

Appendix A Flora and Fauna Survey 2022 – Strategen-JBS&G 2022a –Perth Basin Ecological Studies – Reconnaissance and Basic Autumn Surveys



Beach Energy Pty Ltd
Perth Basin Ecological Studies
Interim Report

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JBS&G Australia Pty Ltd T/A Strategen-JBS&G
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Abbreviations

Term	Definition
BAM Act	<i>Western Australian Biosecurity and Agriculture Management Act 2007</i>
BC Act	<i>Western Australian Biodiversity Conservation Act 2016</i>
BoM	Bureau of Meteorology
DAWE	Commonwealth Department of Agriculture, Water and the Environment (2020-2022, now DCCEEW)
DBCA	Western Australian Department of Biodiversity, Conservations and Attractions
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DEC	Western Australian Department of Environment and Conservation (2006-2013, now DBCA)
DSEWPac	Commonwealth Department of Sustainability Environment Water Population and Communities (2010-2013, now DCCEEW)
DWER	Western Australian Department of Water and Environmental Regulation
EN	Endangered (conservation status as listed under the Commonwealth EPBC Act and/or State BC Act)
EP Act	Western Australian Environmental Protection Act 1986
EPA	Western Australian Environmental Protection Authority
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
GDE	Groundwater Dependent Ecosystem
GDV	Groundwater Dependent Vegetation
GIS	Geographic Information System
IBRA	Interim Biogeographic Regionalisation for Australia
km	kilometre/kilometres
m	metre/metres
MA	Marine species (fauna protected under the Commonwealth EPBC Act or international agreements)
MI	Migratory species (fauna specially protected under the Western Australian BC Act or Commonwealth EPBC Act)
MS	Ministerial Statement
NVIS	National Vegetation Inventory System
MNES	Matters of National Environmental Significance
OS	Other specially protected species (specially protected Fauna species listed under the Western Australian BC Act)
P1, P2, P3, P4, P5	Priority Flora, Fauna or Ecological Community ranking (P1-P5) as per DBCA listings
PEC	Priority Ecological Community
PF	Priority Flora
PMST	Protected Matters Search Tool (hosted by DAWE, used to search for MNES)
SFDV	Sheet Flow Dependent Vegetation
SoW	Scope of Works
sp.	Species (generally referring to an unidentified taxon or when a phrase name has been applied)
subsp.	Subspecies (infrataxon)
SRE	Short Range Endemic
S1	Schedule 1 Fauna species as listed under the Western Australian BC Act
TEC	Threatened Ecological Community
TF	Threatened Flora (previously Declared Rare Flora [DRF] in Western Australia)
var.	Variety (infrataxon)
VU	Vulnerable (conservation status as listed under the Commonwealth EPBC Act and/or State BC Act)
WAH	Western Australian Herbarium
WAM	Western Australian Museum
WAOL	Western Australian Organism List
WONS	Weeds of National Significance
*	Introduced flora species (i.e. weed)

1. Introduction

1.1 Background

As part of the development of the Beharra Springs Facility, Beach Energy Limited (Beach) are proposing to drill a number of gas exploration and development wells in EP 320 and L 11. In order to support environmental approvals for the proposed works, Beach engaged JBS&G to undertake ecological studies including a Reconnaissance flora survey and Basic fauna survey to assess broad vegetation units and fauna habitat at seven sites and associated access corridors. This flora and fauna survey was undertaken in Autumn 2022.

1.2 Survey Area

The area for which ecological survey is required to be undertaken (Survey Area) is located in Arrowsmith, approximately 30 km southeast of Dongara, Western Australia in the Shire of Irwin. The Survey Area totals 255.58 hectares, spanning approximately 20 km, and is positioned south of Mount Adams Road and East of Brand Highway. The Survey Area is comprised of native vegetation, as well as vegetation corridors adjacent to associated access tracks (Figure 1.1)

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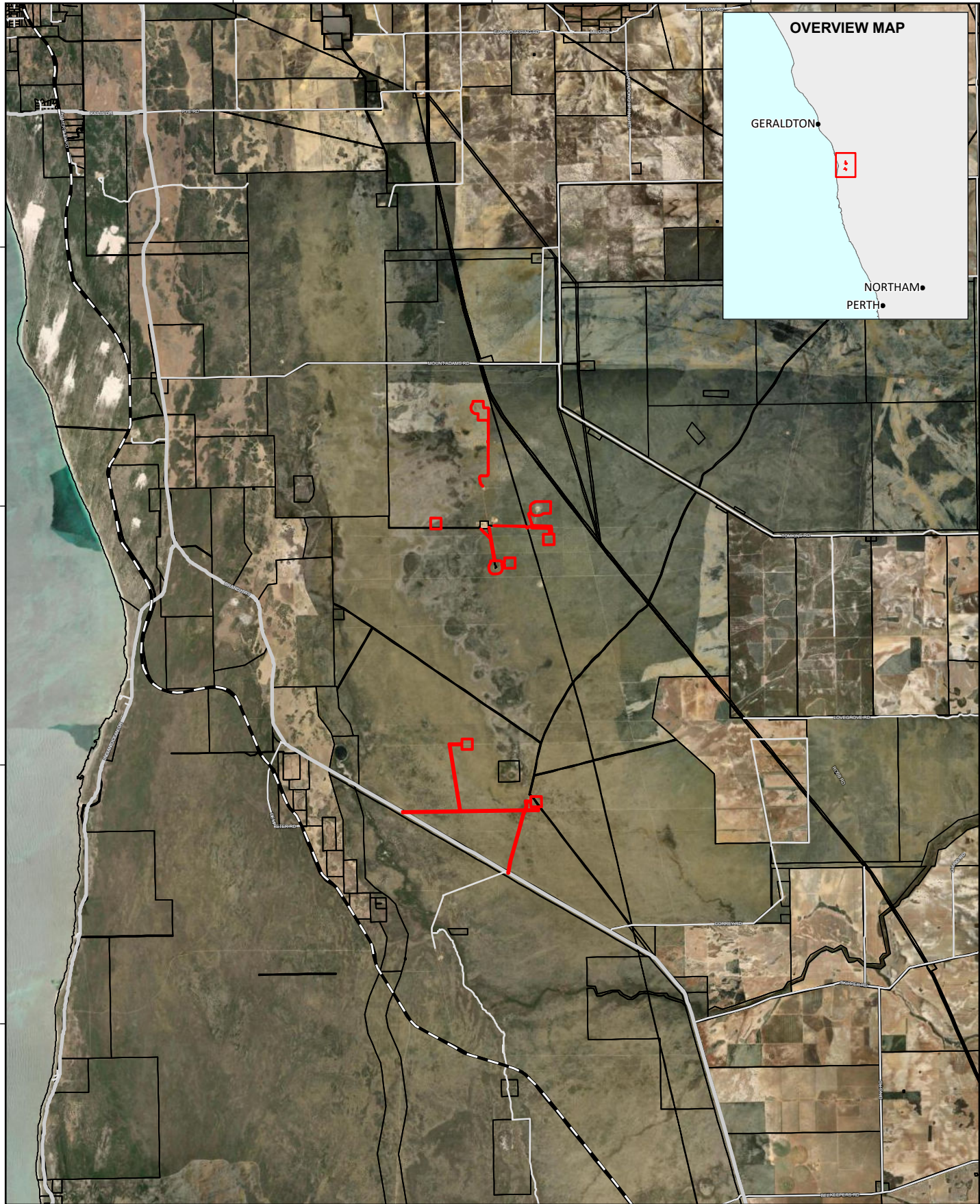
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- Legend**
- Survey area
 - Cadastre (LGATE-002)
 - Rail line
 - Major road
 - Minor road

