 7028160 N 509 m


Minor drainage line


*Acacia incurvaneura*, *A. craspedocarpa* tall open shrubland over *Eremophila georgei*, *E. fraseri* open shrubland



V31 Gravel pit area West			
GPS: 582870 E/ 7028230 N Elevation: 510 m		Landform: Change from stony plain/ lower slope of hill to alluvium/ hardpan plain; possible water discharge point	
Land surface: Yellowish red fine sandy clay loam; surface rock within depression/ wet area < 10 %			
Condition & disturbances: Very good; pastoral disturbances and rabbits; some drought impacts			
NVIS 6: U1+^ <i>Acacia pruinocarpa</i> , <i>Acacia incurvaneura</i> \Acacia\^tree, shrub\7\c; M1^ <i>Acacia craspedocarpa</i> , <i>Psyrax suaveolens</i> \Acacia\^shrub, tree\4\c; M2^ <i>Eremophila georgei</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>E. forrestii</i> subsp. <i>forrestii</i> \Eremophila\^shrub\3\c; G1^ <i>Maireana georgei</i> , <i>Erodium cygnorum</i> \Maireana\^chenopod shrub, forb\1\bi			
Vegetation: <i>Acacia pruinocarpa</i> , <i>Acacia incurvaneura</i> woodland over <i>Acacia craspedocarpa</i> , <i>Psyrax suaveolens</i> tall isolated shrubs over <i>Eremophila georgei</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>E. forrestii</i> subsp. <i>forrestii</i> shrubland over <i>Maireana georgei</i> , <i>Erodium cygnorum</i> low isolated chenopod shrubs			
Height (m)	Crown cover %	Habit	Species
8 – 12	30 – 40	T, S	<i>Acacia pruinocarpa</i> , <i>Acacia incurvaneura</i>
3 – 4	2 – 10	S, T	<i>Acacia craspedocarpa</i> , <i>Psyrax suaveolens</i>
1 – 1.5	30 – 40	S	<i>Eremophila georgei</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>E. forrestii</i> subsp. <i>forrestii</i>
< 0.5	< 2	C, F	<i>Maireana georgei</i> , <i>Erodium cygnorum</i>
<i>Acacia craspedocarpa</i> <i>Acacia incurvaneura</i> <i>Acacia pruinocarpa</i> <i>Eremophila forrestii</i> subsp. <i>forrestii</i> <i>Eremophila georgei</i> <i>Eremophila latrobei</i> subsp. <i>latrobei</i> <i>Erodium cygnorum</i> <i>Maireana georgei</i> <i>Psyrax suaveolens</i>			

<p><b>Opportunistic site GP1</b></p> <p>GPS: 582884 E/ 7028230 N</p> <p>Hardan plain</p> <p>Condition: poor; pastoral impacts – moderate to high; lacks grasses, recruitment mostly absent</p> <p><i>Acacia incurvaneura</i> low isolated trees over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> open shrubland over <i>Erodium cygnorum</i> low sparse forbland</p>	
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<p><b>Opportunistic site GP2</b>  GPS: 582937 E/ 7028466 N Elevation: 508 m  Hardpan plain; drainage area; alluvium  Condition: poor; pastoral impacts; drought impacts moderate to high; recruitment/ regrowth of <i>Eremophila foliosissima</i> following wetter conditions  <i>Acacia pruinocarpa</i>, <i>Acacia incurvaneura</i> low open woodland to low isolated trees over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> sparse shrubland over <i>Eremophila foliosissima</i> low sparse shrubland over <i>Erodium cygnorum</i>, grass tussocks low open forbland</p>	
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V32 Gravel pit area NE			
GPS: 583130 E/ 7028519 N Elevation: 509 m		Landform: Stony plain with ironstone gravel; very gentle slope; aspect N - NE	
Land surface: Yellowish red fine sandy clay loam; surface rock – Ironstone gravel 30 – 40 %; rocks (BIF, chert, quartz) 30 – 40 %; litter < 5 %; fallen timber < 1 %			
Condition & disturbances: Poor; pastoral impacts – groundcover absent; little recruitment; drought impacts – several dead shrubs present			
NVIS 6: U1+^ <i>Acacia incurvaneura</i> , <i>A. pruinocarpa</i> , <i>A. mulganeura</i> \Acacia\^tree, shrub\6\; M1^ <i>Acacia incurvaneura</i> , <i>A. mulganeura</i> \Acacia\^shrub\3\; G1^ <i>Chenopod sp.</i> \Chenopod sp.\^chenopod shrub\1\			
Vegetation: <i>Acacia incurvaneura</i> , <i>A. pruinocarpa</i> , <i>A. mulganeura</i> low open woodland over <i>Acacia incurvaneura</i> , <i>A. mulganeura</i> isolated shrubs over <i>Chenopod sp.</i> low isolated chenopod shrubs			
Height (m)	Crown cover %	Habit	Species
4 – 7	2 – 10	T, S	<i>Acacia incurvaneura</i> , <i>A. pruinocarpa</i> , <i>A. mulganeura</i>
1 – 2	< 2	S	<i>Acacia incurvaneura</i> , <i>A. mulganeura</i>
< 1	< 2	S	<i>Chenopod sp.</i> (sterile, nearly dead)
<i>Acacia incurvaneura</i> <i>Acacia mulganeura</i> <i>Acacia pruinocarpa</i> <i>Chenopod sp.</i>			

V33 31<sup>st</sup> July 2024 10.46 am Gravel pit area East

GPS: 583213 E/ 7028420 N  
Elevation: 509 m

Landform: Alluvial plain; depression/ partly incised drainage line

Land surface: Yellowish red fine sandy clay loam

Condition & disturbances: Good; pastoral impacts – many cattle tracks through area; rabbits; erosion; drought deaths – in particular one large tree (*A. pruinocarpa*); grasses absent

NVIS 6: U1+^ *Acacia pruinocarpa* \Acacia\^tree\7\i; M1^ *Acacia incurvaneura*, *A. fuscaneura*, *A. tetragonophylla* \Acacia\^shrub, tree\4\i; M2^ *Eremophila forrestii* subsp. *forrestii*, *Acacia pruinocarpa*, *Ptilotus obovatus* \Eremophila\^shrub\3\i; G1^ *Erodium cygnorum*, *Tetragonia cristata*, *Maireana ?tomentosa*, *Ptilotus polystachyus*, *Eremophila forrestii* subsp. *forrestii* \Erodium\^forb, chenopod shrub, shrub\1\i

Vegetation: *Acacia pruinocarpa* woodland over *Acacia incurvaneura*, *A. fuscaneura*, *A. tetragonophylla* tall open shrubland over *Eremophila forrestii* subsp. *forrestii*, *Acacia pruinocarpa*, *Ptilotus obovatus* open shrubland over *Erodium cygnorum*, *Tetragonia cristata*, *Eriochiton sclerolaenoides*, *Ptilotus polystachyus* low open forbland

Height (m)	Crown cover %	Habit	Species
> 10	20 – 30	T	<i>Acacia pruinocarpa</i>
2 – 5	10 – 30	S, T	<i>Acacia incurvaneura</i> , <i>A. fuscaneura</i> , <i>A. tetragonophylla</i>
1 – 1.5	20 – 30	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Acacia pruinocarpa</i> , <i>Ptilotus obovatus</i>
< 0.5	10 – 30	F, C, S	<i>Erodium cygnorum</i> , <i>Tetragonia cristata</i> , <i>Eriochiton sclerolaenoides</i> , <i>Ptilotus polystachyus</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i>

*Acacia fuscaneura*  
*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Acacia tetragonophylla*  
*Eremophila forrestii* subsp. *forrestii*  
*Eriochiton sclerolaenoides*  
*Erodium cygnorum*  
*Paspalidium basicladum*  
*Ptilotus obovatus*  
*Ptilotus polystachyus*  
*Senna* sp. *Meekatharra*  
*Tetragonia cristata*





Large *Acacia pruinocarpa* dead - ?drought impact

Regrowth under old crown extent – *Ptilotus obovatus*, *Eremophila forrestii* subsp. *forrestii* low open shrubland over *Erodium cygnorum*, *Tetragonia cristata* low forbland

Taller *Eremophila*, *Senna* sp. *Meekatharra* at edges



<p><b>Opportunistic site GP3</b>  Alluvial plain/ hardpan  GPS: 583196 E/ 7028436 N Elevation: 509 m  Condition: degraded to poor; pastoral impacts (cattle) high; erosion – sheet wash and deposition</p> <p><i>Acacia incurvaneura</i>, <i>A. pruinocarpa</i>, <i>A. ramulosa</i> var. <i>linophylla</i> tall shrubland patches over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> sparse shrubland over <i>Erodium cygnorum</i>, <i>Paspalidium basicladum</i>, <i>Eremophila forrestii</i> subsp. <i>forrestii</i> low open forbland</p>	
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V34 31 <sup>st</sup> July 2024 Gravel pit area SW			
GPS: 582934 E/ 7028150 N Elevation: 516 m		Landform: Stony gentle sloping plain; aspect NE	
Land surface: Yellowish red silty clay loam; surface rock – ironstone gravel 20 – 40 %; larger rocks 2 – 10 cm 20 – 40 %; litter < 5 %; fallen timber < 2 %			
Condition & disturbances: Poor; pastoral impacts, drought impacts – some deaths; sheet erosion			
NVIS 6: U1+^ <i>Grevillea berryana</i> , <i>Acacia aptaneura</i> \Grevillea\^tree\6\bi; M1^ <i>Acacia incurvaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Eremophila glutinosa</i> \Acacia\^shrub\3\bi; G1^ <i>Eragrostis eriopoda</i> , <i>Ptilotus aervoides</i> \Eragrostis\^tussock grass, forb\1\bi			
Vegetation: <i>Grevillea berryana</i> , <i>Acacia aptaneura</i> low isolated trees over <i>Acacia incurvaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Eremophila glutinosa</i> isolated shrubs over <i>Eragrostis eriopoda</i> , <i>Ptilotus aervoides</i> low isolated tussock grasses			
Height (m)	Crown cover %	Habit	Species
3 – 5	< 2	T	<i>Grevillea berryana</i> , <i>Acacia aptaneura</i>
1 – 2	< 2	S	<i>Acacia incurvaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Eremophila glutinosa</i>
< 0.2	< 2	G, F	<i>Eragrostis eriopoda</i> , <i>Ptilotus aervoides</i>
<i>Acacia aptaneura</i> <i>Acacia incurvaneura</i> <i>Acacia ramulosa</i> var. <i>linophylla</i> <i>Eragrostis eriopoda</i> <i>Eremophila glutinosa</i> <i>Grevillea berryana</i> <i>Ptilotus aervoides</i>			
Change to broad drainage line GPS: 583071 E/ 7028202 N Elevation: 514 m		<i>Acacia pruinosa</i> isolated trees over <i>Acacia incurvaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> tall open shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> open shrubland	

**V35 31<sup>st</sup> July 2024 Pit area, north side**

GPS: 583069 E/ 7027557 N  
Elevation: 522 m

Landform: Colluvial outwash slope below BIF ridge; lower slope

Land surface: Surface rock (BIF, chert, quartz) 30 – 40 %

Condition & disturbances: Very good; pastoral impacts moderate

NVIS 6: U1<sup>^</sup> *Acacia incurvaneura*, *A. caesaneura* \Acacia\^tree, shrub\6\r; M1+<sup>^</sup> *Ptilotus rotundifolius*, *Senna glaucifolia*, *Acacia caesaneura*, *Eremophila forrestii* subsp. *forrestii*, *Acacia incurvaneura* \Ptilotus\^shrub\3\j; G1<sup>^</sup> *Ptilotus aevoides*, *Stenopetalum anfractum* \Ptilotus\^forb\1\bi

Vegetation: *Acacia incurvaneura*, *A. caesaneura* low open woodland over *Ptilotus rotundifolius*, *Senna glaucifolia*, *Acacia caesaneura* open shrubland over *Ptilotus aevoides*, *Stenopetalum anfractum* low isolated forbs

Height (m)	Crown cover %	Habit	Species
4 – 8	2 – 10	T, S	<i>Acacia incurvaneura</i> , <i>A. caesaneura</i>
1 – 2	10 – 20	S	<i>Ptilotus rotundifolius</i> , <i>Senna glaucifolia</i> , <i>Acacia caesaneura</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Acacia incurvaneura</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
< 0.3	< 2	F	<i>Ptilotus aevoides</i> , <i>Stenopetalum anfractum</i>

*Acacia caesaneura*  
*Acacia incurvaneura*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila latrobei* subsp. *latrobei*  
*Ptilotus aevoides*  
*Ptilotus rotundifolius*  
*Senna glaucifolia*  
*Stenopetalum anfractum*



**V36 31<sup>st</sup> July 2024 Pit area, north side**

GPS: 583086 E/ 7027479 N  
Elevation: 527 m

Landform: Hill, colluvial outwash slope; moderate slope;  
aspect NW

Land surface: Yellowish red silty clay loam; surface rock – fine gravel 30 – 40 %, BIF, chert rocks 5 – 20 cm 30 – 40 %; litter < 5 %; fallen timber < 1 %

Condition & disturbances: Very good; historic mining activities – tracks and drill locations; lower pastoral impacts

NVIS 6: U1+ ^ *Acacia incurvaneura*, *A. pruinocarpa*, *A. sp. Weld Range* \ *Acacia* \ ^tree, shrub\6\; M1^ *Eremophila macmillaniana*, *Senna glaucifolia*, *Eremophila fraseri* subsp. *fraseri*, *Ptilotus rotundifolius* \ *Eremophila* \ ^shrub\3\; M2^ *Ptilotus rotundifolius*, *Senna glaucifolia* \ *Ptilotus* \ ^shrub\2\bi; G1^ *Maireana melanocoma*, *Ptilotus aervoides*, *Portulaca oleracea*, *Stenopetalum filifolium* \ *Maireana* \ ^chenopod shrub, forb\1\bi

Vegetation: *Acacia incurvaneura*, *A. pruinocarpa*, *A. sp. Weld Range* tall open shrubland over *Eremophila macmillaniana*, *Senna glaucifolia*, *Eremophila fraseri* subsp. *fraseri* sparse shrubland over *Maireana melanocoma*, *Ptilotus aervoides*, *Portulaca oleracea* low isolated chenopod shrubs

Height (m)	Crown cover %	Habit	Species
3 – 8	10 – 20	T, S	<i>Acacia incurvaneura</i> , <i>A. pruinocarpa</i> , <i>A. sp. Weld Range</i>
1 – 2	2 – 10	S	<i>Eremophila macmillaniana</i> , <i>Senna glaucifolia</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Ptilotus rotundifolius</i>
0.3 – 1	< 2	S	<i>Ptilotus rotundifolius</i> , <i>Senna glaucifolia</i>
< 0.3	< 2	C, F	<i>Maireana melanocoma</i> , <i>Ptilotus aervoides</i> , <i>Portulaca oleracea</i> , <i>Stenopetalum filifolium</i> , <i>Eragrostis eriopoda</i>

Other species: *Scaevola spinescens*

*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Acacia sp. Weld Range*  
*Eremophila fraseri* subsp. *fraseri*  
*Eremophila macmillaniana*  
*Maireana melanocoma*  
*Ptilotus aervoides*  
*Ptilotus rotundifolius*  
*Portulaca oleracea*  
*Senna glaucifolia*  
*Stenopetalum filifolium*  
*Scaevola spinescens*



**V37 31<sup>st</sup> July 2024 Gravel pit area north**

GPS: 582908 E/ 7027436 N  
Elevation: 524 m

Landform: Hill; colluvial outwash lower slope; moderate slope; aspect NW

Land surface: Yellowish red silty clay loam; surface rock (BIF, chert) 30 – 40 %

Condition & disturbances: Very good; access road (calcrete surfaced) to north, downslope

NVIS 6: U1+^ *Acacia incurvaneura* \Acacia\^tree\6\i; M1^ *Acacia* sp. Weld Range, *Eremophila macmillaniana* \Acacia\^shrub\4\i; M2^ *Eremophila macmillaniana*, *Senna glaucifolia*, *Psydrax latifolia*, *Senna artemisioides* subsp. *helmsii* \Eremophila\^shrub\3\i; M3^ *Eremophila forrestii* subsp. *forrestii*, *Psydrax latifolia*, *Hibiscus sturtii*, *Senna artemisioides* subsp. *helmsii* \Eremophila\ 2\i; G1^ *Maireana melanocoma*, *Ptilotus obovatus*, *Goodenia tenuiloba*, *Psydrax latifolia*, *Solanum lasiophyllum* \Maireana\^chenopod shrub, shrub, forb\1\i

Vegetation: *Acacia incurvaneura* low open woodland over *Acacia* sp. Weld Range, *Eremophila macmillaniana* tall sparse shrubland over *Eremophila macmillaniana*, *Senna glaucifolia*, *Psydrax latifolia* open shrubland over *Eremophila forrestii* subsp. *forrestii*, *Psydrax latifolia*, *Hibiscus sturtii* low sparse shrubland over *Maireana melanocoma*, *Ptilotus obovatus*, *Goodenia tenuiloba* low sparse chenopod shrubland

Height (m)	Crown cover %	Habit	Species
5 – 8	10 – 30	T	<i>Acacia incurvaneura</i>
2 – 4	2 – 10	S	<i>Acacia</i> sp. Weld Range, <i>Eremophila macmillaniana</i>
1 – 2	10 – 30	S	<i>Eremophila macmillaniana</i> , <i>Senna glaucifolia</i> , <i>Psydrax latifolia</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
0.3 – 1	2 – 10	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Psydrax latifolia</i> , <i>Hibiscus sturtii</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i>
< 0.3	2 – 10	C, S, F	<i>Maireana melanocoma</i> , <i>Ptilotus obovatus</i> , <i>Goodenia tenuiloba</i> , <i>Psydrax latifolia</i> , <i>Solanum lasiophyllum</i> , <i>Erodium cygnorum</i>

*Acacia incurvaneura*  
*Acacia* sp. Weld Range  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila macmillaniana*  
*Erodium cygnorum*  
*Goodenia tenuiloba*  
*Hibiscus sturtii*  
*Ptilotus obovatus*  
*Maireana melanocoma*  
*Psydrax latifolia*  
*Senna artemisioides* subsp. *helmsii*  
*Senna glaucifolia*  
*Solanum lasiophyllum*



**V38 31<sup>st</sup> July 2024 Gravel pit area north/ outside**

GPS: 582838 E/ 7027530 N  
Elevation: 520 m

Landform: Broad drainage line; very gentle slope; aspect ? west

Land surface: Yellowish red fine sandy clay loam; surface rock < 5 %; litter 10 – 20 %; fallen timber 2 – 5 %

Condition & disturbances: Very good; pastoral impacts; sedimentation from erosion upslope – breach of road side bank

NVIS 6: U1+^ *Acacia incurvaneura*, *A. pruinocarpa*\Acacia\^tree\7\c; U2^ *Psyrax latifolia*\Psyrax\ 6\; M1^ *Eremophila forrestii* subsp. *forrestii*, *E. georgei*, *Rhagodia eremaea*\Eremophila\^shrub, chenopod shrub\3\; G1^ *Erodium cygnorum*, *Eremophila forrestii* subsp. *forrestii*, *Psyrax latifolia*, *Goodenia tenuiloba*, *Lepidium oxytrichum*\Erodium\^forb, shrub\2\c

Vegetation: *Acacia incurvaneura*, *A. pruinocarpa* open forest over *Psyrax latifolia* low open woodland over *Eremophila forrestii* subsp. *forrestii*, *E. georgei*, *Rhagodia eremaea* open shrubland over *Erodium cygnorum*, *Eremophila forrestii* subsp. *forrestii*, *Psyrax latifolia* low forbland

Height (m)	Crown cover %	Habit	Species
8 – 12 m	30 – 40	T	<i>Acacia incurvaneura</i> , <i>A. pruinocarpa</i>
4 – 7	2 – 10	T	<i>Psyrax latifolia</i>
1 – 2	20 – 30	S, C	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Rhagodia eremaea</i>
< 1	30 – 70	F, S, C, G	<i>Erodium cygnorum</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Psyrax latifolia</i> , <i>Goodenia tenuiloba</i> , <i>Lepidium oxytrichum</i> , <i>Ptilotus obovatus</i> , <i>Maireana georgei</i> , <i>Crassula colorata</i> var. <i>acuminata</i> , <i>Monachather paradoxus</i> , <i>Tetragonia cristata</i> , <i>Acacia incurvaneura</i>

*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Crassula colorata* var. *acuminata*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila georgei*  
*Erodium cygnorum*  
*Goodenia tenuiloba*  
*Lepidium oxytrichum*  
*Maireana georgei*  
*Monachather paradoxus*  
*Psyrax latifolia*  
*Ptilotus obovatus*  
*Rhagodia eremaea*  
*Tetragonia cristata*



Opportunistic Site Pit01  
GPS: 582832 E/ 7027456 N Elevation: 522 m

Condition: degraded – active erosion (sheet, gully) from breach of road bank; calcrete road surface (white) washed downslope





**V39 31<sup>st</sup> July 2024 2.30 pm Haul road and infrastructure**

GPS: 581362 E/ 7025906 N  
 Elevation: 518 m

Landform: Hardpan plain; alluvium; very gentle slope; aspect south; woodland patch

Land surface: Strong brown (7.5YR6/8) fine sandy clay loam; surface rock (very fine gravel) 10 – 20 %; litter 30 – 40 %; fallen timber 10 – 20 %; bare ground 10 – 30 %

Condition & disturbances: Very good within patch; degraded to poor in surrounding plain; pastoral impacts, rabbits; drought impacts

NVIS 6: U1+^ *Acacia pruinocarpa* \Acacia\^tree\6\; M1^ *Acacia incurvaneura*, *A. ramulosa* var. *linophylla* \Acacia\^shrub\4\; M2^ *Eremophila simulans* subsp. *simulans*, *E. georgei*, *E. forrestii* subsp. *forrestii*, *E. latrobei* subsp. *latrobei*, *Acacia tetragonophylla* \^shrub\3\; G1^ *Eragrostis eriopoda*, *Paspalidium basicladum*, *Ptilotus obovatus*, *Eremophila forrestii* subsp. *forrestii*, *Erodium cygnorum* \Eragrostis\^tussock grass, shrub, forb\1\

Vegetation: *Acacia pruinocarpa* low woodland over *Acacia incurvaneura*, *A. ramulosa* var. *linophylla* tall sparse shrubland over *Eremophila simulans* subsp. *simulans*, *E. georgei*, *E. forrestii* subsp. *forrestii* open shrubland over *Eragrostis eriopoda*, *Paspalidium basicladum*, *Ptilotus obovatus* low sparse tussock grassland

Height (m)	Crown cover %	Habit	Species
9 – 10	20 – 30	T	<i>Acacia pruinocarpa</i>
3 – 4	8 – 10	S	<i>Acacia incurvaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i>
1 – 2	10 – 20	S	<i>Eremophila simulans</i> subsp. <i>simulans</i> , <i>E. georgei</i> , <i>E. forrestii</i> subsp. <i>forrestii</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>Acacia tetragonophylla</i>
< 0.5	2 – 10	G, S, F	<i>Eragrostis eriopoda</i> , <i>Paspalidium basicladum</i> , <i>Ptilotus obovatus</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Erodium cygnorum</i>

Other species: *Maireana georgei*, *Psyrax latifolia*, *Senna glaucifolia*, *Helipterum craspedioides*

- Acacia incurvaneura*
- Acacia pruinocarpa*
- Acacia ramulosa* var. *linophylla*
- Acacia tetragonophylla*
- Eremophila forrestii* subsp. *forrestii*
- Eremophila georgei*
- Eremophila latrobei* subsp. *latrobei*
- Eremophila simulans* subsp. *simulans*
- Eragrostis eriopoda*
- Erodium cygnorum*
- Helipterum craspedioides*
- Maireana georgei*
- Paspalidium basicladum*
- Ptilotus obovatus*
- Psyrax latifolia*
- Senna glaucifolia*



Surrounding plain  
 Condition: degraded to poor  
 Active sheet erosion, hummocking, pedestalling

Tall open shrubland of *Acacia incurvaneura* and *A. ramulosa* var. *linophylla* over sparse shrubland over low sparse tussock grassland



**V40 31<sup>st</sup> July 2014 Relevé Haul road and infrastructure**

GPS: 581266 E/ 7025857 N  
Elevation: 517 m

Landform: Hardpan plain; minor drainage line, incised  
Aspect south

Land surface: Gravelly banks

Condition & disturbances: Good; pastoral impacts along banks – some erosion; narrow strip of woodland/ tall shrubland

Vegetation: *Acacia incurvaneura*, *A. pruinocarpa* open woodland over *Acacia ramulosa* var. *linophylla*, *A. incurvaneura*, *A. caesaneura*, *A. craspedocarpa*, *Psydrax latifolia* tall open shrubland over *Acacia tetragonophylla* sparse shrubland over *Cheilanthes sieberi* subsp. *sieberi*, Liverworts, grass tussocks low isolated ferns

*Acacia caesaneura*  
*Acacia craspedocarpa*  
*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Acacia ramulosa* var. *linophylla*  
*Acacia tetragonophylla*  
*Psydrax latifolia*  
*Cheilanthes sieberi* subsp. *sieberi*



Adjacent plain, hardpan  
GPS: 581224 E/ 7025861 N  
Condition: degraded; high pastoral impacts, almost parkland cleared; severe erosion (sheet)

*Acacia incurvaneura* tall isolated shrubs to tall sparse shrubland over *Eremophila forrestii* subsp. *forrestii*, *A. ramulosa* var. *linophylla* isolated shrubs over *Eragrostis eriopoda* low sparse tussock grassland and *Erodium cygnorum* sparse forbs



**V41 31<sup>st</sup> July 2024 3.30 pm Haul road – ROM and stockpile area**

GPS: 580755 E/ 7025775 N  
Elevation: 516 m

Landform: Outwash lower slope; drainage line; incised

Land surface: Yellowish red fine sandy clay loam; surface rock (gravel) < 20 %; litter 30 – 40 %; fallen timber 2 – 10 %; bare ground 20 – 30 %

Condition & disturbances: Very good; good diversity, recruitment; erosion along channel low to moderate; lower pastoral impacts than plain area

NVIS 6: U1+^ *Acacia incurvaneura*, *A. pruinocarpa* \Acacia\^tree\7\c; M1^ *Acacia ramulosa* var. *linophylla*, *Eremophila forrestii* subsp. *forrestii*, *Acacia pruinocarpa* \Acacia\^shrub, tree\4\c; M2^ *Eremophila forrestii* subsp. *forrestii*, *E. simulans* subsp. *simulans*, *Senna glaucifolia*, *Acacia pruinocarpa*, *A. ramulosa* var. *linophylla* \Eremophila\^shrub\3\c; G1^ *Senna artemisioides* subsp. *filifolia*, *Solanum lasiophyllum*, *Eremophila forrestii* subsp. *forrestii*, *Ptilotus schwartzii*, *Stenopetalum anfractum* \Senna\^shrub, forb\2\c

Vegetation: *Acacia incurvaneura*, *A. pruinocarpa* open forest over *Acacia ramulosa* var. *linophylla*, *Eremophila forrestii* subsp. *forrestii*, *Acacia pruinocarpa* tall sparse shrubland over *Eremophila forrestii* subsp. *forrestii*, *E. simulans* subsp. *simulans*, *Senna glaucifolia* shrubland over *Senna artemisioides* subsp. *filifolia*, *Solanum lasiophyllum*, *Eremophila forrestii* subsp. *forrestii* low sparse shrubland

Height (m)	Crown cover %	Habit	Species
8 – 12	30 – 40	T	<i>Acacia incurvaneura</i> , <i>A. pruinocarpa</i>
1.8 – 4	2 – 10	S, T	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Acacia pruinocarpa</i>
1 – 1.6	30 – 40	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. simulans</i> subsp. <i>simulans</i> , <i>Senna glaucifolia</i> , <i>Acacia pruinocarpa</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
< 1	2 – 10	S, F, G	<i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Solanum lasiophyllum</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Ptilotus schwartzii</i> , <i>Stenopetalum filifolium</i> , <i>Waitzia acuminata</i> , <i>Calotis multicaulis</i> , <i>Paspalidium basicladum</i> , <i>Lawrencella davenportii</i>

*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Acacia ramulosa* var. *linophylla*  
*Calotis multicaulis*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila latrobei* subsp. *latrobei*  
*Eremophila simulans* subsp. *simulans*  
*Lawrencella davenportii*  
*Paspalidium basicladum*  
*Ptilotus schwartzii*  
*Senna artemisioides* subsp. *filifolia*  
*Senna glaucifolia*  
*Solanum lasiophyllum*  
*Stenopetalum filifolium*  
*Waitzia acuminata*



**V42 31<sup>st</sup> July 2024 Haul road – ROM and stockpile area**

GPS: 580829 E/ 7025847 N  
Elevation: 519 m

Landform: Low rise between drainage lines; lower slope of range

Land surface: Yellowish red silty clay loam; surface rock (gravel) > 60 %;

Condition & disturbances: Very good; low pastoral impacts

NVIS 6: U1+ ^ *Acacia incurvaneura*, *A. pruinocarpa* \Acacia\ ^tree\6\; M1 ^ *Acacia incurvaneura*, *A. ramulosa* var. *linophylla*, *Grevillea berryana* \Acacia\ ^shrub, tree\4\; M2 ^ *Eremophila forrestii* subsp. *forrestii*, *Senna artemisioides* subsp. *filifolia*, *Acacia ramulosa* var. *linophylla* \Eremophila\ ^shrub\3\; G1 ^ *Eremophila forrestii* subsp. *forrestii*, *Ptilotus schwartzii*, *Eragrostis eriopoda*, *Eremophila jucunda* subsp. *jucunda* \Eremophila\ ^shrub, forb, tussock grass\1\

Vegetation: *Acacia incurvaneura*, *A. pruinocarpa* low open woodland over *Acacia incurvaneura*, *A. ramulosa* var. *linophylla*, *Grevillea berryana* tall open shrubland over *Eremophila forrestii* subsp. *forrestii*, *Senna artemisioides* subsp. *filifolia*, *Acacia ramulosa* var. *linophylla* open shrubland over *Eremophila forrestii* subsp. *forrestii*, *Ptilotus schwartzii*, *Eragrostis eriopoda* low sparse shrubland

Height (m)	Crown cover %	Habit	Species
5 – 8	2 – 10	T	<i>Acacia incurvaneura</i> , <i>A. pruinocarpa</i>
2 – 4	10 – 20	S, T	<i>Acacia incurvaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Grevillea berryana</i>
1 – 2	10 – 20	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Senna artemisioides</i> subsp. <i>filifolia</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i>
< 0.5	2 – 10	S, F, G	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Ptilotus schwartzii</i> , <i>Eragrostis eriopoda</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i>

Other species: *Hakea lorea*, *Eremophila simulans* subsp. *simulans*, *E. latrobei* subsp. *latrobei*

*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Acacia ramulosa* var. *linophylla*  
*Eragrostis eriopoda*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila jucunda* subsp. *jucunda*  
*Eremophila latrobei* subsp. *latrobei*  
*Eremophila simulans* subsp. *simulans*  
*Grevillea berryana*  
*Hakea lorea*  
*Ptilotus schwartzii*  
*Senna artemisioides* subsp. *filifolia*



**V43 1<sup>st</sup> August 2024 11.35 am Haul road and infrastructure**

GPS: 580642 E/ 7026199 N  
Elevation: 545 m

Landform: Hill; midslope; colluvium;

Land surface: Yellowish red silty clay loam; surface rock (gravel and small rocks) > 80 %; litter < 10 % (mostly concentrated under larger shrubs); fallen timber < 2 %; bare ground < 10 %

Condition & disturbances: Good to very good; historic mining activities – old drill locations and rehab; current pastoral impacts; active erosion – rills, small gullies from run-off from access track; some drought deaths

NVIS 6: U1+ ^ *Acacia rhodophloia*, *A. incurvaneura* \ *Acacia* \ ^ *shrub, tree* \ 4 \ i; M1 ^ *Eremophila latrobei* subsp. *latrobei*, *Acacia incurvaneura* \ *Eremophila* \ ^ *shrub* \ 3 \ b; G1 ^ *Eremophila forrestii* subsp. *forrestii*, *E. latrobei* subsp. *latrobei*, *Goodenia tenuiloba*, *Erodium cygnorum*, *Cheilanthes sieberi* subsp. *sieberi* \ *Eremophila* \ ^ *shrub, forb, fern* \ 1 \ r

Vegetation: *Acacia rhodophloia*, *A. incurvaneura* tall open shrubland over *Eremophila latrobei* subsp. *latrobei*, *Acacia incurvaneura* isolated shrubs over *Eremophila forrestii* subsp. *forrestii*, *E. latrobei* subsp. *latrobei*, *Goodenia tenuiloba* low sparse shrubland

Height (m)	Crown cover %	Habit	Species
3 – 6	10 – 20	S, T	<i>Acacia rhodophloia</i> , <i>A. incurvaneura</i>
1 – 2	< 2	S	<i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Acacia incurvaneura</i>
< 0.6	2 – 10	S, F, E, G	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>Goodenia tenuiloba</i> , <i>Erodium cygnorum</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Sida ectogama</i> , <i>Eragrostis eriopoda</i>

Other species: *Acacia speckii*

*Acacia incurvaneura*  
*Acacia rhodophloia*  
*Acacia speckii* P4  
*Cheilanthes sieberi* subsp. *sieberi*  
*Eragrostis eriopoda*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila latrobei* subsp. *latrobei*  
*Erodium cygnorum*  
*Goodenia tenuiloba*  
*Sida ectogama*



V44 1<sup>st</sup> August 2024 12.02 pm Haul road and infrastructure

GPS: 580077 E/ 7025341 N  
Elevation: 529 m

Landform: Plain; alluvium; gentle slope; broad drainage line, channel to east; aspect SSE

Land surface: Yellowish red fine sandy clay loam; surface rock < 5 %; litter 20 – 30 %; fallen timber 10 – 20 %; bare ground < 10 %

Condition & disturbances: Good; moderate to high pastoral impacts; soil erosion in area; sheet wash and minor rills

NVIS 6: U1+^ *Acacia fuscaneura*, *A. ramulosa* var. *linophylla* \Acacia\^tree, shrub\6\; M1^ *Acacia ramulosa* var. *linophylla*, *Rhagodia eremaea*, *Psyrax latifolia*, *Eremophila simulans* subsp. *simulans* \Acacia\3\; M2^ *Eremophila forrestii* subsp. *forrestii*, *Ptilotus obovatus* \Eremophila\^shrub\2\; G1^ *Tetragonia cristata*, *Erodium cygnorum*, *Maireana georgei*, *Stenopetalum filifolium*, *Calotis multicaulis* \Tetragonia\^forb, chenopod shrub\1\c

Vegetation: *Acacia fuscaneura*, *A. ramulosa* var. *linophylla* low woodland over *Acacia ramulosa* var. *linophylla*, *Rhagodia eremaea*, *Psyrax latifolia* open shrubland over *Eremophila forrestii* subsp. *forrestii*, *Ptilotus obovatus* low open shrubland over *Tetragonia cristata*, *Erodium cygnorum*, *Maireana georgei* low forbland

Height (m)	Crown cover %	Habit	Species
5 – 10	10 – 30	T, S	<i>Acacia fuscaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i>
1 – 2	10 – 20	S, C	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Rhagodia eremaea</i> , <i>Psyrax latifolia</i> , <i>Eremophila simulans</i> subsp. <i>simulans</i>
0.3 – 0.9	10 – 20	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Ptilotus obovatus</i>
< 0.3	40 – 50	F, C, S, G, L	<i>Tetragonia cristata</i> , <i>Erodium cygnorum</i> , <i>Maireana georgei</i> , <i>Stenopetalum filifolium</i> , <i>Calotis multicaulis</i> , <i>Calandrinia</i> sp., <i>Acacia fuscaneura</i> , <i>Monachather paradoxus</i> , <i>Vincetoxicum lineare</i> , <i>Lawrencella davenportii</i>

*Acacia fuscaneura*  
*Acacia ramulosa* var. *linophylla*  
*Calandrinia* sp.  
*Calotis multicaulis*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila simulans* subsp. *simulans*  
*Erodium cygnorum*  
*Lawrencella davenportii*  
*Maireana georgei*  
*Monachather paradoxus*  
*Psyrax latifolia*  
*Ptilotus obovatus*  
*Rhagodia eremaea*  
*Stenopetalum filifolium*  
*Tetragonia cristata*  
*Vincetoxicum lineare*



V45 1<sup>st</sup> August 2024 12.15 pm Haul road and infrastructure

GPS: 579967 E/ 7025320 N  
Elevation: 528 m

Landform: Low rise; gravelly, gentle slope; aspect south east

Land surface: Reddish yellow (7.5YR6/8) fine sandy clay loam; surface rock (gravel) > 50 %; litter

Condition & disturbances: Very good; lower pastoral impacts; some drought impacts

NVIS 6: U1+^ *Acacia caesaneura*, *A. fuscaneura*, *Grevillea berryana*\Acacia\^tree, shrub\6\i; M1^ *Acacia ramulosa* var. *linophylla*, *A. caesaneura*\Acacia\^shrub\4\i; M2^ *Eremophila forrestii* subsp. *forrestii*, *E. simulans* subsp. *simulans*, *E. latrobei* subsp. *latrobei*, *E. jucunda* subsp. *jucunda*\Eremophila\^shrub\3\i; G1^ *Eremophila jucunda* subsp. *jucunda*, *E. simulans* subsp. *simulans*, *Ptilotus schwartzii*, *Eragrostis eriopoda*, *Erodium cygnorum*\Eremophila\^shrub, tussock grass, forb\1\i

Vegetation: *Acacia caesaneura*, *A. fuscaneura*, *Grevillea berryana* low woodland over *Acacia ramulosa* var. *linophylla*, *A. caesaneura* tall sparse shrubland over *Eremophila forrestii* subsp. *forrestii*, *E. simulans* subsp. *simulans*, *E. latrobei* subsp. *latrobei* sparse shrubland over *Eremophila jucunda* subsp. *jucunda*, *E. simulans* subsp. *simulans*, *Ptilotus schwartzii* low sparse shrubland

