# Appendix C Review of Key Potential Flora, Vegetation and Fauna Values on the Proposed Pipeline for Strike Energy near Dongara

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# REVIEW OF KEY POTENTIAL FLORA, VEGETATION AND FAUNA VALUES ON THE PROPOSED PIPELINE FOR STRIKE ENERGY NEAR DONGARA

## Introduction

Mattiske Consulting Pty Ltd (MCPL) was commissioned in February 2020 by Australian Gas Infrastructure Group (AGIG) to conduct a desktop assessment of the potential Flora, Vegetation and Fauna values present on areas near the proposed pipeline for Strike Energy, located approximately 30 km south east of Dongara, WA (Figure 1). Supporting evidence is provided in a series of Figures and Appendices at the end of this Memorandum.

## Methods

A desktop assessment was conducted using FloraBase (Western Australian Herbarium [WAH] 1998- ), NatureMap (Department of Biodiversity, Conservation and Attractions [DBCA] 2007- ) and *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Protected Matters Search Tool* (Department of Agriculture, Water and the Environment [DAWE] 2020a) databases to identify the possible occurrence of threatened and priority flora, threatened fauna and threatened and priority ecological communities within the proposed pipeline survey area.

Search parameters used in the NatureMap search were 'by rectangle' and encompassed the project area polygon using the following parameters: 115° 07' 36" E, 115° 19' 42" E, - 29° 25' 59" S, - 29° 23' 47" S. The aforementioned coordinates were also used in the *EPBC Act Protected Matters Search Tool* (DAWE 2020a).

In addition, historical documentation and vegetation mapping of the region, principally that of Beard (1976 and 1990) and Desmond and Chant (2001), that provide extensive resource material for the floristics and vegetation of the proposed pipeline survey area, was reviewed.

## Results

### Regional Context

The proposed pipeline survey area is located approximately 30 km south east of Dongara (Figure 1), and falls within the Irwin Botanical District in the Northern Sandplains Region of the Southwest Province of Western Australia, and the Lesueur Sandplain subregion of the Geraldton Sandplains Region of the Interim Biogeographic Regionalisation for Australia (IBRA) (DAWE 2020b). The Irwin Botanical District has a typically dry, warm Mediterranean climate, with winter precipitation of 300-500 mm and 7-8 dry months per year (Beard 1990).

### Managed Lands

The Yardanogo Nature Reserve (R 36203) and Beekeepers Nature Reserve (R 24496) are located to the west of the proposed pipeline survey area (Figure 2). The Yardanogo Nature Reserve (R 36203) is located approximately

4 km away from the western edge of the proposed pipeline survey area, and the Beekeepers Nature Reserve (R 24496) is approximately 15 km from the proposed pipeline survey area.

**Geology, Soils and Topography**

The underlying geology of the area is predominantly Permian to Cretaceous sedimentary basins, with horsts of Proterozoic rocks (Beard 1990, Desmond and Chant 2001). The area is characterised by undulating lateritic sandplains with leached sandy soils over laterite in coastal areas; earthy, yellow sands over laterite further inland; and hard-setting loams with red clay subsoils (Beard 1990, Desmond and Chant 2001).

The Department of Primary Industries and Regional Development's (DPIRD) Land Systems present within the proposed pipeline survey area (Figure 3) include:

1. **Mount Adams System (224Ma):** Gently undulating sandplain with low gravel ridges and occasional laterite breakaways.
2. **Correy System (221Cy):** Broad sandy alluvial fan of the lower Arrowsmith River. Pale deep sands predominate, with grey shallow sandy duplexes, moderately deep sandy gravels and yellow deep sands less common. Banksia woodlands and heathlands.

**Vegetation**

The vegetation of the proposed pipeline within the Dongara Area was defined and mapped by Beard (1976) and within the broader region by Beard (1990) in the Irwin Botanical District as coastal scrub heath on sandplains, with *Acacia* and *Allocasuarina* thickets further inland, and hard-setting loams with *Acacia* scrub and scattered *Eucalyptus loxophleba*.

The Pre-European vegetation systems present within the proposed pipeline survey area (Figure 4) include:

1. **Eridoon System:** Flat coastal plain with various small rivers and creeks with numerous small lakes and swamps and some limited alluvial flats of heavier soil on the lower Arrowsmith River. Vegetation consists of scattered small trees with an open layer of tall shrubs over a closed layer of small health-like shrubs, which experiences frequent fires.
    a. **Vegetation Association 378:** Shrublands; scrub-heath with scattered *Banksia* spp., *Eucalyptus todtiana* and *Xylomelum angustifolium* on deep sandy flats in the Geraldton Sandplains Region.

2. **Tathra System:** Occurs on the Victoria and Dandaragan plateau surfaces and western slopes. The majority of the area consists of sandplains with scrub heath and the occasional *Melaleuca* thicket, scattered trees or woodland. Laterite outcrops occur on ridges and breakaways, covered with low heath and occasionally *Allocasuarina* thickets.
    a. **Vegetation Association 49:** Shrublands; mixed heath.
    b. **Vegetation Association 379:** Shrublands; scrub-heath on lateritic sandplain in the central Geraldton Sandplains Region.

**Potential Flora**

A total of 194 vascular plant taxa, representative of 98 genera and 38 families, have the potential to occur within the proposed pipeline survey area (based on NatureMap (DBCA 2007- ) and EPBC Act (DAWE 2020a) search results, included in Appendix A). The most commonly represented families were Myrtaceae (33 taxa), Proteaceae (28 taxa) and Fabaceae (22 taxa). The most commonly represented genera were *Eucalyptus* (10 taxa), *Conostylis* (9 taxa) and *Daviesia* (8 taxa).

**Potential Threatened and Priority Flora**

Twelve threatened flora species, pursuant to Part 2, Division 1, Subdivision 2 of the *Biodiversity Conservation Act 2016* (BC Act) and as listed by the DBCA (2018a) have the potential to occur in the proposed pipeline survey area

(Figure 5). All of these species are pursuant to section 179 of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) or are listed by the DAWE (2020c) (Appendix A).

A total of 18 priority flora species, including two priority one, two priority two, 11 priority three and three priority four species as listed by the Western Australian Herbarium [WAH] (1998- ) have the potential to occur in the proposed pipeline survey area.

An assessment of the likelihood of recording any of the listed threatened and priority taxa withing the proposed pipeline survey area, based on factors including soil type, topography and distribution, is presented in Appendix B. Based on this assessment, six threatened flora species, *Daviesia speciosa* (T), *Eucalyptus crispata* (T), *Eucalyptus leprophloia* (T), *Leucopogon obtectus* (T), *Paracaleana dixonii* (T) and *Thelymitra stellata* (T), had a high likelihood of occurring in the proposed pipeline survey area. A further six threatened flora species had a moderate likelihood of occurring in the proposed pipeline survey area. Ten priority flora species, *Lasiopetalum ogilvieanum* (P1), *Micromyrtus rogeri* (P1), *Eucalyptus macrocarpa* x *pyriformis* (P3), *Guichenotia alba* (P3), *Mesomelaena stygia* subsp. *deflexa* (P3), *Persoonia filiformis* (P3), *Stylidium drummondianum* (P3), *Banksia scabrella* (P4), *Eucalyptus macrocarpa* subsp. *elachantha* (P4) and *Stawellia dimorphantha* (P4), had a high likelihood of occurring in the proposed pipeline survey area. A further eight priority species had a moderate likelihood of occurring in the proposed pipeline survey area.

**Potential Introduced (Weed) Species and Declared Pest (Plant) Organisms**

Five introduced flora species have the possibility of occurring in the proposed pipeline survey area. Two of these species, **Asparagus asparagoides* and **Tamarix aphylla*, are declared pest organisms pursuant to section 22 of the *Biosecurity and Agriculture Management Act 2007* (BAM Act).

**Asparagus asparagoides* and **Tamarix aphylla* both have a declared pest organism keeping category of Exempt for the whole of Western Australia (Department of Primary Industries and Regional Development [DPIRD] 2020). A declared pest category of Exempt requires no permits or conditions for keeping, although there may be other requirements under the BAM Act.

**Potential Threatened and Priority Ecological Communities**

On the basis of a review of literature there are no threatened ecological communities (TECs) listed at Commonwealth level pursuant to sections 181 and 182 of the EPBC Act and listed by the DAWE (2020d).

On the basis of a review of literature, four threatened ecological communities (TECs) listed at State level pursuant to Part 2, Division 2, Subdivision 1 of the BC Act and as listed by DBCA (2018b) have the potential to occur within the proposed pipeline survey area. Threatened ecological communities (TECs) with the potential to occur in the area include:

- *Acacia rostellifera* low forest with scattered *Eucalyptus camaldulensis* on Greenough Alluvial Flats (PD) (DBCA 2018b)
- Ferricrete floristic community (Rocky Springs Type) (VU) (DBCA 2018b)
- Lesueur-Coomallo Floristic Community D1 (CR) (DBCA 2018b)
- Lesueur-Coomallo Floristic Community A1.2 (EN) (DBCA 2018b)

On the basis of a review of literature, there are six priority ecological communities (PECs) as listed at State Level by the DBCA (2019b) that have the potential to occur within the proposed pipeline survey area. Priority ecological communities (PECs) with the potential to occur in the area include:

- Lesueur-Coomallo Floristic Community M2 (*Melaleuca preissiana* woodland) (P1) (DBCA 2019b)
    - Woodland dominated by *Melaleuca preissiana* along sandy drainage lines, with faithful species of *Anigozanthos pulcherrimus* and constant species of *Chamaescilla corymbosa*, *Petrophile brevifolia* and *Xanthorrhoea reflexa* (now *Xanthorrhoea drummondii*).
- Lesueur-Coomallo Floristic Community DFGH (P1) (DBCA 2019b)
    - Mixed species-rich heath on lateritic gravel with *Hakea erinacea, Melaleuca platycalyx* and *Petrophile seminuda:* a fine scale mixture of four floristically-defined communities occurring on lateritic slopes.