Scale: 1:200,000 at A4

0 2 1/2 5
Kilometres

Coord. Sys. GDA2020 MGA Zone 50

Job Number: 62676

Client: Beach Energy

Version: R01 Rev A

Date: 06-Sep-2022

Drawn By: cthatcher

Checked By: TJ

Perth Basin Ecological Studies

SURVEY AREA

FIGURE 1.1



1.3 Compliance

Various legislative documents, policies and guidelines are relevant to the environmental assessment of the Survey Area and provide guidance on survey methodology and outcomes.

1.3.1 Legislative Context

Flora and fauna in Western Australia (WA) are protected formally and informally by various legislative and non-legislative measures, including:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) – Commonwealth;
- *Biodiversity Conservation Act 2016* (BC Act) – State;
- *Environmental Protection Act 1986* (EP Act) – State;
- *Biosecurity and Agriculture Management Act 2007* (BAM Act) – State; and
- WA Department of Biodiversity, Conservation and Attractions (DBCA) Priority lists for flora, ecological communities and fauna.

A short contextual description of each legislative measure is provided below. Other definitions, including species conservation categories, are provided in **Appendix A**.

1.3.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act aims to protect Matters of National Environmental Significance (MNES), which are detailed in Appendix A. Under the EPBC Act, the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) lists protected species and Threatened Ecological Communities (TECs) by criteria set out in the Act. Species are conservation significant if they are listed as Threatened (i.e. Critically Endangered, Endangered and Vulnerable) or Migratory.

Bird species protected as Migratory under the EPBC Act include those listed under international migratory bird agreements relating to the protection of birds which migrate between Australia and other countries, for which Australia has agreed. This includes the Japan-Australia Migratory Bird Agreement (JAMBA), the China-Australia Migratory Bird Agreement (CAMBA), the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Some marine fauna or terrestrial fauna that use marine habitats are listed as Marine under the EPBC Act. These species are only considered conservation significant when a proposed development occurs in a Commonwealth marine area (i.e. any Commonwealth Waters or Commonwealth Marine Protected Area). Outside of such areas, the EPBC Act does not consider these species to be MNES and therefore are not protected under the EPBC Act.

1.3.1.2 *Biodiversity Conservation Act 2016*

DBCA lists taxa (flora and fauna) under the provisions of the BC Act as protected and are classified as according to their need for protection (see Appendix A). The BC Act makes it an offence to 'take' threatened species without an appropriate licence. There are financial penalties for contravening the BC Act.

Under the *Biodiversity Conservation Act 2016* (BC Act), DBCA lists species as Threatened (T) (Declared Rare) or Priority Flora (P1, P2, P3 or P4).

1.3.1.3 *Environmental Protection Act 1986*

Threatened flora, fauna (and significant habitat necessary for the maintenance of indigenous fauna) and ecological communities are given special consideration in environmental impact assessments and have special status as Environmentally Sensitive Areas (ESAs) under the EP Act and the

Environmental Protection (Clearing of Native Vegetation) Regulations 2004. Exemptions for a clearing permit do not apply in, or within 50 m of, an ESA.

1.3.1.4 Biosecurity and Agriculture Management Act 2007

The BAM Act provides for management and control of listed organisms, including introduced flora species (weeds). Species listed as Declared Pests under the BAM Act are classified under three categories:

- C1 Exclusion: Pests assigned under this category are not established in Western Australia, and control measures are to be taken to prevent them entering and establishing in the State.
- C2 Eradication: Pests assigned under this category are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
- C3 Management: Pests assigned under this category 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 that is currently free of that pest.

Under the BAM Act, land managers are required to manage populations of Declared Pests as outlined under the relevant category.

1.3.2 Relevant Guidelines

Additionally, the following factors, guidelines and government listings were taken into consideration when conducting ecological studies within the Survey Area:

- Department of Agriculture, Water and the Environment (DAWE) (2022a) *Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black-cockatoo*, referred to hereafter as the Black Cockatoo Referral Guidelines;
- Department of Environment, Water, Heritage and the Arts (DEWHA) (2009) *Matters of National Environmental Significance. Significant impact guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999*;
- DEWHA (2010) *Survey guidelines for Australia's threatened birds*;
- Department of Sustainability Environment Water Population and Communities (DSEWPaC) (2011) *Survey guidelines for Australia's threatened mammals*;
- EPA (2020a) *Statement of Environmental Principles, Factors and Objectives*;
- EPA (2016a) *Environmental Factor Guideline – Flora and Vegetation*;
- EPA (2016b) *Environmental Factor Guideline – Terrestrial Fauna*;
- EPA (2016c) *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*, referred to hereafter as the Flora and Vegetation Technical Guidance;
- EPA (2020) *Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*, referred to hereafter as the Fauna Technical Guidance;
- Threatened Species Scientific Committee (TSSC 2016) *Approved conservation advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community*;
- Weeds of National Significance (WoNS); and
- Locally significant populations recognised by the DBCA.

2. Methods

2.1 Rationale for Survey Approach

The following survey methods were proposed and discussed as being appropriate to define impacts on flora and vegetation within the Survey Area as a result of the proposed drilling program:

1. Desktop assessment of available ecological data and reports;
2. Reconnaissance (formerly level 1) flora and vegetation survey per *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016c) to characterise broad vegetation units and condition across the Survey Area;
3. Basic (formerly level 1) fauna survey as per *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020) to identify broad faunal assemblages and habitats present within the Survey Area; and
4. Targeted survey for conservation-listed flora within well sites and associated access corridors requiring disturbance, to enable assessment of direct impacts and inform avoidance and mitigation where possible.