Height (m)	Crown cover %	Habit	Species
4 – 7	20 – 30	T, S	<i>Acacia caesaneura</i> , <i>A. fuscaneura</i> , <i>Grevillea berryana</i>
2 – 3	2 – 10	S	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>A. caesaneura</i>
0.5 – 1.2	2 – 10	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. simulans</i> subsp. <i>simulans</i> , <i>E. latrobei</i> subsp. <i>latrobei</i> , <i>E. jucunda</i> subsp. <i>jucunda</i>
< 0.5	2 – 10	S, G, F	<i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>E. simulans</i> subsp. <i>simulans</i> , <i>Ptilotus schwartzii</i> , <i>Eragrostis eriopoda</i> , <i>Erodium cygnorum</i> , <i>Goodenia berardiana</i> , <i>Sida</i> sp. <i>golden calyces</i>

Other species: *Helipterum craspedioides*

*Acacia caesaneura*  
*Acacia fuscaneura*  
*Acacia ramulosa* var. *linophylla*  
*Eragrostis eriopoda*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila jucunda* subsp. *jucunda*  
*Eremophila latrobei* subsp. *latrobei*  
*Eremophila simulans* subsp. *simulans*  
*Erodium cygnorum*  
*Goodenia berardiana*  
*Grevillea berryana*  
*Helipterum craspedioides*  
*Ptilotus schwartzii*  
*Sida* sp. *golden calyces* glabrous



**V46 1<sup>st</sup> August 2024 2.26 pm Haul road and infrastructure**

GPS: 579194 E/ 7025058 N  
Elevation: 536 m

Landform: Low rise, gravelly colluvial outwash , gentle slope

Land surface: Strong brown (7.5YR6/8) silty clay loam; surface rock (gravel) > 70 %; litter – mostly < 1 % to > 90 % under tree

Condition & disturbances: Good to very good; pastoral impacts; historic mining impacts

NVIS 6: U1+^ *Acacia pruinocarpa*\Acacia\^tree\7r; M1^ *Acacia aptaneura*, *A. ramulosa* var. *linophylla*, *A. incurvaneura*\Acacia\^shrub\4i; M2^ *Eremophila forrestii* subsp. *forrestii*, *A. incurvaneura*, *A. aptaneura*, *Senna glaucifolia*, *Eremophila glutinosa*\Eremophila\^shrub\3r; G1^ *Erodium cygnorum*, *Goodenia berardiana*, *Stenopetalum filifolium*, *Eremophila forrestii* subsp. *forrestii*, *Eragrostis eriopoda*\Erodium\^forb, shrub, tussock grass\1bi

Vegetation: *Acacia pruinocarpa* isolated trees over *Acacia aptaneura*, *A. ramulosa* var. *linophylla*, *A. incurvaneura* tall open shrubland over *Eremophila forrestii* subsp. *forrestii*, *A. incurvaneura*, *A. aptaneura* sparse shrubland over *Erodium cygnorum*, *Goodenia berardiana*, *Stenopetalum filifolium* isolated forbs

Height (m)	Crown cover %	Habit	Species
10 – 12	2 – 10	T	<i>Acacia pruinocarpa</i>
3 – 6	10 – 20	S	<i>Acacia aptaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>A. incurvaneura</i>
1 – 2	2 – 10	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>A. incurvaneura</i> , <i>A. aptaneura</i> , <i>Senna glaucifolia</i> , <i>Eremophila glutinosa</i>
< 0.5	< 2	F, S, G	<i>Erodium cygnorum</i> , <i>Goodenia berardiana</i> , <i>Stenopetalum filifolium</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Eragrostis eriopoda</i> , <i>Monachather paradoxus</i> , <i>Waitzia acuminata</i> , <i>Ptilotus schwartzii</i> , <i>Psydrax latifolia</i>

*Acacia aptaneura*  
*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Acacia ramulosa* var. *linophylla*  
*Eragrostis eriopoda*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila glutinosa*  
*Erodium cygnorum*  
*Goodenia berardiana*  
*Monachather paradoxus*  
*Psydrax latifolia*  
*Ptilotus schwartzii*  
*Senna glaucifolia*  
*Stenopetalum filifolium*  
*Waitzia acuminata*






**V47 1<sup>st</sup> August 2024 Haul road and infrastructure**

GPS: 578245 E/ 7024730 N		Landform: Alluvial plain; broad drainage area with groves of mulga; unincised; almost level; aspect ?west	
Elevation: 535 m			
Land surface: Yellowish red clay loam; surface rock < 1 %; litter 20 – 30 %; fallen timber 5 – 10 %			
Condition & disturbances: Poor, some patches good; moderate to high pastoral impacts			
NVIS 6: U1+^ <i>Acacia incurvaneura</i> , <i>Psyrax latifolia</i> \Acacia\^tree\6i; M1^ <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Brachychiton gregorii</i> , <i>Acacia incurvaneura</i> \Eremophila\^shrub\3c; G1^ <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Maireana georgei</i> , <i>Stenopetalum filifolium</i> , <i>Thyridolepis multiculmis</i> \Eremophila\^shrub, chenopod shrub, forb, tussock grass\1r			
Vegetation: <i>Acacia incurvaneura</i> , <i>Psyrax latifolia</i> low woodland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Brachychiton gregorii</i> shrubland over <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Maireana georgei</i> low sparse shrubland			
Height (m)	Crown cover %	Habit	Species
4 – 9	10 – 30	T	<i>Acacia incurvaneura</i> , <i>Psyrax latifolia</i>
1 – 2	30 – 40	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Brachychiton gregorii</i> , <i>Acacia incurvaneura</i>
< 0.6	2 – 10	S, C, F, G	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Maireana georgei</i> , <i>Stenopetalum filifolium</i> , <i>Thyridolepis multiculmis</i> , <i>Ptilotus polystachyus</i> , <i>Erodium cygnorum</i>

Other species: *Eremophila granitica*

*Acacia incurvaneura*  
*Brachychiton gregorii*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila georgei*  
*Eremophila granitica*  
*Erodium cygnorum*  
*Maireana georgei*  
*Psyrax latifolia*  
*Ptilotus polystachyus*  
*Stenopetalum filifolium*  
*Thyridolepis multiculmis*



V48 3.00 pm 1 <sup>st</sup> August 2024 Haul road and infrastructure			
GPS: 578249 E/ 7024621 N Elevation: 535 m		Landform: Stony hardpan plain, alluvium; almost level; aspect south	
Land surface: Yellowish red fine sandy clay loam; surface rock fine gravel 10 – 20 %, rocks 2 – 8 cm 20 – 30 %; litter < 5 %; fallen timber < 1 %			
Condition & disturbances: Poor; pastoral impacts; erosion – sheet, pedestalling			
NVIS 6: G1+ <sup>^</sup> <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>E. georgei</i> , <i>Ptilotus schwartzii</i> , <i>Eragrostis eriopoda</i> , <i>Eriochiton sclerolaenoides</i> \ <i>Eremophila</i> \ <sup>^</sup> <i>shrub</i> , tussock grass, <i>chenopod shrub</i> \1\; G2 <sup>^</sup> <i>Erodium cygnorum</i> , <i>Ptilotus schwartzii</i> \ <i>Erodium</i> \ <sup>^</sup> <i>forb</i> , <i>shrub</i> \1\bi			
Vegetation: <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>E. georgei</i> , <i>Ptilotus schwartzii</i> low sparse shrubland over <i>Erodium cygnorum</i> , <i>Ptilotus schwartzii</i> low isolated forbs			
Height (m)	Crown cover %	Habit	Species
0.1 – 0.6	2 – 10	S, G, C	<i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>E. georgei</i> , <i>Ptilotus schwartzii</i> , <i>Eragrostis eriopoda</i> , <i>Eriochiton sclerolaenoides</i>
< 0.1	< 2	F, S	<i>Erodium cygnorum</i> , <i>Ptilotus schwartzii</i>
Other species: <i>Acacia incurvaneura</i> , <i>A. tetragonophylla</i>			
<i>Acacia incurvaneura</i> <i>Acacia tetragonophylla</i> <i>Eragrostis eriopoda</i> <i>Eremophila georgei</i> <i>Eremophila jucunda</i> subsp. <i>jucunda</i> <i>Eriochiton sclerolaenoides</i> <i>Erodium cygnorum</i> <i>Ptilotus schwartzii</i>			

V49 1 <sup>st</sup> August 2024 3.25 pm Haul road and infrastructure	
GPS: 577478 E/ 7024031 N Elevation 528 m	
Landform: Alluvial plain; broad unincised drainage line, depression; very gentle slope; aspect south	
Land surface: Reddish brown clay loam; surface rock < 5 %; litter 20 – 30 %; fallen timber variable 2 – 20 %; bare ground < 10 %	
Condition & disturbances: Very good to excellent; more impacts (pastoral) around edges and within low forest with sparse understorey; vegetation variable with areas of dense vine thicket present; several sandalwood present, very healthy with excellent crop of fruit.	
Vine forest NVIS 6: U1+ <sup>^</sup> <i>Acacia pruinocarpa</i> , <i>A. incurvaneura</i> \ <i>Acacia</i> \ <sup>^</sup> <i>tree</i> \7\c; U2 <sup>^</sup> <i>Glycine canescens</i> , <i>Santalum spicatum</i> , <i>Psyrax latifolia</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia pruinocarpa</i> \ <i>Glycine</i> \ <sup>^</sup> <i>vine</i> , <i>tree</i> , <i>shrub</i> \4\c; M1 <sup>^</sup> <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Glycine canescens</i> , <i>Psyrax latifolia</i> , <i>Acacia incurvaneura</i> , <i>A. tetragonophylla</i> \ <i>Acacia</i> \ <sup>^</sup> <i>shrub</i> , <i>vine</i> \3\i; G1 <sup>^</sup> <i>Sida ectogama</i> , <i>Glycine canescens</i> , <i>Rhagodia eremaea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> \ <i>Sida</i> \ <sup>^</sup> <i>shrub</i> , <i>vine</i> , <i>chenopod shrub</i> , <i>fern</i> \2\c	
Vegetation vine forest area: <i>Acacia pruinocarpa</i> , <i>A. incurvaneura</i> open forest over <i>Glycine canescens</i> , <i>Santalum spicatum</i> , <i>Psyrax latifolia</i> vineland over <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Glycine canescens</i> , <i>Psyrax latifolia</i> open shrubland over <i>Sida ectogama</i> , <i>Glycine canescens</i> , <i>Rhagodia eremaea</i> low shrubland	

Vine forest

Height (m)	Crown cover %	Habit	Species
8 – 12	30 – 50	T	<i>Acacia pruinocarpa</i> , <i>A. incurvaneura</i>
3 – 7	30 – 40	L, T, S	<i>Glycine canescens</i> , <i>Santalum spicatum</i> , <i>Psydrax latifolia</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia pruinocarpa</i> , <i>A. incurvaneura</i>
1 – 2	10 – 30	S, L	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Glycine canescens</i> , <i>Psydrax latifolia</i> , <i>Acacia incurvaneura</i> , <i>A. tetragonophylla</i>
< 1	30 – 40	S, L, C, E, F, G	<i>Sida ectogama</i> , <i>Glycine canescens</i> , <i>Rhagodia eremaea</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Nicotiana obliqua</i> , <i>Teucrium teucriflorum</i> , <i>Thyridolepis multiculmis</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Goodenia tenuiloba</i> , <i>Psydrax latifolia</i>

Other species: *Calotis multicaulis*, *Chorizema genistoides*, *Grevillea deflexa*, *Eremophila georgei*, *E. sp. Weld Range*, *Eragrostis falcata*, *Oxalis ?corniculata\** (not in flower), *Ptilotus obovatus*

- Acacia incurvaneura*
- Acacia pruinocarpa*
- Acacia ramulosa* var. *linophylla*
- Acacia tetragonophylla*
- Calotis multicaulis*
- Cheilanthes sieberi* subsp. *sieberi*
- Chorizema genistoides*
- Eragrostis falcata*
- Eremophila forrestii* subsp. *forrestii*
- Eremophila georgei*
- Eremophila* sp. *Weld Range*
- Glycine canescens*
- Goodenia tenuiloba*
- Grevillea deflexa*
- Nicotiana obliqua*
- Oxalis ?corniculata\**
- Psydrax latifolia*
- Ptilotus obovatus*
- Rhagodia eremaea*
- Santalum spicatum*
- Sida ectogama*
- Teucrium teucriflorum*
- Thyridolepis multiculmis*



Vegetation – more open woodland areas: *Acacia incurvaneura*, *A. pruinocarpa*, *Psydrax latifolia* low woodland over *Acacia ramulosa* var. *linophylla* tall open shrubland over *Acacia ramulosa* var. *linophylla*, *A. incurvaneura* sparse shrubland over *Eremophila forrestii* subsp. *forrestii*, *Acacia incurvaneura*, *Eremophila* sp. Weld range low sparse shrubland



*Eremophila* sp. Weld Range; very few records



More open woodland areas; vines sparse or absent



*Chorizema genistoides* – mostly on edges of woodland/ forest



*Glycine canescens* (vine) – dominant understorey in some areas

**V50 2<sup>nd</sup> August 2024 7.15 am Haul road and infrastructure**

GPS: 577241 E/ 7023373 N  
Elevation: 520 m

Landform: Ironstone gravel plain; Very gentle slope; aspect  
?west

Land surface: Strong brown (7.5YR5/8) silty clay loam; surface rock (fine ironstone gravel) > 70 %; litter < 5 %; fallen timber < 1 %

Condition & disturbances: Poor; pastoral impacts; drought impacts

NVIS 6: U1^ *Acacia pruinocarpa* \Acacia\^tree\6\bi; M1+^ *Acacia incurvaneura*, *A. tetragonophylla* \Acacia\^shrub\4\r; M2^ *Acacia incurvaneura*, *A. ramulosa* var. *linophylla*, *Eremophila latrobei* subsp. *latrobei*, *Acacia tetragonophylla* \Acacia\^shrub\3\r; M3^ *Eremophila forrestii* subsp. *forrestii*, *Acacia ramulosa* var. *linophylla*, *Eremophila georgei*, *Acacia incurvaneura*, *Solanum lasiophyllum* \Eremophila\^shrub\2\bi; G1^ *Stenopetalum filifolium*, *Menkea villosula*, *Isoetopsis graminifolia*, *Cephalopterum drummondii*, *Cheilanthes sieberi* subsp. *sieberi* \Stenopetalum\^forb, fern\1\i

Vegetation: *Acacia pruinocarpa* low isolated trees over *Acacia incurvaneura*, *A. tetragonophylla* tall sparse shrubland over *Acacia incurvaneura*, *A. ramulosa* var. *linophylla*, *Eremophila latrobei* subsp. *latrobei* sparse shrubland over *Stenopetalum filifolium*, *Menkea villosula*, *Isoetopsis graminifolia* low open forbland

Height (m)	Crown cover %	Habit	Species
9 – 10	< 2	T	<i>Acacia pruinocarpa</i>
3 – 6	2 – 5	S	<i>Acacia incurvaneura</i> , <i>A. tetragonophylla</i>
1 – 2	2 – 10	S	<i>Acacia incurvaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Acacia tetragonophylla</i>
0.3 – 1	< 2	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila georgei</i> , <i>Acacia incurvaneura</i> , <i>Solanum lasiophyllum</i> , <i>Ptilotus obovatus</i> , <i>P. schwartzii</i>
< 0.3	10 – 20	F, E	<i>Stenopetalum filifolium</i> , <i>Menkea villosula</i> , <i>Isoetopsis graminifolia</i> , <i>Cephalopterum drummondii</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Ptilotus aevroides</i>

*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Acacia ramulosa* var. *linophylla*  
*Acacia tetragonophylla*  
*Cephalopterum drummondii*  
*Cheilanthes sieberi* subsp. *sieberi*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila georgei*  
*Eremophila latrobei* subsp. *latrobei*  
*Isoetopsis graminifolia*  
*Menkea villosula*  
*Ptilotus aevroides*  
*Ptilotus obovatus*  
*Ptilotus schwartzii*  
*Stenopetalum filifolium*  
*Solanum lasiophyllum*



**V51 2<sup>nd</sup> August 2024 7.40 am Haul road and infrastructure**

GPS: 577125 E/ 7022254 N  
Elevation: 520 m

Landform: Alluvial plain within ironstone plain; water gaining area; almost level, aspect south

Land surface: Strong brown fine sandy clay loam; surface rock < 2 %; litter < 10 %; fallen timber 2 – 5 %; bare ground 40 – 60 %

Condition & disturbances: Good; structure mostly intact; historic mining activities adjacent to area – old tracks, drill locations and some rehabilitation (ripping). Pastoral impacts.

NVIS 6: U+^ *Acacia pruinocarpa*, *A. aptaneura*, *A. caesaneura* \Acacia\^tree, shrub\7\i; M1^ *Acacia ramulosa* var. *linophylla*, *A. caesaneura* \Acacia\^shrub\4\i; M2^ *Eremophila georgei*, *E. forrestii* subsp. *forrestii*, *Acacia aptaneura* \Eremophila\^shrub\3\i; G1^ *Eremophila georgei*, *E. foliosissima*, *Ptilotus schwartzii*, *Thyridolepis multiculmis*, *Ptilotus obovatus* \Eremophila\^shrub, tussock grass\ 1r

Vegetation: *Acacia pruinocarpa*, *A. aptaneura*, *A. caesaneura* open woodland over *Acacia ramulosa* var. *linophylla*, *A. caesaneura* tall sparse shrubland over *Eremophila georgei*, *E. forrestii* subsp. *forrestii*, *Acacia aptaneura* open shrubland over *Eremophila georgei*, *E. foliosissima*, *Ptilotus schwartzii* low sparse shrubland

Height (m)	Crown cover %	Habit	Species
6 – 14	10 – 20	T, S	<i>Acacia pruinocarpa</i> , <i>A. aptaneura</i> , <i>A. caesaneura</i>
2 – 5	2 – 10	S	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>A. caesaneura</i>
1 – 2	20 – 30	S	<i>Eremophila georgei</i> , <i>E. forrestii</i> subsp. <i>forrestii</i> , <i>Acacia aptaneura</i>
< 0.5	2 – 10	S, G, E, F, C	<i>Eremophila georgei</i> , <i>E. foliosissima</i> , <i>Ptilotus schwartzii</i> , <i>Thyridolepis multiculmis</i> , <i>Ptilotus obovatus</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Erodium cygnorum</i> , <i>Eragrostis eriopoda</i> , <i>Maireana georgei</i>

Other species: *Eremophila jucunda* subsp. *jucunda*

*Acacia aptaneura*  
*Acacia caesaneura*  
*Acacia ramulosa* var. *linophylla*  
*Acacia pruinocarpa*  
*Cheilanthes sieberi* subsp. *sieberi*  
*Eragrostis eriopoda*  
*Eremophila foliosissima*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila georgei*  
*Eremophila jucunda* subsp. *jucunda*  
*Erodium cygnorum*  
*Maireana georgei*  
*Ptilotus obovatus*  
*Ptilotus schwartzii*  
*Thyridolepis multiculmis*



Adjacent open ironstone plain area  
*Acacia aptaneura* tall open to sparse shrubland over *Eremophila jucunda* subsp. *jucunda*, *Ptilotus schwartzii* low isolated to sparse shrubland

APM site E6 within 200 m



**V52 2<sup>nd</sup> August 2024 8.00 am Haul road and infrastructure**

GPS: 576430 E/ 7020972 N  
Elevation 509 m

Landform: Ironstone plain; almost level; drainage to south west;  
narrow denser patch of vegetation within very sparse area

Land surface: Yellowish red fine sandy clay loam; surface rock (fine ironstone gravel) 40 – 50 %; litter

Condition & disturbances: Good; understory mostly intact under tree canopy.

NVIS 6: U1+<sup>^</sup> *Acacia pruinocarpa*, *A. caesaneura*, *A. aptaneura* \Acacia\ ^tree, shrub\6\i; M1<sup>^</sup> *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla*, *Sida ectogama*, *Rhagodia eremaea*, *Hibiscus* sp. \Eremophila\ ^shrub, chenopod shrub\3\i; M2<sup>^</sup> *Ptilotus obovatus*, *Maireana georgei*, *Eremophila georgei*, *Sida ectogama*, *Enchylaena tomentosa* \Ptilotus\ ^shrub, chenopod shrub\2\i; G1<sup>^</sup> *Erodium cygnorum*, *Eremophila georgei*, *Sida ectogama*, *Solanum lasiophyllum*, *Calandrinia* sp. \Erodium\ ^forb, shrub\1\i

Vegetation: *Acacia pruinocarpa*, *A. caesaneura*, *A. aptaneura* low woodland over *Eremophila forrestii* subsp. *forrestii*, *Acacia tetragonophylla*, *Sida ectogama* open shrubland over *Ptilotus obovatus*, *Maireana georgei*, *Eremophila georgei* low open shrubland over *Erodium cygnorum*, *Eremophila georgei*, *Sida ectogama* low sparse forbland

Height (m)	Crown cover %	Habit	Species
6 – 10	10 – 30	T, S	<i>Acacia pruinocarpa</i> , <i>A. caesaneura</i> , <i>A. aptaneura</i>
1 – 2	20 – 30	S, C	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Acacia tetragonophylla</i> , <i>Sida ectogama</i> , <i>Rhagodia eremaea</i> , <i>Hibiscus</i> sp., <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
0.2 – 1	10 – 30	S, C, G	<i>Ptilotus obovatus</i> , <i>Maireana georgei</i> , <i>Eremophila georgei</i> , <i>Sida ectogama</i> , <i>Enchylaena tomentosa</i> , <i>Hibiscus</i> sp., <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Austrostipa elegantissima</i>
< 0.2	2 – 10	F, S, L, C, E	<i>Erodium cygnorum</i> , <i>Eremophila georgei</i> , <i>Sida ectogama</i> , <i>Solanum lasiophyllum</i> , <i>Calandrinia</i> sp., <i>Leichhardtia australis</i> , <i>Maireana georgei</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Thyridolepis multiculmis</i>

Other species: *Psyrdrax latifolia* (4 m), *Teucrium teucriiflorum*, *Eragrostis eriopoda*

*Acacia aptaneura*  
*Acacia caesaneura*  
*Acacia pruinocarpa*  
*Acacia tetragonophylla*  
*Austrostipa elegantissima*  
*Calandrinia* sp.  
*Cheilanthes sieberi* subsp. *sieberi*  
*Eragrostis eriopoda*  
*Enchylaena tomentosa*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila georgei*  
*Eremophila latrobei* subsp. *latrobei*  
*Erodium cygnorum*  
*Hibiscus* sp.  
*Leichhardtia australis*  
*Maireana georgei*  
*Psyrdrax latifolia*  
*Ptilotus obovatus*



*Rhagodia eremaea*  
*Sida ectogama*  
*Solanum lasiophyllum*  
*Teucrium teucriiflorum*  
*Thyridolepis multiculmis*

**V53 2<sup>nd</sup> August 2024 8.50 am Haul road and infrastructure**

GPS: 576462 E/ 7020007 N  
Elevation 514 m

Landform: Low stony hill, minor chert outcrops; gentle slope; aspect north; patches of low trees, tall shrubs within shrubland

Land surface: Strong brown (7.5YR5/6) silty clay loam; surface rock (chert, quartz, other) > 95 %, 2 – 5 cm 80%; litter < 10 %; fallen timber 2 – 3 %; bare ground < 1 %

Condition & disturbances: Very good; pastoral impacts lower than valley areas; signs of cattle in area; drought impacts – vegetation recovering

NVIS 6: U1+^ *Acacia aptaneura*, *A. grasbyi* \Acacia\6\; M1^ *Acacia aptaneura*, *Senna glaucifolia*, *Eremophila forrestii* subsp. *forrestii*, *E. pantonii* \Acacia\^shrub\3\; G1^ *Maireana thesioides*, *M. triptera*, *Senna glaucifolia*, *Solanum lasiophyllum*, *Acacia aptaneura* \Maireana\^chenopod shrub, shrub\2\

Vegetation: *Acacia aptaneura*, *A. grasbyi* low open woodland over *Acacia aptaneura*, *Senna glaucifolia*, *Eremophila forrestii* subsp. *forrestii* sparse shrubland over *Maireana thesioides*, *M. triptera*, *Senna glaucifolia* low open chenopod shrubland

Height (m)	Crown cover %	Habit	Species
3 – 5	2 – 10	T, S	<i>Acacia aptaneura</i> , <i>A. grasbyi</i>
1 – 2	2 – 5	S	<i>Acacia aptaneura</i> , <i>Senna glaucifolia</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. pantonii</i>
< 0.9	10 – 20	C, S, F	<i>Maireana thesioides</i> , <i>M. triptera</i> , <i>Senna glaucifolia</i> , <i>Solanum lasiophyllum</i> , <i>Acacia aptaneura</i> , <i>Cephalopterum drummondii</i> , <i>Sclerolaena</i> sp.

Other species: *Calandrinia* sp., *Helipterum craspedioides*, *Ptilotus exaltatus*, *P. obovatus*, *Sida calyxhymenia*, *S. ectogama*, *Abutilon* sp., *Stenopetalum filifolium*. *Stackhousia muricata*

- Abutilon* sp.
- Acacia aptaneura*
- Acacia grasbyi*
- Calandrinia* sp.
- Cephalopterum drummondii*
- Eremophila forrestii* subsp. *forrestii*
- Eremophila pantonii*
- Helipterum craspedioides*
- Maireana thesioides*
- Maireana triptera*
- Ptilotus exaltatus*
- Ptilotus obovatus*
- Sclerolaena* sp.
- Senna glaucifolia*
- Sida calyxhymenia*
- Sida ectogama*
- Stenopetalum filifolium*
- Solanum lasiophyllum*
- Stackhousia muricata*





**V54 2<sup>nd</sup> August 2024 9.15 am Haul road and infrastructure**

GPS: 576461 E/ 7020071 N  
Elevation 512 m

Landform: Valley; broad drainage line, slight channelling

Land surface: Strong brown clay loam; surface rock – gravel patches 10 – 20 %; small granitic rock outcrop at edge of vegetation; litter 10 – 20 %; fallen timber < 5 %

Condition & disturbances: Very good; pastoral impacts

NVIS 6: U1+<sup>^</sup> *Acacia fuscaneura*, *A. incurvaneura*, *A. aptaneura* \Acacia\^tree\6\i; M1<sup>^</sup> *Acacia grasbyi*, *A. tetragonophylla*, *A. craspedocarpa*, *A. fuscaneura*, *A. ramulosa* var. *linophylla* \Acacia\^shrub, tree\4\i; M2<sup>^</sup> *Acacia ramulosa* var. *linophylla*, *Acacia fuscaneura*, *Eremophila forrestii* subsp. *forrestii*, *Acacia aptaneura*, *Sida ectogama* \Acacia\^shrub\3\i; G1<sup>^</sup> *Roepora lobulata*, *Solanum lasiophyllum*, *Erodium cygnorum*, *Cheilanthes sieberi* subsp. *sieberi*, *Maireana triptera* \Roepora\^forb, shrub, fern, chenopod shrub\1\i

Vegetation: *Acacia fuscaneura*, *A. incurvaneura*, *A. aptaneura* low woodland over *Acacia grasbyi*, *A. tetragonophylla*, *A. craspedocarpa* tall open shrubland over *Acacia ramulosa* var. *linophylla*, *Acacia fuscaneura*, *Eremophila forrestii* subsp. *forrestii* open shrubland over *Roepora lobulata*, *Solanum lasiophyllum*, *Erodium cygnorum* low open forbland

Height (m)	Crown cover %	Habit	Species
5 – 9	20 – 30 (40)	T	<i>Acacia fuscaneura</i> , <i>A. incurvaneura</i> , <i>A. aptaneura</i>
2 – 5	20 – 30	S, T	<i>Acacia grasbyi</i> , <i>A. tetragonophylla</i> , <i>A. craspedocarpa</i> , <i>A. fuscaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>Hakea preissii</i>
1 – 2	10 – 30	S	<i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Acacia fuscaneura</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Acacia aptaneura</i> , <i>Sida ectogama</i> , <i>Eremophila pantonii</i>
< 0.6	10 – 30	F, S, E, C	<i>Roepora lobulata</i> , <i>Solanum lasiophyllum</i> , <i>Erodium cygnorum</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Maireana triptera</i> , <i>M. georgei</i> , <i>Ptilotus obovatus</i>

*Acacia aptaneura*  
*Acacia fuscaneura*  
*Acacia grasbyi*  
*Acacia incurvaneura*  
*Acacia ramulosa* var. *linophylla*  
*Acacia tetragonophylla*  
*Cheilanthes sieberi* subsp. *sieberi*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila pantonii*  
*Erodium cygnorum*  
*Hakea preissii*  
*Maireana georgei*  
*Maireana triptera*  
*Ptilotus obovatus*  
*Roepora lobulata*  
*Sida ectogama*  
*Solanum lasiophyllum*



V54 Rocky outcrop area – granitic



**V55 2<sup>nd</sup> August 2024 10 am Haul road and infrastructure**

GPS: 576334 E/ 7019443 N  
 Elevation: 507 m

Landform: Stony plain at lower slope of low hills; gentle slope; aspect south; patches of open shrubland in very sparse vegetation

Land surface: Reddish brown clay loam; surface rock (dolerite, quartz) 30 – 50 %; litter < 5 %; fallen timber < 1 %; bare ground 30 – 40 %

Condition & disturbances: Poor; pastoral impacts; drought impacts – few deaths of shrubs

NVIS 6: U1^ *Acacia ?aneura*, *A. sp. Weld Range* \Acacia\^shrub, tree\4\bi; M1+^ *Eremophila macmillaniana*, *Acacia sp. Weld Range*, *Acacia speckii*, *A. ?aneura*, *Ptilotus rotundifolius* \Eremophila\^shrub\r; G1^ *Cephalopterum drummondii*, *Sida ectogama*, *Aristida contorta*, *Eremophila macmillaniana*, *Maireana sp.* \Cephalopterum\^forb, shrub, tussock grass, chenopod shrub\1\r

Vegetation: *Acacia ?aneura*, *A. sp. Weld Range* tall isolated shrubs over *Eremophila macmillaniana*, *Acacia sp. Weld Range*, *Acacia speckii* sparse shrubland over *Cephalopterum drummondii*, *Sida ectogama*, *Aristida contorta* low sparse forbland

Height (m)	Crown cover %	Habit	Species
3 – 5	< 2	S, T	<i>Acacia ?aneura</i> , <i>A. sp. Weld Range</i>
1 – 2	2 – 10	S	<i>Eremophila macmillaniana</i> , <i>Acacia sp. Weld Range</i> , <i>Acacia speckii</i> , <i>A. ?aneura</i> , <i>Ptilotus rotundifolius</i>
< 0.5	2 – 10	F, S, G, C, E	<i>Cephalopterum drummondii</i> , <i>Sida ectogama</i> , <i>Aristida contorta</i> , <i>Eremophila macmillaniana</i> , <i>Maireana sp.</i> , <i>Sclerolaena diacantha</i> , <i>Helipterum craspedioides</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Erodium cygnorum</i>

Other species: *Brachychiton gregorii*

*Acacia ?aneura*  
*Acacia speckii* P4  
*Acacia sp. Weld Range*  
*Aristida contorta*  
*Brachychiton gregorii*  
*Cephalopterum drummondii*  
*Cheilanthes sieberi* subsp. *sieberi*  
*Eremophila macmillaniana*  
*Erodium cygnorum*  
*Helipterum craspedioides*  
*Maireana sp.*  
*Ptilotus rotundifolius*  
*Sclerolaena diacantha*  
*Sida ectogama*



V56 2<sup>nd</sup> August 2024 10.45 am Haul road and infrastructure

GPS: 575645 E/ 7018931 N  
Elevation: 512 m

Landform: Gravelly low hills; gentle slope; aspect north  
Potential gravel source

Land surface: Reddish yellow fine sandy clay loam; surface rock (lateritic gravel) 30 – 40 %; litter 5 – 10 %; fallen timber 1 – 2 %; bare ground 30 – 40 %

Condition & disturbances: Good; low recruitment; pastoral impacts; drought impacts

NVIS 6: U1^ *Acacia caesaneura*\Acacia\^shrub\4r; M1+^ *Acacia ramulosa* var. *linophylla*\Acacia\^shrub\3i; G1^ *Ptilotus schwartzii*, *Sida ectogama*, *Eremophila forrestii* subsp. *forrestii*\Ptilotus\^shrub\1\bi

Vegetation: *Acacia caesaneura* tall sparse shrubland over *Acacia ramulosa* var. *linophylla* open shrubland over *Ptilotus schwartzii*, *Sida ectogama*, *Eremophila forrestii* subsp. *forrestii* low isolated shrubs

Height (m)	Crown cover %	Habit	Species
3 – 4	2 – 4	S	<i>Acacia caesaneura</i> ?
1 – 2	20 – 30	S	<i>Acacia ramulosa</i> var. <i>linophylla</i>
< 0.5	< 1	S, G	<i>Ptilotus schwartzii</i> , <i>Sida ectogama</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i>

Other species: *Maireana georgei*, *Eremophila latrobei* subsp. *latrobei*, *Acacia pruinocarpa* (low tree, upslope)

*Acacia caesaneura* ? – much insect damage to new shoots and phyllodes; new shoots not resinous, phyllodes with rounded tips

*Acacia pruinocarpa*

*Acacia ramulosa* var. *linophylla*

*Eremophila forrestii* subsp. *forrestii*

*Eremophila latrobei* subsp. *latrobei*

*Maireana georgei*

*Ptilotus schwartzii*

*Sida ectogama*



V57 2<sup>nd</sup> August 2024 11.03 am Haul road and infrastructure

GPS: 575356 E/ 7018979 N  
Elevation: 505 m

Landform: Hill; minor drainage line  
Trapdoor spiders present

Land surface: Yellowish red clay loam; surface rock < 10 %; litter 10 – 30 % (mostly under larger shrubs); fallen timber < 2 %; cryptogams (lichen, liverworts) 2 – 10 %; bare ground < 10 %

Condition & disturbances: Very good; pastoral impacts – moderate – cattle tracks, grazing, ground disturbances; drought impacts - some deaths – would have been tall shrubland now tall open shrubland, part crown deaths

NVIS 6: U1+^ *Acacia incurvaneura*, *A. tetragonophylla* \Acacia\^shrub, tree\4\; M1^ *Eremophila forrestii* subsp. *hastieana*, *E. latrobei* subsp. *latrobei* \Eremophila\^shrub\3\; G1^ *Waitzia acuminata*, *Erodium cygnorum*, *Panaetia lessonii*, *Cheilanthes sieberi* subsp. *sieberi*, *Helipterum craspedioides* \Waitzia\^forb, fern\1\c

Vegetation: *Acacia incurvaneura*, *A. tetragonophylla* tall open shrubland over *Eremophila forrestii* subsp. *hastieana*, *E. latrobei* subsp. *latrobei* open shrubland over *Waitzia acuminata*, *Erodium cygnorum*, *Panaetia lessonii* low forbland

Height (m)	Crown cover %	Habit	Species
3.5 – 5	10 – 30	S, T	<i>Acacia incurvaneura</i> , <i>A. tetragonophylla</i>
1 – 2	20 – 30	S	<i>Eremophila forrestii</i> subsp. <i>hastieana</i> , <i>E. latrobei</i> subsp. <i>latrobei</i>
< 0.5	50 – 70	F, E, G	<i>Waitzia acuminata</i> , <i>Erodium cygnorum</i> , <i>Panaetia lessonii</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Helipterum craspedioides</i> , <i>Stenopetalum filifolium</i> , <i>Cephalopterum drummondii</i> , <i>Eragrostis dielsii</i> , <i>Euphorbia boophthona</i> , <i>Menkea villosula</i> , <i>Isoetopsis graminifolia</i>

*Acacia incurvaneura*  
*Acacia tetragonophylla*  
*Cephalopterum drummondii*  
*Cheilanthes sieberi* subsp. *sieberi*  
*Eragrostis dielsii*  
*Eremophila forrestii* subsp. *hastieana*  
*Eremophila latrobei* subsp. *latrobei*  
*Erodium cygnorum*  
*Euphorbia boophthona*  
*Helipterum craspedioides*  
*Isoetopsis graminifolia*  
*Panaetia lessonii*  
*Stenopetalum filifolium*  
*Waitzia acuminata*



**V58 2<sup>nd</sup> August 2024 Haul road and infrastructure**

GPS: 574750 E/ 7018889 N  
Elevation: 511 m

Landform: Low hills; mid slope; gentle slope; aspect north

Land surface: Reddish yellow (7.5YR6/6) fine sandy clay loam; surface rock (lateritic gravel) 60 – 70 %; litter 5 – 10 %; fallen timber 1 – 2 %; cryptogams – negligible; bare ground 10 – 20 %; erosion – sheet wash; drought impacts – some deaths and part crown deaths, ground cover very sparse

Condition & disturbances: Good; drought and pastoral impacts

NVIS 6: U1^ *Acacia incurvaneura*, *Psydrax latifolia* \Acacia\^tree, shrub\6\bi; M1+^ *Acacia ramulosa* var. *linophylla* \Acacia\^shrub\4\i; M2^ *Eremophila forrestii* subsp. *forrestii* \Eremophila\^shrub\3\bi; G1^ *Sida* sp. *Golden calyces glabrous*, *Ptilotus schwartzii*, *Eremophila forrestii* subsp. *forrestii*, *Waitzia acuminata*, *Erodium cygnorum* \Sida\^shrub, forb\1\r

Vegetation: *Acacia incurvaneura*, *Psydrax latifolia* low isolated trees over *Acacia ramulosa* var. *linophylla* tall open shrubland over *Sida* sp. *Golden calyces glabrous*, *Ptilotus schwartzii*, *Eremophila forrestii* subsp. *forrestii* low sparse shrubland

Height (m)	Crown cover %	Habit	Species
4 – 6	< 2	T, S	<i>Acacia incurvaneura</i> , <i>Psydrax latifolia</i>
2 – 3.5	10 – 20	S	<i>Acacia ramulosa</i> var. <i>linophylla</i>
1 – 2	< 2	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>
< 0.6	2 – 10	S, F, L	<i>Sida</i> sp. <i>Golden calyces glabrous</i> , <i>Ptilotus schwartzii</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Waitzia acuminata</i> , <i>Erodium cygnorum</i> , <i>Stenopetalum filifolium</i> , <i>Thysanotus manglesianus</i>

Other species: *Grevillea berryana* (4 – 8m), *Menkea villosula*

*Acacia incurvaneura*  
*Acacia ramulosa* var. *linophylla*  
*Eremophila forrestii* subsp. *forrestii*  
*Erodium cygnorum*  
*Grevillea berryana*  
*Menkea villosula*  
*Psydrax latifolia*  
*Ptilotus schwartzii*  
*Sida* sp. *Golden calyces glabrous*  
*Stenopetalum filifolium*  
*Thysanotus manglesianus*  
*Waitzia acuminata*