- *Frankenia pauciflora* low open shrublands in swales (P1) (DBCA 2019b)
  - Community occurs on Tamala South grey-brown sand, on mid to lower slopes of Tamala Limestone ridges and some isolated rises on calcareous deep and shallow sands. Taxa include *Acacia rostellifera, Stylobasium spathulatum, Frankenia pauciflora, Tetragonia implexicoma, Threlkeldia diffusa, Zygophyllum fruticulosum.*
- Claypans with mid dense shrublands of *Melaleuca lateritia* over herbs (classified as Claypans of the Swan Coastal Plain under EPBC Act) (P1) (DBCA 2019b)
  - Claypans (predominantly basins) usually dominated by a shrubland of *Melaleuca lateritia* occurring both on the coastal plain and the adjacent plateau. These claypans are characterized by aquatic (*Hydrocotyle lemnoides* – Priority 4) and amphibious taxa (e.g. *Glossostigma diandrum*, *Villarsia capitata* and *Eleocharis keigheryi* - DRF)
- *Petrophile chrysantha* low heath on Lesueur dissected uplands (Gp200-170) (P2) (DBCA 2019b)
  - Low heath dominated by *Petrophile chrysantha* on Lesueur Dissected Uplands. Associated species include *Dryandra armata* and *Hakea undulata.*
- Tamala Land System (P3) (DBCA 2019b)
  - Plains with a thin covering of sand over limestone, interspersed with stony rises; former saltbush and acacia shrublands, widely degraded and now replaced by winter pastures of exotic annuals

**Potential Fauna**

A total of 34 fauna species have the potential to occur in the proposed pipeline survey area (based on NatureMap (DBCA 2007- ) and EPBC Act (DAWE 2020a) search results, included in Appendix C). The fauna recorded consisted of 22 birds, two invertebrates, eight mammals and two reptiles (Appendix C).

**Potential Threatened and Significant Fauna**

Ten threatened fauna species, pursuant to Part 2, Division 1, Subdivision 2 of the BC Act and as listed by DBCA (2018c), or pursuant to section 179 of the EPBC Act and as listed by the DAWE (2020e), have the potential to occur in the proposed pipeline survey area (Appendix C).

These species are as follows:

- Invertebrates
  - *Idiosoma nigrum* (Shield-backed Trapdoor Spider/Black Rugose Trapdoor Spider)
- Mammals
  - *Dasyurus geoffroii* (Chuditch/Western Quoll)
  - *Parantechinus apicalis* (Dibbler)
- Reptiles
  - *Egernia stokesii badia* (Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink)
- Birds
  - *Calidris ferruginea* (Curlew Sandpiper)
  - *Calyptorhynchus latirostris* (Carnaby's Cockatoo, Short-billed Black-Cockatoo)
  - *Leipoa ocellata* (Malleefowl)
  - *Numenius madagascariensis* (Eastern Curlew, Far Eastern Curlew)
  - *Rostratula australis* (Australian Painted Snipe)
  - *Rostratula benghalensis* (sensu lato) (Painted Snipe)

Of the six threatened birds listed as potentially occurring in the proposed pipeline survey area, only *Calyptorhynchus latirostris* (Carnaby's Cockatoo, Short-billed Black-Cockatoo) and *Leipoa ocellata* (Malleefowl) would be considered likely to occur in the proposed pipeline survey area, as the other listed birds occur in marine/coastal habitats. The presence of particular plant species that may be used for foraging by the Carnaby's Cockatoo are also relevant in assessing the significant values on the proposed pipeline survey area.

Two migratory terrestrial birds, *Motacilla cinerea* (Grey Wagtail) and *Apus pacificus* (Fork-tailed Swift) may also occur in the area. As the survey area does not include marine habitat, other listed migratory bird species, which occur only in marine environments, have not been considered significant for the purpose of this survey.

After assessing the likelihood of the threatened fauna on the basis of habitat and foraging, of the species listed above the majority of the species have a low likelihood except for the *Egernia stokesii badia* (Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink), the *Calyptorhynchus latirostris* (Carnaby's Cockatoo, Short-billed Black-Cockatoo) and potentially the two migratory birds *Motacilla cinerea* (Grey Wagtail) and *Apus pacificus* (Fork-tailed Swift).

**Potential Introduced (Feral) Fauna**

Eight introduced (feral) fauna species, comprising three birds and five mammals, have the potential to occur in the proposed pipeline survey area (Appendix C).

## Discussion and Conclusion

Depending on where the proposed pipeline is located will influence the assessment needs and the potential environmental issues on the alignment.

If the proposed pipeline is located on already cleared and completely degraded areas the assessment needs should be minimal and as such may only involve a reconnaissance level assessment on any remnant areas or any regrowth areas on disturbed areas.

If the proposed pipeline activities include some clearing of native vegetation then there will be a need to undertake additional targeted searches for threatened and priority flora and fauna species, and any other potentially significant flora and fauna species.

If the proposed pipeline activities include some clearing of native vegetation then there will be a need to undertake additional targeted searches for threatened and priority ecological communities as listed at the State and Federal levels and any significant habitats for significant native fauna species.

In view of the potential values on the proposed alignment of the pipeline with the associated construction and on-going management needs every effort should be made to minimize the impacts of the proposed pipeline on native flora, vegetation and fauna values.

During the field assessment of the values the following environmental values will require particular attention:

- Targeted searching for threatened and priority flora and fauna
- Targeted searching for threatened and priority ecological communities
- Searching for potential habitat and foraging plants for *Calyptorhynchus latirostris* (Carnaby's Cockatoo, Short-billed Black-Cockatoo) and other threatened fauna

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**References**

Beard, JS 1976, *Vegetation survey of Western Australia: The vegetation of the Dongara area*, 1:250,000 series, map and explanatory memoir, Vegmap Publications, Perth, WA.

Beard, JS 1990, *Plant life of Western Australia*, Kangaroo Press, Kenthurst, NSW.

*Biodiversity Conservation Act 2016* (WA)

*Biosecurity and Agriculture Management Act 2007* (WA)

Department of Agriculture, Water and the Environment 2020a, *EPBC Act: Protected matters search tool*, Commonwealth of Australia. Available from: http://www.environment.gov.au/epbc/protected-matters-search-tool. [27 February 2020].

Department of Agriculture, Water and the Environment 2020b, *Australia's bioregions (IBRA)*, Commonwealth of Australia. Available from: http://www.environment.gov.au/topics/land/national-reserve-system/science-maps-and-data/australias-bioregions-ibra. [27 February 2020].

Department of Agriculture, Water and the Environment 2020c, *EPBC Act list of threatened flora*, Commonwealth of Australia. Available from: http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora. [27 February 2020].

Department of Agriculture, Water and the Environment 2020d, *EPBC Act list of threatened ecological communities*, Commonwealth of Australia. Available from: http://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl. [27 February 2020].

Department of Agriculture, Water and the Environment 2020e, *EPBC Act list of threatened fauna*, Commonwealth of Australia. Available from: https://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=fauna. [27 February 2020].

Department of Biodiversity, Conservation and Attractions 2007-, *NatureMap: Mapping Western Australia's biodiversity*, Government of Western Australia. Available from: https://naturemap.dpaw.wa.gov.au. [27 February 2020].

Department of Biodiversity, Conservation and Attractions 2018a, *Wildlife conservation (rare flora) notice 2018*, 11 September 2018, Minister for the Environment under section 2 of the BC Act. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants.

Department of Biodiversity, Conservation and Attractions 2018b, *List of threatened ecological communities endorsed by the Western Australia Minister for Environment, 28 June 2018*, Species and Communities Branch, Government of Western Australia. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/wa-s-threatened-ecological-communities.

Department of Biodiversity, Conservation and Attractions 2018c, *Wildlife conservation (specially protected fauna) notice 2018,* 11 September 2018, Minister for the Environment under section 2 of the BC Act. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals

Department of Biodiversity, Conservation and Attractions 2019a, *Conservation codes for Western Australian flora and fauna, 3 January 2019*, Government of Western Australia. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities.

Department of Biodiversity, Conservation and Attractions 2019b, *Priority ecological communities for Western Australia version 28*, *17 January 2019*, Species and Communities Branch, Department of Biodiversity, Conservation and Attractions. Available from: https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/wa-s-threatened-ecological-communities.

Department of Primary Industries and Regional Development 2020, *Western Australian Organism List*, Government of Western Australia. Available from: https://www.agric.wa.gov.au/bam/western-australian-organism-list-waol. [27 February 2020].

Desmond, A. and Chant, A. 2001, 'Geraldton Sandplain 3 (GS3 – Lesueur Sandplain subregion)' in *A biodiversity audit of Western Australia's 53 biogeographical subregions in 2002*, eds. JE May and NL McKenzie, Department of Conservation and Land Management, Western Australia, pp. 293 – 313.