A Reconnaissance level flora and vegetation survey, and Basic fauna survey, was considered appropriate given the absence of conservation significant communities occurring within the Survey Area as defined by initial desktop assessment, the relatively low level of impact of the proposed works, and the extent of Targeted flora survey proposed which would add supplementary information to the initial coverage.

To supplement the Reconnaissance flora and vegetation survey, Targeted flora survey within proposed areas of disturbance will be conducted in mid-late spring 2022 to fully inform the density and distribution of conservation significant flora species with potential to be impacted by the works. The search for flora of conservation significance will utilise parallel transects at 10 m intervals. The findings of these surveys will be presented in separate reports for section of the Project.

An outline of the field survey schedule is shown in **Table 2-1**.

Table 2-1: Survey Schedule

Dates	Phase	Objective
9 May – 9 June 2022	Basic Fauna Survey	<ul style="list-style-type: none"> • Map broad fauna habitat units • Identify general faunal assemblage • Assess likelihood of occurrence of conservation-listed species
24 May – 9 June 2022	Reconnaissance Flora and Vegetation Survey	<ul style="list-style-type: none"> • Map broad vegetation units and condition • Identify areas of significant vegetation • Assess likelihood of occurrence of conservation-listed species
October - November 2022	Targeted Flora Survey at Tarantula Deep, Redback 1 and Redback 1 Deep, Redback South, , Beharra Deep 2 and associated access tracks.	<ul style="list-style-type: none"> • Identify presence of conservation-listed flora

2.2 Desktop Assessment

Desktop methodology was undertaken in accordance with current EPA guidance (EPA 2016c; 2020). A comprehensive review of contextual environmental information was undertaken including climate, biogeography, land systems, and pre-European vegetation. Databases listed in **Table 2-2** were queried to generate a list of species and ecological communities previously recorded within, and in

the vicinity of, the Survey Area – with an emphasis on species and communities of conservation significance and introduced species. Buffers were applied to all searches to provide appropriate contextualisation of the biogeographic region and are listed in **Table 2-2**.

Table 2-2: Database searches conducted for the desktop assessment

Custodian	Database	Search Group	Search Extent (from Survey Area boundary)
Department of Biodiversity Conservation and Attractions	Threatened and Priority Ecological Communities database	Ecological communities	50 km
	Threatened and Priority Flora database	Flora species	18 km
	Threatened and Priority Fauna database	Fauna species	30km
Department of Agriculture, Water and the Environment	Protected Matters Search Tool	Matters of National Environmental Significance	20 km
	State and Commonwealth Heritage	European Heritage	Not Applicable
Department of Planning, Land and Heritage	Aboriginal Heritage Inquiry System	Aboriginal Heritage (Registered and Other)	Not Applicable
WA Herbarium	Western Australian Herbarium (FloraBase)	Flora species	18 km

Reports that document regional flora and fauna within the surrounds of the Survey Area were also reviewed prior to the field assessment. These included:

- Ecologia (2018). *West Erregulla Targeted Flora Survey*;
- Eco Logical Australia (2020). *West Erregulla Pipeline Flora and Fauna Survey*.
- Eco Logical (2021). *West Erregulla Pipeline Flora and Vegetation Survey*;
- Maia Environmental Consultancy Pty Ltd (2013). *Drover - 01 Study Area Reconnaissance and Targeted Flora Surveys*. Document prepared for AWE Limited.
- Mattiske Consulting Pty Ltd (2021a). *Flora and Vegetation Assessment Arrowsmith North Survey Area*. Document prepared for VRX Silica Ltd.
- Mattiske Consulting Pty Ltd (2021b). *Flora and Vegetation Assessment Arrowsmith North Transport Corridor Survey Area*. Document prepared for VRX Silica Ltd.
- Strategen-JBS&G (2020). *Natta 3D Seismic Flora and Vegetation Survey*;
- Strategen-JBS&G (2020). *Zemira 3D Seismic Flora and Vegetation Survey*;
- Woodman Environmental Consulting (2009). *West Erregulla 2 Well Site Flora and Vegetation Assessment*;
- Woodman Environmental Consulting (2013). *West Erregulla Project Flora and Vegetation Assessment*;
- Woodman Environmental Consulting (2018a). *Proposed Xyris Lateral Flora and Vegetation Assessment*;
- Woodman Environmental Consulting (2018b). *Waitsia 3 Flowline Corridor Flora, Vegetation and Fauna Assessment*;

- Woodman Environmental Consulting (2020a) *West Erregulla Exploration Program*; and
- Woodman Environmental Consulting (2020b). *West Erregulla Wells 4 & 5 Flora and Vegetation Risk Assessment*.

Following environmental contextualisation of the Survey Area and evaluation of likely landforms and broad habitats present, the criteria listed in Sections 3.6, 3.7 and 3.8 were applied to regionally significant conservation values to determine the likelihood of occurrence of significant species and communities occurring within the Survey Area. These likelihoods were reassessed following field survey after habitats and landforms had been ground-truthed, and with consideration of in-field survey effort and recorded observations.

2.3 Field Assessment

2.3.1 Reconnaissance Flora and Vegetation Survey

A Reconnaissance survey was undertaken between 24 May and 9 June 2022 by experienced Ecologists Terri Jones (Associate Ecologist; FB62000191), Rachael Pratt (Senior Ecologist; FB 62000141) and Emma Bentley (Ecologist; FB 62000336-2), with field assistance from Logan Penman (Environmental Scientist). In line with EPA Flora and Vegetation Technical Guidance, the objectives of the Reconnaissance survey were to:

- Verify the information obtained during initial desktop study;
- Characterise the flora and delineate the vegetation units present;
- Undertake low intensity sampling of flora and vegetation to describe the general vegetation characteristics and condition; and
- Clarify whether the area may support any significant flora or vegetation.

2.3.1.1 Relevés

During the survey, data was collected from a minimum of one representative relevé within each vegetation type identified, allowing for assessment of additional relevés to provide adequate spatial coverage of the Survey Area.