Extinct mallee fowl mound  
GPS: 574735 E/ 7018873 N  
Elevation: 510 m



**V59 2<sup>nd</sup> August 2024 12.38 pm Haul road and infrastructure**

GPS: 574600 E/ 7019045 N Elevation: 508 m	Landform: Broad drainage line; unincised area; hardpan plain Almost level; aspect north; drains into incised drainage line (V60)
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Land surface: Reddish brown clay loam; surface rock (gravel) < 10 %; litter 10 %; fallen timber 2 – 10 %; bare ground 2 – 20 %; moist

Condition & disturbances: Very good to excellent; some pastoral impacts; structure appears mostly intact; grasses present but sparse

NVIS 6: U1+^ *Acacia pruinocarpa*, *A. incurvaneura* \Acacia\^tree\7\c; U2^ *Psyrax suaeveolens* \Psyrax\^tree\6\l; M1^ *Eremophila forrestii* subsp. *hastieana*, *E. georgei*, *Sida ectogama*, *Psyrax suaveolens*, *P. latifolia* \Eremophila\^shrub\3\c; G1^ *Ptilotus obovatus*, *Eremophila georgei*, *Acacia incurvaneura*, *Erodium cygnorum*, *Arthropodium* sp. \Ptilotus\^shrub, forb\1\i


Vegetation: *Acacia pruinocarpa*, *A. incurvaneura* open forest over *Psyrax suaeveolens* low open woodland over *Eremophila forrestii* subsp. *hastieana*, *E. georgei*, *Sida ectogama* shrubland over *Ptilotus obovatus*, *Eremophila georgei*, *Acacia incurvaneura* low open shrubland

Height (m)	Crown cover %	Habit	Species
9 – 12	30 – 50	T	<i>Acacia pruinocarpa</i> , <i>A. incurvaneura</i>
3 – 5	2 – 10	T	<i>Psyrax suaeveolens</i>
1 – 1.6	30 – 40	S	<i>Eremophila forrestii</i> subsp. <i>hastieana</i> , <i>E. georgei</i> , <i>Sida ectogama</i> , <i>Psyrax suaveolens</i> , <i>P. latifolia</i> , <i>Acacia incurvaneura</i>
< 0.6	10 – 30	S, F, G, L	<i>Ptilotus obovatus</i> , <i>Eremophila georgei</i> , <i>Acacia incurvaneura</i> , <i>Erodium cygnorum</i> , <i>Arthropodium</i> sp., <i>Brachyscome iberidifolia</i>

Other species: *Acacia craspedocarpa*, *Eragrostis eriopoda*, *Eremophila foliosissima*, *Helipterum craspedioides*, *Thyridolepis multiculmis*

- Acacia craspedocarpa*
- Acacia incurvaneura*
- Acacia pruinocarpa*
- Arthropodium* sp.
- Brachyscome iberidifolia*
- Eragrostis eriopoda*
- Eremophila foliosissima*
- Eremophila forrestii* subsp. *hastieana*
- Eremophila georgei*
- Erodium cygnorum*
- Helipterum craspedioides*
- Psyrax suaeveolens*
- Psyrax latifolia*
- Ptilotus obovatus*
- Sida ectogama*
- Thyridolepis multiculmis*



V60 2 <sup>nd</sup> August 2024 Relevé Haul road and infrastructure	
GPS: 574618 E/ 7019128 N Elevation 503 m	Landform: Hardpan plain; incised ephemeral drainage line; drainage to west; pools present, sandy banks and exposed hardpan
Land surface:	
Condition & disturbances: Good to very good; pastoral impacts; erosion	
Vegetation: <i>Acacia caesaneura</i> , <i>A. tetragonophylla</i> , <i>Hakea preissii</i> tall shrubland over <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Acacia tetragonophylla</i> , <i>Glycine canescens</i> shrubland over <i>Chorizema genistoides</i> , <i>Hakea preissii</i> , <i>Grevillea deflexa</i> , low open shrubland	
	
Pools present to depth ~ 0.8 m; dense vegetation on creek banks with pockets of vegetation on islands; few aquatic plants present; many insects	Pockets of shrubland dominated by <i>Acacia</i> and <i>Hakea</i> spp., with understorey of <i>Chorizema genistoides</i> , <i>Grevillea deflexa</i> and <i>Glycine canescens</i> (vine)
<i>Acacia aptaneura</i> <i>Acacia caesaneura</i> <i>Acacia ramulosa</i> var. <i>linophylla</i> <i>Acacia tetragonophylla</i> <i>Aristida contorta</i> <i>Calandrinia</i> sp. (sterile) <i>Chorizema genistoides</i> <i>Cymbopogon ambiguus</i> <i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i> <i>Eremophila forrestii</i> subsp. <i>hastieana</i>	<i>Eremophila fraseri</i> subsp. <i>fraseri</i> <i>Eremophila georgei</i> <i>Glycine canescens</i> <i>Grevillea deflexa</i> <i>Haloragis odontocarpa</i> <i>Marsilea hirsuta</i> <i>Nicotiana obliqua</i> <i>Rhodanthe ?sterilescens</i> (in bud) <i>Sida ectogama</i>



**V61 2<sup>nd</sup> August 2024 1.27 pm Relevé Haul road and infrastructure**

GPS: 573866 E/ 7018932 N  
Elevation 508 m

Landform: Broad, channelled drainage line with gravel banks;  
signs of flooding, debris; aspect SW

Land surface: Deep gravel banks, scattered rocks

Condition & disturbances: Good; signs of high flows through area – main drainage line; erosion, old tracks; pastoral impacts

Vegetation: *Acacia pteraneura*, *A. fuscaneura* tall open shrubland (3 – 5 m) over *Acacia fuscaneura*, *Grevillea deflexa*, *Eremophila fraseri* subsp. *fraseri* sparse shrubland over *Calytrix desolata*, *Grevillea deflexa* low sparse shrubland

*Acacia fuscaneura*  
*Acacia pruinocarpa*  
*Acacia pteraneura* (tentative)  
*Acacia tetragonophylla*  
*Androcalva luteiflora*  
*Calandrinia* sp. (sterile)  
*Calytrix desolata*  
*Chorizema genistoides*  
*Cymbopogon ambiguus*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila forrestii* subsp. *hastieana*  
*Eremophila fraseri* subsp. *fraseri*  
*Grevillea deflexa*  
*Hakea preissii*  
*Ptilotus exaltatus*



**V62 2<sup>nd</sup> August 2024 Relevé 1.50 pm Haul road and infrastructure**

GPS: 573149 E/ 7018896 N  
Elevation: 508 m

Landform: Hardpan plain wit fine ironstone gravel mantle;  
almost level; aspect SW

Land surface: Yellowish red fine sandy clay loam; surface rock (fine ironstone gravel) 60 – 70 %

Condition & disturbances: Degraded to poor; high pastoral impacts

Vegetation: *Acacia incurvaneura* isolated tall shrubs over *Acacia ramulosa* var. *linophylla* ,  
*Eremophila forrestii* subsp. *forrestii* isolated shrubs over *Eremophila forrestii* subsp. *forrestii*, *E.*  
*latrobei* subsp. *latrobei*, *Acacia tetragonophylla*, *Psyrax latifolia* low sparse shrubland

*Acacia incurvaneura*

*Acacia ramulosa* var. *linophylla*

*Acacia tetragonophylla*

*Eremophila forrestii* subsp. *forrestii*

*Eremophila latrobei* subsp. *latrobei*

*Monachather paradoxus*

*Psyrax latifolia*

*Ptilotus aevroides*



V63 2<sup>nd</sup> August 2024 2.05 pm Haul road and infrastructure

GPS: 571925 E/ 7019056 N  
Elevation 502 m

Landform: Hardpan plain, alluvium; ephemeral drainage line/  
depression; very gentle slope; aspect south

Land surface: Yellowish red fine sandy clay loam; surface rock < 5 %; litter 10 – 30 %; fallen timber 2 – 3 %; bare ground 30 – 40 %

Condition & disturbances: Very good; denser patch of woodland within sparsely vegetated ironstone plain; grasses absent; pastoral impacts more at edges; drought impacts – some deaths and part crown death; trapdoor spiders present

NVIS 6: U+^ *Acacia pruinocarpa* \Acacia\ ^tree\7i; U2^ *Acacia incurvaneura*, *A. ramulosa* var. *linophylla*, *A. tetragonophylla*, *Psyrax suaveolens*, *Acacia aptaneura* \Acacia\ ^shrub, tree\4c; M1^ *Eremophila forrestii* subsp. *forrestii*, *E. georgei*, *Acacia aptaneura*, *Psyrax latifolia* \Eremophila\ ^shrub\3c; G1^ *Sida ectogama*, *Cheilanthes sieberi* subsp. *sieberi*, *Erodium cygnorum*, *Eremophila georgei* \Sida\ ^shrub, fern, forb\1i

Vegetation: *Acacia pruinocarpa* woodland over *Acacia incurvaneura*, *A. ramulosa* var. *linophylla*, *A. tetragonophylla* tall shrubland over *Eremophila forrestii* subsp. *forrestii*, *E. georgei*, *Acacia aptaneura* shrubland over *Sida ectogama*, *Cheilanthes sieberi* subsp. *sieberi*, *Erodium cygnorum* low open shrubland


Height (m)	Crown cover %	Habit	Species
10 – 16	10 – 30	T	<i>Acacia pruinocarpa</i>
3 – 10	30 – 40	S, T	<i>Acacia incurvaneura</i> , <i>A. ramulosa</i> var. <i>linophylla</i> , <i>A. tetragonophylla</i> , <i>Psyrax suaveolens</i> , <i>Acacia aptaneura</i> , <i>A. craspedocarpa</i>
1 – 2	30 – 40	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Acacia aptaneura</i> , <i>Psyrax latifolia</i>
< 0.5	10 – 30	S, E, F	<i>Sida ectogama</i> , <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i> , <i>Erodium cygnorum</i> , <i>Eremophila georgei</i>


*Acacia aptaneura*  
*Acacia craspedocarpa*  
*Acacia incurvaneura*  
*Acacia pruinocarpa*  
*Acacia ramulosa* var. *linophylla*  
*Acacia tetragonophylla*  
*Cheilanthes sieberi* subsp. *sieberi*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila georgei*  
*Erodium cygnorum*  
*Psyrax latifolia*  
*Psyrax suaveolens*  
*Sida ectogama*



Edge of woodland/ tall shrubland patch – many deaths of medium to tall shrubs



V64 2 <sup>nd</sup> August 2024 Relevé Haul road and infrastructure	
GPS: 572029 E/ 7018992 N Elevation: 502 m	Landform: Plain, hardpan; alluvial; almost level; aspect south
Land surface: Yellowish red fine sandy clay loam; surface rock (fine ironstone gravel) 50 – 60 %	
Condition & disturbances: Poor; pastoral impacts high – many tracks, land surface disturbance; sheet erosion	
Vegetation: <i>Acacia aptaneura</i> , <i>A. incurvaneura</i> , <i>A. pruinocarpa</i> tall sparse shrubland over <i>Acacia incurvaneura</i> , <i>A. craspedocarpa</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. jucunda</i> subsp. <i>jucunda</i> sparse shrubland	
Other species: <i>Eremophila georgei</i> , <i>Erodium cygnorum</i> , <i>Calandrinia</i> sp., <i>Acacia ramulosa</i> var. <i>linophylla</i> , <i>Grevillea berryana</i> (4m)	
<i>Acacia aptaneura</i> <i>Acacia craspedocarpa</i> <i>Acacia incurvaneura</i> <i>Acacia pruinocarpa</i> <i>Acacia ramulosa</i> var. <i>linophylla</i> <i>Calandrinia</i> sp. <i>Eremophila forrestii</i> subsp. <i>forrestii</i> <i>Eremophila georgei</i> <i>Eremophila jucunda</i> subsp. <i>jucunda</i> <i>Erodium cygnorum</i> <i>Grevillea berryana</i>	

V65 2 <sup>nd</sup> August 2024 Relevé Haul road and infrastructure	
GPS: 571519 E/ 7019026 N Elevation 505 m	Landform: Stony hardpan plain; gentle slope; aspect south – SW
Land surface: Surface rock fine ironstone gravel 30 – 40 %; rocks (2 – 10 cm) 30 – 40 %; bare ground 10 %	
Condition & disturbances: Degraded; high pastoral impacts; drought impacts	
Vegetation: <i>Acacia aptaneura</i> , <i>A. incurvaneura</i> tall sparse shrubland to south; <i>Ptilotus rotundifolius</i> , <i>Eremophila jucunda</i> subsp. <i>jucunda</i> , <i>E. forrestii</i> subsp. <i>forrestii</i> low isolated shrubs	
<i>Acacia aptaneura</i> <i>Acacia incurvaneura</i> <i>Eragrostis eriopoda</i> <i>Eremophila forrestii</i> subsp. <i>forrestii</i> <i>Eremophila jucunda</i> subsp. <i>jucunda</i> <i>Ptilotus aevroides</i> <i>Ptilotus rotundifolius</i>	

**V66 2<sup>nd</sup> August 2024 Relevé Haul road and infrastructure**

GPS: 571243 E/ 7018975 N  
Elevation: 499 m

Landform: Ironstone hardpan plain; almost level; aspect south

Land surface: Yellowish red silty clay loam; surface rock fine ironstone gravel 30 – 50 %; rocks (2 – 10 cm) 20 %; bare ground 20 – 30 %

Condition & disturbances: Poor; high pastoral impacts; sheet erosion, hummocking

Vegetation: *Eremophila punicea*, *Eragrostis eriopoda* low open shrubland

*Acacia ramulosa* var. *linophylla* (isolated shrub)

*Eragrostis eriopoda*


*Eremophila jucunda* subsp. *jucunda*

*Eremophila punicea*

*Erodium cygnorum*



The following are survey sites from October 2023

V67 22/10/2023 9.22 am Haul Road western end			
GPS: 571097 E/ 7018946 N Elevation: 504 m		Landform: Stony plain	
Land surface: Yellowish red clay loam; surface rock (ironstone gravel 40 – 50 %; BIF, quartz rocks 5 – 10 %) 40 – 60 %			
Condition & disturbances: Poor; pastoral impacts, timber cutting; erosion sheet wash – hardpan exposed			
NVIS 6: U1^ <i>Acacia aptaneura</i> , <i>A. pruinocarpa</i> \Acacia\^shrub\4\; M1^ <i>Acacia aptaneura</i> , <i>A. pruinocarpa</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>A. tetragonophylla</i> \Acacia\^shrub\3\; G1^ <i>Acacia aptaneura</i> , <i>Eremophila punicea</i> , <i>Ptilotus rotundifolius</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Ptilotus schwartzii</i> \Acacia\^shrub\2\bi			
Vegetation: <i>Acacia aptaneura</i> , <i>A. pruinocarpa</i> tall sparse shrubland over <i>Acacia aptaneura</i> , <i>A. pruinocarpa</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> sparse shrubland over <i>Acacia aptaneura</i> , <i>Eremophila punicea</i> , <i>Ptilotus rotundifolius</i> low isolated shrubs			
Height (m)	Crown cover %	Habit	Species
2 – 5	2 – 10	S	<i>Acacia aptaneura</i> , <i>A. pruinocarpa</i>
1 – 2	2 – 10	S	<i>Acacia aptaneura</i> , <i>A. pruinocarpa</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>A. tetragonophylla</i>
< 1	< 2	S	<i>Acacia aptaneura</i> , <i>Eremophila punicea</i> , <i>Ptilotus rotundifolius</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Ptilotus schwartzii</i>
Other species: <i>Eremophila foliosissima</i>			
<i>Acacia aptaneura</i> <i>Acacia pruinocarpa</i> <i>Acacia tetragonophylla</i> <i>Eremophila foliosissima</i> <i>Eremophila fraseri</i> subsp. <i>fraseri</i> <i>Eremophila punicea</i> <i>Ptilotus rotundifolius</i> <i>Ptilotus schwartzii</i> <i>Senna artemisioides</i> subsp. <i>helmsii</i>			

**V 68 22/10/2023 9.00 am Haul Road western end**

GPS: 570854 E/ 7018905 N  
Elevation: 502 m

Landform: Plain, hardpan; low rise; aspect south to south west

Land surface: Yellowish red fine sandy clay loam; surface rock 0 %; litter 30 – 40 %; fallen timber < 2 %; cryptogams (lichen) 5 – 10 %

Condition & disturbances: Very good; pastoral impacts

NVIS 6: U1+^ *Acacia aptaneura*, *A. caesaneura*, *Brachychiton gregorii*, *Hakea lorea*\Acacia\^tree\6\; M1^ *Brachychiton gregorii*, *Acacia tetragonophylla*, *Psyrax latifolia*, *Acacia caesaneura*\Brachychiton\^shrub, tree\4\; M2^ *Eremophila forrestii* subsp. *forrestii*, *Psyrax suaveolens*, *Pittosporum angustifolium*\Eremophila\^shrub\3\; G1^ *Eremophila forrestii* subsp. *forrestii*, *E. georgei*, *Eragrostis falcata*, *Ptilotus polystachyus*, *Stenopetalum filifolium*\Eremophila\^shrub, tussock grass, forb\2\c

Vegetation: *Acacia aptaneura*, *A. caesaneura*, *Brachychiton gregorii* low woodland over *Brachychiton gregorii*, *Acacia tetragonophylla*, *Psyrax latifolia* tall sparse shrubland over *Eremophila forrestii* subsp. *forrestii*, *Psyrax suaveolens*, *Pittosporum angustifolium* open shrubland over *Eremophila forrestii* subsp. *forrestii*, *E. georgei*, *Eragrostis falcata* low shrubland

Height (m)	Crown cover %	Habit	Species
8 – 10	20 – 30	T	<i>Acacia aptaneura</i> , <i>A. caesaneura</i> , <i>Brachychiton gregorii</i> , <i>Hakea lorea</i>
4 – 5	2 – 10	S, T	<i>Brachychiton gregorii</i> , <i>Acacia tetragonophylla</i> , <i>Psyrax latifolia</i> , <i>Acacia caesaneura</i>
0.7 – 1.5	10 – 20	S	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>Psyrax suaveolens</i> , <i>Pittosporum angustifolium</i>
< 0.7	30 – 40	S, G, F, L	<i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Eragrostis falcata</i> , <i>Ptilotus polystachyus</i> , <i>Stenopetalum filifolium</i> , <i>Cephalopterum drummondii</i> , dried off forbs, <i>Ptilotus obovatus</i> , <i>Leichhardtia australis</i>

Other species: *Thysanotus manglesianus*, *Acacia ramulosa* var. *linophylla*, *Eremophila glutinosa*, *E. serrulata*, *Rhodanthe* sp., *Roepera* sp., *Hakea lorea* (0.5 m), *Ptilotus exaltatus*, *Teucrium teucriiflorum*

*Acacia caesaneura*  
*Acacia ramulosa* var. *linophylla*  
*Acacia tetragonophylla*  
*Brachychiton gregorii*  
*Cephalopterum drummondii*  
*Eragrostis falcata*  
*Eremophila forrestii* subsp. *forrestii*  
*Eremophila georgei*  
*Eremophila glutinosa*  
*Eremophila serrulata*  
*Hakea lorea*  
*Leichhardtia australis*  
*Pittosporum angustifolium*  
*Psyrax latifolia*  
*Psyrax suaveolens*  
*Ptilotus exaltatus*  
*Ptilotus obovatus*  
*Ptilotus polystachyus*



*Rhodanthe* sp.  
*Roepera* sp.  
*Stenopetalum filifolium*  
*Teucrium teucriiflorum*  
*Thysanotus manglesianus*

V 69 22/10/2023 8.23 am Haul Road western end

GPS: 570041 E/ 7018530 N  
Elevation: 501 m

Landform: Gravel plain with rocky patches

Land surface: Red (2.5YR4/8) clay loam; surface rock (gravel, rocks – BIF, dolerite, quartz; ironstone gravel) 50 – 70 %; litter < 2 %; fallen timber < 1 %; cryptogams (lichen) < 1 %; bare ground 5 – 20 %

Condition & disturbances: Degraded - Poor; high pastoral impacts; hard pan exposed; sheet erosion; rilling and back-cutting; pedestalling and hummocking

NVIS 6: U1^ *Acacia aptaneura* \Acacia\^shrub\4\bi; M1+^ *Senna artemisioides subsp. helmsii*, *Acacia ramulosa var. linophylla* \Senna\^shrub\3\r; G1^ *Eremophila compacta*, *Ptilotus polystachyus*, *Solanum lasiophyllum*, *Monachather paradoxus*, *Eragrostis eriopoda* \Eremophila\^shrub, tussock grass\2\r

Vegetation: *Acacia aptaneura* isolated tall shrubs over *Senna artemisioides subsp. helmsii*, *Acacia ramulosa var. linophylla* sparse shrubland over *Eremophila compacta*, *Ptilotus polystachyus*, *Solanum lasiophyllum* low sparse shrubland


Height (m)	Crown cover %	Habit	Species
3 – 5	< 2	S	<i>Acacia aptaneura</i>
1 – 2	2 – 4	S	<i>Senna artemisioides subsp. helmsii</i> , <i>Acacia ramulosa var. linophylla</i>
< 0.7	5 – 10	S, G	<i>Eremophila compacta</i> , <i>Ptilotus polystachyus</i> , <i>Solanum lasiophyllum</i> , <i>Monachather paradoxus</i> , <i>Eragrostis eriopoda</i> , <i>E. falcata</i> , <i>Ptilotus obovatus</i>


Other species: *Acacia incurvaneura*, *Amphipogon caricinus var. caricinus*, *Aristida contorta*, *Eremophila exilifolia*, *Maireana triptera*, *Ptilotus rotundifolius*, *Stenopetalum filifolium*, *Sclerolaena diacantha*


*Acacia aptaneura*  
*Acacia incurvaneura*  
*Acacia ramulosa var. linophylla*  
*Amphipogon caricinus var. caricinus*  
*Aristida contorta*  
*Eragrostis eriopoda*  
*Eragrostis falcata*  
*Eremophila compacta*  
*Eremophila exilifolia*  
*Maireana triptera*  
*Monachather paradoxus*  
*Ptilotus obovatus*  
*Ptilotus polystachyus*  
*Ptilotus rotundifolius*  
*Sclerolaena diacantha*  
*Senna artemisioides subsp. helmsii*  
*Solanum lasiophyllum*  
*Stenopetalum filifolium*





V70 22/10/2023 7.59 am Woodland patch Haul Road western end			
GPS: 569661 E/ 7018198 N Elevation: 493 m		Landform: Plain, small grove of vegetation Gentle slope; aspect south	
Land surface: Red fine sandy clay loam; surface rock < 1 %; litter > 80 % ^ 3 – 4 cm; fallen timber 1 – 2 %			
Condition & disturbances: Very good; pastoral impacts, rubbish; vegetation mostly intact			
NVIS 6: U1+ ^ Acacia pruinocarpa \Acacia\ ^tree\7\i; M1^ Acacia aptaneura, Pittosporum angustifolium, Psydrax latifolia \Acacia\ ^tree, shrub\6\c; M2^ Sida ectogama, Pittosporum angustifolium, Eremophila georgei, Acacia tetragonophylla, Psydrax suaveolens \Sida\ ^shrub\3\c; G1^ Sida ectogama, Psydrax latifolia, Acacia aptaneura, Pittosporum angustifolium, Eremophila georgei \Sida\ ^shrub			
Vegetation: Acacia pruinocarpa woodland over Acacia aptaneura, Pittosporum angustifolium, Psydrax latifolia low woodland over Sida ectogama, Pittosporum angustifolium, Eremophila georgei shrubland over Sida ectogama, Psydrax latifolia, Acacia aptaneura low open shrubland			
Height (m)	Crown cover %	Habit	Species
12	25 – 30	T	Acacia pruinocarpa
4 – 6	30 – 40	T, S	Acacia aptaneura, Pittosporum angustifolium, Psydrax latifolia
1 – 2	30 – 40	S	Sida ectogama, Pittosporum angustifolium, Eremophila georgei, Acacia tetragonophylla, Psydrax suaveolens
0.3 – 1	10 – 15	S, C	Sida ectogama, Psydrax latifolia, Acacia aptaneura, Pittosporum angustifolium, Eremophila georgei, Ptilotus obovatus, Enchylaena tomentosa, Teucrium teucriiflorum
Other species: Maireana triptera, M. georgei, Ptilotus polystachyus, Senna artemisioides subsp. filifolia, S. artemisioides subsp. artemisioides, Abutilon sp., Sclerolaena eurotioides, Leichhardtia australis, Ptilotus exaltatus			
<p><i>Abutilon sp.</i>  <i>Acacia aptaneura</i>  <i>Acacia pruinocarpa</i>  <i>Acacia tetragonophylla</i>  <i>Enchylaena tomentosa</i>  <i>Eremophila georgei</i>  <i>Leichhardtia australis</i>  <i>Maireana georgei</i>  <i>Maireana triptera</i>  <i>Pittosporum angustifolium</i>  <i>Psydrax latifolia</i>  <i>Psydrax suaveolens</i>  <i>Ptilotus exaltatus</i>  <i>Ptilotus obovatus</i>  <i>Ptilotus polystachyus</i>  <i>Sclerolaena eurotioides</i>  <i>Senna artemisioides subsp. artemisioides</i>  <i>Senna artemisioides subsp. filifolia</i>  <i>Sida ectogama</i>  <i>Teucrium teucriiflorum</i></p>			

V 71 22/10/2023 7.33 am Haul Road western end			
GPS: 569290 E/ 7017878 N Elevation: 494 m		Landform: Plain; small patch of denser vegetation	
Land surface: Yellowish red (5YR5/6) fine sandy clay loam; surface rock (BIF, ironstone gravel, siltstone, quartz) 0.5 – 6 cm, 10 – 20 % with some denser patches			
Condition & disturbances: Good; less disturbances than surrounding plain			
NVIS 6: U1+^ <i>Acacia aptaneura</i> , <i>Psydrax suaveolens</i> , <i>P. latifolia</i> , <i>Acacia tetragonophylla</i> \^tree, shrub\6\c; M1^ <i>Eremophila georgei</i> , <i>E. forrestii</i> subsp. <i>forrestii</i> , <i>Sida ectogama</i> , <i>Leichhardtia australis</i> , <i>Acacia aptaneura</i> \^shrub, climber\3\c; M2^ <i>Ptilotus obovatus</i> , <i>Monachather paradoxus</i> , <i>Psydrax rigidula</i> , <i>Eremophila georgei</i> , <i>Psydrax suaveolens</i> \^shrub, tussock grass\2\i; G1^ Dried off forbs, <i>Solanum lasiophyllum</i> , <i>Psydrax latifolia</i> , <i>Sclerolaena</i> sp., <i>Sida ectogama</i> \^forb, shrub\1\i			
Vegetation: <i>Acacia aptaneura</i> , <i>Psydrax suaveolens</i> , <i>P. latifolia</i> tall shrubland over <i>Eremophila georgei</i> , <i>E. forrestii</i> subsp. <i>forrestii</i> , <i>Sida ectogama</i> shrubland over <i>Ptilotus obovatus</i> , <i>Monachather paradoxus</i> , <i>Psydrax rigidula</i> low open shrubland over Dried off forbs, <i>Solanum lasiophyllum</i> , <i>Psydrax latifolia</i> low open forbland			
Height (m)	Crown cover %	Habit	Species
4 – 6	30 – 40	T, S	<i>Acacia aptaneura</i> , <i>Psydrax suaveolens</i> , <i>P. latifolia</i> , <i>Acacia tetragonophylla</i>
1 – 2.5	50 – 60	S, L	<i>Eremophila georgei</i> , <i>E. forrestii</i> subsp. <i>forrestii</i> , <i>Sida ectogama</i> , <i>Leichhardtia australis</i> , <i>Acacia aptaneura</i> , <i>P. latifolia</i> , <i>Solanum lasiophyllum</i> , <i>Acacia tetragonophylla</i>
0.2 – 1	10 – 30	S, G	<i>Ptilotus obovatus</i> , <i>Monachather paradoxus</i> , <i>Psydrax rigidula</i> , <i>Eremophila georgei</i> , <i>Psydrax suaveolens</i>
< 0.2	10 – 20	F, S	Dried off forbs, <i>Solanum lasiophyllum</i> , <i>Psydrax latifolia</i> , <i>Sclerolaena</i> sp., <i>Sida ectogama</i>
Other species: <i>Acacia pruinocarpa</i> low tree stand with <i>A. caesaneura</i> ; <i>Eremophila compacta</i> , <i>Senna artemisioides</i> subsp. <i>xsturtii</i> , <i>Eremophila ericalyx</i> , <i>E. foliosissima</i> , <i>Teucrium teucriiflorum</i>			
<i>Acacia aptaneura</i> <i>Acacia caesaneura</i> <i>Acacia pruinocarpa</i> <i>Acacia tetragonophylla</i> <i>Eremophila ericalyx</i> <i>Eremophila foliosissima</i> <i>Eremophila forrestii</i> subsp. <i>forrestii</i> <i>Eremophila georgei</i> <i>Leichhardtia australis</i> <i>Monachather paradoxus</i> <i>Psydrax latifolia</i> <i>Psydrax rigidula</i> <i>Psydrax suaveolens</i> <i>Ptilotus obovatus</i> <i>Sclerolaena</i> sp. <i>Senna artemisioides</i> subsp. <i>xsturtii</i>		 <i>Sida ectogama</i> <i>Solanum lasiophyllum</i> <i>Teucrium teucriiflorum</i>	

V72 22/10/23 7.00 am Haul Road western end			
GPS: 568940 E/ 7017390 N Elevation: 488 m		Landform: Stony plain; almost level; aspect south	
Land surface: Yellowish red (5YR5/6) fine sandy clay loam; surface rock (BIF, ironstone gravel, siltstone, quartz) 0.5 – 6 cm, 10 – 50 %; litter < 5 %; bare ground 40 – 50 %			
Condition & disturbances: Degraded; tracks, roads, pastoral and mining impacts; erosion active – sheet, pedestalling and hummocking			
NVIS 6: U1^ <i>Acacia aptaneura</i> \Acacia\^tree\6\bi; M1^ <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Acacia pruinocarpa</i> , <i>A. tetragonophylla</i> \Eremophila\^shrub\3\bi; G1+^ <i>Eremophila punicea</i> , <i>E. fraseri</i> subsp. <i>fraseri</i> , <i>Ptilotus schwartzii</i> , <i>P. obovatus</i> , <i>Amphipogon caricinus</i> \Eremophila\^shrub, tussock grass, forb\1\r			
Vegetation: <i>Acacia aptaneura</i> low isolated trees over <i>Eremophila fraseri</i> subsp. <i>fraseri</i> isolated shrubs over <i>Eremophila punicea</i> , <i>E. fraseri</i> subsp. <i>fraseri</i> , <i>Ptilotus schwartzii</i> low sparse shrubland			
Height (m)	Crown cover %	Habit	Species
> 2	< 2	T	<i>Acacia aptaneura</i>
0.9 – 1.5	< 2	S	<i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Acacia pruinocarpa</i> , <i>A. tetragonophylla</i>
< 0.6	2 – 10	S, G, F	<i>Eremophila compacta</i> , <i>E. fraseri</i> subsp. <i>fraseri</i> , <i>Ptilotus schwartzii</i> , <i>P. obovatus</i> , <i>Amphipogon caricinus</i> var. <i>caricinus</i> , <i>Monachather paradoxus</i> , <i>Sclerolaena eurotioides</i> , <i>S. fusiformis</i> , <i>Stenopetalum filifolium</i>
Other species: <i>Acacia craspedocarpa</i> , <i>A. fuscaneura</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , <i>E. georgei</i> , <i>Maireana thesioides</i> , <i>M. georgei</i> , <i>M. carnosa</i> , <i>Psyrax suaeveolens</i>			
<i>Acacia aptaneura</i> <i>Acacia craspedocarpa</i> <i>Acacia fuscaneura</i> <i>Acacia pruinocarpa</i> <i>Acacia tetragonophylla</i> <i>Amphipogon caricinus</i> var. <i>caricinus</i> <i>Eremophila compacta</i> <i>Eremophila forrestii</i> subsp. <i>forrestii</i> <i>Eremophila fraseri</i> subsp. <i>fraseri</i> <i>Eremophila georgei</i> <i>Maireana carnosa</i> <i>Maireana georgei</i> <i>Maireana thesioides</i> <i>Monachather paradoxus</i> <i>Psyrax suaeveolens</i> <i>Ptilotus obovatus</i> <i>Ptilotus schwartzii</i> <i>Sclerolaena eurotioides</i> <i>Sclerolaena fusiformis</i> <i>Stenopetalum filifolium</i>			

30<sup>th</sup> August 2024  
Dr Tim Moulds  
Director Invertebrate Solutions Pty Ltd  
PO Box 14  
Victoria Park, WA 6979  
Reference: 2024ISJ10-F01-20240830

## **Review of *Cethegus* species limits and SRE status in Western Australia.**

Attention Goran Seat  
General Manager Projects  
Fenix Resources Ltd

Dear Goran

In response to your request on behalf of Fenix Resources Ltd (Fenix) on 26<sup>th</sup> July 2024 to provide an assessment of the mygalomorph spider *Cethegus fugax* with regard to its status as a potential short range endemic (SRE) invertebrate in Western Australia, Invertebrate Solutions Pty Ltd (Invertebrate Solutions) makes the following response in the form of a technical memorandum.

### **Technical Memorandum Scope**

Invertebrate Solutions has been requested by Fenix to review the mygalomorph spider *Cethegus fugax* and specifically address the following:

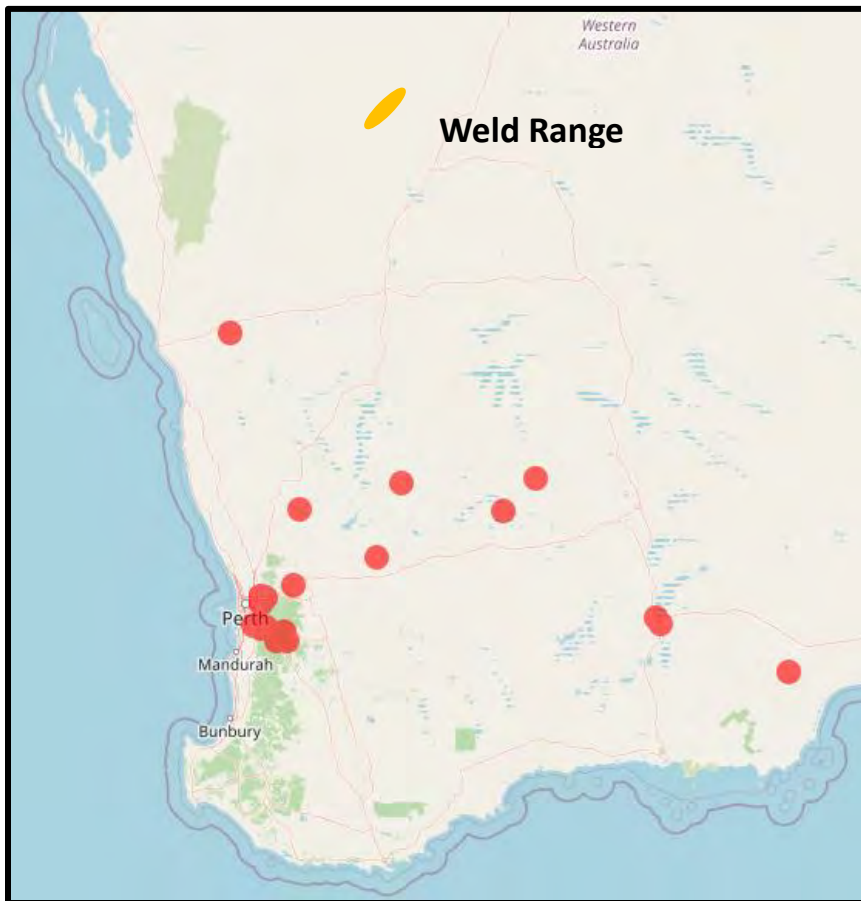
- Assess the species limits for *C. fugax* based upon morphological and genetic data as contained in published and unpublished literature.
- Provide an assessment for the distribution of *C. fugax* in the Mid West region of Western Australia and determine if it is considered to be an SRE.
- Provide recommendations and any suggested requirements for further work to comply with relevant legislation.
- Provide a written report containing the above items.

## Arachnida: Mygalomoprhae: Euagridae: *Cethegus*

Mygalomorph spiders of the genus *Cethegus* are restricted to Australia, and have recently been transferred from the family Dipluridae to Euagridae, which was elevated from a subfamily based upon a multigene genetic analysis (Opatova et al. 2020). The genus currently contains 12 recognised species that occur from rainforest on Cape York in Queensland, through open forest to the west of the Great Dividing Range in Queensland and NSW and in desert areas of South Australia, to semi-arid habitats in inland southern Western Australia (Raven 1984).