*Environment Protection and Biodiversity Conservation Act 1999* (Cth)

International Union for Conservation of Nature 2020, *The IUCN red list of threatened species.* Available from: https://www.iucnredlist.org. [27 February 2020].

Western Australian Herbarium 1998-, *FloraBase – the Western Australian Flora,* Department of Parks and Wildlife. Available from: https://florabase.dpaw.wa.gov.au.

**Attachments**

**Figure 1:** Locality

**Figure 2:** Managed Lands

**Figure 3:** Land Systems

**Figure 4:** Pre-European Vegetation

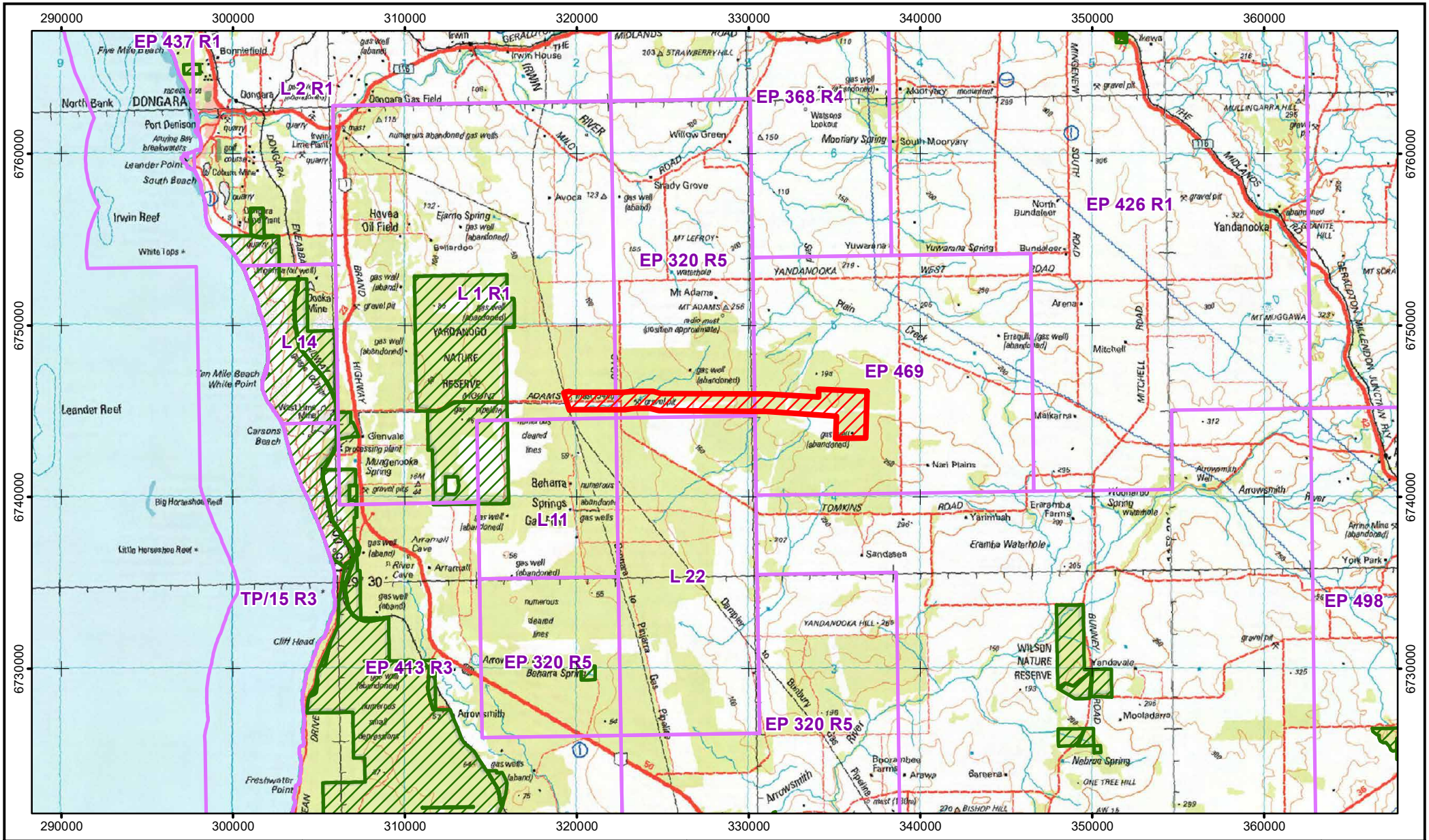
**Figure 5:** Threatened and Priority Flora

**Appendix A:** Vascular plant species with the potential to occur within the proposed pipeline survey area

**Appendix B:** Assessment of threatened and priority flora potentially present within the proposed pipeline survey area

**Appendix C:** Fauna species with the potential to occur within the proposed pipeline survey area

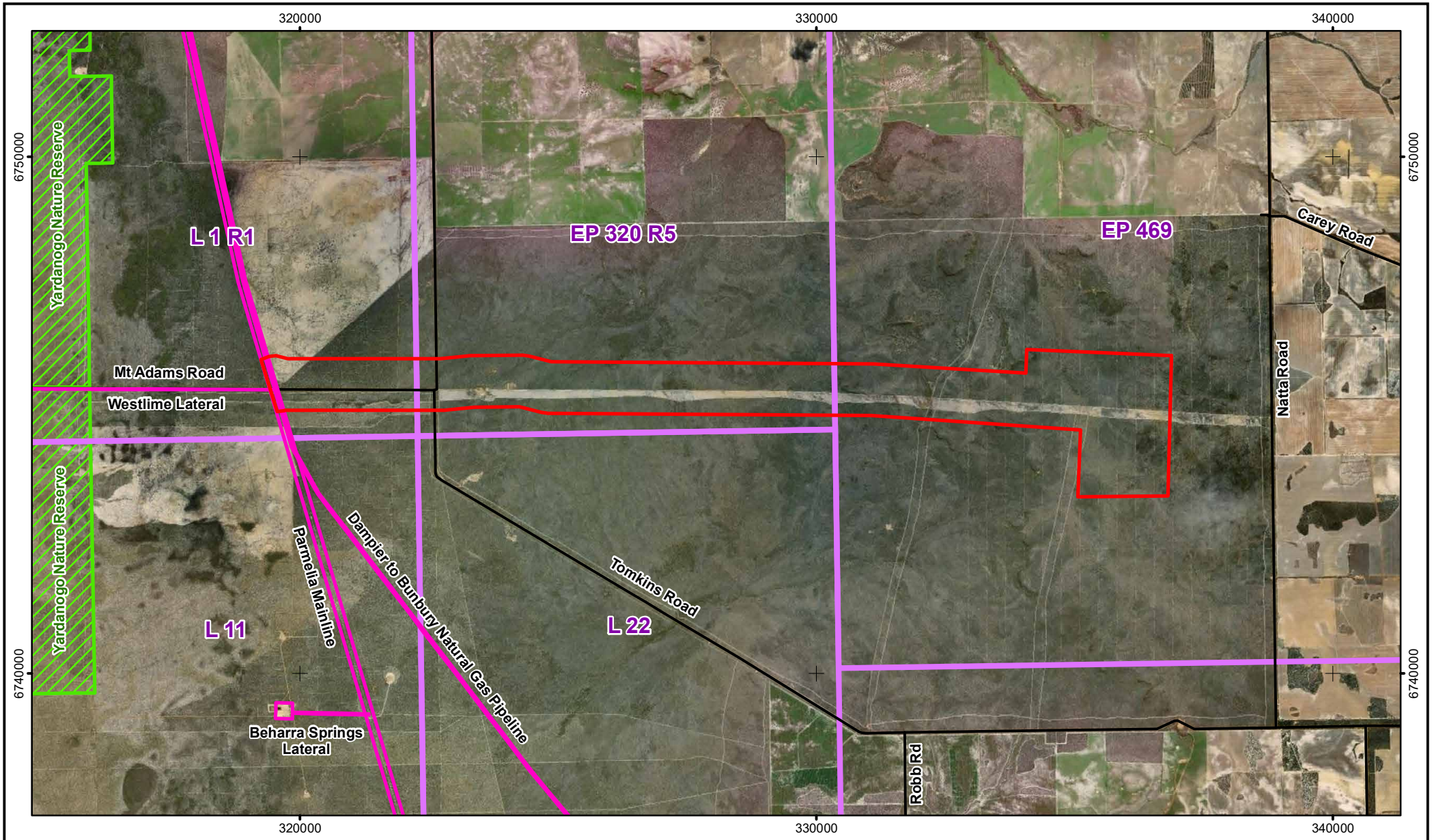
Source: Image: Digital Globe (10/11/2016),DBCA Managed Lands: DBCA




# West Erregulla-2 Exploration Well Locality

Figure: 1

Source: Image: Digital Globe (10/11/2016), Leases: DMIRS, DBCA Managed Lands: DBCA




Legend
- Study Area
- WA Petroleum Lease
- Gas Pipeline
- DBCA Estate
- Roads

Client: Strike Energy

N

0 2,000 m
Scale: 1:100,000
MGA94 (Zone 50)