Within each relevé the following information was recorded:

- Name of recorder;
- Date;
- GPS co-ordinates (recorded in WGS84 MGA Zone 50 and converted to GDA2020 MGA Zone 50);
- Dimensions (radius) of the relevé;
- Photograph of the vegetation;
- Vegetation condition;
- Brief vegetation description;
- Topography;
- Soil type and colour;
- Geology (type, size and cover of any rocks, stones, gravel or outcropping);
- Average percentage cover of leaf litter and bare ground;

- Disturbance details including fire history (time since last fire), and physical disturbance including evidence of erosion, grazing and weed invasion; and
- All vascular flora taxa present (with average height and total percentage foliage cover of each taxon).

2.3.1.2 Flora

All vascular flora species (both native and exotic) observed within relevés were recorded. For any taxa known to be conservation significant, or where an introduced flora (weed) species constituting a Weed of National Significance (WoNS) or Declared Pest plant (DPP) was observed, a GPS location and a count of the individuals present or percentage foliage cover were recorded. Where applicable, the extent of any conservation significant population was also recorded to enable mapping of populations and to inform avoidance and mitigation strategies.

Opportunistic observations of supplementary or conservation-listed flora taxa made whilst traversing the Survey Area were additionally recorded.

2.3.1.3 Vegetation Units

Vegetation units were identified and described using a combination of geotagged photography from the targeted surveys, site observations and relevé data. Aerial photography, soil-landscape mapping interpretation and field notes taken during the survey were then used to develop polygon boundaries over the Survey Area.

Vegetation descriptions and classifications were recorded at Level V as per the National Vegetation Information System (NVIS) framework (NVIS Technical Working Group 2017). Terminology and categories relevant to the NVIS classifications are presented in Appendix A. Up to three species per stratum from each defined stratum present (upper, mid and ground) were used to form descriptions applied to relevés and derived vegetation types. Based on the large sandplain areas and large beta diversity, finer scale vegetation mapping was not deemed possible based on the reconnaissance level survey.

Codes applied to vegetation types described were formulated using the dominant species of the highest stratum present within the vegetation type that had >2% cover, with the upper case first letter referring to the genus, and lower case letter (or letters) referring to the species, and additional upper case letters at the conclusion of the code referring to the stratum structure. For example, **EtLW** refers to *Eucalyptus todtiana* low woodland.

2.3.1.4 Vegetation Condition

Vegetation condition was recorded within all relevés, and opportunistically within the Survey Area during the field assessments. Vegetation condition polygon boundaries were developed using this information in conjunction with aerial photography interpretation and data collected during targeted surveys and were digitised as for vegetation type mapping polygon boundaries. Vegetation condition was described using the EPA recommended vegetation condition scale for the Southwest Botanical Province (Table 2-3).

Table 2-3: Vegetation Condition Scale for Southwest and Interzone Botanical Provinces (EPA 2016)

Vegetation Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

2.3.1.5 Flora Identification and Nomenclature

Where flora could not be identified confidently in the field, specimens were collected in accordance with procedures outlined by the Western Australian Herbarium (WAH) (DBCA 2020a). Plant specimens collected during the field surveys were identified either in-house by experienced ecologists using appropriate reference material, or submitted for identification with experienced independent taxonomist Bethea Loudon. Nomenclature of species recorded was undertaken in accordance with WAH (1998-).

2.3.1.6 Statistical Analysis

Floristic analysis is not typically required for a Reconnaissance level of survey and has limited application in this instance due to the low intensity of sampling and absence of replicate relevés for some vegetation units. However, analyses were conducted to confirm if vegetation types identified in the field had a basis in the floristic composition of the assessed relevés.

PATN© software (Belbin & Collins 2013) is a multivariate analysis tool used to generate estimates of association (resemblance, affinity, distance) between sets of data and group the datasets accordingly. The software was used to generate floristic groups using the data collected from the relevés, in order to better delineate and understand local significance of floristic units.

A species accumulation curve was additionally generated using relevé data to demonstrate adequacy of sampling, utilising EstimateS© statistical software (Colwell 2013). However, for a reconnaissance survey with low intensity sampling, the species inventory is not anticipated to be comprehensive.

2.3.2 Basic Fauna Survey

A Basic fauna survey was undertaken between 9 May and 9 June 2022 by experienced Ecologists Terri Jones (Associate Ecologist) and Emma Bentley (Ecologist). In line with EPA Fauna Technical Guidance, the purpose of the Basic fauna survey was to gather broad fauna habitat information, with specific objectives being to:

- verify the information obtained during initial desktop study; and
- map and describe fauna habitats.

2.3.2.1 Fauna Habitat Assessment Points

Evaluation was made at one or more assessment sites within each discernible habitat unit, with replicates to allow for spatial distribution of assessment across the Survey Area. Each habitat assessment point made record of:

- Name of recorder;
- Date;
- GPS co-ordinates (recorded in WGS84 MGA Zone 50);
- Representative photograph of the habitat;
- Brief vegetation description;
- Presence of significant trees suitable for Black Cockatoo Breeding;
- Topography;
- Soil type and colour;
- Geology (type, size and cover of any rocks, stones, gravel or outcropping);
- Average percentage cover of leaf litter and bare ground;
- Disturbance details including fire history (time since last fire), and physical disturbance including evidence of erosion, grazing and weed invasion; and
- All fauna species, or secondary evidence thereof, observed.

2.3.2.2 Bird Survey

Periods of ornithological survey were undertaken in different vegetation units to help identify bird assemblages relevant to the habitat types present in the Survey Area. Bird species identifiable via opportunistic sighting or call observations whilst moving throughout the site were additionally recorded.

2.3.2.3 Active Searches

Active searching was undertaken within areas of suitable microhabitat such as rockpiles, coarse woody debris and logs, and accumulated litter. Where applicable, raking of litter or temporary displacement of timber was undertaken, with care taken not to create lasting disturbance of habitat.

2.3.2.4 Secondary Evidence

All observations of secondary fauna evidence were recorded and identified to species level where possible. This included recognisable tracks, scat material or other evidence such as burrows or scrapes.

2.3.2.5 Fauna Habitat Mapping

Values recorded at fauna habitat assessment points, as well as observations undertaken continuously during traverses, were utilised in conjunction with vegetation unit mapping to define and map fauna habitat types present in the Survey Area. Habitat units are distinguished based on landform, soil type, vegetation composition and structure, and faunal assemblage observed. Potential for utilisation by fauna with specialised requirements (such as hollow-nesting species), or isolated or restricted habitats, was considered throughout the survey.

Additionally, previous habitat mapping and available aerial imagery was used to further refine and characterise habitat units. Habitats were mapped spatially and extents within the Survey Area calculated using Geographic Information System (GIS) software.