### *Cethegus fugax*

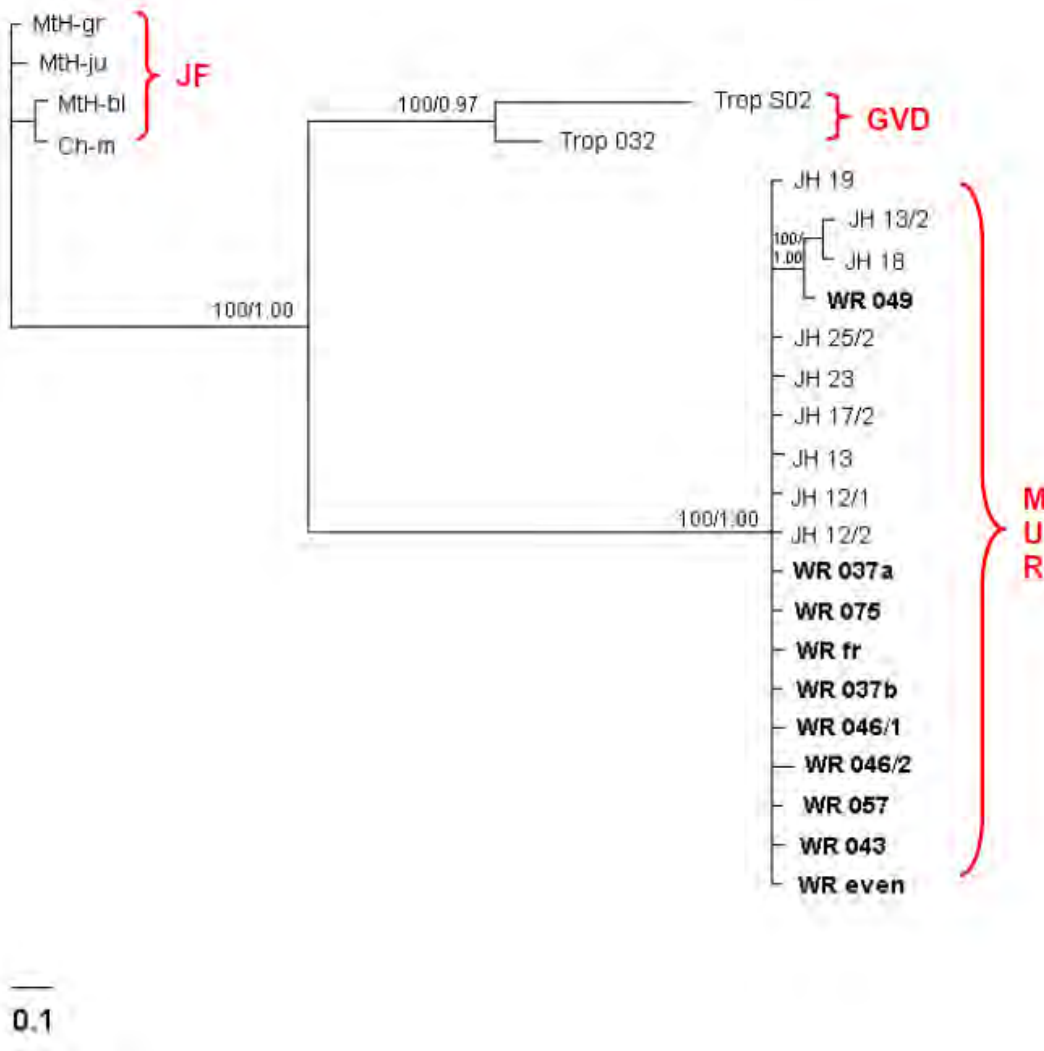
*Cethegus fugax* is one of two species of *Cethegus* that occurs in Western Australia and is found in subcoastal areas along the Nullarbor Plain, in the south-western corner, and near the west coast about as far north as Geraldton, W.A. (Main 1960, Figure 1). The species is not known to occur in the mesic forests of the South West. Although Main (1960) records the species as occurring as far east as South Australia, Raven (1984) remains doubtful of these records being *C. fugax* without further detailed examination to determine their conspecificity.



**Figure 1.** The distribution of *Cethegus fugax* in Western Australia from ALA.org.au and the approximate position of Weld Range.

Invertebrate surveys in the Mid West as part of environmental assessments for mining projects have recorded *C. fugax* much further north than Geraldton and they are known to occur throughout the Mid West, with populations known from Weld Range and Robinson Range (Ecologia 2009a) and Jack Hills (GHD 2011).

The genetic diversity of *Cethegus fugax* records were examined by Ecologia (2009b), in order to provide additional information to compliment the morphological characters that had previously been investigated by Main (1960) and Raven (1985). Ecologia (2009b) sought to determine, using a multigene analysis of *Cethegus fugax* represented a species complex or a single widespread species. The study used three different genes, 16S, CO1 and ITS1. Thirty-eight individuals from the Midwest were sequenced (15 Weld Range, 10 Jack Hills, 12 Robinson Range, 1 Morawa), along with four specimens from the type locality at Mt Helena, in the Perth Hills and 3 individuals of *C. ischnotheloides* from the Great Victorian Desert, which is the closest geographical species to *C. fugax* and was used for comparison of results and to determine intra and interspecific variation.



**Figure 2** Maximum Likelihood phylogenetic tree based on ITS1 (after Ecologia 2009b Figure 3-2). The scale bar represents 0.1 substitutions per site. JF – Jarrah Forrest; GVD – Great Victoria Desert; MUR – Murchison / Mid West.

The subsequent analysis of the genetic data showed distinctive and well supported clades of *C. ischnotheloides*, *C. fugax* from the Jarrah forest (type locality) and *C. fugax* from the Midwest (Ecologia 2009b, Figure 2). This high level grouping was evident in both the Maximum Likelihood and Bayesian Inference analysis techniques on multiple different genes, that provides a high degree of confidence in the results. This data would therefore support the hypothesis that the individuals of *C. fugax* from the Midwest are a different, undescribed species of *Cethegus*, and do not represent *C. fugax*.

The populations of Mid West *C. 'fugax'* show some genetic structuring by geographical location (Figure 2, Figure 3), however, the assertion from Ecologia (2009b) that these represents distinct subspecies is not supported by the data, as the analysis shows weak support for most of the clades and no morphological differences were evident. It is to be expected that some genetic structuring over the wide geographical distances between population in the Mid West would be present, and a similar pattern of genetic structuring was found with the widespread *Idiosoma clypeatum* (Rix et al. 2018) occurring throughout the midwest (including Weld Range and Jack Hills) when the genus was revised. *Idiosoma clypeatum* shows similar clumped distributions around Weld Range and Jack Hills with similar levels of genetic structuring to that seen in *C. 'fugax' – Mid west'* and was ultimately described as a single widespread species due to the similar morphological characters of the populations and the genetic distances being below interspecific variation, as is shown in the Ecologia (2009b) data.

The data, both genetic and morphologic obtained by Ecologia (2009b) support the existence of an undescribed species of *Cethegus* in the Mid West, however the species is widespread, and based upon current records is not considered to be an SRE according to the definition of Harvey 2002).

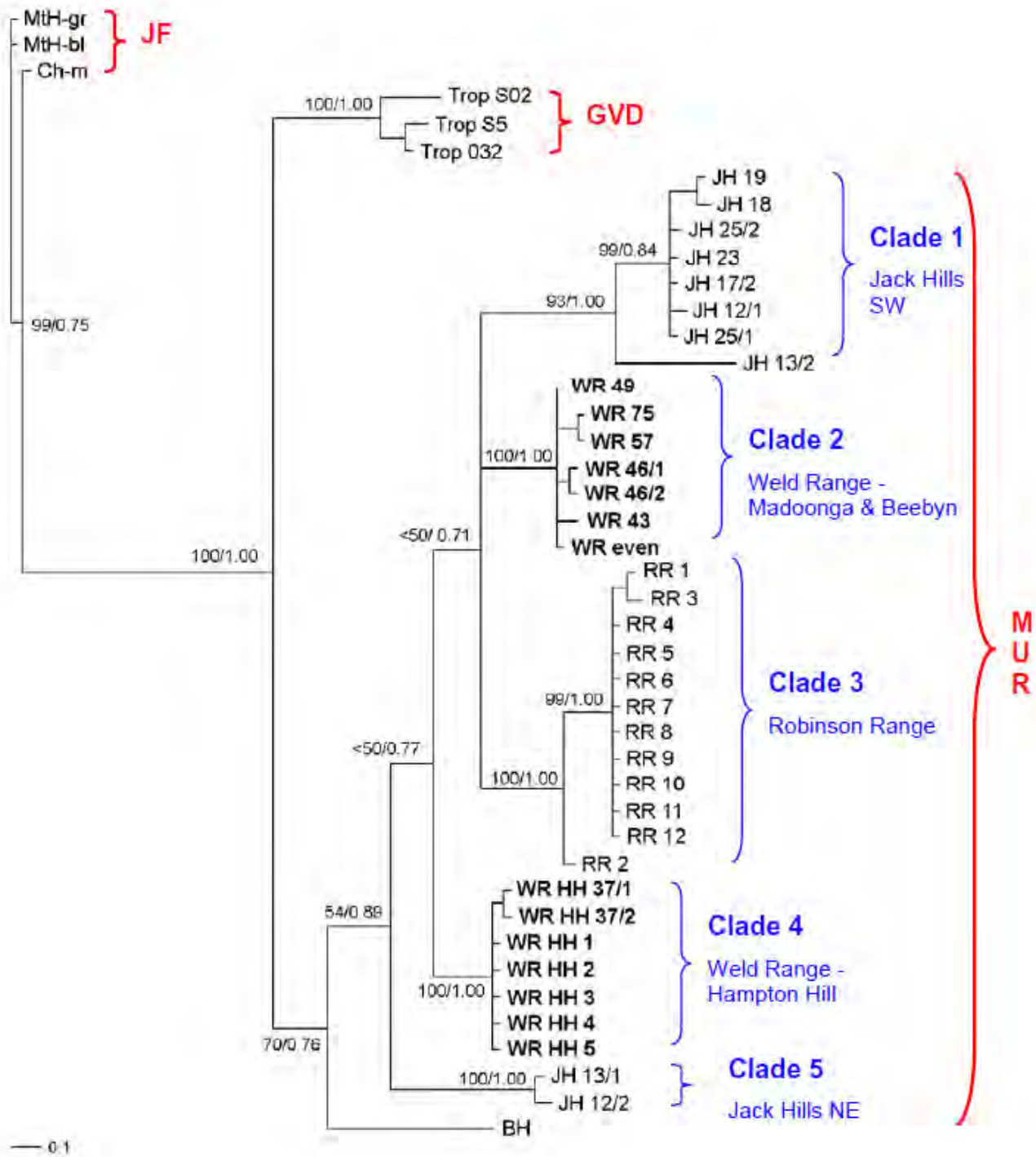


Figure 3 Maximum Likelihood phylogenetic tree based on 16S (after Ecologia 2009b Figure 3-3). The scale bar represents 0.1 substitutions per site. JF – Jarrah Forrest; GVD – Great Victoria Desert; MUR – Murchison / Mid West. Support for individual structuring of Murchison clades is weak (<95) and does not support species level separation.



## Conclusions and Recommendations

The mygalomorph spider *C. fugax* occurs in southern and coastal Western Australia. The specimens from the Mid West that have been recorded at Weld Range, Jack Hills and Robinson Range have nominally been identified previously as *C. fugax*. The genetic and morphological study undertaken by Ecologia (2009b) shows the individuals from the Mid-West region are an undescribed species of *Cethegus*, but differ genetically from *C. fugax* and the other closest geographical representative of the genus *C. ischnotheloides* enough to warrant being classified as a distinct species in their own right. The species *C. "midwest"* does exhibit some internal genetic structuring related to its geographical distribution, however, these differences are not large enough to justify splitting the taxa into multiple species. *Cethegus 'midwest'* is therefore a widespread species and is not considered to be a SRE according to the definition of Harvey (2002).

As *Cethegus 'midwest'* is not considered a SRE, nor a conservation significant species, no further survey work or management actions are deemed necessary.

Sincerely



Dr Tim Moulds

Director and Principal Ecologist

***Invertebrate Solutions Pty Ltd***

0429792834

[tim@invertebratesolutions.com](mailto:tim@invertebratesolutions.com)

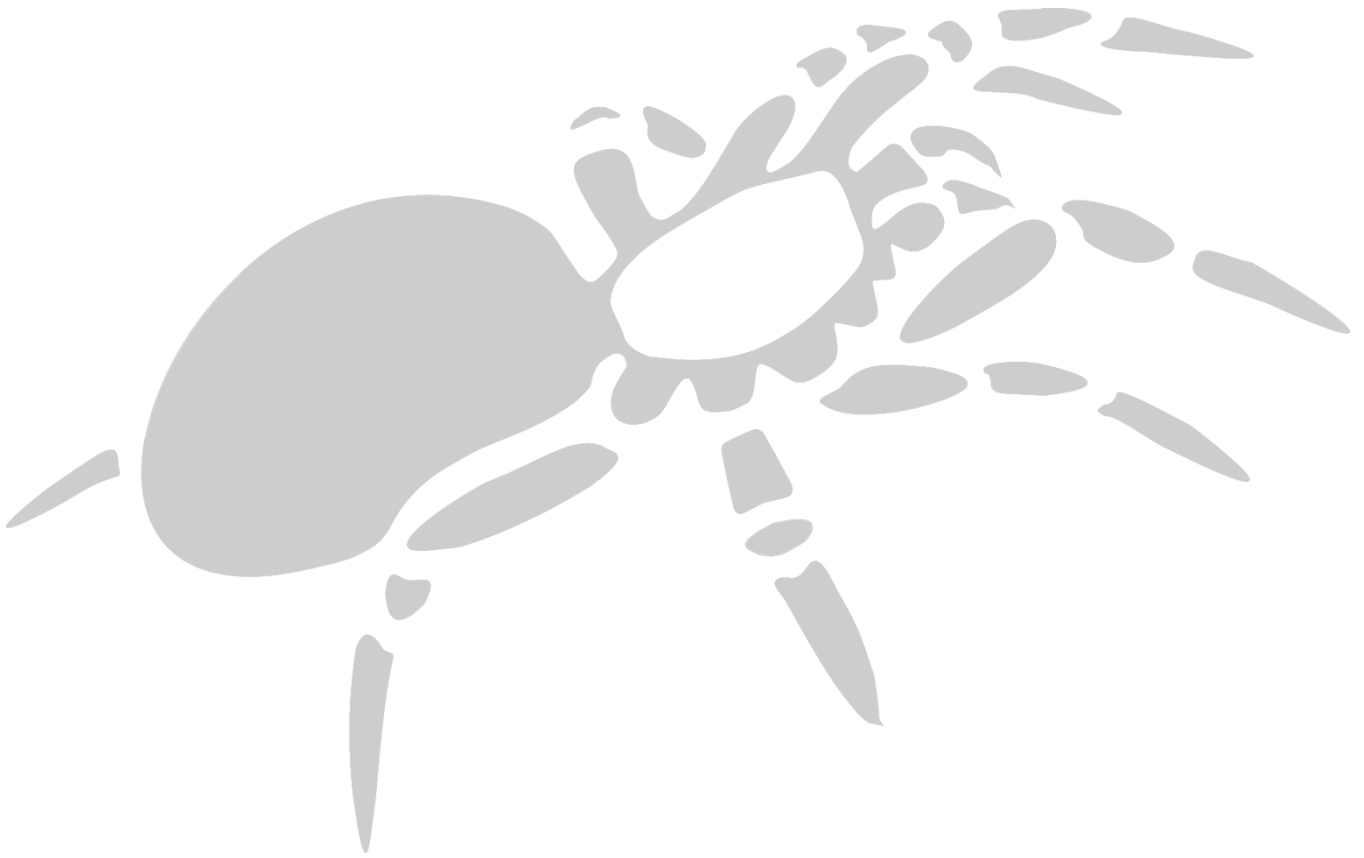
## Limitations and Exclusions

This study was limited to the extent of information made available to Invertebrate Solutions at the time of undertaking the work. Information not made available to this study, or which subsequently becomes available may alter the conclusions made herein.

The opinions, conclusions and any recommendations in this report are based on information available, including published species distribution records and reviewed at the date of preparation of the report. Invertebrate Solutions has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared. The opinions, conclusions and any recommendations in this report are based on assumptions made by Invertebrate Solutions described in this report (this section and throughout this report). Invertebrate Solutions disclaims liability arising from any of the assumptions being incorrect.

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## Appendix 2

Iron Ridge Stygofauna Assessment - ecologia Environment 2020

2 April 2020

**Jeremy Shepherdson**

c/o Fenix Resources

[jeremy@ecotecwa.com.au](mailto:jeremy@ecotecwa.com.au)

**RE: IRON RIDGE STYGOFAUNA ASSESSMENT**

Dear Jeremy,

*ecologia* Environment (*ecologia*) was engaged by Fenix Resources Ltd. (Fenix) to conduct a stygofauna survey to support environmental approvals, including a Mining Proposal, for the proposed Iron Ridge Project over tenement M20/118 (the 'study area'). The study area is located approximately 55 km northwest of Cue in the Murchison region (**Figure 1**). Where new bores are installed within an aquifer that has not yet been surveyed for stygofauna, baseline stygofauna sampling should be undertaken to determine the stygofauna assemblage within the aquifer, including for the presence of any stygofauna species of conservation significance.

*ecologia* conducted a stygofauna survey over two phases (six months apart) conforming to the requirements of a pilot study outlined in EPA Factor Guideline: *Subterranean Fauna* and EPA Technical Guidance: *Sampling Methods for Subterranean fauna*. The initial phase (stygofauna fauna trap establishment) was conducted in conjunction with the Level 1 fauna and fauna habitat assessment (2-4 September 2019) and the second (trap retrieval) on March 9<sup>th</sup>, 2020. Three bores were sampled for subterranean fauna, including two production bores and one monitoring bore. Bore hole drilling and water quality data is provided in Table 1.

**Table 1: Stygofauna sample bore locations and drilling information.**

<i>ecologia</i> Bore ID	Bore Id	Coordinates (GDA94, Zone 50)		Drilled Depth (m)	Reamed Depth (m)	Cased Depth (m)	Slotted Interval (m bgl)	Static water level	Electrical conductivity	Temperature (°C)	pH	Salinity (mg/L TDS)
		Easting	Northing									
WB01	IRPB01	567584	7019374	174	174	170	68-170	44.78	924	24.8	8.06	585
WB02	IRPB02	567775	7019516	120	122	122	14-122	65.52	967	24.9	6.81	544
WB03	IRMB- C	567802	7019436	115	<b>115</b>	115	54-114	55.33	1047	25.2	7.7	ND

**Desktop Assessment**

A number of bores have previously been sampled for stygofauna in the Weld Range and surrounding area. In 2009 *ecologia* (2009) conducted a baseline stygofauna survey at the Weld Range and surrounding pastoral land, which included sampling 84 drill holes (26 at Beebyn, 40 at Madoonga and 18 at the surrounding pastoral land outside the area of impact), laboratory identifications and reporting, interpretation of the potential impacts and an associated risk assessment of the various project components on stygofauna communities or species. The Beebyn and Madoonga survey areas are within close proximity to the Iron Ridge

study area and the surrounding pastoral bores provide good contextual information on a local and sub-regional scale.

No stygobitic species/communities were identified during the previous stygofauna surveys within the Beebyn impact area or in the regional pastoral bores, although stygophylic representatives of two crustacean orders (Ostracoda and Copepoda) and one annelid sub-class were recorded from nine pastoral wells (ecologia 2009).

One stygobitic copepod from the order Calanoida found in a troglofauna trap at Madoonga suggests that stygofauna may be present in the wider area, though this was not able to be confirmed by stygofauna sampling in nearby bores. The stygophilic copepod found in regional bores, *Mesocyclops brooksi*, is known from both surface waters and ground waters, and it is widespread in Western Australia. The ostracods, *Cypridopsis vidua* and *Sarscypridopsis oschracea* are often found in wells in arid Western Australia but are typically surface species inhabiting open freshwater bodies in southern Western Australia.

The results of this survey suggest that the groundwater habitat in and around the Beebyn impact area is depauperate of true stygofauna and therefore no risk assessment or management recommendations were conducted (ecologia 2009).

## Methodology

### Stygofauna haul nets

Sampling for stygofauna at Iron Ridge was conducted using haul nets of appropriate diameter (depending on water bore diameter). The net is lowered slowly into the bore using handle and rope and reel to ensure net does not fall freely to the bottom of bore. A minimum of three hauls are performed with a 150 µm mesh net and further three hauls are performed with a 50 µm mesh net. All samples are washed in 50µm sieve and preserved in a vial with 100% ethanol. All vials are labelled with date, bore name and replicate number. Samples are kept in cool, dark place and transported back to Perth for sorting and identification. Specimens were sent to Bennelongia Environmental stygofauna taxonomic specialists for identification.

### Standing water level

Standing water level dipper is used to determine the standing water level in each water bore/ drill hole. This provides information on the local aquifers for stygofauna.

### Water chemistry

Water parameters such as salinity and/or conductivity, pH, turbidity, temperature, dissolved oxygen and redox potential are collected *in situ* using portable water quality meter to assess stygobiotic habitat related to water quality.

## Results

No stygobitic species were collected from the two production bores sampled (WB01 and WB02) at Iron ridge during either phase of the survey. One very juvenile stygobitic Crustacea from the Class Ostracoda was recorded at WB03 (Bore ID: IRMB-C) during phase one.

Non-stygofaunal bycatch from the order Collembola (Springtails) were recorded from both WB01 and WB02 during phase one. WB01 also recorded one non-stygofaunal bycatch from the order Acarina (mites). WB02 recorded one mite from the Order Trombidiformes during the March 2020 trap retrieval.

Sample analysis results are provided in Table 2.





**Table 2: Sample analysis results (Bennelongia)**

Project	Orebody	Field Bore Code	Cleint Bore ID	Easting	Northing	Visit Date	Sample Type	Sample Notes	Kingdom	Phylum	Subphylum	Class	Subclass	Order_	Genus	Species	Lowest ID
Iron Ridge	Weld Range	WB02_S1	IRPB02	567775	7019516	03-Sep-19	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB02_S1	IRPB02	567775	7019516	03-Sep-19	Net	150um	Animalia	Arthropoda	Hexapoda	Entognatha		Collembola		sp.	Collembola sp.
Iron Ridge	Weld Range	WB02_S2	IRPB02	567775	7019516	05-Sep-19	Net	50um	Animalia	Arthropoda	Hexapoda	Entognatha		Collembola		sp.	Collembola sp.
Iron Ridge	Weld Range	WB02_S2	IRPB02	567775	7019516	05-Sep-19	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB01_S1	IRPB01	567584	7019374	03-Sep-19	Net	150um	Animalia	Arthropoda	Hexapoda	Entognatha		Collembola		sp.	Collembola sp.
Iron Ridge	Weld Range	WB01_S1	IRPB01	567584	7019374	03-Sep-19	Net	50um	Animalia	Arthropoda	Hexapoda	Entognatha		Collembola		sp.	Collembola sp.
Iron Ridge	Weld Range	WB01_S1	IRPB01	567584	7019374	03-Sep-19	Net	50um	Animalia	Arthropoda	Chelicerata	Arachnida	Acari	Acarina		sp.	Acarina sp.
Iron Ridge	Weld Range	WB01_S2	IRPB01	567584	7019374	05-Sep-19	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB01_S2	IRPB01	567584	7019374	05-Sep-19	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB03_S1	IRMB-C	567802	7019436	03-Sep-19	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB03_S1	IRMB-C	567802	7019436	03-Sep-19	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB03_S2	IRMB-C	567802	7019436	05-Sep-19	Net	50um	Animalia	Arthropoda	Crustacea	Ostracoda				sp. unident.	Ostracoda sp. unident.
Iron Ridge	Weld Range	WB03_S2	IRMB-C	567802	7019436	05-Sep-19	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB01_S1	IRPB01	567584	7019374	9/03/2020	Net	150 um									No Invertebrates
Iron Ridge	Weld Range	WB01_S1	IRPB01	567584	7019374	9/03/2020	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB01_S2	IRPB01	567584	7019374	9/03/2020	Net	150 um									No Invertebrates
Iron Ridge	Weld Range	WB01_S2	IRPB01	567584	7019374	9/03/2020	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB02_S1	IRPB02	567775	7019516	9/03/2020	Net	150um	Animalia	Arthropoda	Chelicerata	Arachnida	Acari	Trombidiformes		sp.	Trombidiformes sp.
Iron Ridge	Weld Range	WB02_S1	IRPB02	567775	7019516	9/03/2020	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB02_S2	IRPB02	567775	7019516	9/03/2020	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB02_S2	IRPB02	567775	7019516	9/03/2020	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB03_S1	IRMB-C	567802	7019436	9/03/2020	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB03_S1	IRMB-C	567802	7019436	9/03/2020	Net	50um									No Invertebrates
Iron Ridge	Weld Range	WB03_S2	IRMB-C	567802	7019436	9/03/2020	Net	150um									No Invertebrates
Iron Ridge	Weld Range	WB03_S2	IRMB-C	567802	7019436	9/03/2020	Net	50um									No Invertebrates

## Conclusions

The results of this survey, combined with the results of previously stygofauna surveys within and surrounding the Iron Ridge project area and the Weld Range, indicate that the groundwater habitat within the study area is depauperate in stygofauna diversity.

One juvenile ostracod was collected on one occasion from the monitoring bore (WB03). This specimen was unidentifiable to species level (due to absence of mature morphological features); however, it is potentially from the family Cyprididae which is one of the most diverse group of freshwater ostracods (Atlas of Living Australia 2020).

It is unlikely that impacts from the proposal at Iron Ridge will have any significant impacts on local stygofauna communities.

Best Regards,



## Shaun Grein

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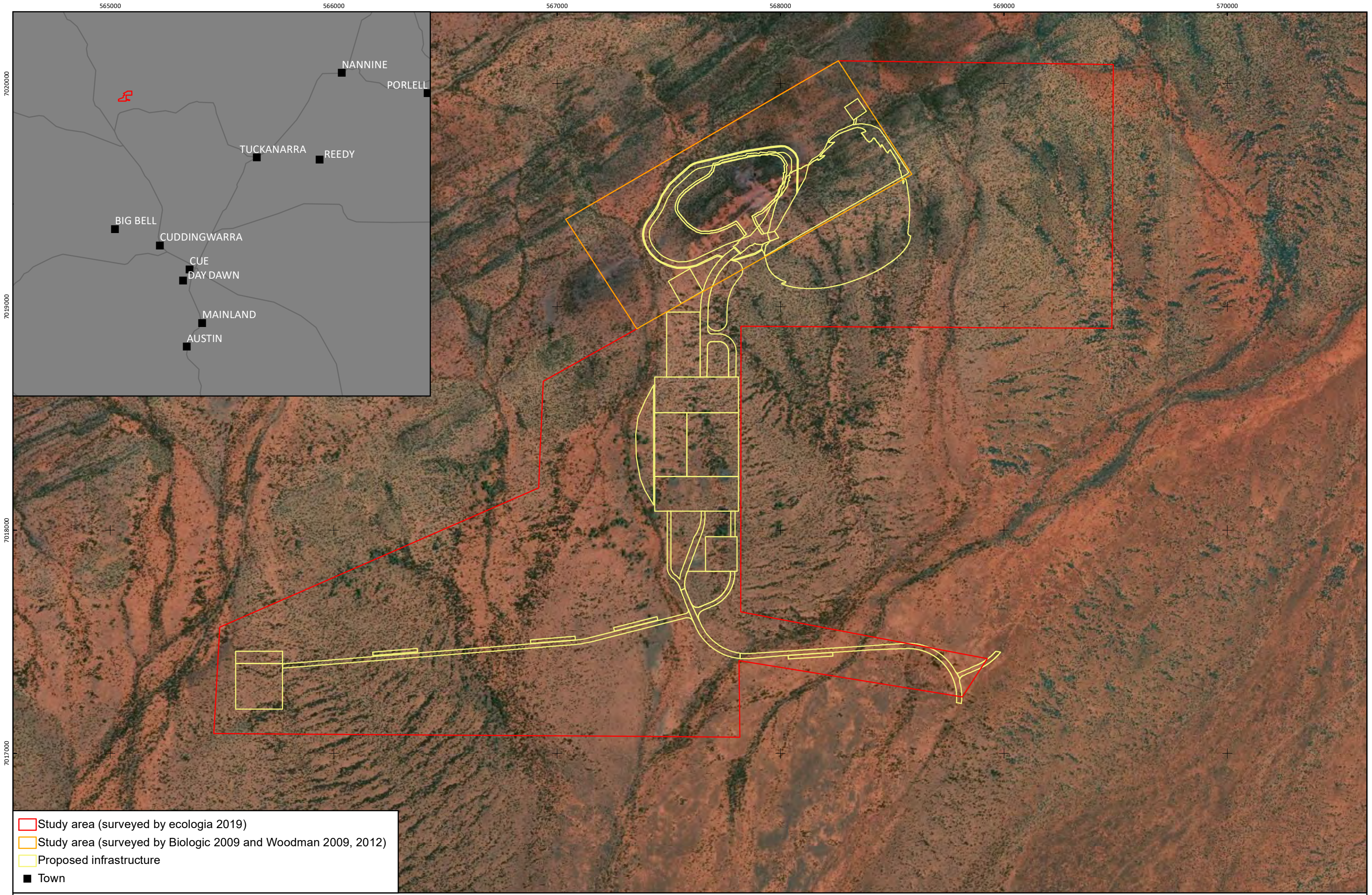
## Figures

## References


Atlas of Living Australia. 2020. Atlas of Living Australia. Database Search.

<https://bie.ala.org.au/species/urn:lsid:biodiversity.org.au:afd.taxon:c43e0e37-64ec-4a54-aaa6-704c4221f81f>.

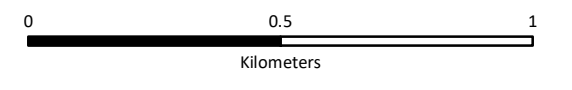
ecologia Environment. 2009. Weld Range Stygofauna Assessment, Unpublished Report for Sinosteel-Midwest Management.



- Study area (surveyed by ecologia 2019)
- Study area (surveyed by Biologic 2009 and Woodman 2009, 2012)
- Proposed infrastructure
- Town


 Project: 1796  
 Date: 19 March 2020  
 Author: AC  
 Coordinate System: GDA 1994 MGA Zone 50  
 Projection: Transverse Mercator  
 Absolute Scale: 1:15,000 @A3

**Figure 1:** Study area and proposed mining related infrastructure.



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

565500

567000

568500

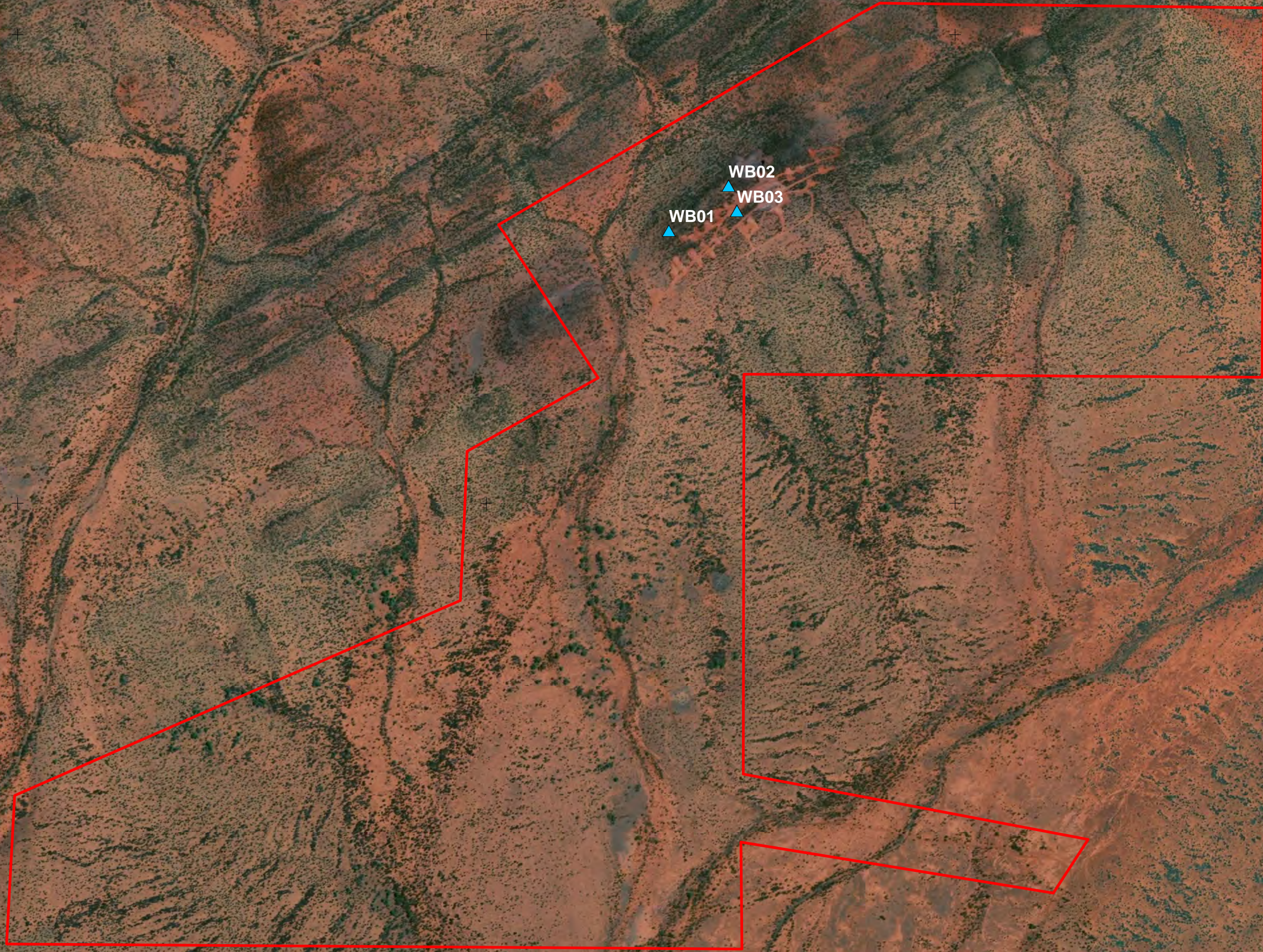
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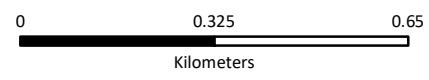
7018500

7017000

Study area  
▲ Bore hole



**Figure 2: Bore hole locations**



# Appendix 3

Hydrogeology and Hydrology Assessment – Pentium 2024

**PENTIUM**  
WATER



# FENIX RESOURCES W11 DEPOSIT

**Hydrogeology and Hydrology Assessment**

Rev 0

09/05/2024



## Document Status

Version	Purpose of document	Author	Reviewed by	Review Date
Rev A	Early draft for information	R Swift, J Hollander, R Wright, Ella Robson	R Swift, R Wright	24/04/24
Rev B	Draft for comment	R Swift, J Hollander, R Wright	R Swift, R Wight	02/05/24
Rev C	Updated bore locations, general layout	R Swift, J Hollander, R Wright	R Swift, R Wright	07/05/24
Rev 0	Final	R Swift, J Hollander, R Wright	R Swift, R Wright	09/05/24

## Approval for Issue

Name	Signature	Date
Rob Swift		09/05/2024

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## Table of Contents

<b>1. Introduction</b>	<b>1</b>
1.1. Background	1
1.2. Locality	1
1.3. Land Use	1
1.4. W11 Development	1
1.5. Scope of work	1
1.6. Document structure	1
<b>2. Climate / rainfall</b>	<b>4</b>
2.1. Climate	4
2.2. Local hydrology	4
<b>3. Geology</b>	<b>6</b>
<b>4. Hydrogeology</b>	<b>9</b>
4.1. Aquifers	9
4.1.1. Overview	9
4.1.2. W11	9
4.2. Groundwater recharge	9
4.3. Groundwater throughflow	9
4.4. Groundwater users	9
4.5. Groundwater dependent ecosystems	10
4.6. Previous Groundwater Investigations	11
4.6.1. Overview	11
4.6.2. Previous hydraulic testing	12
4.6.3. Previous groundwater exploration	12
4.6.3.1. W11	12
4.6.3.2. Iron Ridge	12
<b>5. Pit progression and dewatering</b>	<b>17</b>
5.1. Pit progression	17
5.2. Analytical model setup	17
5.2.1. Radial flow into a circular excavation	17
5.2.2. Volume of water within each bench	18
5.3. Analytical model results	19
5.4. Dewatering bores	21
5.5. Existing Groundwater Licence	21
<b>6. Water balance</b>	<b>22</b>
<b>7. Pit closure</b>	<b>23</b>
<b>8. Conclusions and recommendations</b>	<b>25</b>
8.1. Groundwater	25
8.2. Further investigation recommendations	25
<b>9. References</b>	<b>28</b>

## Table of Appendices

<b>Appendix A: W11 Hydrology Assessment</b>	<b>29</b>
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## List of Figures

Figure 1 W11 location	2
Figure 2 W11 general layout	3
Figure 3 Meekatharra Airport summary rainfall and evaporation data (BOM station 007045)	4





Figure 4 W11 site hydrology .....	5
Figure 5 Regional geology of the Weld Range iron ore mineralisation (based on SRK, 2010)..	7
Figure 6 Faulting bisecting the BIF at W11 and along strike (from Jones, 1962).....	8
Figure 7 Geology of W11 and surrounds (based on GSWA, 1983) – for stratigraphy codes refer Table 1. ....	8
Figure 8 Bores close to W11 - including results of a bore audit in 2008 (data from SRK, 2008) .....	10
Figure 9 Potential groundwater dependent ecosystems near W11 (based on BOM, 2024) .....	11
Figure 10 Historical drilling locations near W11 (W11 shown in red; PFS drilling in yellow; BFS drilling (2009) in orange).....	14
Figure 11 Analytical model geometry (left) and bench volume (right) .....	18
Figure 12 W11 stage curve .....	23
Figure 13 W11 - post closure water level recovery – ~5 L/s (i.e., as per late time dewatering) .....	24
Figure 14 W11 post-closure salinity – increasing over time.....	24
Figure 15 Recommended W11 hydrogeological investigation bore locations .....	27

## List of Tables

Table 1 Geology - W11 and surrounds (Based on GWSA, 1983).....	6
Table 2 Summary of previous studies.....	11
Table 3 Packer testing results (based on SRK, 2010) .....	12
Table 4 Test production bores near W11 (from SRK, 2008) .....	15
Table 5 Long term monitoring bores near W11 (from SRK, 2008).....	15
Table 6 Water quality samples near W11 (extracted from SRK, 2010).....	16
Table 7 W11 bench progression (estimated).....	17
Table 8 Approximate annual abstraction rates from W11 pit (L/s) .....	19
Table 9 Analytical model summary.....	20
Table 10 Annual water balance for operations near W11 pit.....	22
Table 11 Proposed hydrogeological investigation bore locations and objectives .....	26

## List of Charts

**No table of figures entries found.**



# 1. Introduction

## 1.1. Background

Fenix have secured the exclusive right to mine and export up to 10 million dry metric tonnes of iron ore from the high-grade Beebyn-W11 iron ore deposit in the Weld Range. Beebyn-W11 is located approximately 20 km east of existing mining operations at Iron Ridge. Currently Fenix are looking to develop the W11 pit.

Resources WA are assisting Fenix with the development of the mine plan (MP) and closure mine plan (CMP) for the deposit. This document provides an assessment of the hydrogeology and hydrology associated with the W11 pit based on historical reports and data available for the site.

## 1.2. Locality

W11 pit is situated approximately 70 km west-southwest of Meekatharra and 50 km north-northwest of Cue in the Shire of Meekatharra (Figure 1).