CAD Ref: a2762_f01_02
Date: March 2020 | Rev: A | A4

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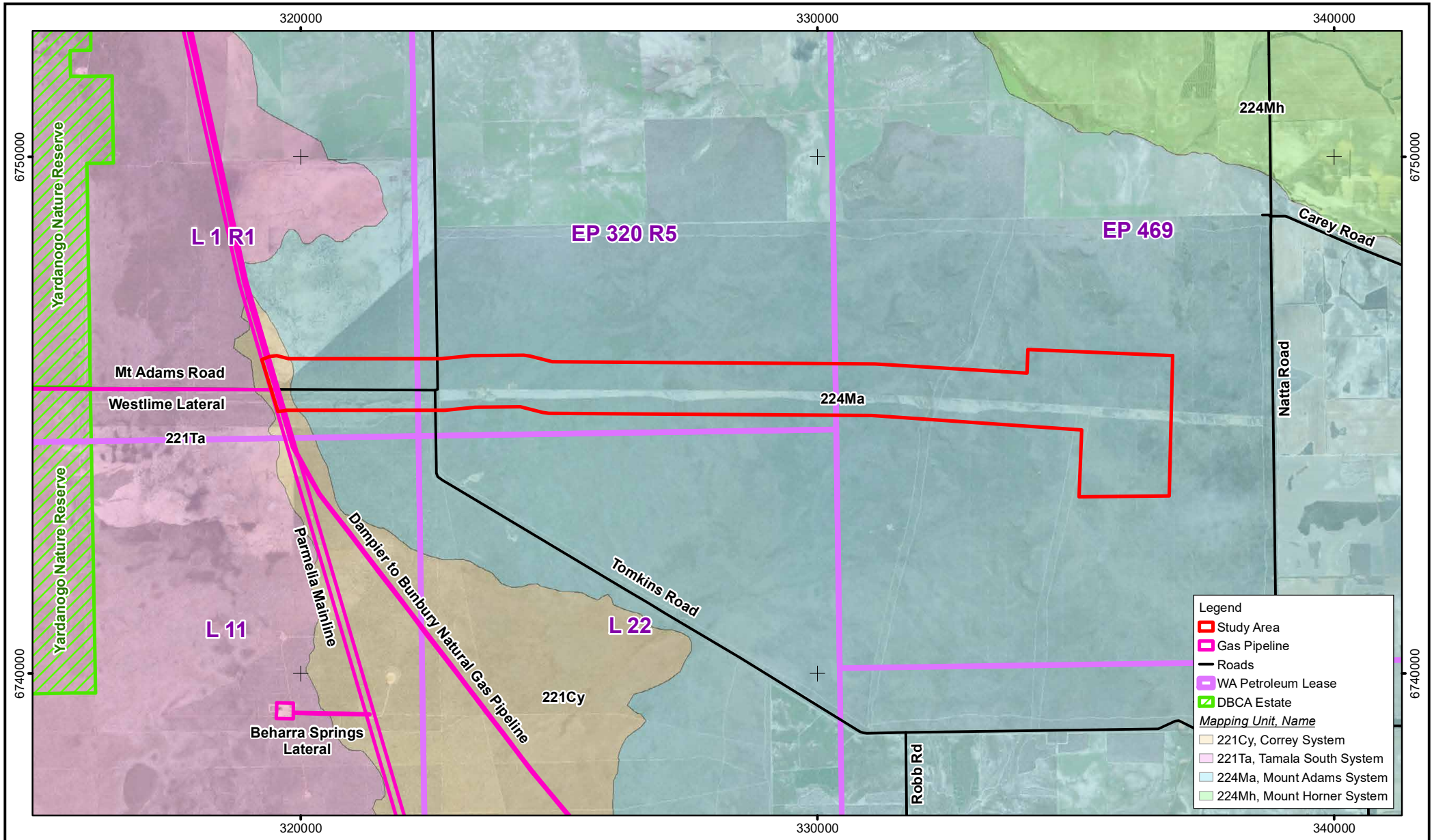
# West Erregulla-2 Exploration Well
## Managed Lands
### showing Petroleum Leases

Figure: 2

Source: Image: Digital Globe (10/11/2016), Leases: DMIRS, DBCA Managed Lands: DBCA, Land Systems: DPIRD




Client: Strike Energy

N

0 2,000m

Scale: 1:100,000
MGA94 (Zone 50)

CAD Ref: a2762_f01_03

Date: March 2020 | Rev: A | A4

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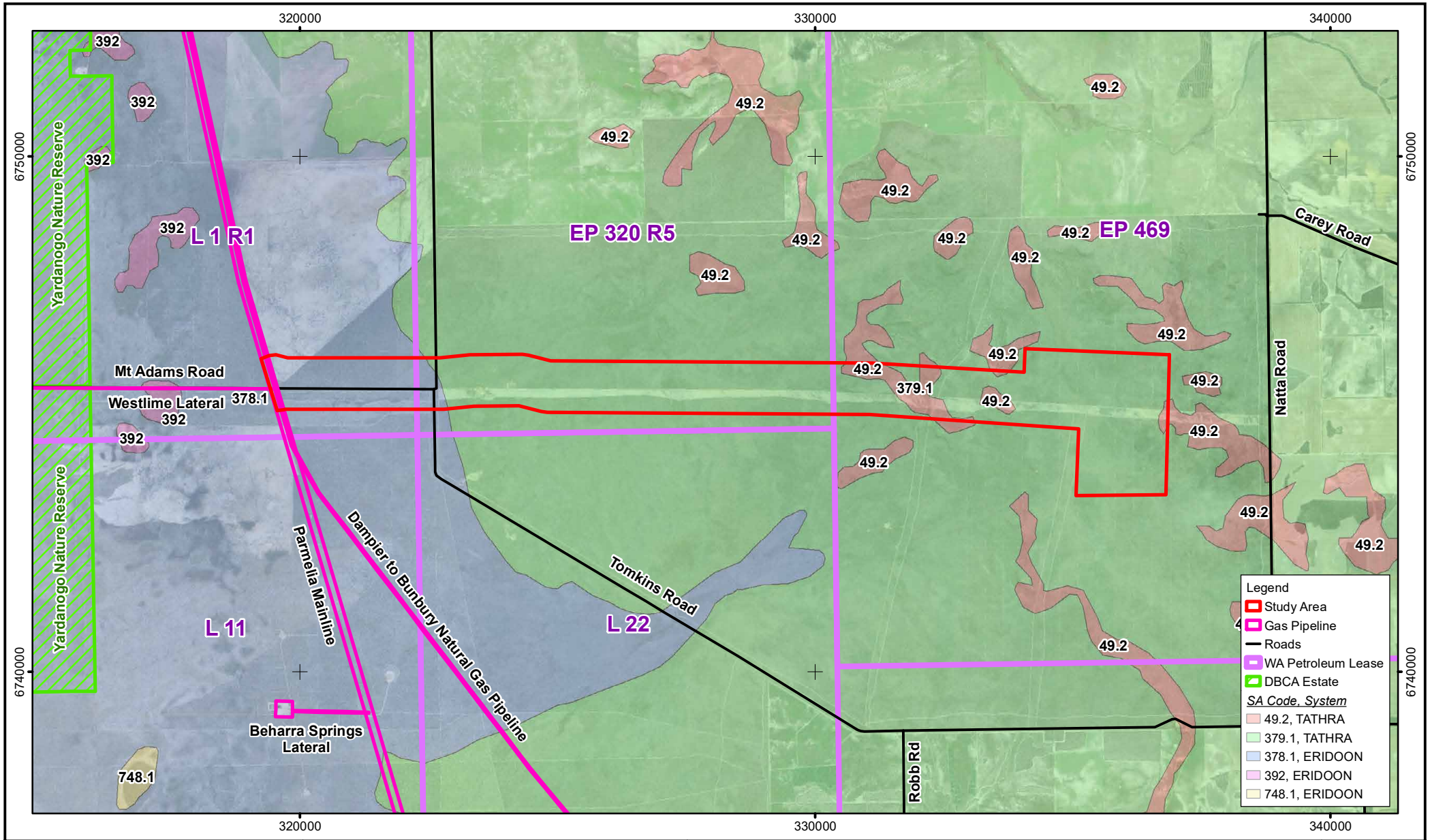
# West Erregulla-2 Exploration Well
# Land Systems

Figure: 3

Source: Image: Digital Globe (10/11/2016), Leases: DMIRS, DBCA Managed Lands: DBCA, Pre European Vegetation: DPIRD




Client: Strike Energy

N

0 2,000 m

Scale: 1:100,000
MGA94 (Zone 50)