2.3.2.6 Short Range Endemic Habitat Assessment

Short Range Endemic (SRE) species are defined as terrestrial or freshwater invertebrates which have a naturally restricted distribution, typically of less than 10,000 km² (EPA 2009). Within their known range, SRE species may occur discontinuously in fragmented and highly specialised habitats.

Prior to field survey, previous survey literature and aerial imagery of the area was inspected to identify areas more likely to contain SRE taxa based on geographic features and landform, as well as vegetation and visible ecological linkage features. During the field survey, all habitat types were evaluated for potential to support SRE species. In particular, the area was assessed for examples of restricted or sheltered habitats known to have greater potential to support SRE species (EPA 2009). This includes such features as:

- Sheltered habitats and microhabitats:
 - Southwest facing slopes;
 - Rock piles, gorges, cliff faces or breakaways;
 - Naturally occurring springs;
 - Drainage lines;
 - Areas of vine thicket or exposed root systems; and
 - Fire refugia.
- Habitat isolates:
 - Outcrops and boulder piles;
 - Mesas and plateau remnants;
 - Areas of banded ironstone, exposed calcrete or dolomite dykes; and
 - Isolated birridas or lakes.

Observational and foraging techniques were additionally utilised in the field to actively search for evidence of SRE species in areas of more suitable habitat. This involved raking of leaf litter, targeted searching for presence of trapdoor spider burrow entrances and inspection of rock piles or coarse woody debris.

2.3.2.7 Black Cockatoo Habitat Assessment

As part of the desktop assessment, known locations of Black Cockatoo breeding and roosting sites in the vicinity were reviewed (DBCA 2019a; 2019b). During field assessment, the Survey Area was surveyed for presence of Black Cockatoos, and observed occurrences of any significant trees with potential for Black Cockatoo breeding or roosting recorded. Vegetation was additionally assessed for suitability as foraging habitat against the foraging quality scoring tool set out in the Black Cockatoo Referral Guidelines (DAWE 2022a). The scoring tool is provided in Appendix A.

At each fauna habitat assessment point (Appendix G), the following factors were evaluated and recorded:

- Presence of vegetation favoured for foraging (as listed in the Black Cockatoo Referral Guidelines), including Proteaceous species, Eucalypt species, Pinus species etc.;
- Evidence of foraging e.g. chewed Eucalypt nuts;

- GPS location of potential nesting or night roosting trees; and
- Evidence of any vegetation disease, such as *Phytophthora* dieback or Marri Canker.

2.3.3 Well Site Photographic Records

Each of the proposed and established well sites within the Survey Area was photographed from the central GPS location to provide photographic record. Photographs were taken from the centre point facing north, east, south and west respectively. Images are provided in Appendix F.

3. Desktop Assessment Results

This section describes the existing physical environment of the Survey Area and identifies relevant values and sensitivities of the environment that may be affected by the Project.

The region has a dry warm Mediterranean climate with warm, dry summers and cool, wet winters, but seven to eight dry months per year. At the Eneabba automatic weather station (station 008225), which operated from 1964-2017, the average annual rainfall during this period was 489.6 mm, with the highest monthly rainfall occurring from June to August (Figure 2.1). The wettest year on record was 1999, with an annual rainfall of 850.6 mm, 220.6 mm of which fell in May. The highest recorded monthly rainfall was 280.2 mm which fell in June 1964.

The average monthly maximum temperature ranged from 19.7 °C in July to 36.5 °C in February. Average monthly minimum temperatures ranged from 8.9 °C in July to 19.6 °C in February. The hottest recorded day was 48.7 °C in February 1991, and the lowest minimum temperature of 0.5 °C was recorded on in July 1998.