## 1.3. Land Use

The major land use in the area is sheep and cattle grazing on pastoral leases.

## 1.4. W11 Development

The general layout of the area close to the W11 pit is shown in Figure 2. The pit is planned to progress to a depth of approximately 135 mbgl (~395 mAHD).

## 1.5. Scope of work

Pentium Water was commissioned by Resources WA to undertake hydrogeological and hydrological assessments of the proposed W11 pit development to inform on the mine plan (MP) and closure mine plan (CMP). This included:

- Hydrogeology
  - Summarise test work / data sources relevant to the 2024 MP and MCP for W11
  - Recommendations and commentary regarding:
    - Dewatering requirements
    - Monitoring and production bore location
    - Pit lake formation post-mining
- Hydrology
  - Assessment of the impacts on site hydrology with regards the proposed mine pit, waste dump layout, including recommendations regarding appropriate management strategies.
  - Flood risk assessment for the mine
  - Surface water management assessment of the proposed miscellaneous licence path from Beeby to Iron Ridge for an access road.

## 1.6. Document structure

This report captures the hydrogeological and hydrological aspects of the study in the following broad structure:

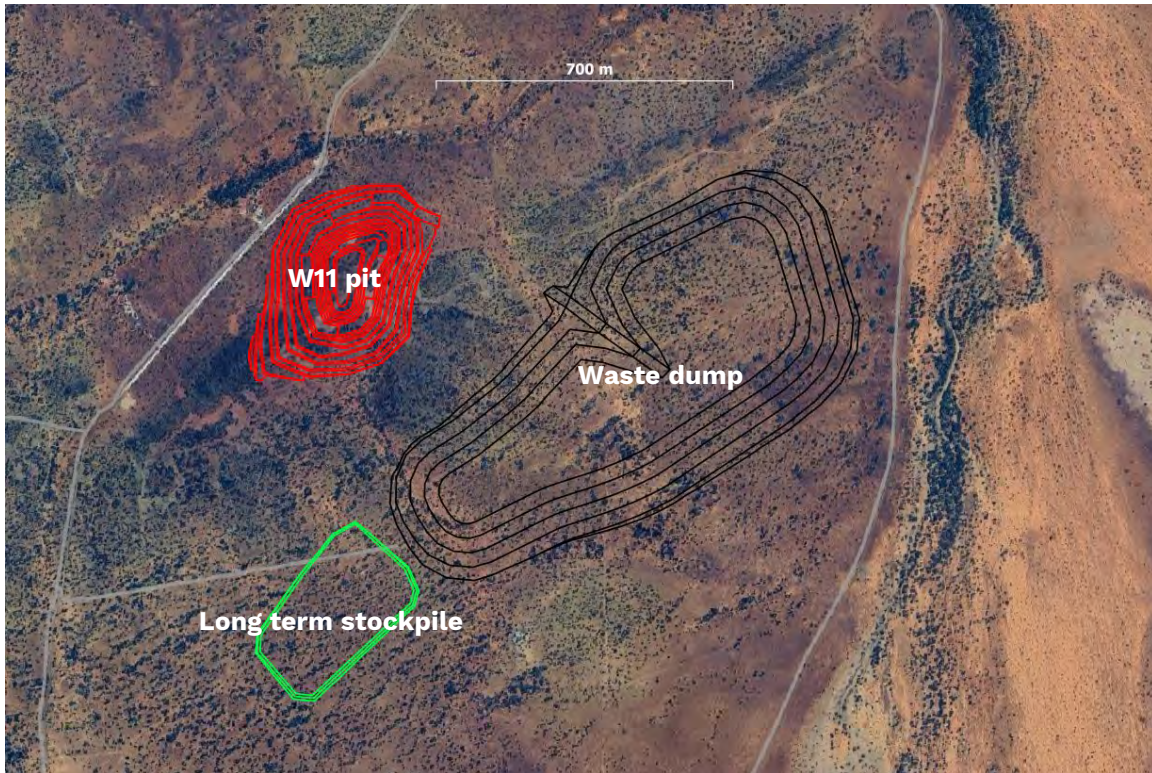
- Hydrogeology – main body of the report
- Hydrology –Appendix A (Hydrology)





**Figure 1 W11 location**





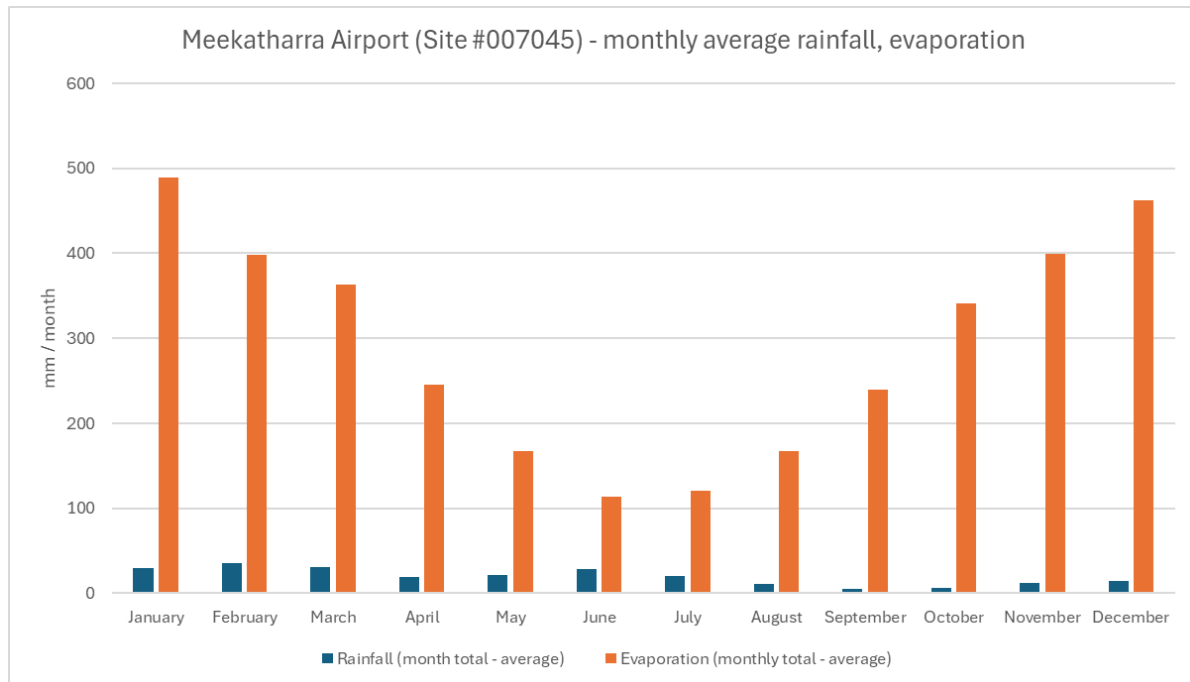
**Figure 2 W11 general layout**



## 2. Climate / rainfall

### 2.1. Climate

The region is semi-arid, characterised by low rainfall and high evaporation. Rainfall tends to be irregular and is greatly exceeded by evaporation. Winters are cool to mild; summers are hot and temperatures regularly exceed 40 °C. Monthly average rainfall and evaporation data from the Bureau of Meteorology's weather station at Meekatharra Airport (site number 007045) is presented in Figure 3.



**Figure 3 Meekatharra Airport summary rainfall and evaporation data (BOM station 007045)**

### 2.2. Local hydrology

W11 is situated to the east of an unnamed tributary of Jungar Creek, which drains towards the south-southeast. W11 lies at the crest close to the eastern end of the Weld Range, which rise locally to an elevation of 551 mAH approximately 50 m above the surrounding gently sloping terrain of a broad alluvial valley.





Figure 4 W11 site hydrology



### 3. Geology

W11 is situated on the northern extent of the Yilgarn Craton within the Meekatharra – Mount Magnet greenstone belt. Basement rock underlays extensive laterite which has in places been eroded along current and historical drainage lines. In such areas, the basal rock has been overlain by colluvial and alluvial deposits of sand and clay of up to 20 m thick (Water and Rivers Commission, 2001).

W11 is one of several identified lenses of iron ore mineralisation identified in the Weld Range (Figure 5). The Weld Range comprises a series of steeply dipping jaspilite interlayered with dolerite (Jones, 1962). On a regional scale, the Weld Range is an east-northeasterly striking greenstone belt, which forms part of the Archaean supra-crustal sequences of the Murchison Domain in the Yilgarn Craton which are intruded by granitic plutons and separated by extensive areas of massive to gneissic granite. Local geology is summarised in Table 1.

The Weld Range is segmented by a well-developed fault system, which is described by Jones (1962) as having ‘strongly affected the iron ore bodies’. Essentially, the BIF is offset, by up to 100 m, along its strike, leading to BIF abutting the surrounding dolerite in places.

Two main deposit areas have been named: Madoonga to the west and Beebyn to the east (Figure 7).

The Beebyn Deposit contains several steeply south-easterly dipping banded iron formations (BIFs) interlayered with dolerite.

**Table 1 Geology - W11 and surrounds (Based on GWSA, 1983)**

Unit	Geology code	Description
<b>Alluvium</b>	Qa	Alluvium, unconsolidated sand, silt and gravel in drainage lines and adjacent floodplains.
<b>Eolian sand</b>	Czs	Eolian sand overlying laterite (Czl)
<b>Jaspilite, Banded iron formation</b>	Aij	Jaspilite, banded iron formation; red, black and white banded
<b>Banded Iron Formation</b>	Aiw	Banded iron formation, black and white banded
<b>Dolerite</b>	Add	Dolerite, medium grained, intruded between beds of Banded Iron Formation.
<b>Granite</b>	Agb	Biotite granite
<b>Granodiorite</b>	Agl	Biotite adamellite and granodiorite

The mineralised zones are offset by up to 100 m by sub-vertical north-west striking faults.



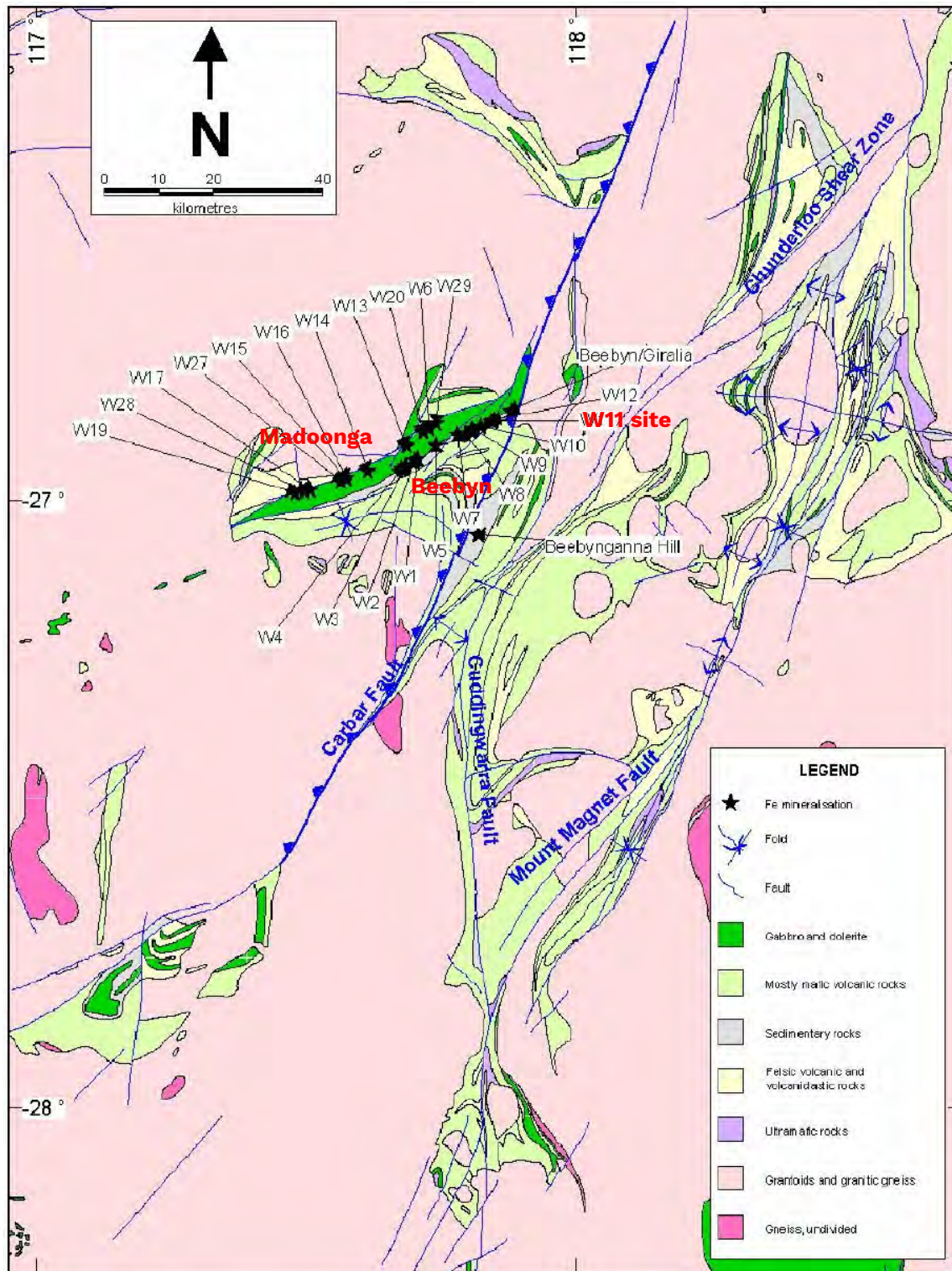


Figure 5 Regional geology of the Weld Range iron ore mineralisation (based on SRK, 2010)







Figure 6 Faulting bisecting the BIF at W11 and along strike (from Jones, 1962)

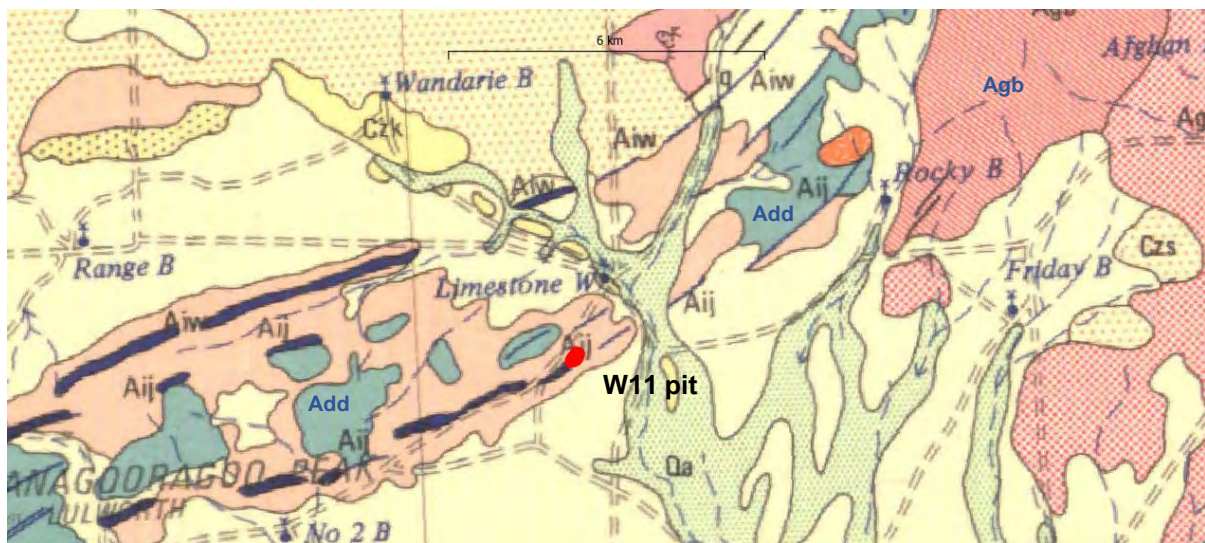


Figure 7 Geology of W11 and surrounds (based on GSWA, 1983) – for stratigraphy codes refer Table 1.



## 4. Hydrogeology

### 4.1. Aquifers

#### 4.1.1. Overview

The Weld Range is stated within the East Murchison Groundwater Management unit. Groundwater typically is found at depths of between 5 to 50 mbgl beneath the alluvial plain surrounding the Weld Range. Groundwater is also encountered in bedrock material that forms the Weld Range. Close to W11 groundwater occurs at ~490 mRL (B\_WB\_02, April 2024)

Recharge to the system is anticipated to be limited, occurring from rainfall infiltration mainly along ephemeral creeks.

#### 4.1.2. W11

At W11 mineralised Banded Iron Formation forms the most prospective aquifer and is surrounded by low permeability dolerite and saprock. Furthermore, northwesterly faults offset the BIF such that along strike it may form partially to completely isolated compartments.

Historically there has been limited drilling within the faulted compartment in which W11 sits as shown on Figure X. B\_WB2\_01 has been subject to a 72-hour constant rate test, during which time it was able to sustain a yield of 0.99 L/s. B\_WB2\_03 was unable to sustain a significant yield and was installed as a monitoring bore. Noting the potentially compartmentalised nature of the orebodies it is considered that connectivity between orebodies may be limited.

Packer test data indicates generally low permeability units are encountered in the area, again suggesting that regional connectivity may be limited and that long term yields are likely to be low in bores installed into basement rock.

### 4.2. Groundwater recharge

Recharge to the system is anticipated to be limited, occurring from rainfall infiltration mainly along ephemeral creeks and direct recharge to outcrop.

### 4.3. Groundwater throughflow

In the W11 area, groundwater throughflow is anticipated to be limited and preferentially occur along strike of the mineralised BIF. Northwesterly striking faults have offset the BIF locally, displacing it against low permeability dolerite – it is anticipated that this would reduce connectivity between the faulted units, limiting throughflow.

### 4.4. Groundwater users

Locally, groundwater is targeted by shallow wells or water supply bores for domestic and / or stock watering purposes. Existing bores are typically drilled along existing creek lines, and are anticipated to be targeting the shallow alluvial aquifer. The closest bore is Limestone Bore, approximately 1.6 km to the north-northeast of W11.

SRK undertook a bore audit during 2008, the nearby results for which are summarised in Figure 8. The regional groundwater gradient is from northwest to southeast, broadly consistent with contemporary hydrology. Groundwater elevation close to W11 has been measured at approximately 490 mAHD, consistent with regional groundwater.





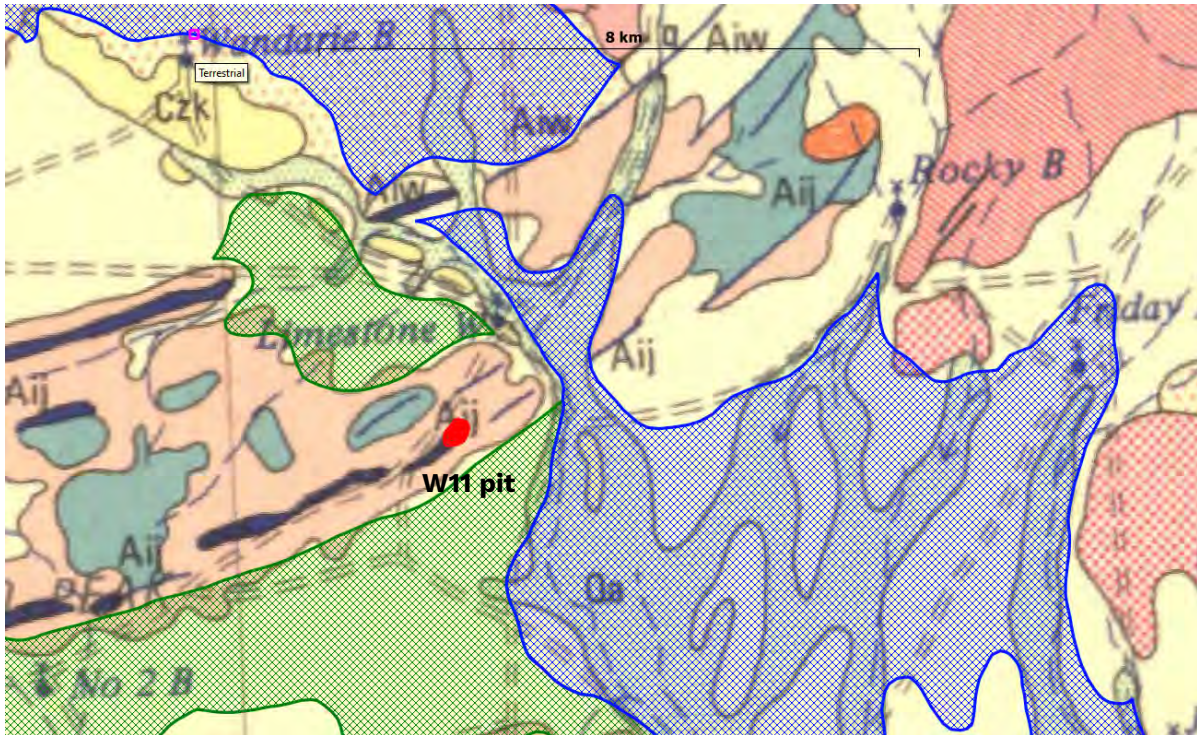
**Figure 8 Bores close to W11 - including results of a bore audit in 2008 (data from SRK, 2008)**

#### 4.5. Groundwater dependent ecosystems

Potential groundwater dependent ecosystems have been identified and mapped on a national scale by the Bureau of Meteorology (Doody, et. al, 2017). BOM's GDE database indicates that potential terrestrial GDEs have been identified on the alluvial flood plains and surrounding hard pans of the low-lying terrain near W11 (Figure 9).

- Low potential GDE (blue in Figure 9) –
  - identified along the alluvial flood plain /creek line associated with minor ephemeral creeks in the area; described as: flat hardpan wash plains;
  - supporting groved mulga shrublands and occasssional wanderrie grasses.
  - Approximately 1.3 km east of W11
- Medium potential GDE (green on Figure 9)
  - identified on the laterite / hardpan surfacre away from creeklines;
  - described as: gently undulating gravelley plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supporting groved mulga and bowg
  - Approximately 350 m south of W11; and ~1 km north of W11.





**Figure 9 Potential groundwater dependent ecosystems near W11 (based on BOM, 2024)**

## 4.6. Previous Groundwater Investigations

### 4.6.1. Overview

There have been limited groundwater investigations in the immediate environs of the W11 Pit. Several studies have considered the broader Breebyn-W11 area. Relevant reports are summarised in Table 2.

**Table 2 Summary of previous studies**

Author	Title	Comment
<b>Worley Parsons, 2008</b>	Weld Range Iron Ore Pre-Feasibility Study – Mine Site Infrastructure Hydrology Study	Hydrology and surface water assessment of the then mine plan.
<b>SRK, 2010</b>	Weld Range Iron Ore Project – Bankable Feasibility Study (BFS) – Hydrogeological Investigation and Modelling	Regional scale model for Beebyn and Madoonga deposits; calibrated to single high yielding bore; indicative dewatering rates of up to ~2.7 GL/a and ~8.6 GL/a  Reports that original (Pre-feasibility study) predictions for dewatering at Beebyn and Madoonga were ~11 GL/a and 20 GL/a  Packer testing indicated hydraulic conductivities of key units as:  Dolerite ~0.001 m/d Orebody ~0.01 m/d Saprock ~0.0004 m/d Saprolite ~0.001 m/d
<b>SRK, 2012</b>	Weld Range model rerun	Update on earlier model; still based on very high volumes
<b>Rockwater, 2019</b>	Iron Ridge Project – Bore Completion and Hydrogeological Assessment	Recent aquifer testing and modelling for the nearby Iron Ridge deposit. Broadly comparable, if slightly larger, to the W11 deposit.



Author	Title	Comment
		Estimated dewatering rates of ~10 L/s, for a period of approximately 7 years.

Noting the very high predicted dewatering volumes predicted at the pre-feasibility study and bankable feasibility study stage it is considered that although these values related to a much larger final pit, the values are nonetheless high for the hydrogeological setting and based on available drilling data from both Iron Ridge and W11 areas. The outcomes associated with recent testing and modelling at Iron Ridge are more consistent with what would be expected based on the hydrogeological setting – i.e., narrow BIF aquifers surrounded by low permeability dolerite or saprock.

Site specific investigation of the W11 area is recommended to confirm the current conceptualisation and further inform on dewatering and water management strategies.

#### 4.6.2. Previous hydraulic testing

The results of 92 packer tests from 19 geotechnical bores drilled across the Beebyn and Madoonga areas are plotted in SRK, 2008 and summarised in Table 3.

**Table 3 Packer testing results (based on SRK, 2010)**

	Unit	Permeability (m/d)
<b>Packer testing</b>	Dolerite	0.001
	Orebody	0.01
	Saprock	0.0004
	Saprolite	0.001

#### 4.6.3. Previous groundwater exploration

##### 4.6.3.1. W11

Drilling of hydrogeological exploration bores in the environs of W11 are summarised in Table 4 and Figure 10. During previous studies, 5 production bores have been installed in the Beebyn area together with 6 long term monitoring bores. Available bore details are summarised in Table 4.

No hydrogeological investigation bores have successfully targeted the BIF in the environs of W11, with long term monitoring bores and the closest production bores being installed in low permeability saprock or dolerite.

B\_WB02\_03 was drilled targeting the BIF close to the planned W11 pit but did not encounter BIF until ~140 mbgl. B\_WB02\_03 was installed to ~113 mbgl, within saprolite material and yielded only 0.99 L/s during a pumping test of 72 hours duration.

Water chemistry data from the 2009/10 investigations is summarised in Table 4. The chemistries are broadly similar, and all representative of water within the dolerite surrounding W11. The water is fresh to brackish in nature, consistent with that observed during the regional monitoring undertaken in 2008 (SRK, 2008).

Overall, the available bore data indicates material surrounding W11 to be low permeability in nature.

##### 4.6.3.2. Iron Ridge

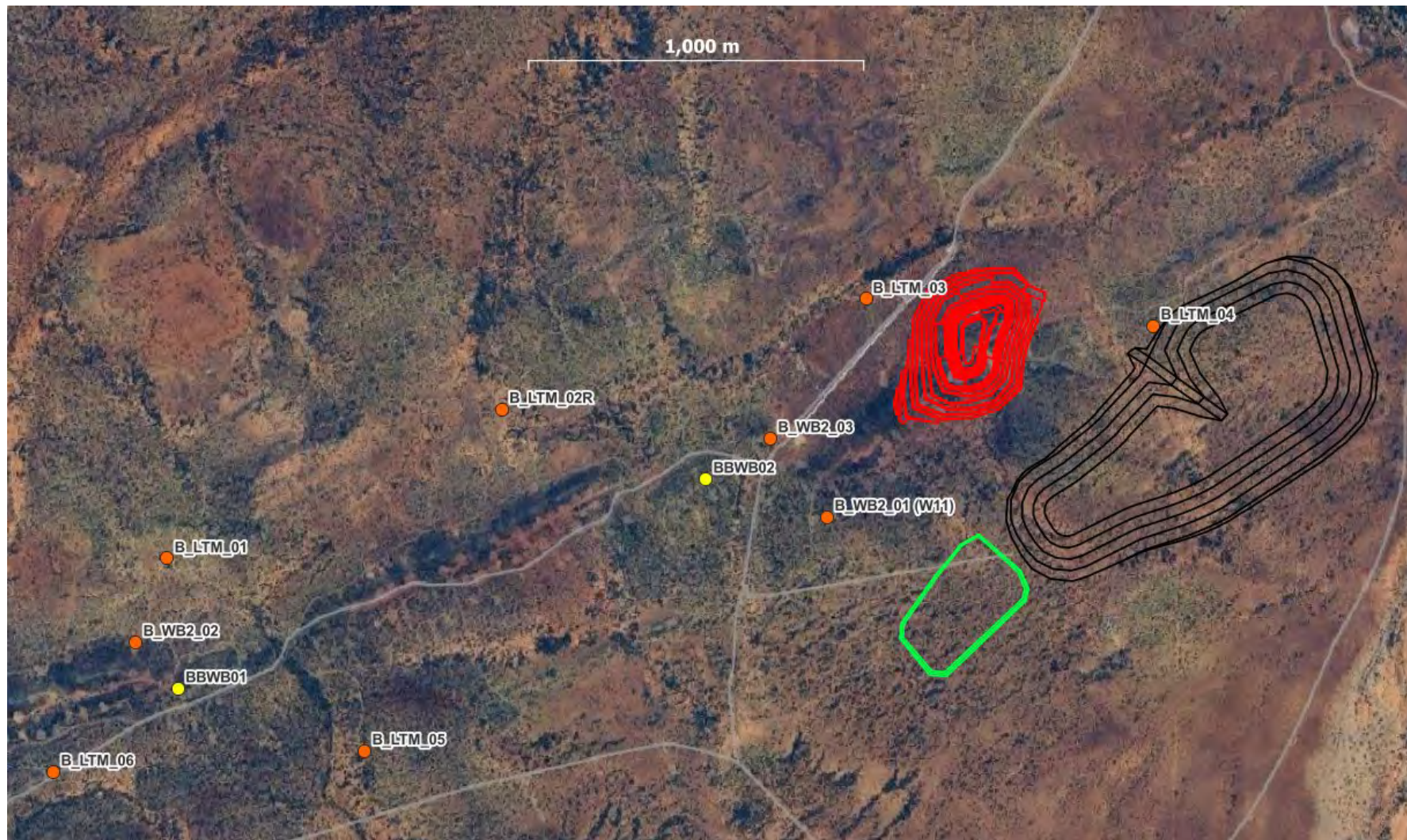
The nearby Iron Ridge deposit (~20 km west south-west, along strike of W11) was investigated in 2019 (Rockwater, 2019) and included two production bores targeting the BIF. Iron Ridge targets a similar orebody (steeply dipping BIFs flanked by dolerite) to that encountered at W11 – therefore is considered a suitable proxy. Key findings from Rockwater, 2019 include:

- IRPB01 (production bore)



- drilled and installed within BIF; airlift development (post construction) yields of ~24 L/s; pumping testing at 33 L/s, results indicated that these rates were not sustainable and water levels would reach aquifer base after 180 days.
- IRPB02 (production bore)
  - Drilled and installed in BIF, air lift development (post construction) yields of ~3 L/s; pumping testing at 9 L/s was achieved.
- The site conceptualisation identifies that the BIF beds are moderately to highly permeable, whilst the surrounding dolerite is low permeability. This is consistent with the setting at W11.
- Dewatering rates of ~10 L/s are predicted over the approximately 7-year life of mine.





**Figure 10 Historical drilling locations near W11 (W11 shown in red; PFS drilling in yellow; BFS drilling (2009) in orange)**



**Table 4 Test production bores near W11 (from SRK, 2008)**

Bore ID	Easting (Z50)	(MGA)	Northing (MGA Z50)	Ground level (mAHD)	Collar height (magl)	Casing	Drilled depth (m)	Slotted interval (mbgl)	Geology encountered	Water level (mbtoc)	(mAHD)	pH	Salinity (mg/L TDS)	Yield (L/s)	Transmissivity (m2/d)
										2024	2024	2009	2009	2009	
<b>Feasibility Study (2008)</b>															
<b>B_WB2_01 (W11)</b>	582645.79		7026807.51	517.79	0.5	50 mm uPVC	148	120-144	0-14 canga; 14 -103 saprolite (clay); 103-150 (dolerite)	29.6	488.69	8.6	1400		
<b>B_WB2_02</b>	580582.96		7026433.98	541.04	0.8	50 mm uPVC	150	108-114; 120-126; 132-138; 144-150	0-1 canga; 1-124 saprolite (clay); 124-150 (dolerite)	49.7	492.14	7.6	950		
<b>B_WB2_03</b>	582476.71		7027041.12	525.36	0.24	200 mm uPVC	150	47-113	0-9 canga; 9-109 saprolite (clay); 109-142 dolerite; 142-150 interbedded orebody and ultramafic	35.0	490.6	7.1	670	0.99 (pumping test)	0.9 (recovery data)
<b>Prefeasibility study bores</b>															
<b>BBWB01</b>	580712		7026294	-	-	-	-	-	Bore log not sighted as part of this report [anticipated to be targeting BIF]	35.2	~490	-	-	12.4	148
<b>BBWB02</b>	582288		7026916	-	-	-	-	-	Bore log not sighted as part of this report [anticipated to be targeting BIF]	49.7	~490	-	-	1.79	3.6

**Table 5 Long term monitoring bores near W11 (from SRK, 2008)**

Bore ID	Easting (Z50)	(MGA)	Northing (MGA Z50)	Ground level (mAHD)	Collar height (magl)	Casing	Drilled depth (m)	Slotted interval	Geology encountered	Water level (mbgl)	(mAHD)	pH	Salinity (mg/L TDS)
										2024	2024	2009	2009
<b>Bores near W11</b>													
<b>B_LTM_02R</b>	581686		7027118	524.3	0.59	50 mm uPVC	84	44.5-80.5	0-4 canga; 4-52 saprolite (sand / silt) 52-84 dolerite	33.2	491.86	8.4	680
<b>B_LTM_03</b>	582768		7027451	514.92	0.6	50 mm uPVC	90	47-83	0-1 canga; 1-21 saprolite 21-90 dolerite	25.9	489.62	7.8	690
<b>B_LTM_04</b>	583631		7027376	508.47	0.46	50 mm uPVC	78	41-71	0-8 unconsolidated sediment 8-37 saprolite (clay) 37-78 dolerite	22.2	486.73	7.6	830
<b>Bores to the southeast</b>													
<b>B_LTM_01</b>	580676		7026679	528.76	0.72	50 mm uPVC	108	71-101	0-28 saprolite (clay) 28-110 dolerite	37.7	491.78	8.9	1000
<b>B_LTM_05</b>	518282		7026100	513.7	0.6	50 mm uPVC	90	48-84	0-2 canga 2-5 dolerite 5-20 saprolite 20-90 dolerite	22.8	491.5		
<b>B_LTM_06</b>	580335		7026038	524.69	0.6	50 mm uPVC	84	47-77	0-20 saprolite 20-73 dolerite 73-84 no return	32.8	492.49		





**Table 6 Water quality samples near W11 (extracted from SRK, 2010)**

Bore ID		B_LTM_03	B_LTM_04	B_WB2_01	B_WB2_02
Date		15/07/2009	16/07/2009	17/07/2009	18/07/2009
pH		7.8	7.6	8.6	7.6
Conductivity @ 25	uS/cm	1200	1400	2300	1600
TDS calculated	mg/L	690	830	1400	950
Hardness (as CaCO <sub>3</sub> )	mg/L	250	330	500	310
Carbonate, CO <sub>3</sub>	mg/L	<1	<1	14	<1
Bicarbonate, HCO <sub>3</sub>	mg/L	290	370	380	370
Chloride, Cl	mg/L	180	220	450	260
Sulphate, SO <sub>4</sub>	mg/L	88	130	190	160
Nitrate, NO <sub>3</sub>	mg/L	55	28	<0.2	14
Sodium, Na	mg/L	170	180	190	230
Potassium, K	mg/L	11	14	180	12
Calcium, Ca	mg/L	37	45	50	39
Magnesium, Mg	mg/L	38	54	92	52
Soluble Iron, Fe	mg/L	<0.02	<0.02	<0.02	<0.02
Fluoride, F	mg/L	0.4	0.3	0.5	0.3
Free Cyanide	mg/L	<0.01	<0.01	<0.01	<0.01
Aluminium, Al	mg/L	<0.02	<0.02	<0.02	<0.02
Arsenic, As	mg/L	0.005	<0.002	0.24	<0.002
Manganese, Mn	mg/L	0.007	0.007	0.074	0.29
Lead, Pb	mg/L	<0.005	<0.005	<0.005	<0.005
Cadmium, Cd	mg/L	<0.001	<0.001	<0.001	<0.001
Copper, Cu	mg/L	<0.005	<0.005	<0.005	<0.005
Antimony, Sb	mg/L	<0.0005	<0.0005	0.05	<0.05
Mercury, Hg	mg/L	<0.05	<0.05		
Silver, Ag	mg/L	<0.005	<0.005	<0.005	<0.005
Boron, B	mg/L	1	0.9	0.7	1.2
Barium, Ba	mg/L	<0.005	<0.005	0.02	<0.01
Beryllium, Be,	mg/L	<0.005	<0.005	<0.005	<0.005
Cobalt, Co	mg/L	<0.01	<0.01	<0.01	<0.01
Chromium, Cr	mg/L	<0.005	<0.005	<0.005	<0.005
Molybdenum, Mo	mg/L	<0.01	<0.01	<0.01	<0.01
Nickel, Ni	mg/L	0.007	0.005	0.06	0.008
Phosphorous, P	mg/L	0.08	0.25	<0.05	<0.05
Selenium, Se	mg/L	0.004	0.004	0.048	0.007
Sulphur, S	mg/L	28	41	64	52
Silicon, Si	mg/L	18	19	30	26
Tin, Sn	mg/L	<0.05	<0.05	<0.05	<0.05
Strontium, Sr	mg/L	0.25	0.32	0.45	0.28
Thallium, Tl	mg/L	<0.02	<0.02	<0.02	<0.02
Titanium, Ti	mg/L	<0.005	<0.005	<0.005	<0.005
Vandium, V	mg/L	<0.02	<0.01	0.03	<0.01
Zinc, Zn	mg/L	0.043	0.03	0.42	0.68



## 5. Pit progression and dewatering

### 5.1. Pit progression

W11 is planned to progress to a depth of approximately 125 mbgl (excavation from ~520 mAHD to ~395 mAHD) over a period of 3 years (between 2025 to 2028), as approximated in Table 7.

**Table 7 W11 bench progression (estimated)**

Pre-mining	Initial ground level		Initial groundwater level		
	~520 mAHD		~490 mAHD		
<b>Mine progression</b>					
Year of operation	Lowest (mAHD)	bench	Approximate radius of pit (m)	Estimated volume of progression	Estimated volume of water (m <sup>3</sup> ) based on Sy of 0.05
1	500		Above water table		
1	490		167	2927310	790736
1	480		150	2180239	633726
1	470		134	1578906	498820
2	460		117	1109326	375607
2	450		87	754897	277473
2	440		75	495161	207273
2	430		62	301376	149333
3	420		49	163372	98282
3	410		33	73935	54130
3	400		30	24792	16107
3	395				

### 5.2. Analytical model setup

A simple analytical model was considered appropriate to provide a high-level assessment of potential dewatering volumes and associated impacts. It is recommended that site specific hydrogeological investigations are undertaken to validate the conceptualisation and associated assumptions.