CAD Ref: a2762_f01_04

Date: March 2020 | Rev: A | A4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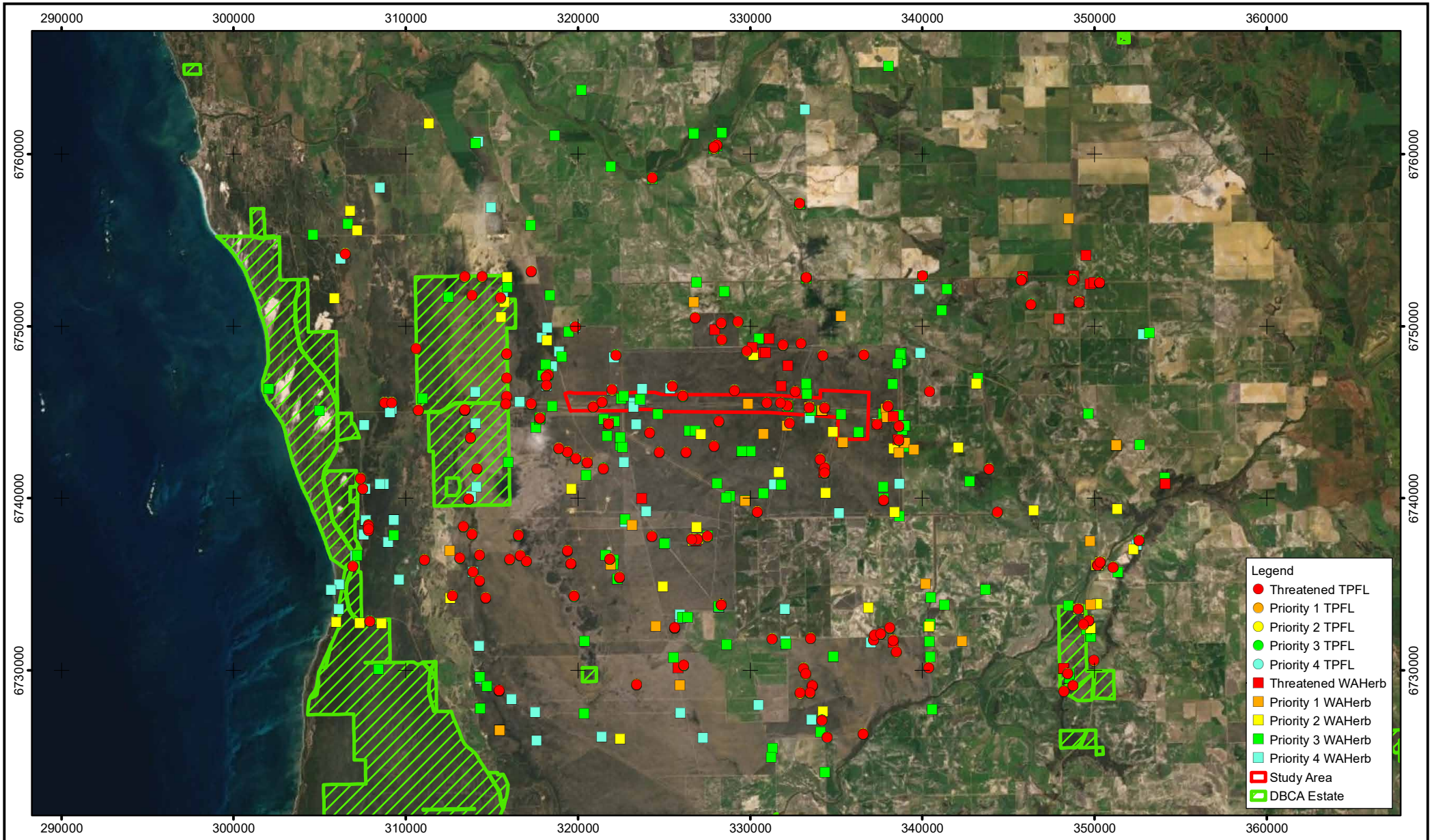
# West Erregulla-2 Exploration Well
# Pre European Vegetation

Figure: 4

Source: Image: Digital Globe (10/11/2016),DBCA Managed Lands: DBCA, Flora: DBCA (33-0220)




Client: Strike Energy

N

0 6,000 m

Scale: 1:300,000
MGA94 (Zone 50)

CAD Ref: a2762_f01_05

Date: March 2020 | Rev: A | A4

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# West Erregulla-2 Exploration Well
# Threatened & Priority Flora

Figure: 5

**APPENDIX A: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR WITHIN THE PROPOSED PIPELINE SURVEY AREA**

Note: * denotes introduced species; T denotes threatened flora and P1-P4 denote priority flora species (DBCA 2019a). SCC= State conservation code; FCC = Federal conservation code; CE = Critically Endangered; E = Endangered; V = Vulnerable; [1] (DAWE 2020a); [2] (DBCA 2007-)

| Family | Species | SCC | FCC | EPBC[1] | NatureMap[2] |
|---|---|---|---|---|---|
| Anarthriaceae | *Anarthria polyphylla* | | | | x |
| | *Lyginia imberbis* | | | | x |
| Apiaceae | *Actinotus leucocephalus* | | | | x |
| | *Homalosciadium homalocarpum* | | | | x |
| Araliaceae | *Trachymene pilosa* | | | | x |
| Asparagaceae | *Acanthocarpus* sp. Ajana (C.A. Gardner 8596) | | | | x |
| | * *Asparagus asparagoides* | | | x | |
| | *Dichopogon preissii* | | | | x |
| | *Laxmannia omnifertilis* | | | | x |
| | *Lomandra hastilis* | | | | x |
| | *Thysanotus rectantherus* | | | | x |
| Asteraceae | *Vittadinia dissecta* var*. hirta* | | | | x |
| | *Waitzia acuminata* var*. albicans* | | | | x |
| | *Waitzia suaveolens* var*. suaveolens* | | | | x |
| Boraginaceae | *Halgania argyrophylla* | | | | x |
| | *Halgania* sp. Wongan Hills (K.F. Kenneally 2393) | | | | x |
| Campanulaceae | *Lobelia rhytidosperma* | | | | x |
| | *Wahlenbergia gracilenta* | | | | x |
| Caryophyllaceae | * *Corrigiola litoralis* | | | | x |
| Celastraceae | *Tripterococcus brunonis* | | | | x |
| Colchicaceae | *Wurmbea tubulosa* | T | E | x | |
| Cyperaceae | *Lepidosperma apricola* | | | | x |
| | *Lepidosperma* sp. P1 small head (M.D. Tindale 166A) | | | | x |
| | *Lepidosperma* sp. | | | | x |
| | *Mesomelaena stygia* subsp*. deflexa* | P3 | | | x |
| | *Schoenus andrewsii* | | | | x |
| | *Schoenus minutulus* | | | | x |
| Dasypogonaceae | *Calectasia hispida* | | | | x |
| Dilleniaceae | *Hibbertia hypericoides* subsp*. hypericoides* | | | | x |
| | *Hibbertia robur* | | | | x |
| | *Hibbertia subvaginata* | | | | x |
| Ecdeiocoleaceae | *Ecdeiocolea monostachya* | | | | x |
| | *Georgeantha hexandra* | | | | x |
| Elaeocarpaceae | *Tetratheca paucifolia* | | | | x |
| Ericaceae | *Andersonia heterophylla* | | | | x |
| | *Astroloma microdonta* | | | | x |
| | *Leucopogon glaucifolius* | | | | x |
| | *Leucopogon hispidus* | | | | x |
| | *Leucopogon inflexus* | | | | x |

**APPENDIX A: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR WITHIN THE PROPOSED PIPELINE SURVEY AREA**

Note: * denotes introduced species; T denotes threatened flora and P1-P4 denote priority flora species (DBCA 2019a). SCC= State conservation code; FCC = Federal conservation code; CE = Critically Endangered; E = Endangered; V = Vulnerable; [1] (DAWE 2020a); [2] (DBCA 2007-)

| Family | Species | SCC | FCC | EPBC[1] | NatureMap[2] |
|---|---|---|---|---|---|
| Ericaceae (cont.) | *Leucopogon obtectus* | T | E | x | |
| | *Leucopogon* sp. Yandanooka (M. Hislop 2507) | | | | x |
| | *Styphelia xerophylla* | | | | x |
| Euphorbiaceae | *Beyeria gardneri* | P3 | | | x |
| | *Monotaxis bracteata* | | | | x |
| Fabaceae | *Acacia auronitens* | | | | x |
| | *Acacia cavealis* | | | | x |
| | *Acacia dilatata* | | | | x |
| | *Acacia fagonioides* | | | | x |
| | *Acacia lasiocarpa* var. *bracteolata* | | | | x |
| | *Acacia sphacelata* subsp. *sphacelata* | | | | x |
| | *Chorizema humile* | T | E | x | |
| | *Cristonia stenophylla* | | | | x |
| | *Daviesia hakeoides* subsp. *hakeoides* | | | | x |
| | *Daviesia hakeoides* subsp. *subnuda* | | | | x |
| | *Daviesia incrassata* subsp. *teres* | | | | x |
| | *Daviesia nudiflora* subsp. *hirtella* | | | | x |
| | *Daviesia oxyclada* | | | | x |
| | *Daviesia pedunculata* | | | | x |
| | *Daviesia speciosa* | T | E | x | |
| | *Daviesia triflora* | | | | x |
| | *Gastrolobium plicatum* | | | | x |
| | *Jacksonia nutans* | | | | x |
| | *Jacksonia restioides* | | | | x |
| | *Jacksonia sternbergiana* | | | | x |
| | *Leptosema aphyllum* | | | | x |
| | *Mirbelia spinosa* | | | | x |
| Goodeniaceae | *Dampiera alata* | | | | x |
| | *Dampiera lindleyi* | | | | x |
| | *Dampiera oligophylla* | | | | x |
| | *Dampiera teres* | | | | x |
| | *Lechenaultia biloba* | | | | x |
| | *Lechenaultia hirsuta* | | | | x |
| | *Scaevola canescens* | | | | x |
| | *Scaevola phlebopetala* | | | | x |
| | *Velleia trinervis* | | | | x |
| Haemodoraceae | *Anigozanthos humilis* subsp. *humilis* | | | | x |
| | *Conostylis aurea* | | | | x |
| | *Conostylis candicans* subsp. *procumbens* | | | | x |
| | *Conostylis canteriata* | | | | x |
| | *Conostylis dielsii* subsp. *dielsii* | | | | x |
| | *Conostylis dielsii* subsp. *teres* | | | x | |
| | *Conostylis hiemalis* | | | | x |
| | *Conostylis micrantha* | T | E | x | |
| | *Conostylis neocymosa* | | | | x |
| | *Conostylis resinosa* | | | | x |
| | *Haemodorum discolor* | | | | x |
| | *Haemodorum simulans* | | | | x |
| | *Haemodorum spicatum* | | | | x |