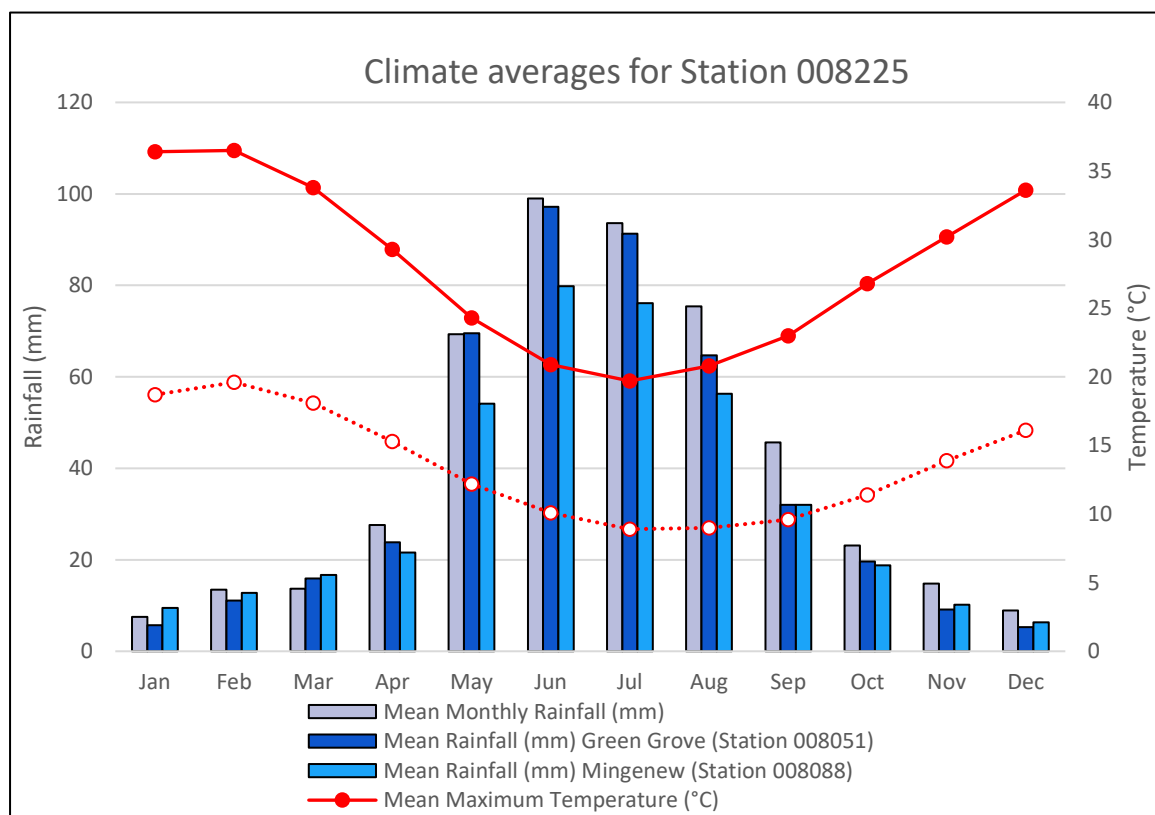
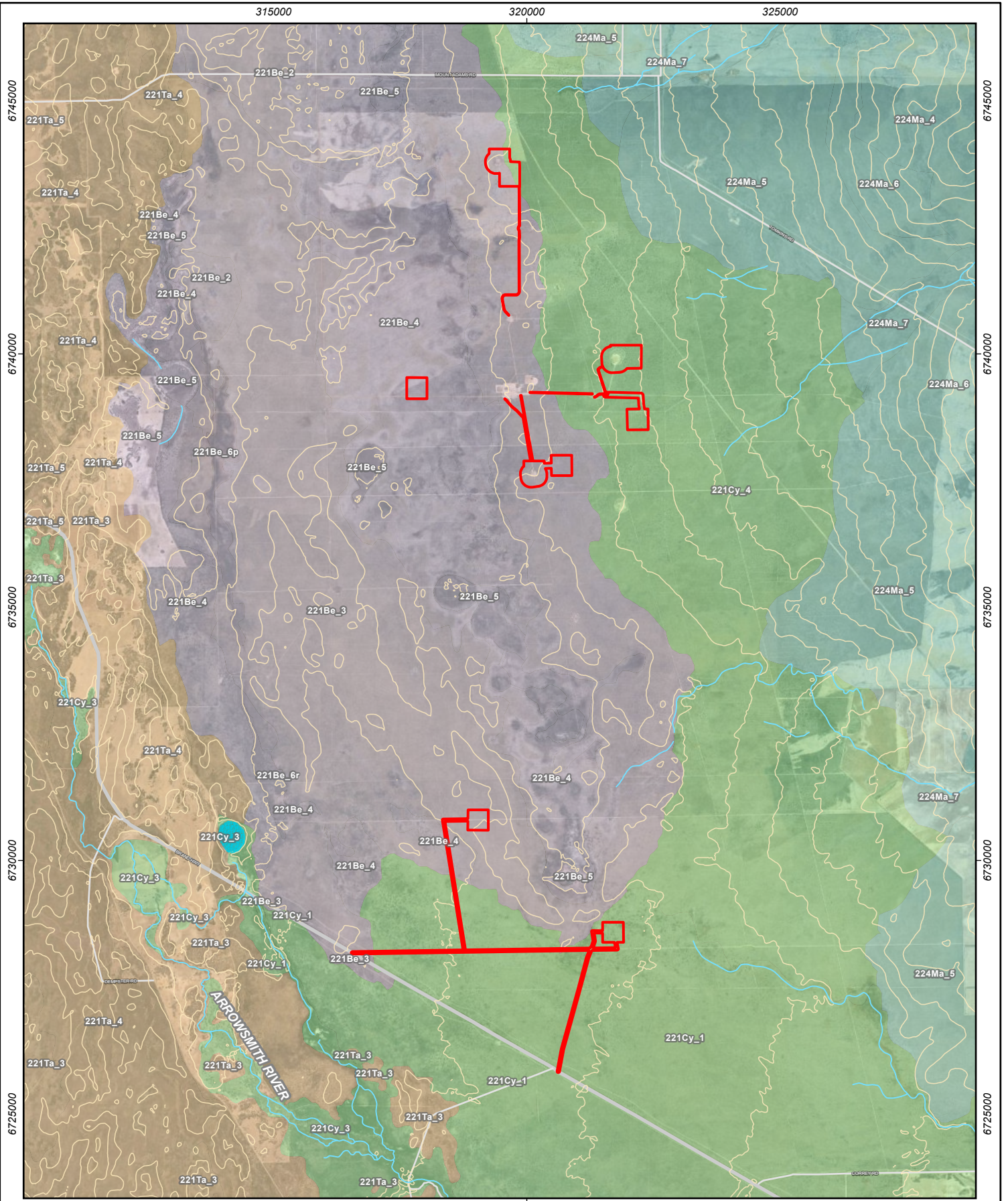


Figure 2.1: Climate data

3.1 Soils and Landforms

The Geraldton Sandplains are characterised by a series of old dunes which run parallel to the coast. The younger Quindalup dunes occur near the contemporary coastline, with the Spearwood dunes occurring further inland. The soils are typically sandy with some areas of exposed limestone, and a series of wetlands occurs along the plains. In the east lateritic rises occur.

Based on the 2017 soil and landform mapping dataset DPIRD-027 from the Department of Primary Industries and Regional Development (DPIRD), there are four main soil-land subsystems comprising the Survey Area (Table 3-1). The soil-land sub-systems have been used to inform potential presence of conservation significant flora and communities.



Legend Survey area Lake Soil Landscape Mapping - Best Available (DPIRD-027) 221Be 221Cy 221Ta 224Ma Topographic contours (mAHD) Watercourses Major road Minor road	Scale: 1:100,000 at A4 	Perth Basin Ecological Studies SOILS, LANDFORMS AND HYDROLOGY FIGURE 3.1
	Coord. Sys. GDA2020 MGA Zone 50 	
	Job Number: 62676	
	Client: Beach Energy	
	Version: R01 Rev A Date: 06-Sep-2022	
Drawn By: ctatcher Checked By: TJ		

Table 3-1: Soil Landscape Subsystems (DPIRD-027)

Reference	Soil subsystem	Description	Extent within Survey Area (ha)	% within Survey Area
221Be_3	Beharra 3 subsystem	Level to gently undulating sandplain; yellow deep sand	96.00	38%
221Be_4	Beharra 4 subsystem	Level to gently undulating sandplain with numerous small playas and swampy depressions; Yellow and pale deeps sands with some swamp soils	19.82	8%
221Cy_1	Correy 1 Subsystem	Alluvial plain; Pale deep sands dominate with yellow deep sands and shallow and deep sandy duplexes	63.03	25%
221Cy_4	Correy 4 subsystem	Alluvial fans and dunes outwashed from scarp; pale and yellow deep sands	76.74	30%

3.2 Topography

The topography of the Survey Area is low lying with a gentle inclination to the east. In the northern section of the Survey Area, the lowest elevation is 40 m AHD to the west and the highest elevation is 70 m AHD to the east, with the northern and southern parts of the section at 50 m AHD. In the southern section of the Survey Area the lowest elevation is 40 m AHD to the west, rising to 50 m AHD in the east (Figure 3.1).