Water associated with pit dewatering comprises:

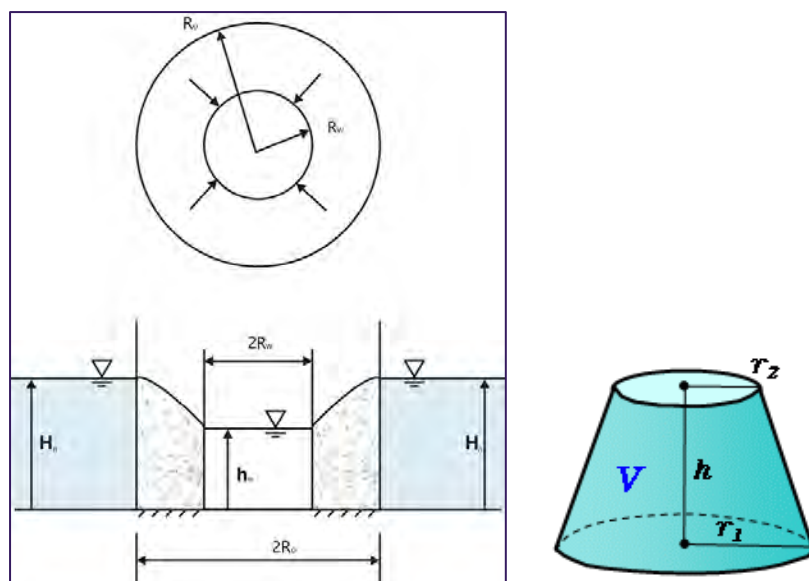
- Radial inflow from surrounding aquifers
- Water stored within the pit footprint

These two sources are considered further below and summarised in Figure 11.

#### 5.2.1. Radial flow into a circular excavation

Based on the Dupuit-Theim equation for unconfined aquifer conditions (below) Fetter, 1988; Powers et. al, 2007) mine inflows to maintain dry mining have been estimated based on a life of mine of 3 years.





**Figure 11 Analytical model geometry (left) and bench volume (right)**

$Q$  = abstraction volume

$K$  = hydraulic conductivity (m/d) (0.03 m/d, based on SRK, 2008 ('Geometric mean of orebody'))

$h_o$  = height of SWL above base of aquifer (assumed to be ~390 mAHD (5m below base of pit))

$h_w$  = height of water level in pit (490 mAHD, based on historical and recent measurement)

$r_w$  = equivalent radius of pit

$r_o$  = maximum extent of cone of drawdown ( $\text{SQRT}(2.25 k \cdot h_o \cdot t / S_y)$ )

$t$  = time since pumping or inflow started

$S_y$  = specific yield, 0.05 (5%)

The radius of influence ( $r_o$ , above) is calculated based on a rearrangement of the Jacob equation (Powers et al. 2007). The most reliable means of defining this is through a pumping test which would help identify potential recharge from other aquifers and recharge boundaries, but in the absence of this it is considered to provide a reasonable initial estimation of the likely radius of influence. The results of this are summarised in Table 6.

### 5.2.2. Volume of water within each bench

To include the volume of water within the pit shell itself a calculation considering the pit as a simple truncated cone was used (see Figure 6). The estimated total volume of water within each bench progression is presented in Table 5 and summarised as an equivalent rate (assuming the whole bench is removed in one year, for simplicity) in Table 6.

$r_1$  = radius of upper surface (upper bench)

$r_2$  = radius of lower surface (lower bench)

$h$  = difference in bench elevation

The volume is calculated based on:

$$1/3 \times \text{Volume} = \frac{1}{3} \pi r^2 \cdot H - \frac{1}{3} \pi r^2 \cdot (H - h)$$



### 5.3. Analytical model results

For simplicity the mine progression is assumed to take place at 10 m increments on an approximately quarterly basis. A summary of results are presented in Table 8, with a more detailed breakdown in Table 9.

A dewatering requirement of ~10 L/s is anticipated across the life of the pit, potentially declining over time as the pit progress into less weathered and / or fractured material.

**Table 8 Approximate annual abstraction rates from W11 pit (L/s)**

	Base case	Sensitivity 1	Sensitivity 2	Within pit material
<b>Year 1 (mainly above WT)</b>	~10+	~10+		0.04
<b>Year 2</b>	~9	~10	~7	0.1
<b>Year 3</b>	5	7	3	0.03
<b>Average</b>	~7	~10	~5	
	~0.2 GL/a	~0.3 GL/a	~0.16 GL/a	~0.2 GL (over life of operation)



**Table 9 Analytical model summary**

Year / quarter	Bench elevation	Step (days)	Elapsed time (days)	Hw-end of step (m)	Equivalent radius of pit (m)	Base case (k = 0.02)		Sensitivity 1 (k = 0.04)		Sensitivity 2 (k = 0.01)		Water from pit void	
						Extent of cone of depression (Ro, end of step) (m)	Inflow end of step (k = 0.02)	Extent of cone of depression (Ro, end of step) (m)	Inflow end of step (k=0.04)	Extent of cone of depression (Ro, end of step) (m)	Inflow end of step (k=0.01)	Water from (L/s)	removed storage
<b>Y1 Q1</b>	510	Above WT											
<b>Y1 Q2</b>	500												
<b>Y1 Q3</b>	490												
<b>Y1 Q4</b>	480	91.25		90	150	91	*	128	*	64	*	5	
<b>Y2 Q1</b>	470	91.25		80	134	128	*	181	17.4**	91	*	4	
<b>Y2 Q2</b>	460	91.25		70	117	157	12.8**	222	11.7**	111	*	3	
<b>Y2 Q3</b>	450	91.25		60	101	181	7.9	256	10	128	9.7	2.4	
<b>Y2 Q4</b>	440	91.25		50	87	203	6.4	287	9.1	143	5.5	1.8	
<b>Y3 Q1</b>	430	91.25		40	75	222	5.7	314	8.6	157	4.2	1.3	
<b>Y3 Q2</b>	420	91.25		30	62	240	4.9	339	7.8	170	3.3	0.9	
<b>Y3 Q3</b>	410	91.25		20	49	256	4.2	362	7.0	181	2.7	0.6	
<b>Y3 Q4</b>	400	91.25		10	33	272	3.4	384	5.9	192	2	0.3	
							5.4		8.1		4.6		

\* calculated extent of cone of depression within pit radius, model not valid

\*\* caution – radius of influence is close to pit radius, likely overestimating inflow volumes



Based on current data, indicating low prevailing permeability of material surrounding the W11 pit, inflows are anticipated to be limited. The extent of drawdown is also expected to be limited, not extending a significant distance from the pit, and focussed on fracture aquifer networks.

Note the calculated radius of influence in Table 8 assumes radial inflow (a simplification of the model assumptions) which is unlikely since the BIF is surrounded by low permeability dolerite – drawdown is expected to propagate along the BIF units. Noting also that the BIF units are faulted and offset against the dolerite, extensive drawdown along the BIF, across separate faulted units is considered unlikely.

Due to the low permeability and reducing pit dimensions with progression to depth as the radius of influence expands the volume of incoming water is anticipated to reduce over time.

During mining the cone of depression is anticipated to extend along strike of the Banded Iron Formation, with limited drawdown occurring outside the orebody due to the low permeability of the surrounding dolerite. It is unlikely that any measurable drawdowns associated with W11 would be observed at nearby receptors. Noting the proximity of potential GDEs to the north, east and south, assessment based on site specific data (e.g., drilling and test pumping to assess local groundwater response to pumping, installation of a monitoring network of bores) is recommended.

#### **5.4. Dewatering bores**

Noting the anticipated limited volumes of water it is considered that dewatering of the W11 pit would be managed using 2 to 3 dewatering bores together with sump pumping as required.

The Banded Iron Formation forms the main aquifer in the W11 area, dewatering bores targeting this unit along strike of the W11 pit (within the same faulted block of BIF) would be expected to manage dewatering, along with in pit sump pumping, as W11 progresses. Recommended bore locations are identified as part of further investigations to assess the hydrogeological setting of W11 (See Section 8.2).

#### **5.5. Existing Groundwater Licence**

GWL165387(5) is an existing groundwater licence that covers the W11 area. The purpose of the licence is for:

- Dust suppression of earthworks and construction purposes
- Exploration drilling operations
- Mining camp purposes

The groundwater licence capacity is planned to be increased to meet anticipated demand / dewatering requirements of up to 500,000 kL/a.



## 6. Water balance

A high-level water balance for the W11 deposit is summarised in Table 10 (based on Pers. Comms., L.Romero (01/05/2024)). Demand is essentially driven by dust suppression and other local operational water requirements.

**Table 10 Annual water balance for operations near W11 pit**

Year	Demand	Dewatering	Comment
<b>Construction</b>	< 1 L/s		Local supply
<b>Y1</b>	~11 L/s	~10+ L/s	Surplus possible
<b>Y2</b>	~11 L/s	~10 L/s	Potentially balanced supply vs. demand
<b>Y3</b>	~11 L/s	~5 L/s	Deficit possible

Based on the analytical modelling completed to date, and consistent with the current conceptualisation and observation from the nearby Iron Ridge deposit, dewatering volumes are anticipated to be low, and decline as mining progresses. Consequently, there may be a need to obtain additional water to meet demand requirements, particularly during Year 3 of operations. Such a demand may be met by installing an additional bore(s) along strike (to the southwest) within the Banded Iron Formation (i.e., the most prospective aquifer, locally) – away from the pit footprint and area of dewatering.

Further investigation is required to quantify the dewatering volumes at W11 with a greater degree of certainty.

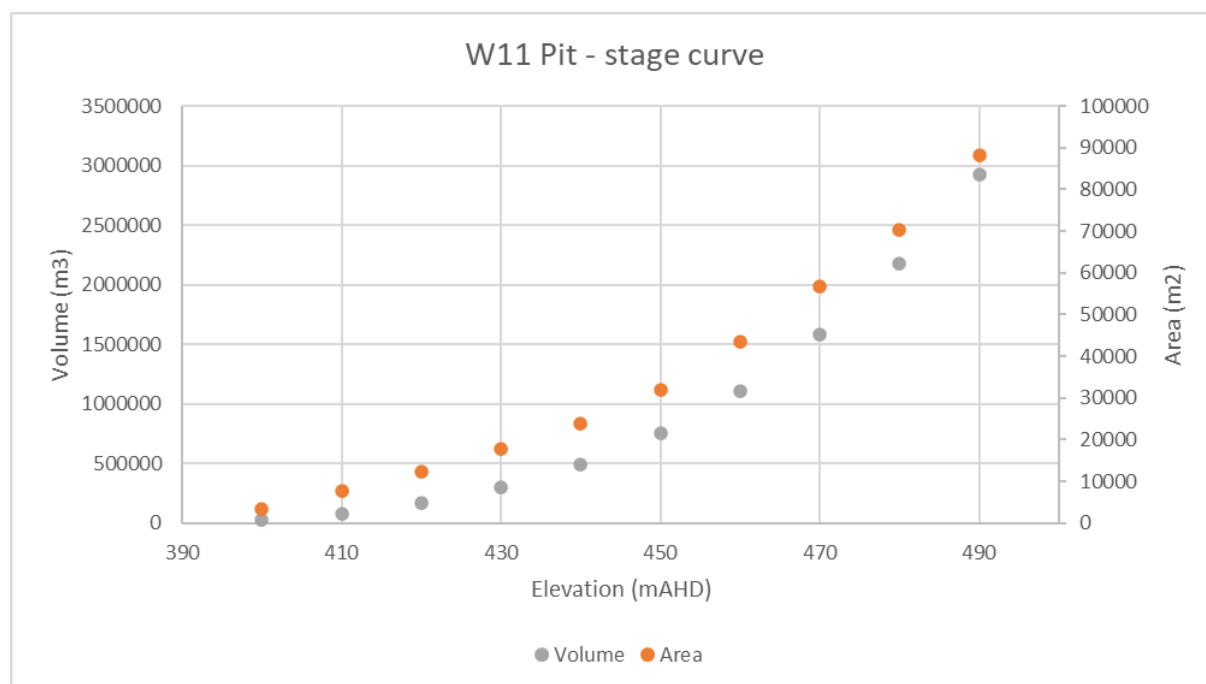


## 7. Pit closure

It is understood that the pit is to remain as a pit void at closure. The pit is surrounded by low permeability units, and in an area of high evaporation and low rainfall – therefore it is considered that the pit would form a terminal pit lake. Noting a key recommendation of this report is to obtain site specific data, a simple scenario is considered with regards the post-closure water balance.

The water balance for the pit was developed using GoldSim, with the pit characterised using the stage curve below (Figure 12).

Annual average rainfall was applied to the pit area, with annual average evapotranspiration applied to the pit lake area – (based on data from the nearby BOM Meekatharra weather station) – Figure 3.



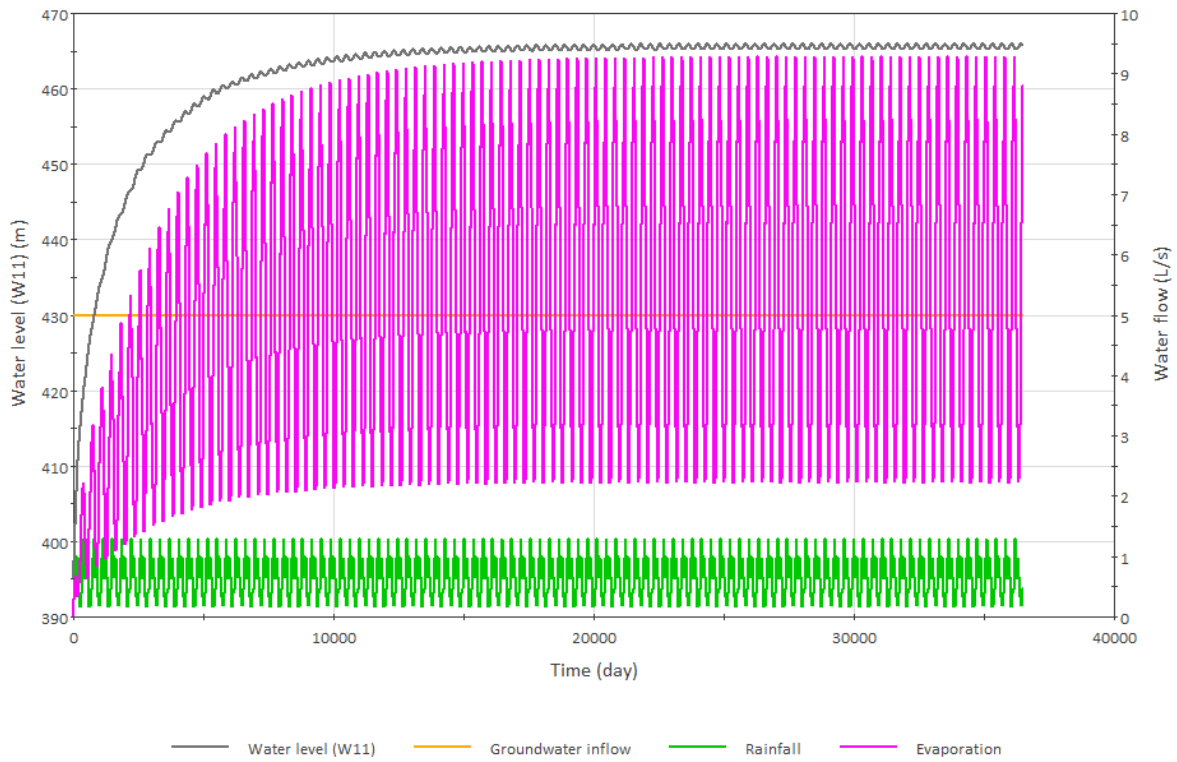
**Figure 12 W11 stage curve**

In the example presented (Figure 13), a nominal inflow of 5 L/s from groundwater is assumed, equivalent to the late time dewatering volumes. At such rates, recovery is incomplete reaching only ~465 mRL compared to pre-mining water levels of ~490 mRL. As water levels recover, evaporation losses increase and eventually the system equilibrates (i.e., inflows = outflows). If inflows are higher, then water levels would be expected to recover further and conversely if inflows are low (i.e., very limited inflow from the surrounding low permeability dolerite – as is likely) then the recovered water level would be lower.

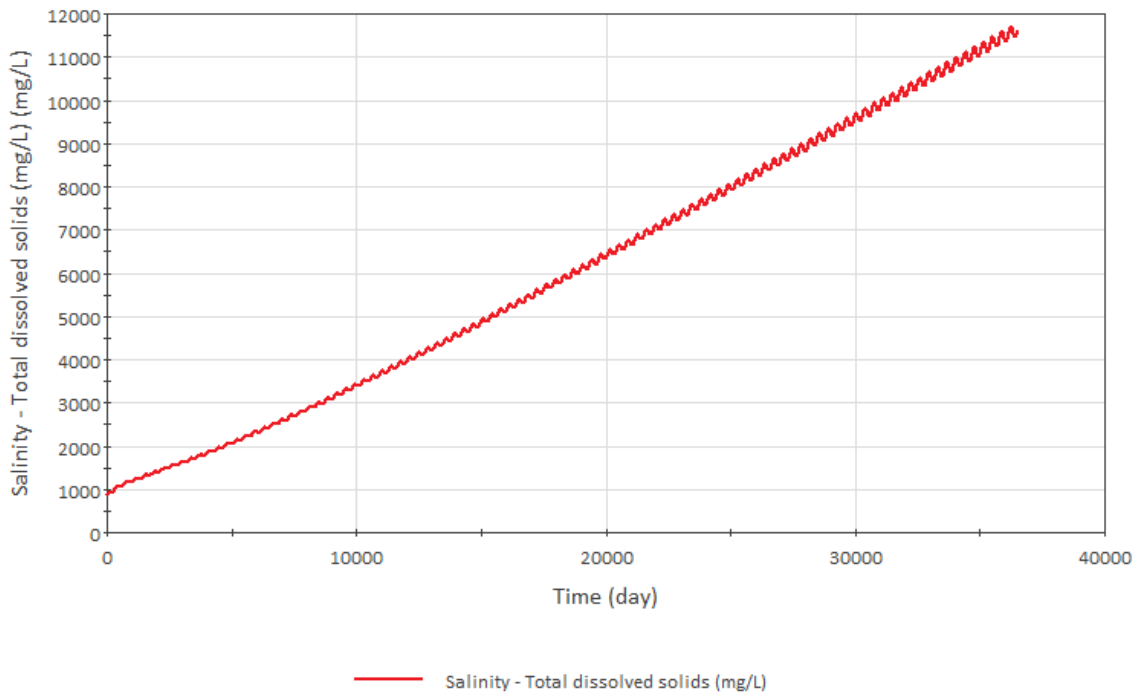
Since the only outflow of water is evaporation, over time the water becomes increasingly saline – as shown in Figure 14. Under the modelled scenario concentrations of approximately 12,000 mg/L TDS are predicted after ~100 years, compared to prevailing concentrations of ~1,000 mg/L (from bores in the nearby surrounds).







**Figure 13 W11 - post closure water level recovery – ~5 L/s (i.e., as per late time dewatering)**



**Figure 14 W11 post-closure salinity – increasing over time**



## 8. Conclusions and recommendations

### 8.1. Groundwater

- W11 pit is planned to progress to a depth of 130 mbgl, approximately 90 m below the prevailing water table in an area flanked by a low permeability aquifer.
- Groundwater levels in the environs of W11 are approximately 490 mRL.
- There are no site-specific hydrogeological testing data relating to the W11 pit – nearby test production bores were very low yielding. The assessment undertaken provides an indication of potential groundwater responses, but further investigation is required to obtain site specific data and test the assumptions made herein.
- Long term dewatering requirements are anticipated to be of the order of 10 L/s.
- Drawdown is anticipated to propagate along strike within the Banded Iron Formation.
- There are GDEs of moderate to low potential to the north (1km), east (1.3 km) and south (0.3 km) of W11.
- At closure, the pit is anticipated to become a saline pit lake, with water becoming increasingly saline over time.

### 8.2. Further investigation recommendations

The collection of site-specific data relating to the W11 pit is recommended with regards:

- Validating dewatering yields.
- Assessing local groundwater response to pumping – e.g., connectivity within the BIF, nature of connectivity with surrounding dolerite.
- Inform post-closure groundwater recovery rates.
- Expansion of the current monitoring network to provide baseline data in the W11 area, in particular in areas between W11 and nearby potential GDEs.

To inform on the above a hydrogeological investigation, incorporating 3 production bores, is recommended, as summarised in Table 11 and Figure 15. The overarching objective of the investigation is to obtain site specific data relating to the groundwater environment at W11. The three production bore locations may, if considered appropriate, be suitable for use for dewatering of the pit.

Test pumping of the production bores is recommended to obtain site specific hydraulic parameters and inform on the conceptualisation, for example connectivity between the BIF (orebody) and the surrounding dolerite. The recommended test pumping program for each production bore comprises:

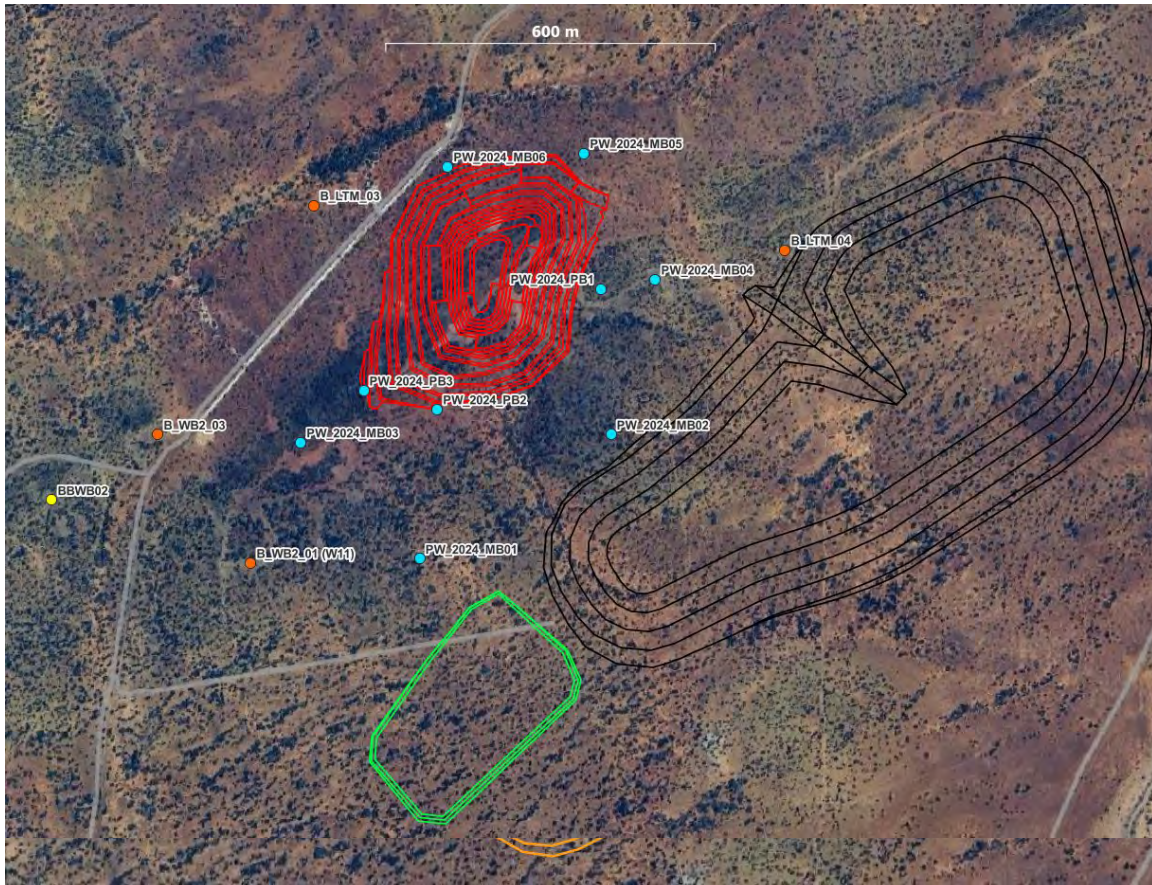
- Step testing
  - 5 x 80-minute steps at different rates to inform on likely bore performance and to select an appropriate rate for the constant rate test (CRT)
- Constant rate test
  - 24-to-72-hour test at a constant rate, monitoring of nearby monitoring bores to inform on connectivity within and between different hydrostratigraphic units at W11.
- Recovery test
  - Monitoring of water levels post-CRT – obtain further information on the hydraulic parameters and aquifer connectivity.



**Table 11 Proposed hydrogeological investigation bore locations and objectives**

Label	Easting	Northing	Target depth (mbgl)	Nominal completion Diameter	Anticipated geology	Objective
<b>Production bores</b>						
<b>PW_2024_PB1</b>	583283	7027306	~130	204 mm ID (8")	Dolerite; BIF (orebody)	Potential dewatering bore; targeting main unit of Banded Iron Formation (BIF)
<b>PW_2024_PB2</b>	582986	7027086	~130	204 mm ID (8")	Dolerite; BIF (orebody)	Potential dewatering bore; targeting faulted and offset main unit of BIF
<b>PW_2024_PB3</b>	582852	7027121	~130	204 mm ID (8")	Dolerite; BIF (orebody)	Potential dewatering bore; targeting minor unit of BIF
Monitoring bores						
<b>PW_2024_MB01</b>	582954	7026815	~130	50 mm uPVC	Dolerite	ex-pit; groundwater connectivity between orebody and dolerite to the south of the pit
<b>PW_2024_MB02</b>	582738	7027027	~130	50 mm uPVC	Dolerite	Monitoring bore -ex-pit; groundwater connectivity between orebody and dolerite to the south of the pit.
<b>PW_2024_MB03</b>	583303	7027041	~130	50 mm uPVC	Dolerite / BIF	Monitoring bore – along strike within the main unit of BIF; monitor propagation of dewatering within the BIF
<b>PW_2024_MB04</b>	583382	7027323	~130	50 mm uPVC	Dolerite / BIF	Monitoring bore; targeting BIF unit (same as ..PB1) – monitor propagation of dewatering within the BIF
<b>PW_2024_MB05</b>	583253	7027553	~130	50 mm uPVC	Dolerite / Fault	Monitoring bore – ex-pit; connectivity across potential fault structure and within dolerite adjacent to the pit.
<b>PW_2024_MB06</b>	583005	7027528	~130	50 mm uPVC	Dolerite	Monitoring – dolerite north of the pit; monitoring of propagation of dewatering to the north





**Figure 15 Recommended W11 hydrogeological investigation bore locations**



## 9. References

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# **Appendix A: W11 Hydrology Assessment**



## Memo

Date: 9 May 2024  
To: Leonardo Romero  
From: Ella Robson  
Pages: 9 + 13 Figures  
Regarding: Fenix – W11 Hydrology Study

## Background

Fenix have secured the exclusive right to mine and export up to 10 million tonnes (Mt) of iron ore from the high-grade Beebyn-W11 Iron Ore Deposit. Beebyn-W11 is ~20km east of the existing Fenix mining operation at Iron Ridge (refer Fig. A). The initial proposal is to mine 4Mt at a rate of 1.5Mtpa over a 3 year period. The life of mine may be extended in the future.

A hydrology study is required to support the mining proposal (MP) and mine closure plan (MCP). Worley Parsons undertook a mine site infrastructure hydrology study (“Weld Range Iron Ore Pre-Feasibility Study: Mine Site Infrastructure Hydrology Study”) in 2008; however as the layout has now changed, an updated review of the hydrology is required.

## Scope

The scope is as follows:

- Review of previous report
- Characterisation and description of existing drainage conditions
- Delineation of catchments that impinge on mine infrastructure and access / haul roads
- Calculation of flood flow estimates for a range of AEPs (annual exceedance probabilities), including the PMP (probable maximum flood)
- 2D flood modelling of the predevelopment, post development (operational) and closure mine site using the latest drone survey
- Recommendations of surface water management strategies (bunds, diversions, culverts etc.)

## Climate and Topography

### General

Rainwater falling in the area drains quickly off the Weld Range ridges through narrow channels which widen substantially as the water drains onto the flatter areas. In the flatter areas, the flow of water can become ambiguous with streams dividing, in some cases the divisions flow in quite different directions. The beds of the main channels of the water courses comprise coarse sand, rocks and cobbles; with silty sand banks which are easily eroded.

The project lies on the southern end of one major catchment (Beebyn Creek). The ephemeral watercourse draining this catchment flows south through Beebyn Gap. The Beebyn-W11 site sits near the top of a ridgeline within the Beebyn Creek catchment, with elevations ranging from ~RL495m to RL550m.

The area has a semi-arid climate with hot summers and mild to cool winters. The closest Bureau of Meteorology (BoM) gauging station is in Cue (site number 007017), about 59km south of site. The average annual rainfall at Cue is 231mm. Most rainfall typically occurs January – July, with low rainfall in September - November, but highly variable.

Temperatures vary from minimum - maximum averages of 7°- 20°C in winter, and 20°- 38°C in summer. The average annual pan evaporation is ~3,500mm.

Western Australia is already experiencing the impacts of climate change. All of WA has warmed, with an average temperature rise of 1.3°C since 1910. Rainfall has increased over most of WA, other than the far west and southwest where it has declined (at a rate faster than anywhere else in Australia). Projections are that WA will continue to get hotter, drier, extreme rain events will become more intense, and the number of tropical cyclones in north-west WA will continue to decrease.

However, the projected life of mine is sufficiently short that these mooted changes will have no significant impact on the project.

## Rainfall Intensity-Frequency-Depth

The Bureau of Meteorology (BoM) website provides probabilistic or statistically based Intensity Frequency Duration (IFD) rainfall characteristics. IFD rainfall depths represent design rainfalls for events of frequent and infrequent occurrence, for various annual exceedance probabilities (AEP). IFD data for the site and selected durations is shown in Table 1 (BOM, 2016). Design temporal rainfall distributions are available in the Australian Rainfall and Runoff (ARR) data hub, and describe how rainfall falls over time.

Table 1: Intensity-Frequency-Duration (IFD) Rainfalls (mm)

Duration (hrs)	Annual Exceedance Probabilities (AEP)								
	63%	50%	20%	10%	5%	2%	1%	0.01%	PMP
1	13	16	25	32	40	51	61	122	305
4.5	22	26	41	52	65	83	99	198	495
12	31	37	58	74	91	114	134	268	670
24	38	46	73	92	113	140	162	324	810
36	42	51	81	103	126	156	179	358	895
72	48	59	94	119	144	177	202	404	1,010

It can be noted that 63% AEP is equivalent to 1 year ARI (average recurrence interval, the (average period between exceedances); 50% AEP = 1.44 year ARI; 39% AEP = 2 year ARI, 18% AEP = 5 year ARI and so on up to 1% AEP = 100 year ARI.

### Probable Maximum Precipitation

In addition, closure of mines requires consideration of rare storms that could occur at an undefined time after closure. The upper limit for extreme rainfalls can reasonably be represented by the 10,000 year rainfalls, or up to the Probable Maximum Precipitation (PMP). The PMP is theoretically the greatest depth of precipitation meteorologically possible for a given duration over a defined size storm area, at that specific location – as a reasonable indication of the upper limit on rainfall that could be anticipated.

Based on statistical extrapolation, the 10,000 year rainfalls are ~2x 1% AEP rainfalls. By rule of thumb, the PMP is typically ~2-2.5x 10,000 year rainfalls i.e. ~5x 1% AEP rainfalls.

PMP estimates were also made using BOM deterministic methods, GTSMR (Generalised Tropical Storm Method, relevant for durations of 24 hours or more), and the GSDM (Generalised Short Duration Method, based on convective thunderstorms of 6 hours duration or less). The same PMP estimates are used over large areas of Australia, in more southern and inland locations, can tend to provide relatively larger rainfall intensities than statistical extrapolation suggests.

The adopted PMPs have been nominally taken as 5x 1% AEP rainfalls.



## Hydrology

### General

XP-RAFTS was used to estimate design flows from catchments external to the mine site. RAFTS is a nonlinear rainfall - runoff program, with the relevant catchments subdivided into sub-catchments with routing links between with appropriate input data (terrain slopes, roughness, rainfall data and rainfall losses). Rainfall losses were calculated using the SCS method based on sandy clay loam soils, with brush vegetation at <50% ground cover. The program then simulates design rainfall with time over a catchment, removing losses to calculate rainfall excess or runoff, and then routes this runoff through the links, to generate flood runoff hydrographs at specified nodes across the watershed.

### Beebyn Creek

Beebyn Creek flows south east, before turning south and along the east side of the proposed mine site. Catchment delineation was undertaken (refer Fig. B) and a catchment area of 225km<sup>2</sup> estimated. A 1% AEP peak flow of 312m<sup>3</sup>/s was calculated (critical duration 36hr). The 5% and 2% AEP flows are 150m<sup>3</sup>/s and 235m<sup>3</sup>/s.

Hydraulic modelling was carried out using the hydraulic model, HECRAS. The model simulates hydraulic flow behaviour within a 2D grid domain based on topography (i.e. based on a digital terrain model). Flow hydrographs for external peak flows were exported out of RAFTS and applied as input to the edges of the model; coupled with direct rainfall or RoG (rain-on-grid) modelling over the local area of the survey (refer Fig. B). A RoG model is a distributed model where the runoff processes are simulated by applying rainfall to each cell in the 2D grid or mesh, and the 2D hydraulic solver is used to route the water down the catchment.

The modelling shows that Beebyn Creek floods to about 1m deep, and the 1% AEP flood extents do not impact mine infrastructure (encroach to within ~170m). Refer Fig. C & Fig. D.

### Mine Area – Local Flooding

The mining area generally lies near the top of a ridge and on the edge of catchment boundaries (refer Figure B). As a result, catchments impacting site infrastructure are relatively small.

RoG modelling (1% AEP 4.5hr duration) was carried out over the mining area using HECRAS, for pre-development (existing conditions) and post development (proposed infrastructure in place, blocking off flow paths). The resulting flooding is shown in Fig. E, F, G and H.

Most of the mine site flooding is shallow sheet flow <50mm (not shown on the figures) with some natural shallow waterways across the site. One flow path runs west to east towards Beebyn Creek and flows up to 1m deep.

The modelling shows minor flow paths that impact the processing area and waste dump. The pit is outside of any major flooding. Surface water flows from the north pond ~0.9m deep against the Processing Area, before flowing around to the south west. Surface water also ponds with a max depth ~1.5m at a trapped low point on the northern side of the waste dump.

## Surface Water Management

### General and Sediment Control

Objectives for water quality are outlined in “Water Quality Protection Guidelines”, Department of Water and Environment, 2000. This is a series of 11 guidelines for water quality management in mining and mineral processing (those relating to water, water quality monitoring, stormwater, mechanical servicing and workshop facilities, laboratory waste, and fuelling chemical storage are relevant to this project). Various other guidelines and standards may be applicable, including for example DWER Guidelines and ANZECC Guidelines for Fresh and Marine Water Quality.

Heavy rainfall over disturbed land (due to mining and construction activities) brings the risk of erosion, particularly from waste dumps and stockpiles. Surface water management requires consideration of each drainage path to prevent sediment and other contaminants from washing into natural flow paths. Stormwater run-off from disturbed mining infrastructure can

be captured behind demarcation bunds, collected in evaporation ponds, or captured in sedimentation basins.

## Mine Area

### Pit

Based on modelling, there are no major surface water impacts on the pit, a standard pit bund will be sufficient to prevent minor surface water flows from entering the pit.

### Waste Dump

The waste dump outline blocks a natural flow path to the south (refer Fig. G), trapping runoff from a ~12ha catchment at a low point RL503m, between higher terrain and the waste dump haul road (which will form a barrier to flow). In the 1% AEP rainfall event, ponding is to ~1.5m deep (refer Fig. G). Some of the catchment could be diverted higher up, to direct some flow eastward, and reduce the impacting catchment area and subsequent ponding against the waste dump by 50%. In a short Life of Mine, this ponding is considered acceptable, noting a lower chance of a 1% AEP rainfall, and less ponding. The ponded water will dissipate by evaporation and infiltration.

Waste dumps need to be shaped to drain internally, with crest bunds to retain water on the top and reduce run-off and erosion down the batter faces. Where run-off from the dump sides can escape into the environment, then a capture bund should be installed at the toe of the dump to retain (sediment laden) dirty water runoff.

### Processing Area

The road joining the Processing Area to the mining area runs downhill to the west. Natural flow paths up to 0.2m deep (1% AEP) across the road alignment. The lowest point in the road is adjacent to the Processing Area, where drainage would be directed across the road.

The area occupies about 50ha and lies across the general fall of the site cutting off natural drainage. Minor flow paths run through the area and in a 1% AEP rainfall event, there is a buildup of water (refer Fig. G). The Processing Area needs to be raised or bunded off, and minor diversion drains installed to direct water west around or through the area.

## Closure

### General

Mining is a temporary land use and rehabilitation need to be consistent with projected future land use (such as pastoralism and heritage conservation). The objective is to ensure an effective planning process is in place over the life of mine, so closure is achieved in an environmentally sustainable manner, and without unacceptable liability to the State (refer “Mine Closure Plan Guidance”, Department of Mines, Industry Regulation and Safety, 2020).

DMIRS MCP guidance includes desirable mine closure principles, such as no adverse impact on surface and groundwater hydrological patterns, water quality, water levels and water chemistry; and no long-term reduction in base flows and availability of water to meet local environmental values.

It is not proposed to backfill the pit as part of the closure plan. The pit and waste dump landforms will therefore remain after mine closure, while the rest of the site will be decommissioned. This includes removal of infrastructure, and rehabilitation of disturbed areas (including tanks, wastes, contaminated soil, compacted surfaces such as old roadways, site compounds, etc). The area is graded to direct surface water off site, into natural drainage paths, and leaving no water trapped upstream of final landforms.

Post closure surface water modelling results are shown in Figures I, J, K & L.