**APPENDIX A: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR WITHIN THE PROPOSED PIPELINE SURVEY AREA**

Note: * denotes introduced species; T denotes threatened flora and P1-P4 denote priority flora species (DBCA 2019a). SCC= State conservation code; FCC = Federal conservation code; CE = Critically Endangered; E = Endangered; V = Vulnerable; [1] (DAWE 2020a); [2] (DBCA 2007-)

| Family | Species | SCC | FCC | EPBC[1] | NatureMap[2] |
|---|---|---|---|---|---|
| Hemerocallidaceae | *Stawellia dimorphantha* | P4 | | | x |
| | *Tricoryne humilis* | | | | x |
| | *Tricoryne* sp. Eneabba (E.A. Griffin 1200) | | | | x |
| Lamiaceae | *Hemiandra gardneri* | T | E | x | |
| | *Hemiandra rubriflora* | | | | x |
| | *Hemiandra* sp. Eneabba (H. Demarz 3687) | P3 | | | x |
| | *Hemiphora bartlingii* | | | | x |
| | *Quoya verbascina* | | | | x |
| Malvaceae | *Alyogyne huegelii* | | | | x |
| | *Guichenotia alba* | P3 | | | x |
| | *Guichenotia micrantha* | | | | x |
| | *Guichenotia sarotes* | | | | x |
| | *Lasiopetalum drummondii* | | | | x |
| | *Lasiopetalum ogilvieanum* | P1 | | | x |
| | *Seringia hermanniifolia* | | | | x |
| Myrtaceae | *Beaufortia elegans* | | | | x |
| | *Calothamnus longissimus* | | | | x |
| | *Calothamnus quadrifidus* subsp*. angustifolius* | | | | x |
| | *Calytrix cravenii* | | | | x |
| | *Calytrix depressa* | | | | x |
| | *Darwinia pauciflora* | | | | x |
| | *Darwinia speciosa* | | | | x |
| | *Daviesia divaricata* subsp*. divaricata* | | | | x |
| | *Eremaea beaufortioides* var*. beaufortioides* | | | | x |
| | *Ericomyrtus* sp. Mt Lesueur (E.A. Griffin 2325) | | | | x |
| | *Eucalyptus* x *balanites* | T | E | x | |
| | *Eucalyptus crispata* | T | V | x | x |
| | *Eucalyptus horistes* | | | | x |
| | *Eucalyptus impensa* | T | E | x | |
| | *Eucalyptus leprophloia* | T | E | x | x |
| | *Eucalyptus macrocarpa* subsp*. elachantha* | P4 | | | x |
| | *Eucalyptus macrocarpa* x *pyriformis* | P3 | | | x |
| | *Eucalyptus opimiflora* | | | | x |
| | *Eucalyptus pyriformis* | | | | x |
| | *Eucalyptus todtiana* | | | | x |
| | *Hypocalymma xanthopetalum* | | | | x |
| | *Leptospermum erubescens* | | | | x |
| | *Melaleuca aspalathoides* | | | | x |
| | *Melaleuca leuropoma* | | | | x |
| | *Melaleuca trichophylla* | | | | x |
| | *Melaleuca urceolaris* | | | | x |
| | *Micromyrtus rogeri* | P1 | | | x |
| | *Scholtzia laxiflora* | | | | x |
| | *Thryptomene racemulosa* | | | | x |
| | *Verticordia blepharophylla* | | | | x |
| | *Verticordia eriocephala* | | | | x |
| | *Verticordia grandis* | | | | x |
| | *Verticordia luteola* var*. luteola* | P3 | | | x |
| Olacaceae | *Olax aurantia* | | | | x |

**APPENDIX A: VASCULAR PLANT SPECIES WITH THE POTENTIAL TO OCCUR WITHIN THE PROPOSED PIPELINE SURVEY AREA**

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| Family | | Species | SCC | FCC | EPBC[1] | NatureMap[2] |
|---|---|---|---|---|---|---|
| Orchidaceae | | *Paracaleana dixonii* | T | E | x | x |
| | | *Thelymitra stellata* | T | E | x | |
| Poaceae | * | *Cenchrus ciliaris* | | | x | |
| Polygalaceae | | *Comesperma griffinii* | P2 | | | x |
| | | *Comesperma rhadinocarpum* | P3 | | | x |
| Proteaceae | | *Banksia carlinoides* | | | | x |
| | | *Banksia dallanneyi* subsp. *media* | | | | x |
| | | *Banksia fraseri* var. *crebra* | P3 | | | x |
| | | *Banksia lanata* | | | | x |
| | | *Banksia leptophylla* var. *melletica* | | | | x |
| | | *Banksia scabrella* | P4 | | | x |
| | | *Banksia shuttleworthiana* | | | | x |
| | | *Conospermum boreale* | | | | x |
| | | *Conospermum brachyphyllum* | | | | x |
| | | *Conospermum nervosum* | | | | x |
| | | *Conospermum wycherleyi* | | | | x |
| | | *Grevillea candelabroides* | | | | x |
| | | *Grevillea shuttleworthiana* subsp. *canarina* | | | | x |
| | | *Hakea candolleana* | | | | x |
| | | *Hakea neospathulata* | | | | x |
| | | *Hakea polyanthema* | | | | x |
| | | *Hakea smilacifolia* | | | | x |
| | | *Isopogon linearis* | | | | x |
| | | *Isopogon tridens* | | | | x |
| | | *Persoonia acicularis* | | | | x |
| | | *Persoonia filiformis* | P3 | | | x |
| | | *Persoonia rudis* | P3 | | | x |
| | | *Petrophile brevifolia* subsp. *rosea* | | | | x |
| | | *Petrophile macrostachya* | | | | x |
| | | *Petrophile megalostegia* | | | | x |
| | | *Petrophile scabriuscula* | | | | x |
| | | *Stirlingia latifolia* | | | | x |
| | | *Synaphea spinulosa* | | | | x |
| Rhamnaceae | | *Polianthion wichurae* | | | | x |
| | | *Stenanthemum notiale* subsp. *notiale* | | | | x |
| Rutaceae | | *Boronia coerulescens* subsp. *spinescens* | | | | x |
| | | *Boronia cymosa* | | | | x |
| | | *Boronia ramosa* subsp. *anethifolia* | | | | x |
| | | *Diplolaena eneabbensis* | | | | x |
| | | *Geleznowia verrucosa* | | | | x |
| Santalaceae | | *Leptomeria empetriformis* | | | | x |
| Sapindaceae | | *Diplopeltis huegelii* | | | | x |
| | | *Diplopeltis huegelii* subsp. *subintegra* | | | | x |
| Solanaceae | * | *Lycium ferocissimum* | | | x | |
| Stylidiaceae | | *Levenhookia octomaculata* | | | | x |

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Note: * denotes introduced species; T denotes threatened flora and P1-P4 denote priority flora species (DBCA 2019a). SCC= State conservation code; FCC = Federal conservation code; CE = Critically Endangered; E = Endangered; V = Vulnerable; [1] (DAWE 2020a); [2] (DBCA 2007-)

| Family | | Species | SCC | FCC | EPBC[1] | NatureMap[2] |
|---|---|---|---|---|---|---|
| Stylidiaceae (cont.) | | *Stylidium adpressum* | | | | x |
| | | *Stylidium diuroides* subsp. *paucifoliatum* | | | | x |
| | | *Stylidium drummondianum* | P3 | | | x |
| | | *Stylidium eriopodum* | | | | x |
| | | *Stylidium maitlandianum* | | | | x |
| | | *Stylidium pseudocaespitosum* | P2 | | | x |
| | | *Stylidium* sp. | | | | x |
| Tamaricaceae | * | *Tamarix aphylla* | | | x | |
| Thymelaeaceae | | *Pimelea angustifolia* | | | | x |
| | | *Pimelea leucantha* | | | | x |
| | | *Pimelea sulphurea* | | | | x |
| Violaceae | | *Hybanthus floribundus* subsp. *floribundus* | | | | x |

**APPENDIX B: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT WITHIN THE PROPOSED PIPELINE SURVEY AREA**

**Note:** IBRA Distribution: AVW – Avon Wheatbelt; CAR – Carnarvon; COO – Coolgardie; ESP – Esperance Plains; GAS – Gascoyne; GES – Geraldton Sandplains; GVD – Great Victoria Desert; JAF – Jarrah Forest; MAL – Mallee; MUR – Murchison; SWA – Swan Coastal Plain; YAL – Yalgoo. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking. SCC – State Conservation Code; FCC – Federal Conservation Code.