3.3 Surface Water and Wetlands

There are two ephemeral surface water courses identified to the southwest and southeast of the Survey Area, Arrowsmith Lake and the Arrowsmith River (Figure 3.1). There are no listed wetlands in or near the Survey Area.

3.4 Heritage and Conservation Reserves

One registered Aboriginal heritage site was found in proximity to the Survey Area – the Arrowsmith River (ID 30068), which runs from the south-west of the Survey Area around to east, with its closest point approximately 1.2 km to the southwest of the Survey Area (Figure 3.2). The registered site follows the course of the main river. None of the tributaries close to the Survey Area form part of the registered site.

Another Heritage Place; 5217 (Stored Data/Not a Site), is located within the most southern point of the Survey Area (Figure 3.2).

Four heritage survey areas were identified by the search within or adjacent to the Survey Area. One heritage survey area mostly covers and extends beyond the Survey Area is associated with archaeological study of proposed seismic programme, Beharra Springs. Two heritage survey sites approximately 0.5km to the northeast running adjacent to the Survey Area, are heritage monitoring of Aboriginal Sites within Loop 7 of DBNGP Stage 5B, Midlands Road to Yandanooka Hills, associated with a Natural Gas Pipeline and an ethnographic survey of two proposed deviations to the Dampier to Bunbury Gas Pipeline Route. Approximately 6km west of the southern section of the Survey Area is a heritage survey area for a Summary of Burial Sites Investigation 1976-77 (Figure 3.2).

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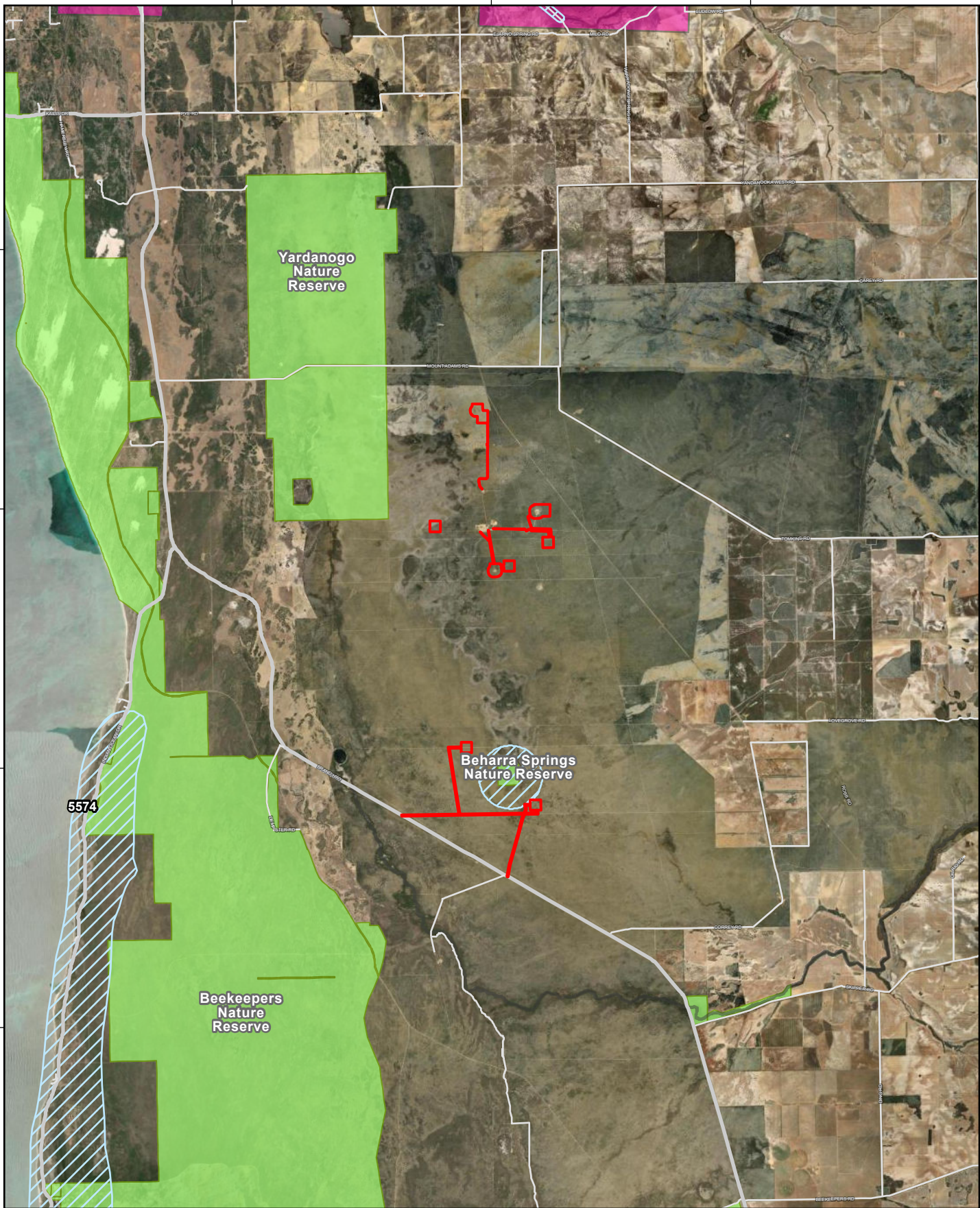
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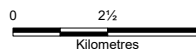
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Legend

- Survey area
- Conservation areas
- Aboriginal heritage places (DPLH-001)
- Registered site
- Other heritage place
- Major road
- Minor road