### Waste Dump

Waste dumps can consist of unconsolidated, dispersive, and erodible materials, which when combined with steep and / or long slopes, result in a potential for erosion and sediment run-off. The main rehabilitation consideration is the projected land use and long-term stability of landforms - with visual amenity, erodibility, stability and dust management as the key drivers,

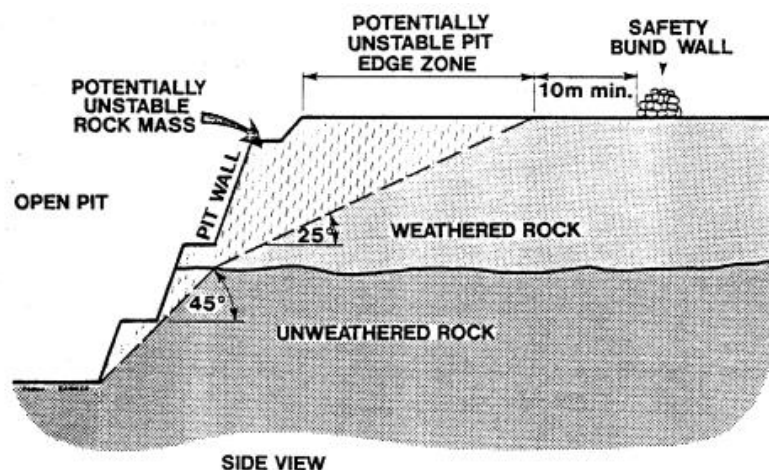
while biophysical appearance and vegetation (endemic plant communities that approximate the natural surrounds) a secondary driver.

Outer exposed surfaces should be provided with a rocky substate to prevent erosion on slopes (gullying, loss of surface material and vegetation). The waste dump surfaces may be designed to hold water on the top, to prevent it running down the sides, or include cross slope berm cell bunds to retain water on the dump sides.

However, externally surface water run-off is trapped against the northern side of the dump, up to 4.5m deep in a PMP event, and results in a loss of run-off volume downstream. It is largely impractical to construct an open excavated drain around the ends of the dump, to the east or west. Other options at closure include filling the impacting catchment area with waste, shaped to a finished free draining surface; or changing the final alignment of the northern edge to better follow natural surface contours, and allowing free surface drainage toward the west. At closure, the waste dump will be configured to prevent ponding against the toe.

### Pit Abandonment Bund

As the pit will remain open at closure (i.e. will not be backfilled), the method generally preferred to minimise inadvertent public access involves the construction of an abandonment bund wall around the perimeter of the open pit void, 10m outside the area designated as being susceptible to wall collapse (refer “Safety Bund Walls Around Abandoned Open Pit Mines”, DMIRS, Doc No: ZMA048HA, Dec. 1997). DMIRS (Figure 4) below defines pit wall stability, relating to walls excavated in unweathered or weathered rock, or both.



The bund is required to have minimum dimensions of 2m high, 5m base width. As the pit is located towards the top of a ridge line, there is no requirement for the abandonment bund to also act as a flood bund against external flooding. The bunds are subject to raindrop erosion and fresh competent rock, for example, is preferred, as this determines the long-term integrity of the structure (expected to remain functional for hundreds of years). Materials are best produced before excavation equipment is removed from the site, and final blasting provides a source of suitable unweathered material. Where oxide or weathered material only is available, a larger cross-sectional area of bund is required.

## Road Train Haul Road

### General

Ore is currently trucked with quad road trains 490 km from the Iron Ridge mine site to the Beringarra – Cue Road and then to Geraldton Port, via Cue and Mt Magnet. The new Beebyn-W11 mine site is 20 km east of the existing Iron Ridge mining operation, and a new bitumen (2-coat) sealed haul road is to be constructed to connect to the existing road. A number of flow paths cross the proposed road route.

## Design Flows

The catchments impacting the proposed road route are shown in Fig. M. The catchment boundaries and streamlines have been approximated with digital terrain modelling using SRTM (Shuttle Radar Topography Mission) data. Design flows for each estimated catchment are shown in Appendix.

## Road Drainage

Road drainage provisions typically comprise pavement cross fall, table drains, floodways, culverts, and rock protection. The type of structure at waterway crossings is generally determined by the level of immunity from flooding that is required, and the time of closure acceptable due to over-road flooding. Floodways are level stretches of road at flood crossings, and are particularly suitable in flat or gently undulating terrain, where drainage patterns are less well defined. Due to the short life of mine, and relatively small catchments, floodways are considered suitable. Culverts may be included, particularly if required to maintain road geometry across the waterway. In sheet flow areas, upstream diversions (bunds) may be used to direct flows towards particular floodways in order to minimise the number of crossings.

The permissible trafficable depth of water through which the haul trucks may operate should be established, as a direct determinant of Average Annual Time of Closure / AATOC. The average closure times are typically small (hours) in small catchments, but may persist for longer than average, and become disruptive, in larger creeks. For a mine haul road, an acceptable “out of service time” (days per annum of road outage) can be based on internal risk analysis i.e. size of plant and port stockpiles.

Main Roads WA highways in the north are typically low formation roads, with a low level of flood immunity. The roads may be closed to traffic for some period (days) in most years, when water is deeper than 200mm (conventional vehicles) and 500mm (heavy vehicles). Subject to risk analysis, the haul road may similarly have a low level of flood design immunity.

It is noted that a single break in a long road will result in a failure of the whole system, and the true flood risk is higher than might otherwise be expected (common practice is to assess each individual waterway crossing in isolation and adopt that flood immunity as the flood immunity for the entire road).

## Summary

Fenix propose a new mining operation at Beebyn-W11 deposit, ~20km east of the existing Iron Ridge mining operation.

The 1% AEP 24 hour rainfall in the area is estimated as 162mm, the 24 hour PMP is about 800mm. XP-RAFTS was used to estimated design flows.

Beebyn Creek has a catchment area of 225km<sup>2</sup> and flows past the site, but does not impact mine infrastructure. The mine generally lies near the top of a ridge and catchments and surface water flows impacting site infrastructure are relatively small.

Minor flow paths run through the site and the proposed pit, waste dump and processing area boundaries, and infrastructure in this area needs to be bunded off and stormwater diverted through or around as required, to prevent ponding. Diversion channels and bunds required are all minor. A standard pit bund will be sufficient to prevent surface water flows from entering the pit. Ponding against the northern side of the waste dump may occur, depending on the development and configuration of the waste dump, and in the operational phase, will be permitted to evaporate and infiltrate in situ.

A Road Train Haul Road is to be constructed to connect to the existing haul road. A number of flow paths cross the proposed road route, the impacting catchments are based on SRTM data, and design flows have been estimated for each catchment. Fenix is currently in the process of undertaking a lidar survey to a high level of accuracy for purposes of road and waterway design. Due to the short life of mine, and relatively small catchments, floodways (with culverts if required) are considered suitable. The length of floodways may be determined by the selected design flood event and permissible water depth.

Adherence to surface water protection principles and implementation of environmental control measures is required to mitigate risk of erosion and sedimentation from construction and mining activities.

Mining is a temporary land use and after closure of the mine, the area requires rehabilitation consistent with future land uses, and not adversely impact surface and groundwater hydrological patterns and water quality. Waste dumps and sloping surfaces in particular need to be stabilised against erosion as a potential source of sediment.

Extreme rainfall in Beebyn Creek and over the mine site will cause shallow flooding around remnant mine infrastructure (pit abandonment bund and waste dump). The final abandonment bund and waste dump should be configured such that surface run-off is not trapped behind these landforms, but that the site retains free draining characteristics.

Kind Regards

A handwritten signature in black ink, appearing to read 'Ella Robson', written in a cursive style.

Ella Robson

Senior Water Resource Engineer

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## Appendix: Road Train Haul Road Surface Water

- A new access Road Train Haul Road will connect to the Iron Ridge haul road to Geraldton
- Catchments (refer Fig. M) impacting the road route is based on SRTM topographical data
- For catchments ( $A_c$  measured in  $\text{km}^2$ ) less than  $10\text{km}^2$ :
  - 1% AEP flows may be estimated as  $3.5 \times A_c^{0.9}$
  - <1% AEP flows may be estimated as 'K'  $\times A_c^{0.9}$ . See Table 2
  - E.g. 10% AEP flow may be estimated by  $1.11 \times A_c^{0.9}$
- Road route 20km long crosses some significant waterways
- The impacting catchments run-off from the ridgeline to the north, and total  $\sim 40\text{km}^2$
- There are 2 larger catchments  $>10 \text{ km}^2$ , CS04 and CS09.

Table 2: Table of Annual Exceedance Probabilities versus Flood Flow Estimation

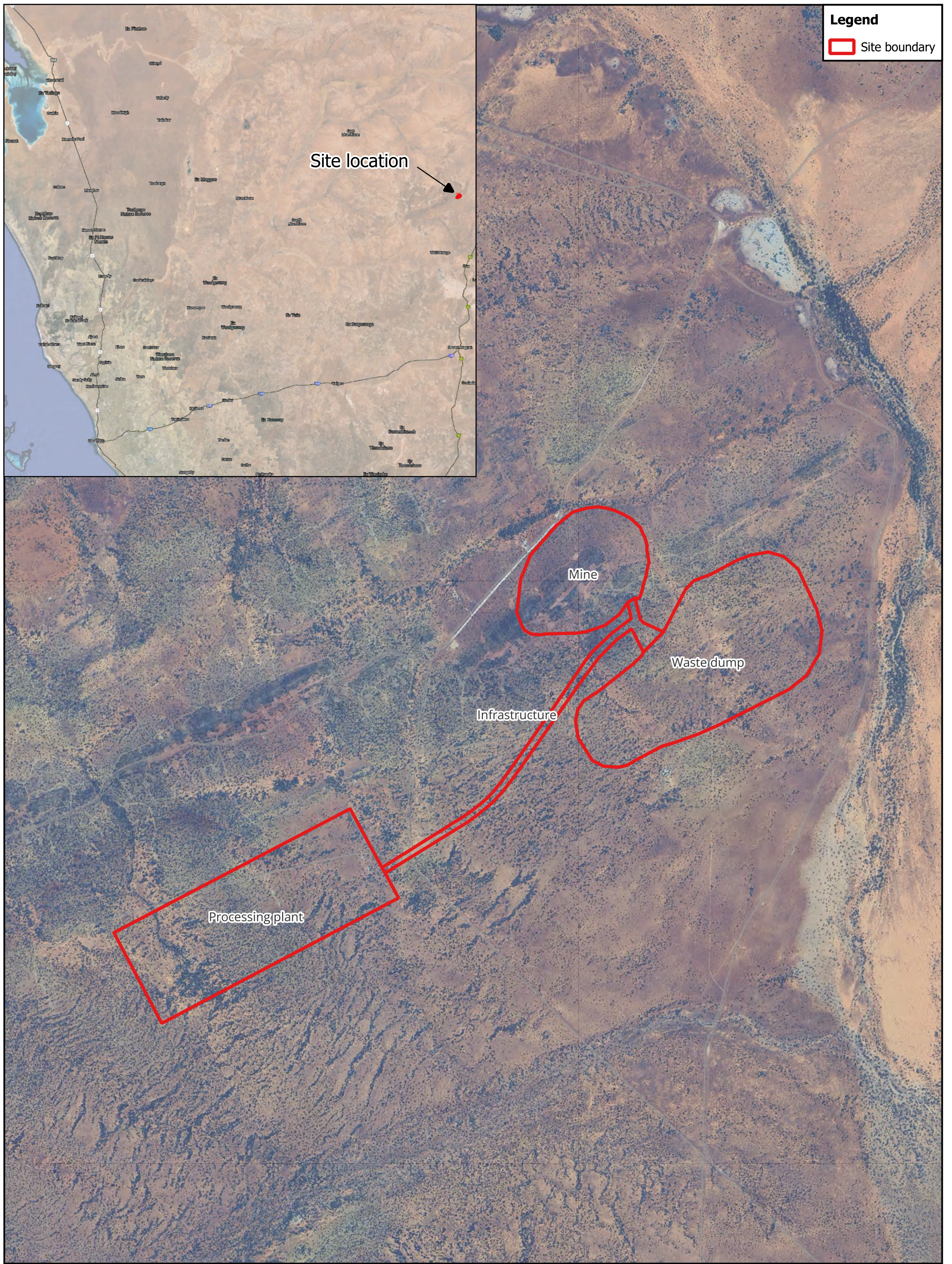
AEP	Fraction of 1% AEP flood flow	K ( $Q = K \times A_c^{0.9}$ )
63.21%	0.03	0.11
50%	0.06	0.19
20%	0.18	0.64
10%	0.32	1.11
5%	0.48	1.69
2%	0.75	2.64
1%	1.00	3.50


Table 3: Peak Flows ( $\text{m}^3/\text{s}$ ) using Nominal Catchments (SRTM) (Fig. M)

Catchment ID	$A_c$ ( $\text{km}^2$ )	Annual Exceedance Probabilities (AEP)						
		63.2%	50%	20%	10%	5%	2%	1%
CS_01	0.46	0.1	0.1	0.3	0.5	0.8	1.3	1.7
CS_02	2.33	0.2	0.4	1.4	2.4	3.6	5.6	7.5
CS_03	0.17	0.0	0.0	0.1	0.2	0.3	0.5	0.7
CS_04	14.29	0.9	1.5	5.2	8.9	14	21	28
CS_05	4.09	0.4	0.7	2.3	3.9	6.0	9.4	12.5
CS_06	2.55	0.2	0.4	1.5	2.6	3.9	6.1	8.1
CS_07	7.26	0.6	1.1	3.8	6.6	10.0	15.7	20.9
CS_08	0.17	0.0	0.0	0.1	0.2	0.3	0.5	0.7
CS_09	21.42	1.2	2.2	7.3	13	19	30	40
CS_10	1.84	0.2	0.3	1.1	1.9	2.9	4.6	6.1
CS_11	0.80	0.1	0.2	0.5	0.9	1.4	2.2	2.9
CS_12	0.54	0.1	0.1	0.4	0.6	1.0	1.5	2.0
CS_13	5.45	0.5	0.9	3.0	5.1	7.8	12.1	16.2
CS_14	4.80	0.4	0.8	2.6	4.5	6.9	10.8	14.4
CS_15	0.30	0.0	0.1	0.2	0.4	0.6	0.9	1.2
CS_16	1.11	0.1	0.2	0.7	1.2	1.9	2.9	3.9
CS_17	1.17	0.1	0.2	0.7	1.3	1.9	3.0	4.0
CS_18	0.80	0.1	0.2	0.5	0.9	1.4	2.1	2.9

## List of Figures

- Figure A: Site Location
- Figure B: Catchments
- Figure C: Beebyn Creek Pre-Development Maximum Depth – 1% AEP 36 hr
- Figure D: Beebyn Creek Pre-Development Maximum Velocity – 1% AEP 36 hr
- Figure E: Mine Site Pre-Development Maximum Depth – 1% AEP 4.5 hr
- Figure F: Mine Site Pre-Development Maximum Velocity – 1% AEP 4.5 hr
- Figure G: Mine Site Post-Development Maximum Depth – 1% AEP 4.5 hr
- Figure H: Mine Site Post-Development Maximum Velocity – 1% AEP 4.5 hr
- Figure I: Beebyn Creek Closure Maximum Depth – PMF 36 hr
- Figure J: Beebyn Creek Closure Maximum Velocity – PMF 36 hr
- Figure K: Mine Site Closure Maximum Depth – PMF 4.5 hr
- Figure L: Mine Site Closure Maximum Velocity – PMF 4.5 hr
- Figure M: Road Train Haul Road



**Legend**  
 Site boundary

Site location

Mine

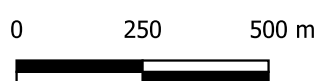
Waste dump

Infrastructure

Processing plant



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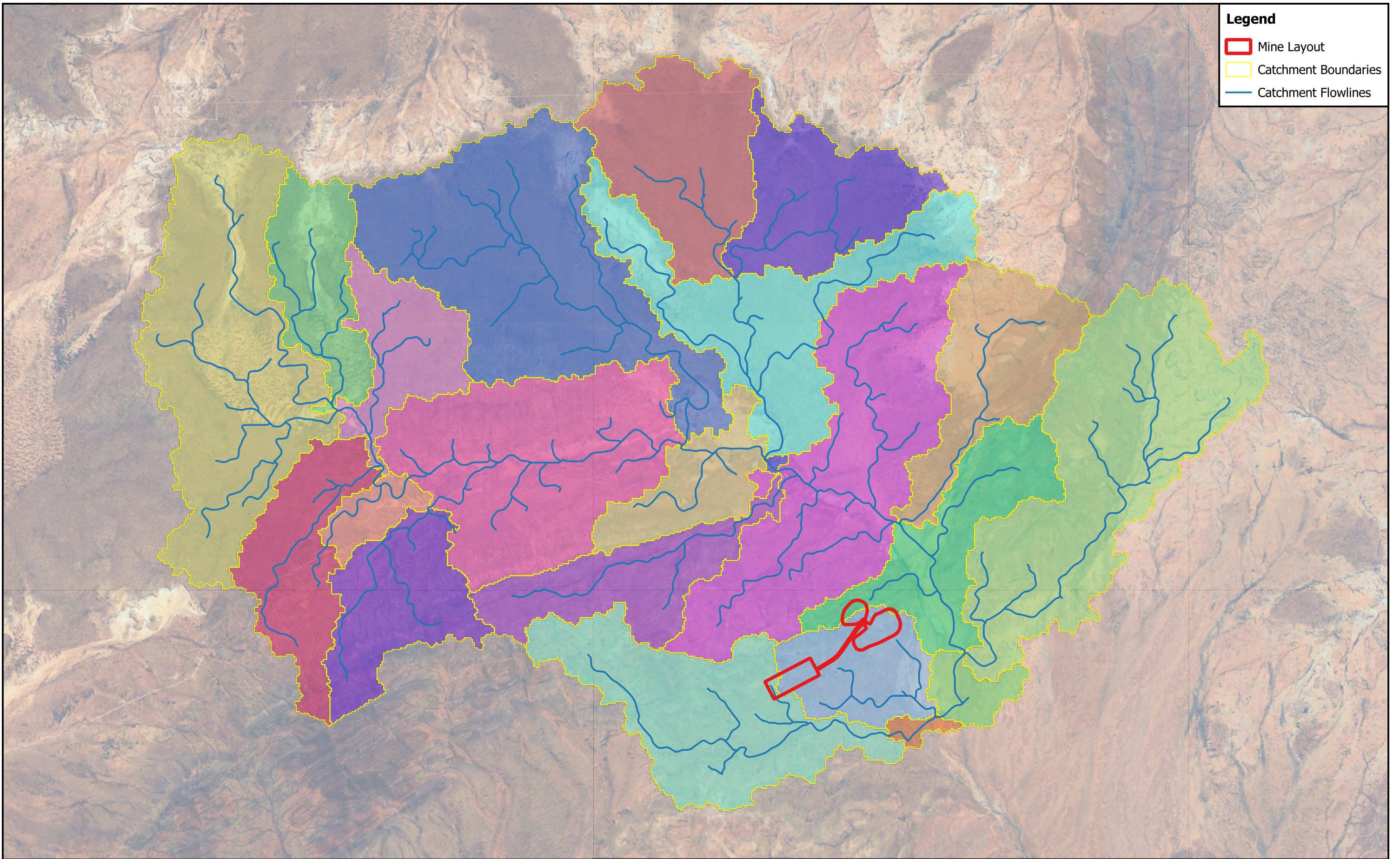


GDA94 / MGA zone 50

**Figure A**

Beebyn W11 Mine - Site location





**Legend**

- Mine Layout
- Catchment Boundaries
- Catchment Flowlines

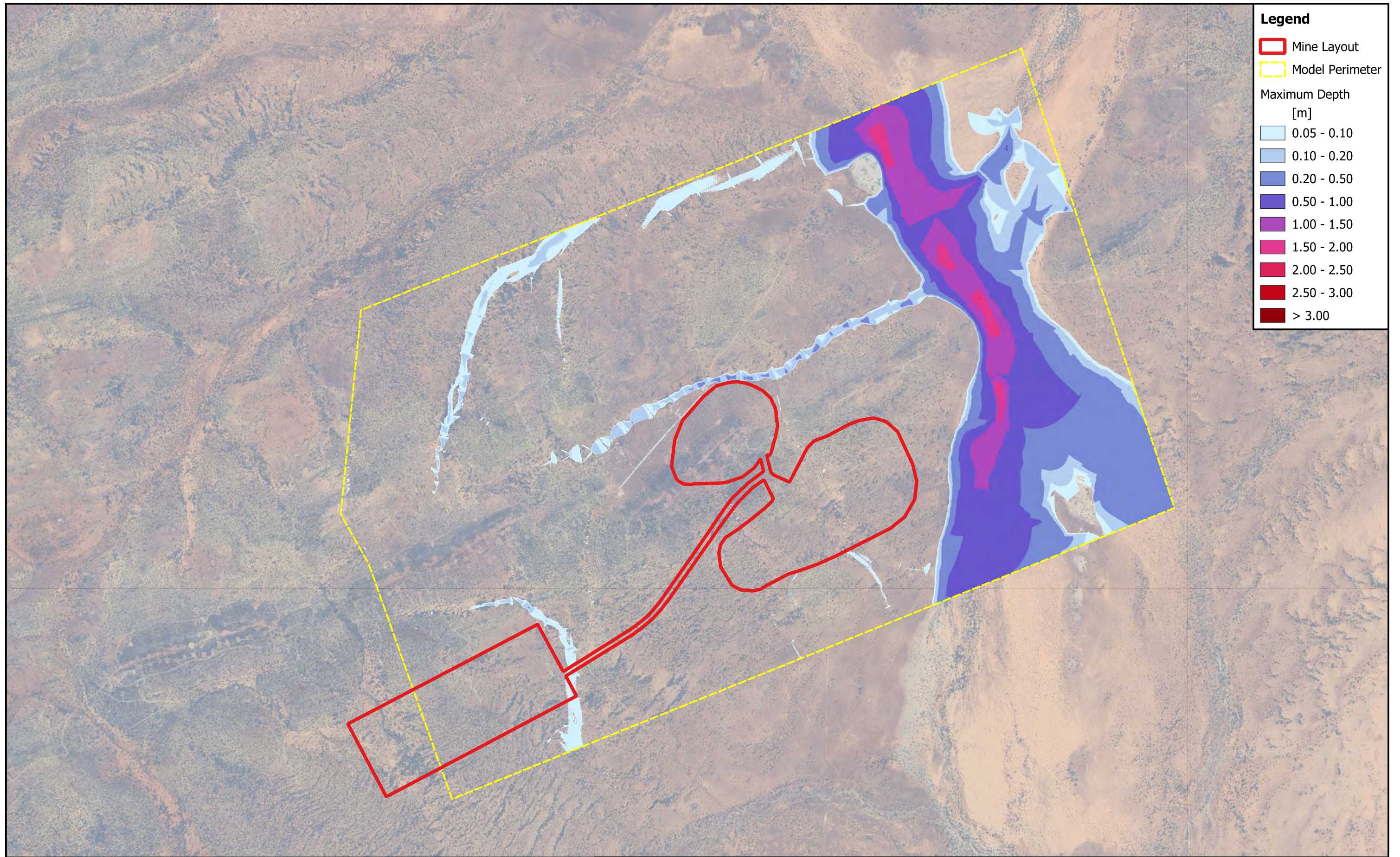


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0                      2.5                      5 km

GDA94 / MGA zone 50

**Figure B**  
 Beebyn W11 Mine - Catchments



**Legend**

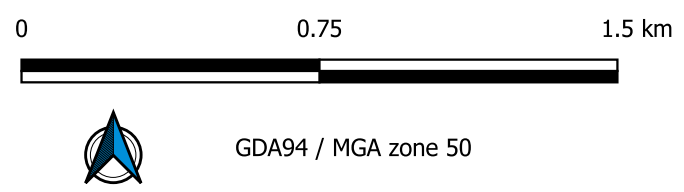
- Mine Layout
- Model Perimeter

Maximum Depth  
[m]

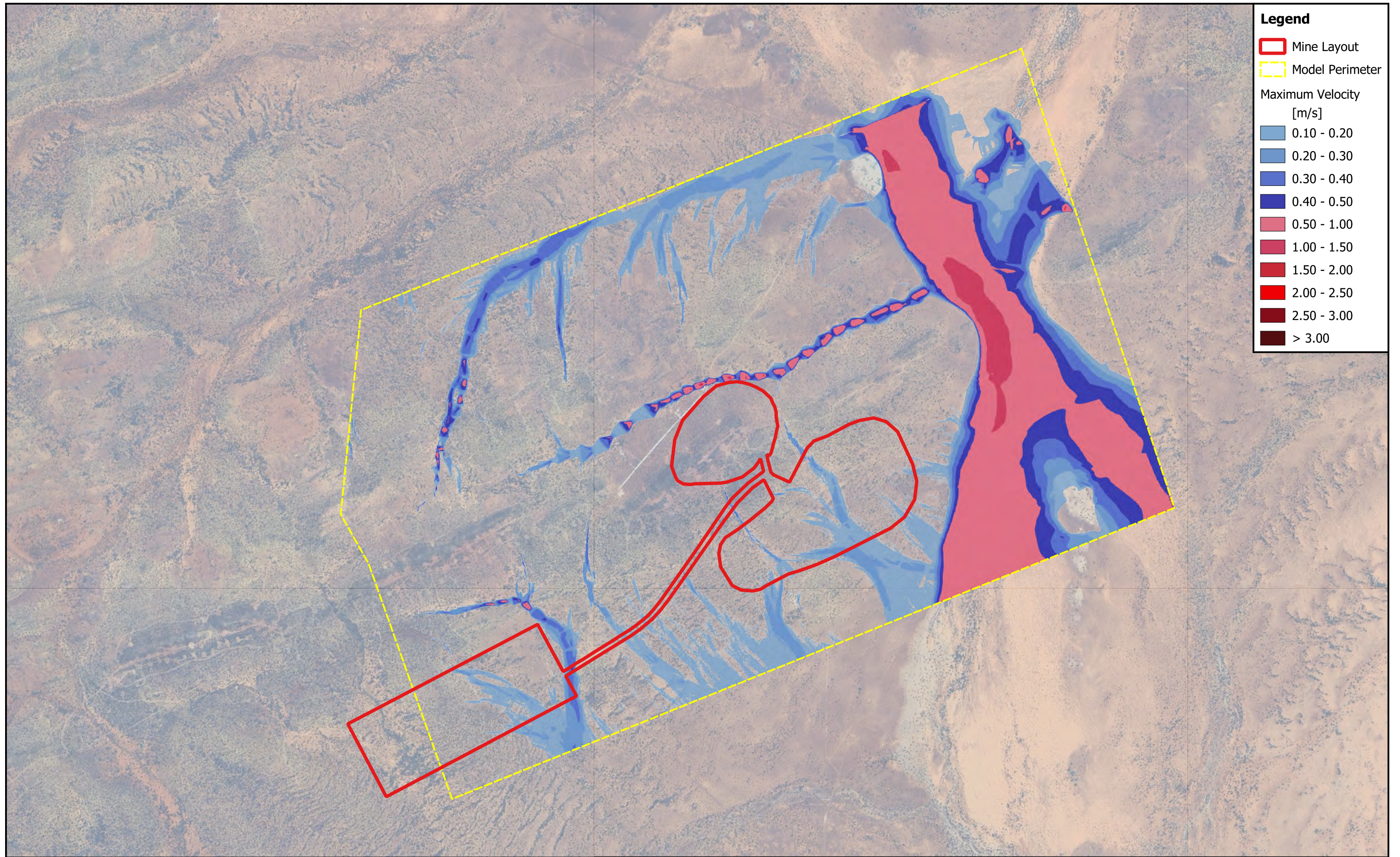
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- > 3.00



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**Figure C**  
 Beebyn W11 Mine - Beebyn Creek Pre-development  
 Maximum Depth - 1% AEP - 36 hr



**Legend**

- Mine Layout
- Model Perimeter

Maximum Velocity  
[m/s]

- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- > 3.00

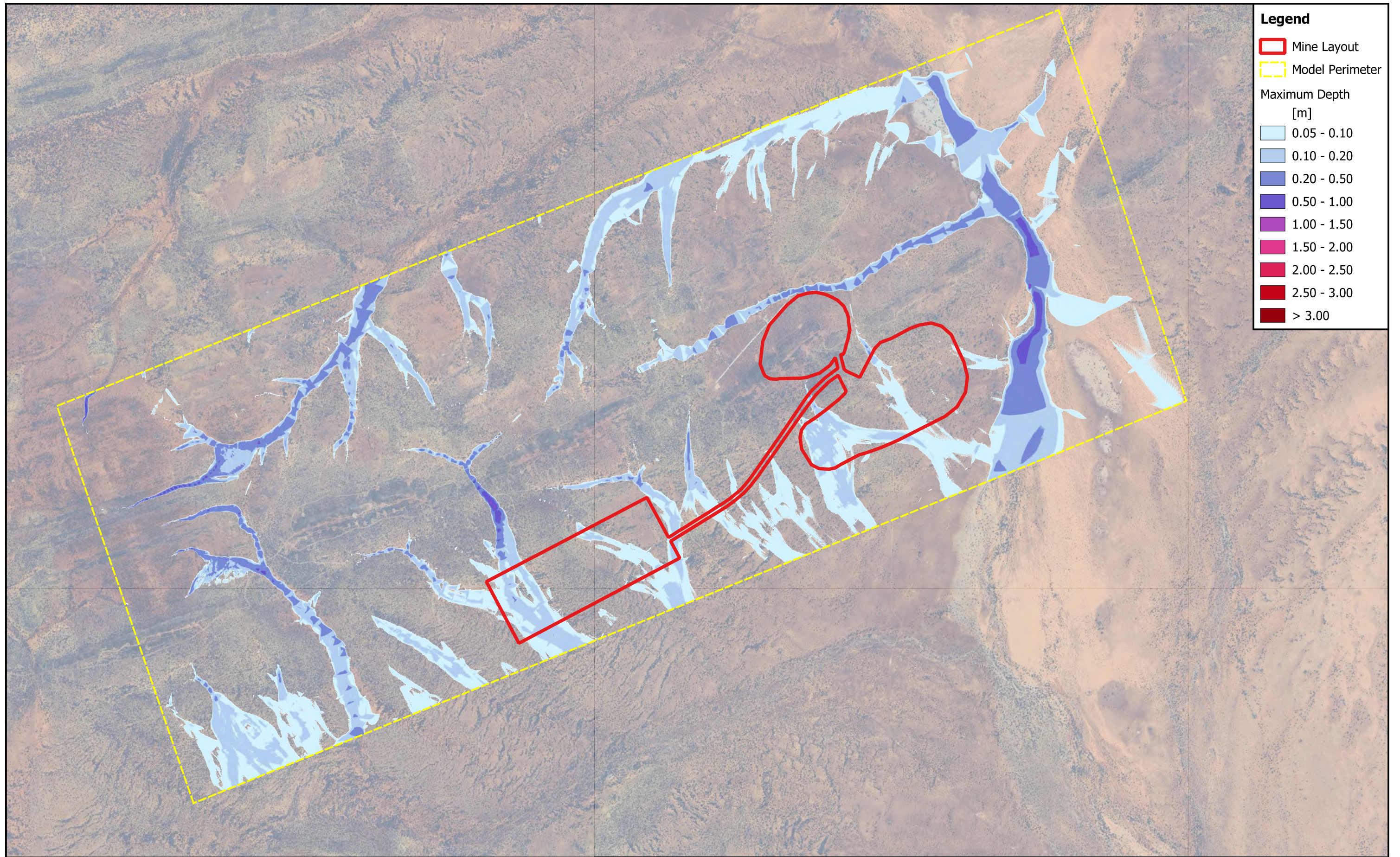


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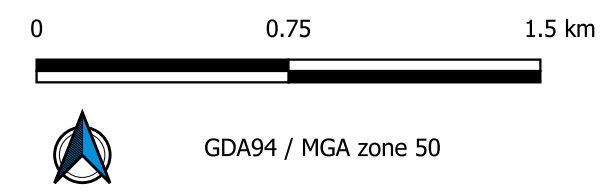
0                      0.75                      1.5 km

GDA94 / MGA zone 50

**Figure D**  
 Beebyn W11 Mine - Beebyn Creek Pre-development  
 Maximum Velocity - 1% AEP - 36 hr

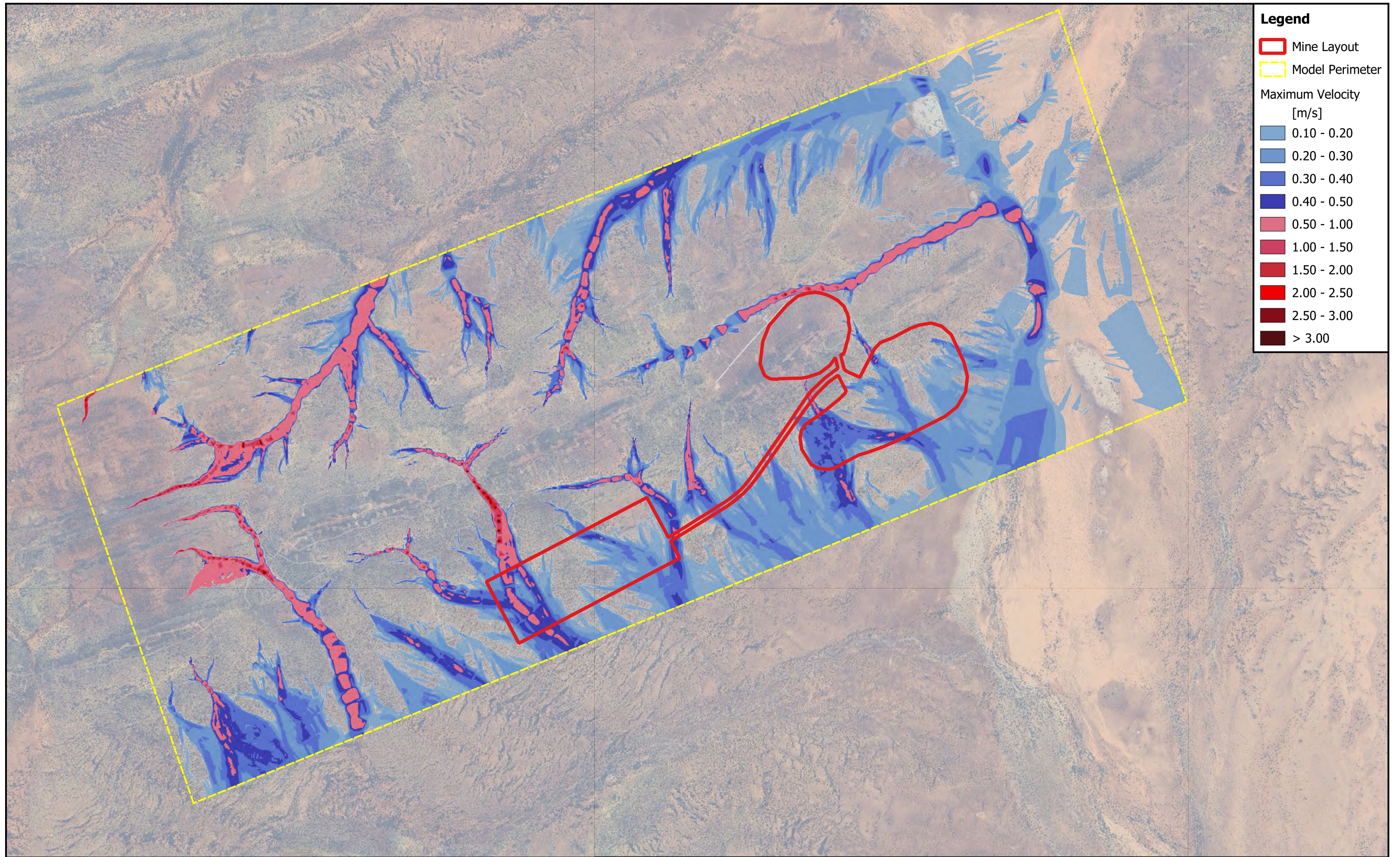


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 landgate



**Figure E**

Beebyn W11 Mine - Mine Site Pre-Development  
 Maximum Depth - 1% AEP - 4.5 hr



**Legend**

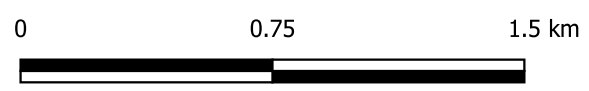
- Mine Layout
- Model Perimeter

Maximum Velocity  
[m/s]

- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- > 3.00



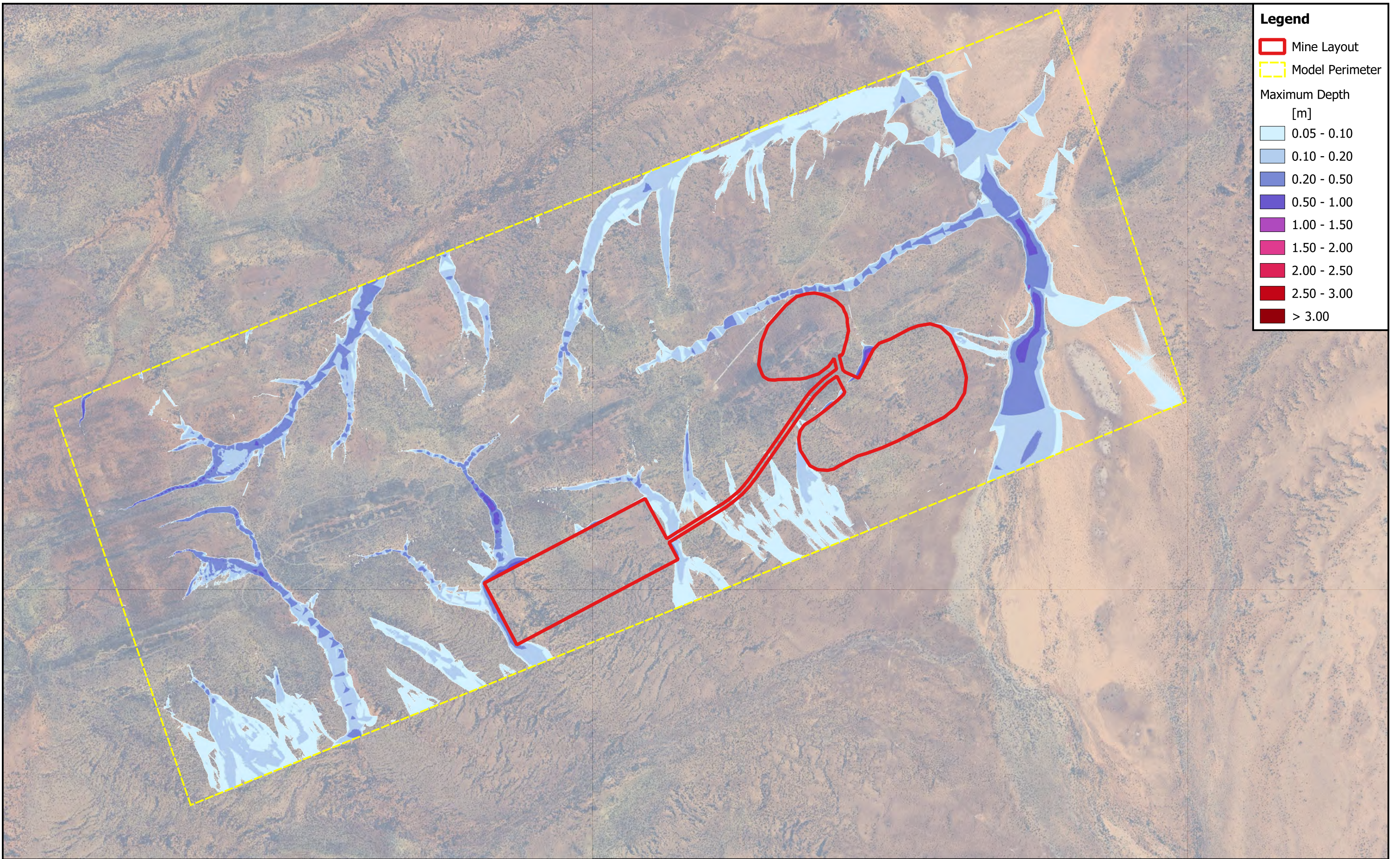
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 landgate