| Species | Family | SCC | FCC | Description and Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|
| *Chorizema humile* | Fabaceae | T | Endangered | Habit: Sprawling, prostrate or decumbent shrub.<br>Flower colour: yellow & red/brown<br>Flowering period: July to September<br>Soils: Sandy clay or loam. Plains.<br>IBRA Distribution: AVW, GES<br>Florabase records: 32 | Moderate |
| *Conostylis micrantha* | Haemodoraceae | T | Endangered | Habit: Rhizomatous, tufted perennial, grass-like or herb, 0.13-0.24 m high.<br>Flower colour: yellow-cream/red<br>Flowering period: July to August<br>Soils: White or grey sand. Sandplains.<br>IBRA Distribution: AVW, GES<br>Florabase records: 22 | Moderate |
| *Daviesia speciosa* | Fabaceae | T | Endangered | Habit: Many-stemmed shrub, 0.3-0.8 m high.<br>Flower colour: red<br>Flowering period: April to May<br>Soils: Gravelly lateritic soils. Undulating plains, rises.<br>IBRA Distribution: AVW, GES<br>Florabase records: 19 | High |
| *Eucalyptus* x *balanites* | Myrtaceae | T | Endangered | Habit: Mallee, to 5 m high, bark rough, flaky.<br>Flower colour: white<br>Flowering period: October to December or January to February<br>Soils: Sandy soils with lateritic gravel<br>IBRA Distribution: GES, SWA<br>Florabase records: 11 | Moderate |

**APPENDIX B: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT WITHIN THE PROPOSED PIPELINE SURVEY AREA**

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| Species | Family | SCC | FCC | Description and Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|
| *Eucalyptus crispata* | Myrtaceae | T | Vulnerable | Habit: Mallee, 3-7 m high, bark rough on the trunk, in partly decorticated curls.<br>Flower colour: yellow-cream<br>Flowering period: March to June<br>Soils: Sand, loam with lateritic gravel. Lateritic breakaways.<br>IBRA Distribution: GES<br>Florabase records: 25 | High |
| *Eucalyptus impensa* | Myrtaceae | T | Endangered | Habit: Straggly mallee, to 1.5 m high, bark smooth.<br>Flower colour: pink<br>Flowering period: June to July<br>Soils: Yellow sand. Lateritic hills.<br>IBRA Distribution: GES<br>Florabase records: 12 | Moderate |
| *Eucalyptus leprophloia* | Myrtaceae | T | Endangered | Habit: Mallee, 2-5(-8) m high, bark rough, loose & flaky to 1 m.<br>Flower colour: cream-white<br>Flowering period: August to October<br>Soils: White or grey sand over laterite. Valley slopes.<br>IBRA Distribution: AVW, GES<br>Florabase records: 22 | High |
| *Hemiandra gardneri* | Lamiaceae | T | Endangered | Habit: Prostrate, pungent shrub, 0.1-0.2 m high, to 1 m wide.<br>Flower colour: red/pink-red<br>Flowering period: August to October<br>Soils: Grey or yellow sand, clayey sand. Sandplains.<br>IBRA Distribution: AVW, GES<br>Florabase records: 21 | Moderate |
| *Leucopogon obtectus* | Ericaceae | T | Endangered | Habit: Erect shrub, 0.5-1.7 m high.<br>Flower colour: cream-yellow<br>Flowering period: August to October<br>Soils: Grey sand.<br>IBRA Distribution: GES<br>Florabase records: 19 | High |

**APPENDIX B: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT WITHIN THE PROPOSED PIPELINE SURVEY AREA**

**Note:** IBRA Distribution: AVW – Avon Wheatbelt; CAR – Carnarvon; COO – Coolgardie; ESP – Esperance Plains; GAS – Gascoyne; GES – Geraldton Sandplains; GVD – Great Victoria Desert; JAF – Jarrah Forest; MAL – Mallee; MUR – Murchison; SWA – Swan Coastal Plain; YAL – Yalgoo. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking. SCC – State Conservation Code; FCC – Federal Conservation Code.

| Species | Family | SCC | FCC | Description and Habitat | | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| *Paracaleana dixonii* | Orchidaceae | T | Endangered | Habit:<br>Flower colour:<br>Flowering period:<br>Soils:<br>IBRA Distribution:<br>Florabase records: | Tuberous, perennial, herb, 0.09-0.2 m high.<br>yellow-brown<br>October to December or January<br>Grey sand over granite.<br>GES, SWA<br>20 | High |
| *Thelymitra stellata* | Orchidaceae | T | Endangered | Habit:<br>Flower colour:<br>Flowering period:<br>Soils:<br>IBRA Distribution:<br>Florabase records: | Tuberous, perennial, herb, 0.15-0.25 m high.<br>yellow & brown<br>October to November<br>Sand, gravel, lateritic loam.<br>GES, JAF, SWA<br>20 | High |
| *Wurmbea tubulosa* | Colchicaceae | T | Endangered | Habit:<br>Flower colour:<br>Flowering period:<br>Soils:<br>IBRA Distribution:<br>Florabase records: | Cormous, perennial, herb, 0.01-0.03 m high, dioecious or sometimes andromonoecious.<br>white-pink<br>June to August<br>Clay, loam. River banks, seasonally-wet places.<br>AVW, GES<br>19 | Moderate |
| *Lasiopetalum ogilvieanum* | Malvaceae | P1 | - | Habit:<br>Flower colour:<br>Flowering period:<br>Soils:<br>IBRA Distribution:<br>Florabase records: | Shrub, 0.45-1.5 m high.<br>pink-white<br>July to October<br>White/grey or yellow sand, stony loam. Undulating plains, lateritic rises.<br>AVW, GES<br>17 | High |

**APPENDIX B: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT WITHIN THE PROPOSED PIPELINE SURVEY AREA**

**Note:** IBRA Distribution: AVW – Avon Wheatbelt; CAR – Carnarvon; COO – Coolgardie; ESP – Esperance Plains; GAS – Gascoyne; GES – Geraldton Sandplains; GVD – Great Victoria Desert; JAF – Jarrah Forest; MAL – Mallee; MUR – Murchison; SWA – Swan Coastal Plain; YAL – Yalgoo. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking. SCC – State Conservation Code; FCC – Federal Conservation Code.

| Species | Family | SCC | FCC | Description and Habitat | | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| *Micromyrtus rogeri* | Myrtaceae | P1 | - | Habit:<br>Flower colour:<br>Flowering period:<br>Soils:<br>IBRA Distribution:<br>Florabase records: | Shrub, 0.2-0.4m high.<br>white<br>July to October<br>Yellow-brown sandy soils, gravel, laterite. Breakaways.<br>GES, JAF<br>13 | High |
| *Comesperma griffinii* | Polygalaceae | P2 | - | Habit:<br>Flower colour:<br>Flowering period:<br>Soils:<br>IBRA Distribution:<br>Florabase records: | Annual or perennial, herb, to 0.15 m high.<br>white<br>October<br>Yellow or grey sand. Plains.<br>AVW, ESP, GES, MAL, SWA<br>14 | Moderate |
| *Stylidium pseudocaespitosum* | Stylidiaceae | P2 | - | Habit:<br>Flower colour:<br>Flowering period:<br>Soils:<br>IBRA Distribution:<br>Florabase records: | Rosetted perennial, herb, 0.1-0.3 m high. Leaves tufted, linear, 2-7 cm long, 0.5-2 mm wide, apex subacute, margin entire, scabrous. Scape glabrous. Inflorescense racemose.<br>yellow<br>September to November<br>White, grey or yellow sand over laterite. Breakaways and hillslopes.<br>AVW, GES<br>20 | Moderate |
| *Banksia fraseri* var. *crebra* | Proteaceae | P3 | - | Habit:<br>Flower colour:<br>Flowering period:<br>Soils:<br>IBRA Distribution:<br>Florabase records: | Shrub, 0.3-4 m high.<br>cream, pale-golden yellow & brown<br>July to August<br>Sand, gravelly clay loam, lateritic soil. Sandplains, shallow valleys, slopes.<br>GES, SWA<br>16 | Moderate |

**APPENDIX B: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT WITHIN THE PROPOSED PIPELINE SURVEY AREA**

**Note:** IBRA Distribution: AVW – Avon Wheatbelt; CAR – Carnarvon; COO – Coolgardie; ESP – Esperance Plains; GAS – Gascoyne; GES – Geraldton Sandplains; GVD – Great Victoria Desert; JAF – Jarrah Forest; MAL – Mallee; MUR – Murchison; SWA – Swan Coastal Plain; YAL – Yalgoo. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking. SCC – State Conservation Code; FCC – Federal Conservation Code.