GDA94 / MGA zone 50

**Figure F**

Beebyn W11 Mine - Mine Site Pre-Development  
 Maximum Velocity - 1% AEP - 4.5 hr






**Legend**

- Mine Layout
- Model Perimeter

Maximum Depth  
[m]

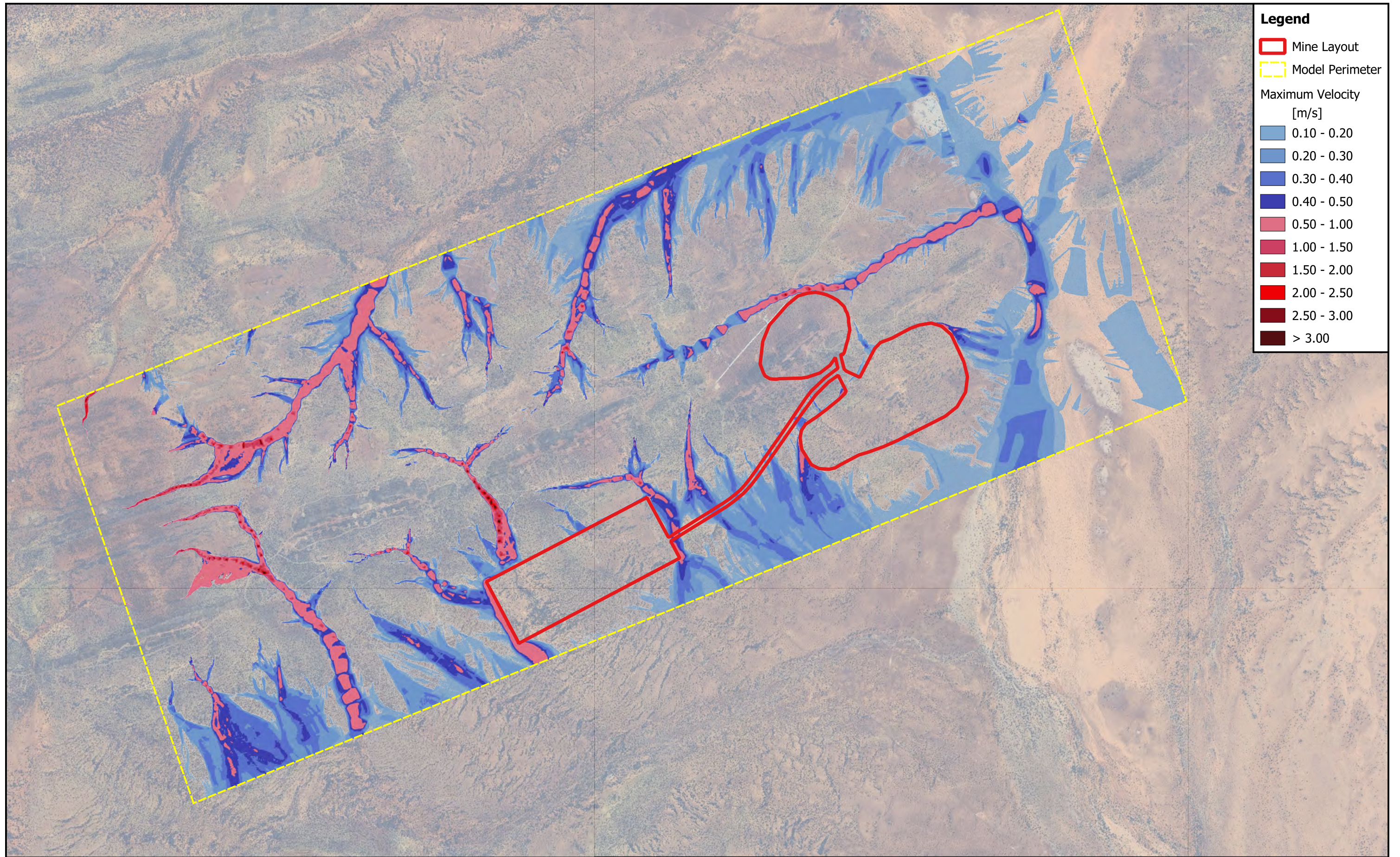
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- > 3.00


 Project code:  
 Drawn by: Joost Hollander  
 Date: 29/04/2024  
 Scale: 1:22500  
 Page size: A3  
 Sources: data.gov.au, DWER,  
 landgate

0                      0.75                      1.5 km  
  
                      GDA94 / MGA zone 50

**Figure G**

Beebyn W11 Mine - Mine Site Post-Development  
Maximum Depth - 1% AEP - 4.5 hr



**Legend**

- Mine Layout
- Model Perimeter

Maximum Velocity [m/s]

- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- > 3.00



Project code:  
 Drawn by: Joost Hollander  
 Date: 29/04/2024  
 Scale: 1:22500  
 Page size: A3  
 Sources: data.gov.au, DWER,  
 landgate

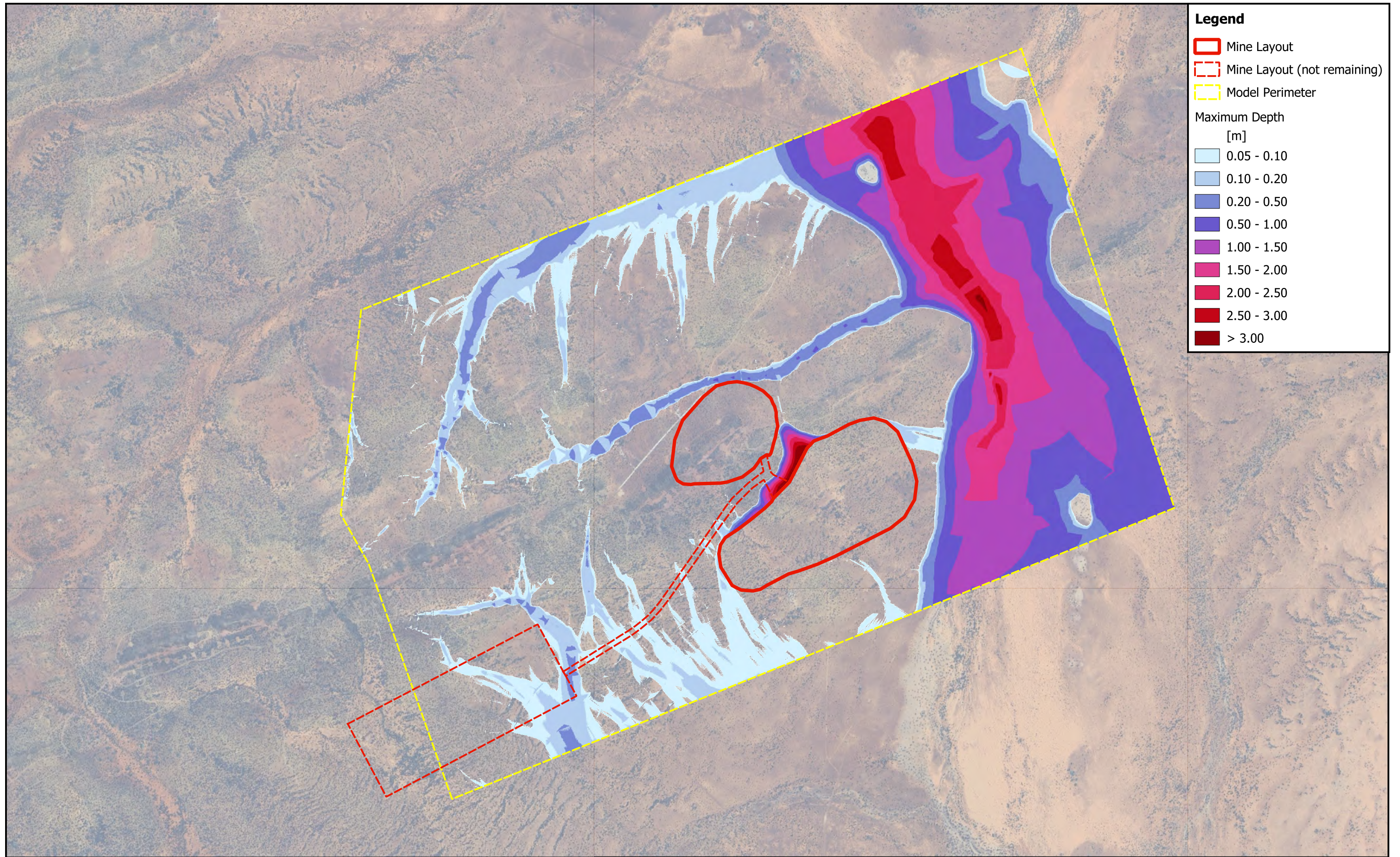
0 0.75 1.5 km



GDA94 / MGA zone 50

**Figure H**

Beebyn W11 Mine - Mine Site Post-Development  
 Maximum Velocity - 1% AEP - 4.5 hr



**Legend**

- Mine Layout
- Mine Layout (not remaining)
- Model Perimeter

Maximum Depth  
[m]

- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- > 3.00



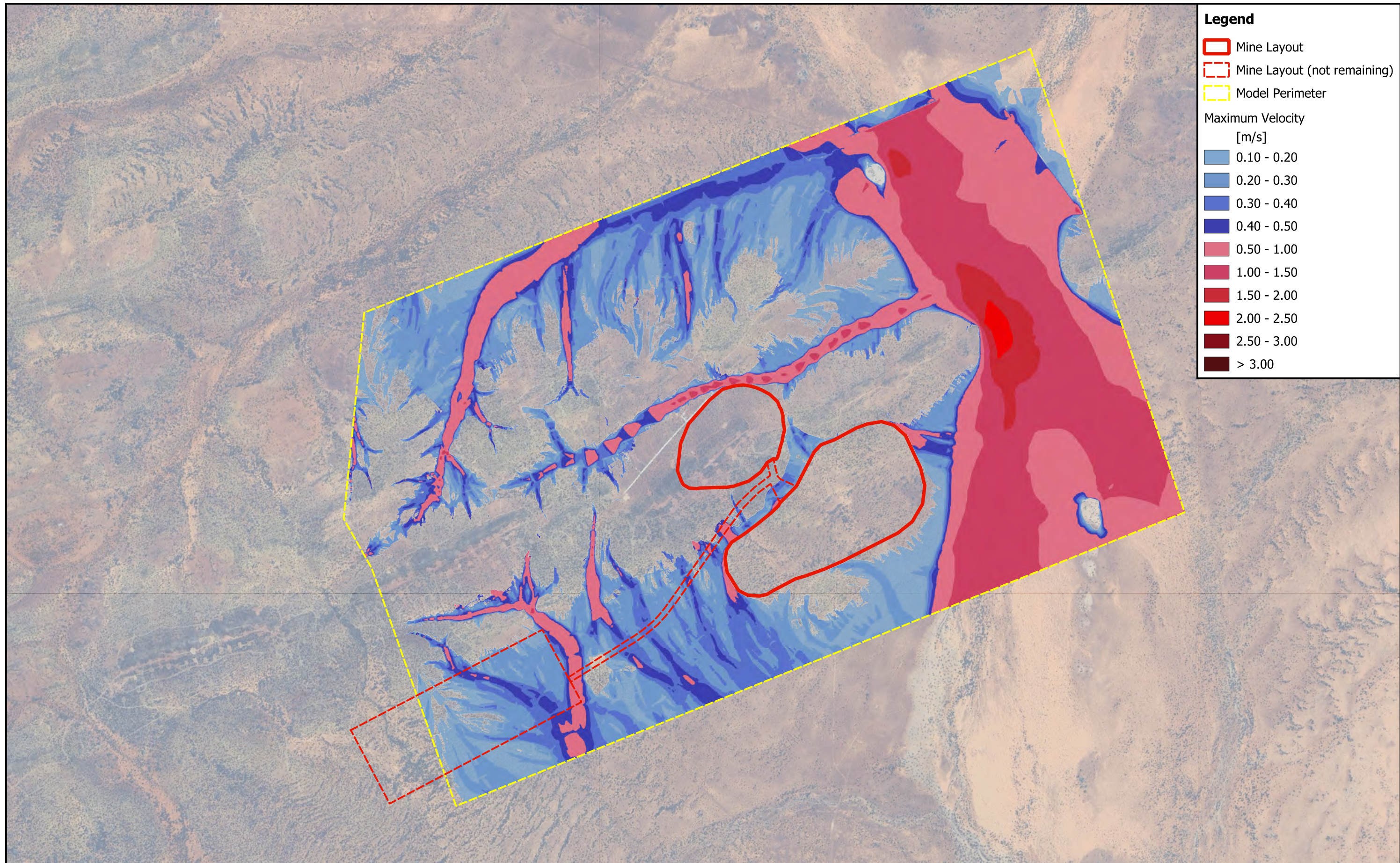
Project code:  
 Drawn by: Joost Hollander  
 Date: 01/05/2024  
 Scale: 1:19023  
 Page size: A3  
 Sources: data.gov.au, DWER,  
 landgate

0                      0.75                      1.5 km

GDA94 / MGA zone 50

**Figure I**  
 Beebyn W11 Mine - Beebyn Creek Closure  
 Maximum Depth - PMF - 36 hr





**Legend**

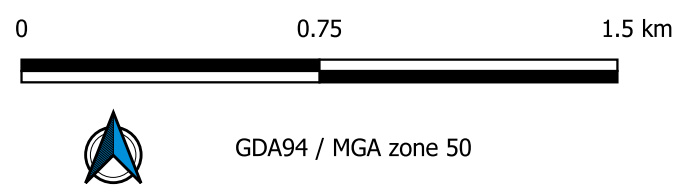
- Mine Layout
- Mine Layout (not remaining)
- Model Perimeter

Maximum Velocity  
[m/s]

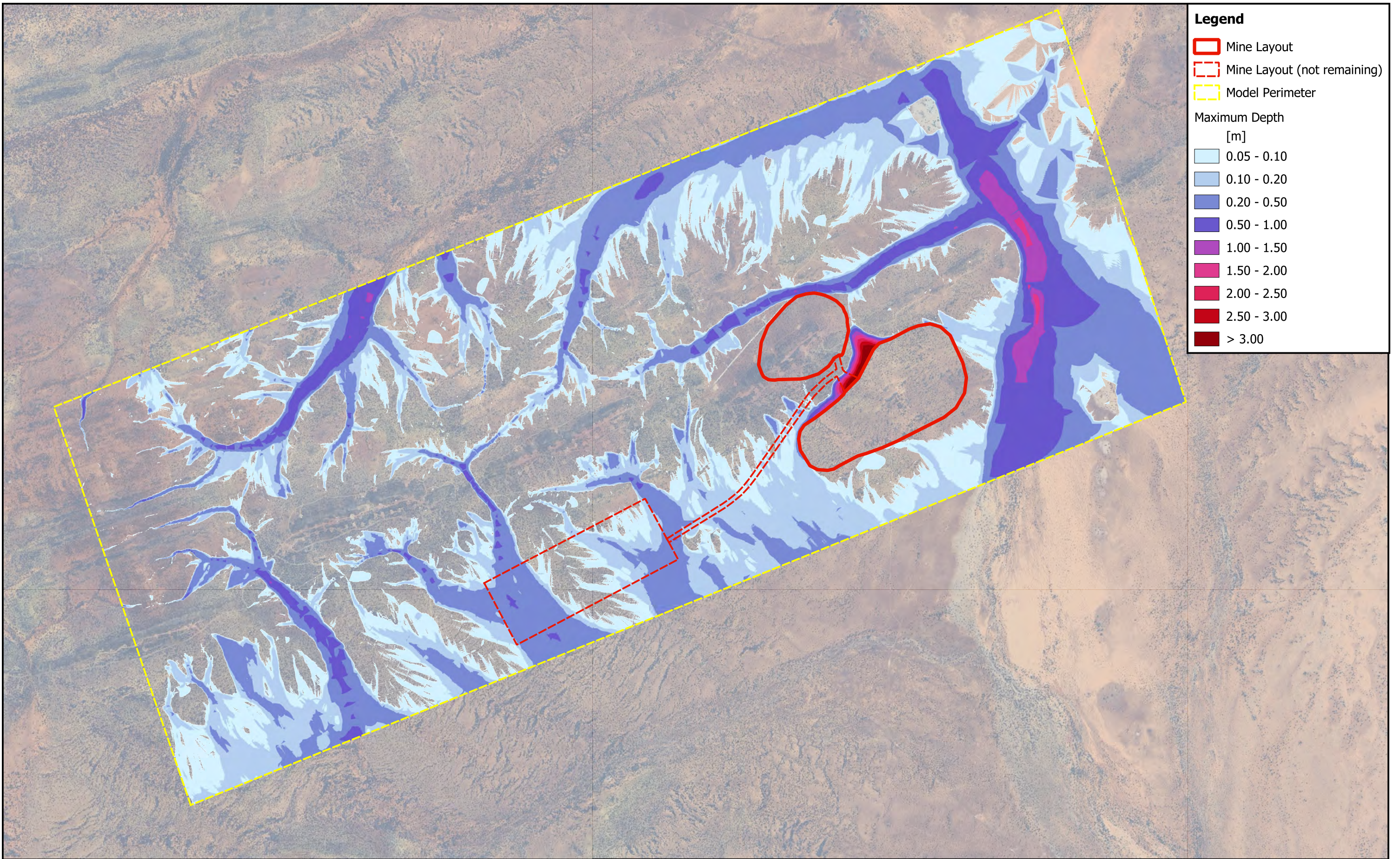
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- > 3.00



Project code:  
 Drawn by: Joost Hollander  
 Date: 01/05/2024  
 Scale: 1:19023  
 Page size: A3  
 Sources: data.gov.au, DWER,  
 landgate



**Figure J**  
 Beebyn W11 Mine - Beebyn Creek Closure  
 Maximum Velocity - PMF - 36 hr





**Legend**


- Mine Layout
- Mine Layout (not remaining)
- Model Perimeter

Maximum Depth  
[m]

- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- > 3.00

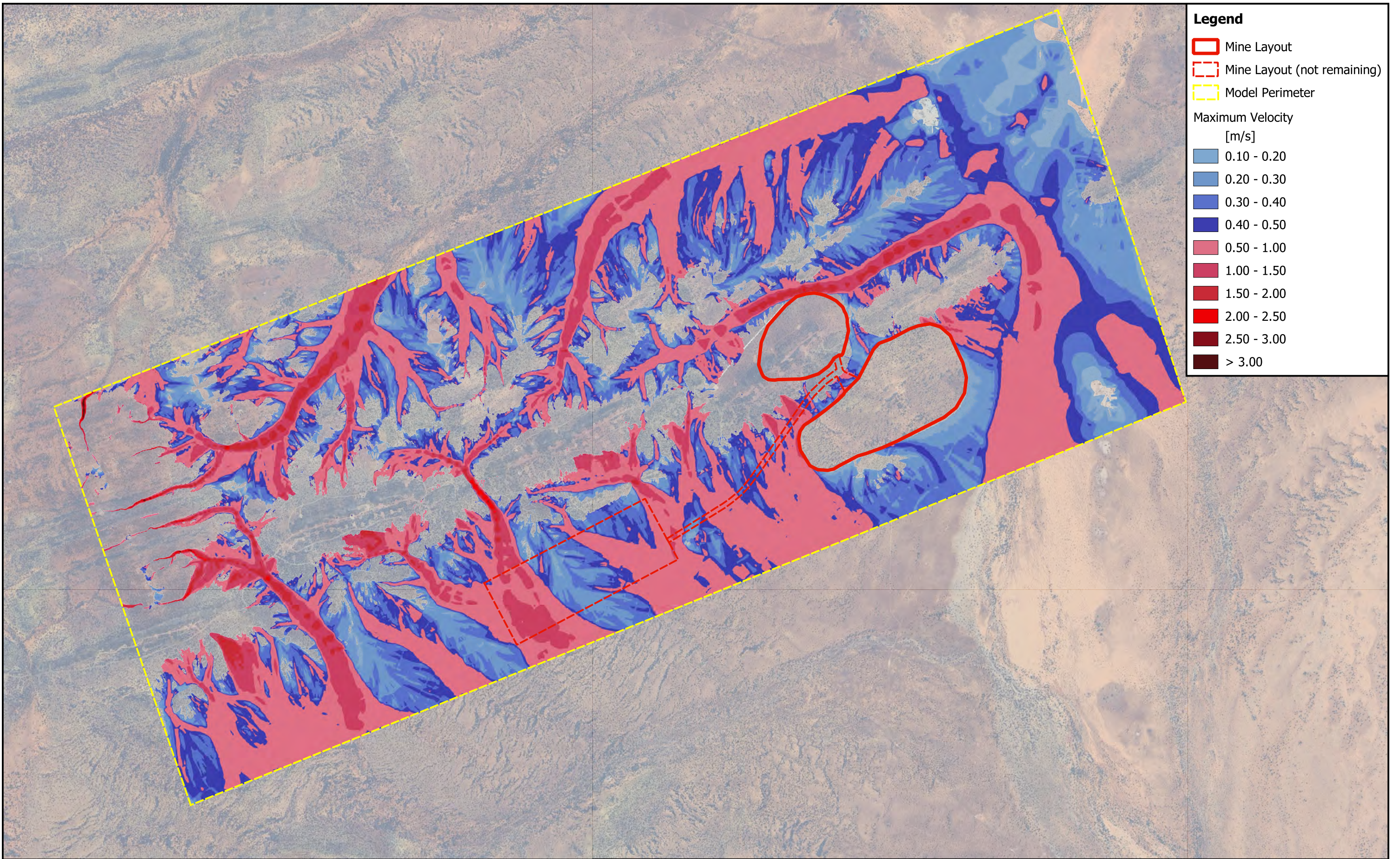

 Project code:  
 Drawn by: Joost Hollander  
 Date: 01/05/2024  
 Scale: 1:22500  
 Page size: A3  
 Sources: data.gov.au, DWER,  
 landgate

0                      0.75                      1.5 km  



                     GDA94 / MGA zone 50

**Figure K**

Beebyn W11 Mine - Mine Site Closure  
Maximum Depth - PMF - 4.5 hr




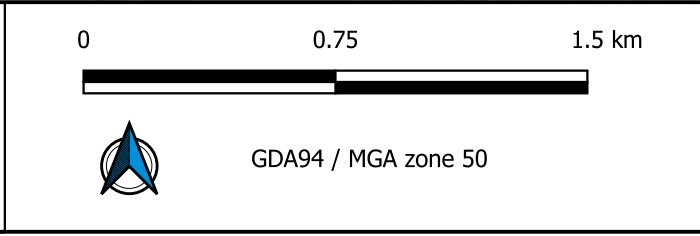
**Legend**

- Mine Layout
- Mine Layout (not remaining)
- Model Perimeter

Maximum Velocity  
[m/s]

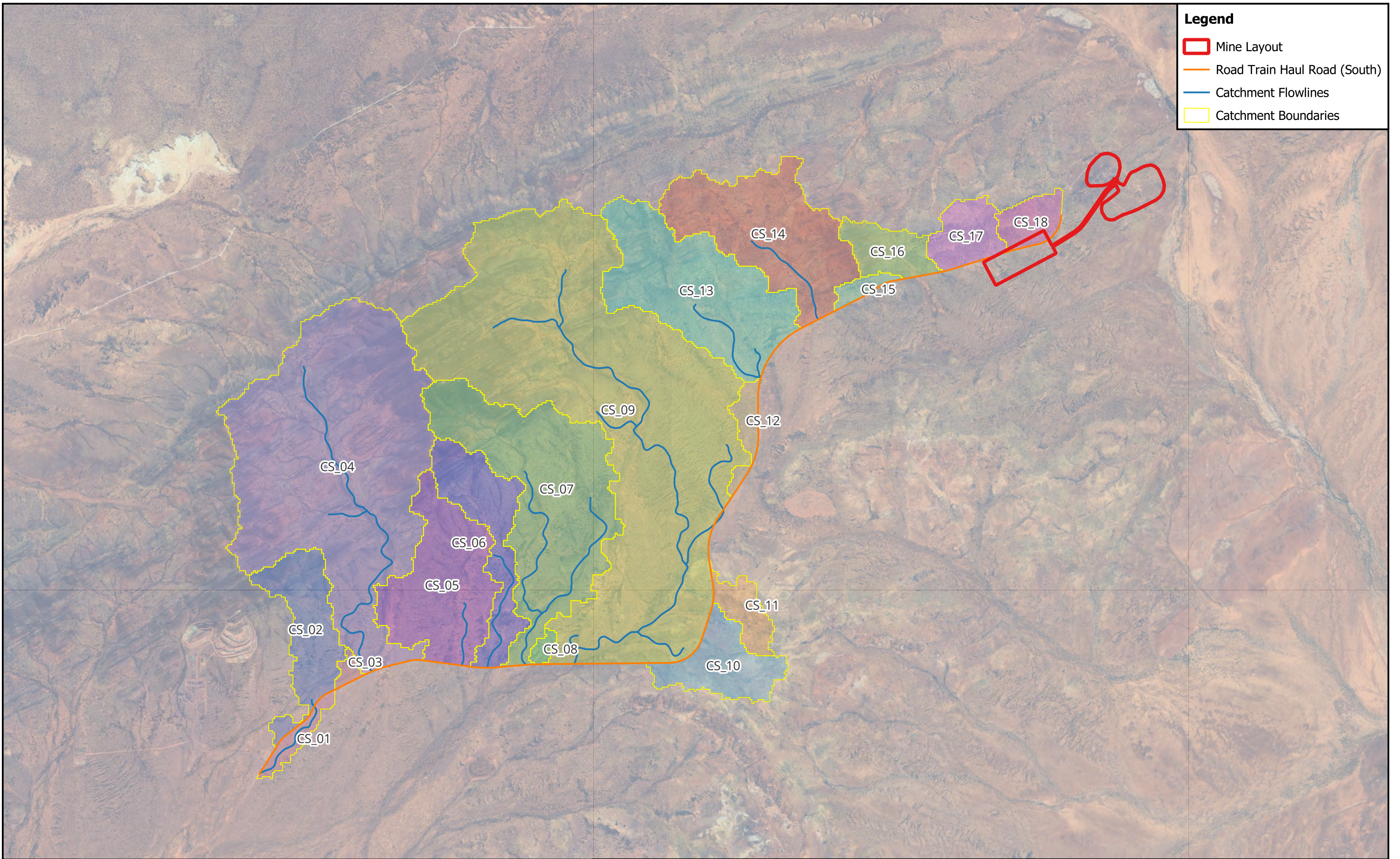
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.50
- 2.50 - 3.00
- > 3.00


 Project code:  
 Drawn by: Joost Hollander  
 Date: 01/05/2024  
 Scale: 1:22500  
 Page size: A3  
 Sources: data.gov.au, DWER,  
 landgate



**Figure L**

Beebyn W11 Mine - Mine Site Closure  
Maximum Velocity - PMF - 4.5 hr



**Legend**

- Mine Layout
- Road Train Haul Road (South)
- Catchment Flowlines
- Catchment Boundaries



Project code:  
 Drawn by: Joost Hollander  
 Date: 06/05/2024  
 Scale: 1:60000  
 Page size: A3  
 Sources: data.gov.au, DWER,  
 landgate

0      1      2 km

GDA94 / MGA zone 50

**Figure M**

Beebyn W11 Mine - Road Train Haul Road

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## MINING TENEMENT SUMMARY REPORT

**MINING LEASE 51/869**

Status: Live

### TENEMENT SUMMARY

<b>Area:</b> 6,093.50000 HA	<b>Death Reason :</b>
<b>Mark Out :</b> 04/05/2010 11:45:00	<b>Death Date :</b>
<b>Received :</b> 19/05/2010 08:30:00	<b>Commence :</b> 03/06/2015
<b>Term Granted :</b> 21 Years	<b>Expiry :</b> 02/06/2036

### CURRENT HOLDER DETAILS

**Name and Address**

SINOSTEEL MIDWEST CORPORATION LIMITED  
AUSTWIDE MINING TITLE MANAGEMENT PTY LTD, C/- AUSTWIDE MINING TITLE MANAGEMENT PTY LTD,  
PO BOX 1434, WANGARA, WA, 6947, xxxxxxxx@austwidemining.com.au, xxxxxxx400

### DESCRIPTION

**Locality:** BEEBYN  
**Datum:** DATUM SITUATED AT 571187.46mE 7027362.57mN  
**Boundary:** THEN TO 576381.33mE 7030087.12mN 581274.88mE  
7030058.31mN 583995.18mE 7029495.37mN  
585097.62mE 7027396.27mN 577922.44mE  
7023622.49mN 577916.49mE 7022696.22mN  
575736.16mE 7022709.64mN 575750.56mE  
7025310.42mN 571174.57mE 7025338.42mN BACK TO  
DATUM

Area :	Type	Dealing No	Start Date	Area
	Surveyed		23/11/2015	6,093.50000 HA
	Granted		02/06/2015	6,085.00000 HA
	Applied For		04/05/2010	6,085.00000 HA

### SHIRE DETAILS

Shire	Shire No	Start	End	Area
CUE SHIRE	2380	23/11/2015		6,093.50000 HA

### RENT STATUS

**Due For Year End 02/06/2025:** PAID IN FULL  
**Due For Year End 02/06/2026:** \$174,288.40

### EXPENDITURE STATUS

**Expended Year End 02/06/2024:** EXPENDED IN FULL  
**Current Year Commitment :** \$0.00

Department of Mines, Industry Regulation and Safety  
Minerals House  
100 Plain Street  
East Perth WA 6004

20 March 2024

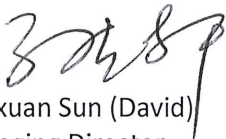
To whom it may concern,

**LETTER OF AUTHORISATION – MINING LEASE M51/869**

Pursuant to an agreement with Fenix Resources Ltd (Fenix) for mining rights over a section of Mining Lease M51/869, Sinosteel Midwest Corporation Ltd consents to Fenix applying for and operating under any approvals granted.

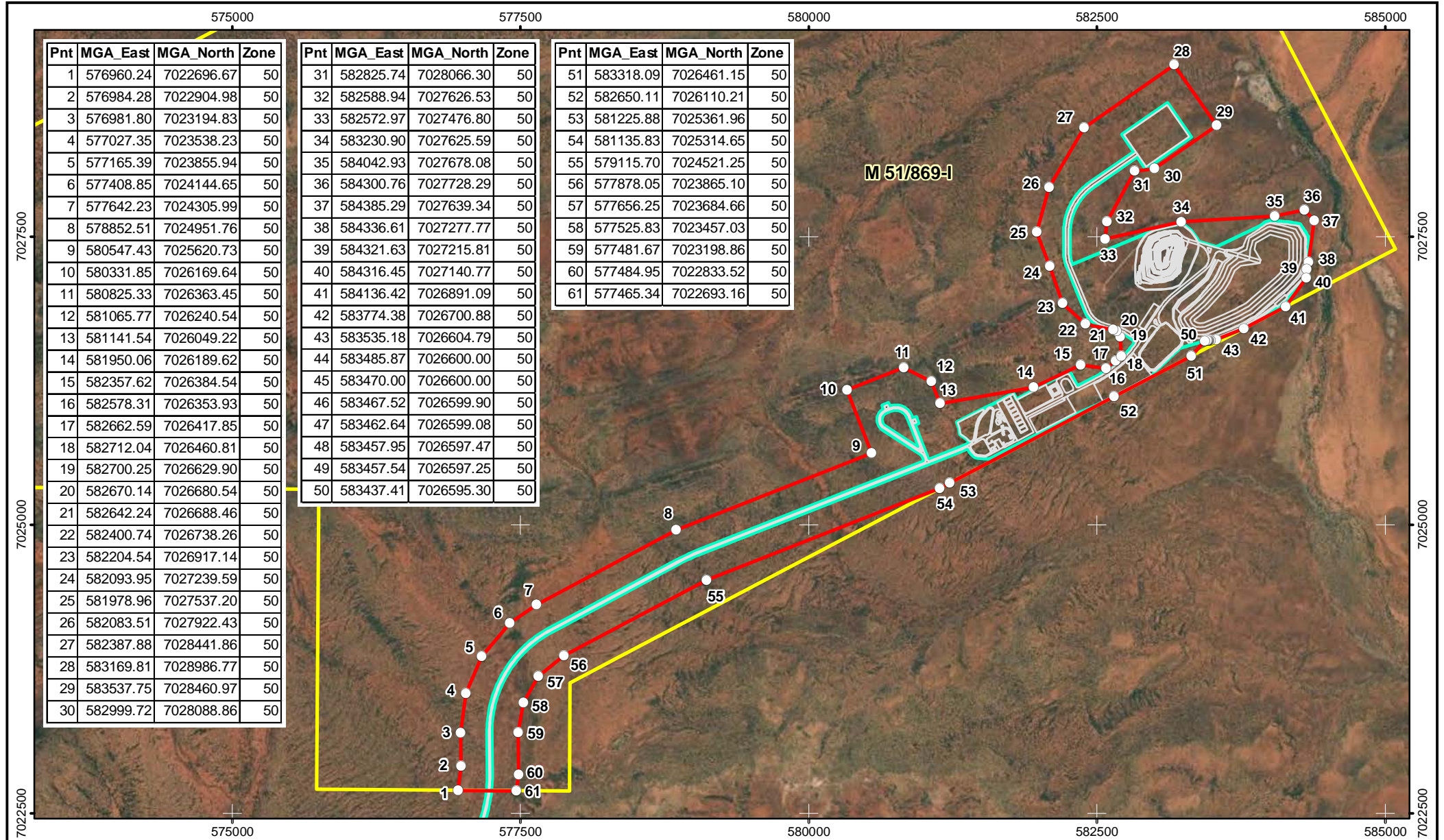
Should you have any questions regarding this authorisation, please contact Peter Jones by email at [pjones@smcl.com.au](mailto:pjones@smcl.com.au).

Kind Regards,



Xiaoxuan Sun (David)  
Managing Director

Source:



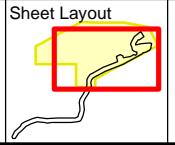
Pnt	MGA_East	MGA_North	Zone
1	576960.24	7022696.67	50
2	576984.28	7022904.98	50
3	576981.80	7023194.83	50
4	577027.35	7023538.23	50
5	577165.39	7023855.94	50
6	577408.85	7024144.65	50
7	577642.23	7024305.99	50
8	578852.51	7024951.76	50
9	580547.43	7025620.73	50
10	580331.85	7026169.64	50
11	580825.33	7026363.45	50
12	581065.77	7026240.54	50
13	581141.54	7026049.22	50
14	581950.06	7026189.62	50
15	582357.62	7026384.54	50
16	582578.31	7026353.93	50
17	582662.59	7026417.85	50
18	582712.04	7026460.81	50
19	582700.25	7026629.90	50
20	582670.14	7026680.54	50
21	582642.24	7026688.46	50
22	582400.74	7026738.26	50
23	582204.54	7026917.14	50
24	582093.95	7027239.59	50
25	581978.96	7027537.20	50
26	582083.51	7027922.43	50
27	582387.88	7028441.86	50
28	583169.81	7028986.77	50
29	583537.75	7028460.97	50
30	582999.72	7028088.86	50

Pnt	MGA_East	MGA_North	Zone
31	582825.74	7028066.30	50
32	582588.94	7027626.53	50
33	582572.97	7027476.80	50
34	583230.90	7027625.59	50
35	584042.93	7027678.08	50
36	584300.76	7027728.29	50
37	584385.29	7027639.34	50
38	584336.61	7027277.77	50
39	584321.63	7027215.81	50
40	584316.45	7027140.77	50
41	584136.42	7026891.09	50
42	583774.38	7026700.88	50
43	583535.18	7026604.79	50
44	583485.87	7026600.00	50
45	583470.00	7026600.00	50
46	583467.52	7026599.90	50
47	583462.64	7026599.08	50
48	583457.95	7026597.47	50
49	583457.54	7026597.25	50
50	583437.41	7026595.30	50

Pnt	MGA_East	MGA_North	Zone
51	583318.09	7026461.15	50
52	582650.11	7026110.21	50
53	581225.88	7025361.96	50
54	581135.83	7025314.65	50
55	579115.70	7024521.25	50
56	577878.05	7023865.10	50
57	577656.25	7023684.66	50
58	577525.83	7023457.03	50
59	577481.67	7023198.86	50
60	577484.95	7022833.52	50
61	577465.34	7022693.16	50

**Legend**

- ▬ Development Envelope within M 51/869 (698.96 ha)
- ▬ W11 Proposed Infrastructure
- ▭ Proposed Disturbance Envelope
- ▭ Tenement M 51/869



0 1,050m

Scale: 1:45,000  
MGA94 (Zone 50)

Author: G. Seat, J. Shepherdson  
Date: September 2024 Rev: A | A4

**FENIX** Fenix Beebyn Pty Ltd.  
Lv 33, 1 Spring St Perth, WA 6000  
Head Office: + 61 (0)8 9226 2011  
<https://fenixresources.com.au>

CAD Ref: a3028\_Env\_13\_13\_01

Drawn: CAD Resources  
[www.cadresources.com.au](http://www.cadresources.com.au) ~ Tel: (08) 9246 3242

## Beebyn-W11 Iron Ore Deposit Development Envelope within M 51/869