| Species | Family | SCC | FCC | Description and Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|
| *Beyeria gardneri* | Euphorbiaceae | P3 | - | Habit: Shrub, 0.25-0.5 m high.<br>Flower colour: yellow<br>Flowering period: August to September<br>Soils: Yellow sand.<br>IBRA Distribution: AVW, GES, SWA, YAL<br>Florabase records: 36 | Moderate |
| *Comesperma rhadinocarpum* | Polygalaceae | P3 | - | Habit: Perennial, herb.<br>Flower colour: blue<br>Flowering period: October to November<br>Soils: Sandy soils<br>IBRA Distribution: COO, GES, GVD, JAF, SWA<br>Florabase records: 16 | Moderate |
| *Eucalyptus macrocarpa* x *pyriformis* | Myrtaceae | P3 | - | Habit: Erect, open mallee tree, 1.2-6 m high.<br>Flower colour: red<br>Flowering period: April or August to October<br>Soils: Sand, lateritic sandy soils. Hills, rocky ironstone ridges, sandplains.<br>IBRA Distribution: AVW, GES, JAF, SWA<br>Florabase records: 39 | High |
| *Guichenotia alba* | Malvaceae | P3 | - | Habit: Slender, lax, few-branched shrub, 0.1-0.45 m high.<br>Flower colour: white<br>Flowering period: July to August<br>Soils: Sandy & gravelly soils. Low-lying flats, depressions.<br>IBRA Distribution: AVW, GES, SWA<br>Florabase records: 38 | High |
| *Hemiandra* sp. Eneabba (H. Demarz 3687) | Lamiaceae | P3 | - | Habit: Straggly, erect shrub, 0.5-0.9 m high, to 0.4 m wide.<br>Flower colour: blue/violet<br>Flowering period: February<br>Soils: Sand. Disturbed sites.<br>IBRA Distribution: GES<br>Florabase records: 35 | Moderate |

**APPENDIX B: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT WITHIN THE PROPOSED PIPELINE SURVEY AREA**

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| Species | Family | SCC | FCC | Description and Habitat | | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| *Mesomelaena stygia* subsp. *deflexa* | Cyperaceae | P3 | - | Habit:<br>Flower colour:<br>Flowering period:<br>Soils:<br>IBRA Distribution:<br>Florabase records: | Tufted perennial, grass-like or herb (sedge), 0.1-0.5 m high.<br>brown-black<br>March to October<br>White, grey or lateritic sand, clay, gravel.<br>GES<br>29 | High |
| *Persoonia filiformis* | Proteaceae | P3 | - | Habit:<br>Flower colour:<br>Flowering period:<br>Soils:<br>IBRA Distribution:<br>Florabase records: | Erect, spreading, lignotuberous shrub, 0.07-0.4 m high.<br>yellow<br>November to December<br>Yellow or white sand over laterite.<br>GES<br>24 | High |
| *Persoonia rudis* | Proteaceae | P3 | - | Habit:<br>Flower colour:<br>Flowering period:<br>Soils:<br>IBRA Distribution:<br>Florabase records: | Erect, often spreading shrub, 0.2-1 m high.<br>yellow<br>September to December or January<br>White, grey or yellow sand, often over laterite.<br>GES, JAF, SWA<br>41 | Moderate |
| *Stylidium drummondianum* | Stylidiaceae | P3 | - | Habit:<br>Flower colour:<br>Flowering period:<br>Soils:<br>IBRA Distribution:<br>Florabase records: | Rosetted perennial, herb, 0.05-0.22 m high. Leaves narrowly oblanceolate, 0.5-3 cm long, 0.8-2 mm wide, apex mucronate, margin hyaline and serrulate, glabrous. Scape hoary. Inflorescence paniculata.<br>pink<br>August to October<br>Sand or clayey sand over laterite. Upper hillslopes, breakaways.<br>AVW, GES<br>36 | High |

**APPENDIX B: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT WITHIN THE PROPOSED PIPELINE SURVEY AREA**

**Note:** IBRA Distribution: AVW – Avon Wheatbelt; CAR – Carnarvon; COO – Coolgardie; ESP – Esperance Plains; GAS – Gascoyne; GES – Geraldton Sandplains; GVD – Great Victoria Desert; JAF – Jarrah Forest; MAL – Mallee; MUR – Murchison; SWA – Swan Coastal Plain; YAL – Yalgoo. Likelihood of occurrence in survey area is based on a Low, Moderate or High ranking. SCC – State Conservation Code; FCC – Federal Conservation Code.

| Species | Family | SCC | FCC | Description and Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|
| *Verticordia luteola* var. *luteola* | Myrtaceae | P3 | - | Habit: Slender shrub, 0.5-1.4 m high.<br>Flower colour: white-yellow<br>Flowering period: November to December<br>Soils: Grey sand over gravel. Flats.<br>IBRA Distribution: AVW, GES<br>Florabase records: 20 | Moderate |
| *Banksia scabrella* | Proteaceae | P4 | - | Habit: Much-branched, lignotuberous shrub, 0.6-2 m high.<br>Flower colour: yellow & cream & purple<br>Flowering period: September to December or January<br>Soils: White, grey or yellow sand, sometimes with lateritic gravel. Sandplains, lateritic ridges.<br>IBRA Distribution: GES<br>Florabase records: 51 | High |
| *Eucalyptus macrocarpa* subsp. *elachantha* | Myrtaceae | P4 | - | Habit: Spreading or sprawling mallee, 0.8-4 m high, bark smooth, grey over salmon pink.<br>Flower colour: red-pink<br>Flowering period: August to September or November to December<br>Soils: White or grey sand over laterite. Hillslopes, ridges, sandplains.<br>IBRA Distribution: GES, SWA<br>Florabase records: 55 | High |
| *Stawellia dimorphantha* | Hemerocallidaceae | P4 | - | Habit: Stilt-rooted perennial, herb, 0.05-0.2 m high.<br>Flower colour: purple/cream<br>Flowering period: June to November<br>Soils: White, grey, yellow sand.<br>IBRA Distribution: GES<br>Florabase records: 23 | High |

**APPENDIX C: FAUNA SPECIES WITH THE POTENTIAL TO OCCUR WITHIN THE PROPOSED PIPELINE SURVEY AREA**

Note: * denotes introduced species; P1-P4 denote priority fauna species (DBCA 2019a); SCC= State Conservation Code (MI = Migratory Species; CR = Critically Endangered; EN = Endangered, VU = Vulnerable); FCC = Federal Conservation Code (MI = Migratory Species; CE = Critically Endangered; E = Endangered; V = Vulnerable); IUCN[1] = International Union for Conservation of Nature [IUCN] Red List of Threatened Species (LC = Least Concern; NT = Near Threatened; VU = Vulnerable; EN = Endangered), (IUCN 2020); [2] (DAWE 2020a); [3] (DBCA 2007-).

| Group | Species | Common Name | SCC | FCC | IUCN[1] | EPBC[2] | Naturemap[3] |
|---|---|---|---|---|---|---|---|
| Birds | *Actitis hypoleucos* | Common Sandpiper | MI | MI | LC | x | |
| | *Apus pacificus* | Fork-tailed Swift | MI | MI | LC | x | |
| | *Ardea alba* | Great Egret, White Egret | | | LC | x | |
| | *Ardea ibis* | Cattle Egret | | | LC | x | |
| | *Calamanthus campestris* subsp. *montanellus* | Rufous Fieldwren, Western Fieldwren (western wheatbelt) | | | LC | | x |
| | *Calidris acuminata* | Sharp-tailed Sandpiper | MI | MI | LC | x | |
| | *Calidris ferruginea* | Curlew Sandpiper | CR | CE & MI | NT | x | |
| | *Calidris melanotos* | Pectoral Sandpiper | MI | MI | LC | x | |
| | *Calyptorhynchus latirostris* | Carnaby's Cockatoo, Short-billed Black- | EN | E | EN | x | |
| | *Chrysococcyx osculans* | Black-eared Cuckoo | | | LC | x | |
| | * *Columba livia* | Rock Pigeon, Rock Dove, Domestic Pigeon | | | | x | |
| | *Haliaeetus leucogaster* | White-bellied Sea-Eagle | | | LC | x | |
| | *Leipoa ocellata* | Malleefowl | VU | V | VU | x | |
| | *Merops ornatus* | Rainbow Bee-eater | | | LC | x | |
| | *Motacilla cinerea* | Grey Wagtail | MI | MI | LC | x | |
| | *Numenius madagascariensis* | Eastern Curlew, Far Eastern Curlew | CR | CE & MI | EN | x | |
| | *Pandion haliaetus* | Osprey | | | LC | x | |
| | * *Passer montanus* | Eurasian Tree Sparrow | | | | x | |
| | *Rostratula australis* | Australian Painted Snipe | EN | E | EN | x | |
| | *Rostratula benghalensis* (sensu lato) | Painted Snipe | | E | LC | x | |
| | * *Streptopelia senegalensis* | Laughing Turtle-dove, Laughing Dove | | | | x | |
| | *Thinornis rubricollis* | Hooded Plover | P4 | | VU | x | |
| Invertebrates | *Cercophonius michaelseni* | Scorpion | | | | | x |
| | *Idiosoma nigrum* | Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider | EN | V | | x | |
| Mammals | * *Canis lupus familiaris* | Domestic Dog | | | | x | |
| | *Dasyurus geoffroii* | Chuditch, Western Quoll | VU | V | NT | x | |
| | * *Felis catus* | Cat, House Cat, Domestic Cat | | | | x | |
| | * *Mus musculus* | House Mouse | | | | x | |
| | *Notamacropus irma* | Western Brush Wallaby | P4 | | | | x |
| | * *Oryctolagus cuniculus* | Rabbit, European Rabbit | | | | x | |
| | *Parantechinus apicalis* | Dibbler | EN | E | EN | x | |
| | * *Vulpes vulpes* | Red Fox, Fox | | | | x | |
| Reptiles | *Ctenophorus maculatus* subsp. *maculatus* | Spotted Military Dragon | | | LC | | x |
| | *Egernia stokesii badia* | Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink | VU | E | LC | x | |