Scale: 1:200,000 at A4



Coord. Sys. GDA2020 MGA Zone 50



Job Number: 62676

Client: Beach Energy

Version: R01 Rev A

Date: 06-Sep-2022

Drawn By: ctatcher

Checked By: TJ

Perth Basin Ecological Studies

CONSERVATION AREAS

FIGURE 3.2

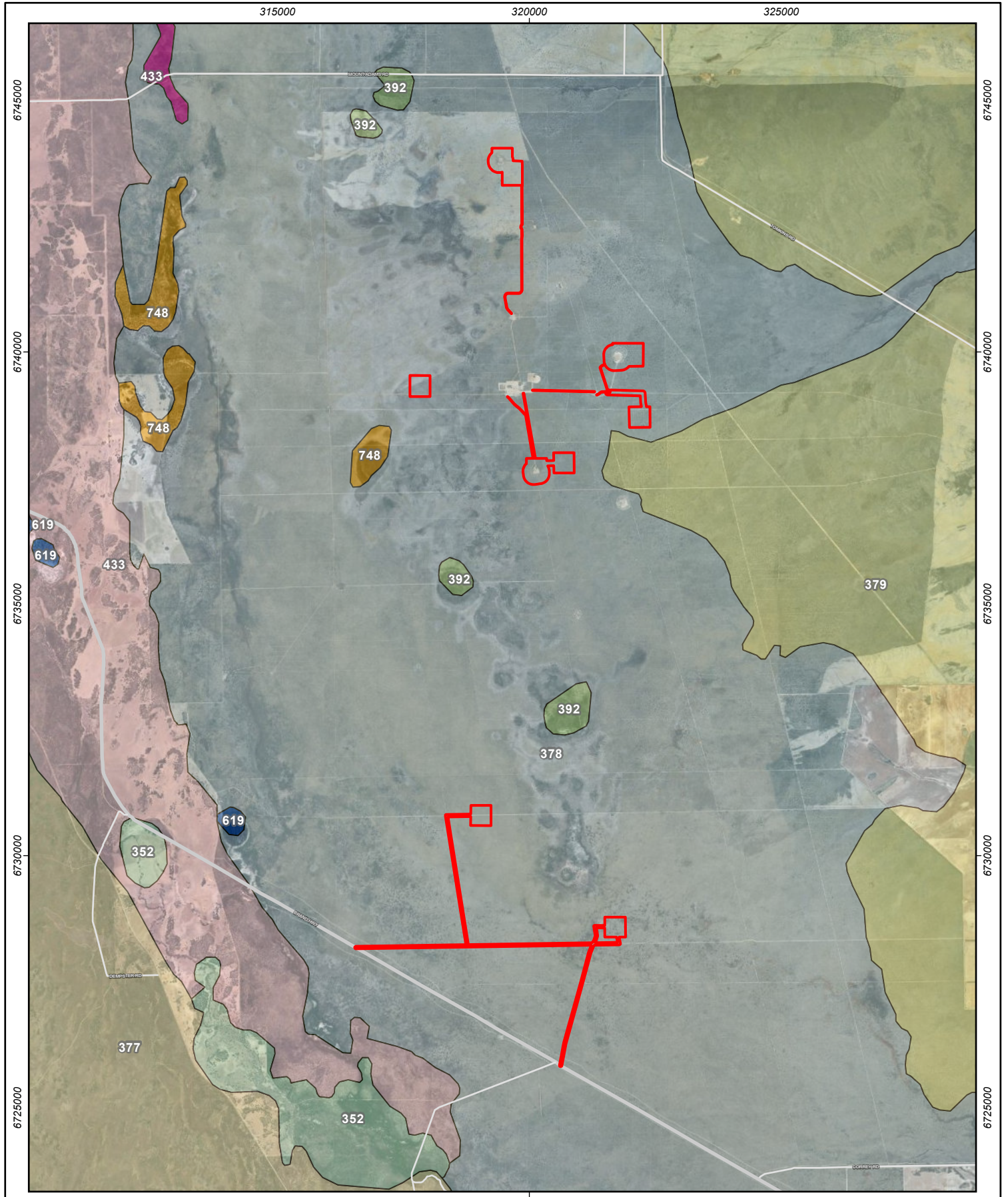


3.5 Pre-European Vegetation

Shephard et al. (2001) mapped the extent of pre-European vegetation across Western Australia, with recent updates reflecting the National Vegetation Information System (NVIS) Standards. One vegetation associations correspond with the Survey Area: Eridoon_378. The pre-European and current extent of each vegetation association is available from the State-wide Vegetation Statistics Dataset (Government of Western Australia, 2019) and is provided in Figure 3.3 and Table 3-2.

Table 3-2: Vegetation Associations

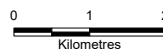
System	Association	Pre-European extent within IBRA region (ha)	Percent remaining within IBRA region (%)
Eridoon	378 – Scrub-Heath. Mixed heath with scattered tall Acacia spp., PROTEACEAE and MYRTACEAE.	93,523.98	65.04



Legend

- Survey area
- Pre-European vegetation (DPIRD-006)
- Erindoon 378
- Erindoon 392
- Erindoon 433
- Erindoon 748
- ILLYARIE 352
- ILLYARIE 377
- ILLYARIE 433
- ILLYARIE 619
- Tathra 379
- Major road
- Minor road

Scale: 1:100,000 at A4



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PRE-EUROPEAN VEGETATION

FIGURE 3.3



3.6 Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs)

Seven conservation-significant ecological communities were identified by database searches within 50 km of the Survey Area (Figure 3.4). The ecological communities consisted of two Priority Ecological Community (PEC) and two Threatened Ecological Communities (TEC). The results also identified three Preliminary Threatened Ecological Communities; Freshwater basin wetlands of the central wheatbelt, Freshwater basin wetlands of the northern agricultural areas dominated by *Eucalyptus camaldulensis*, and Freshwater basin wetlands of the Southern Wheatbelt.

None of the ecological communities were identified within the Survey Area, with all being more than 10 km from the Survey Area boundary. However, the potential for occurrence of each of these ecological communities has been assessed based on available pre-European vegetation, hydrology, soils, landform and geology information (Table 3-3).

Table 3-3: Threatened Ecological Communities Potentially Occurring within the Survey Area

Floristic Community	Conservation Status		Description	Likelihood of Occurrence
	BC Act	EPBC Act		
Assemblages of organic mound springs of the Three Springs area	EN	Not listed	The habitat of this community is characterised by continuous discharge of groundwater in raised areas of peat. The peat and surrounds provide a stable, permanently moist series of microhabitats. The vegetation component of the community contains many moisture loving species including an overstorey of <i>Melaleuca preissiana</i> trees. <i>Eucalyptus camaldulensis</i> and <i>E. rudis</i> are also found in a number of the mound springs. The shrub layer often includes <i>Hypocalymma angustifolium</i> and <i>Acacia saligna</i> over <i>Baumea vaginalis</i> and other sedges. The herbaceous <i>Patersonia occidentalis</i> (swamp variant) was recorded at several mound springs.	Very Unlikely (based on mapped vegetation units, soils and landform)
Coastal sands dominated by <i>Acacia rostellifera</i> , <i>Eucalyptus oraria</i> and <i>Eucalyptus obtusiflora</i> (Geraldton area)	P1	Not listed	Floristically, this community is similar to other <i>Acacia rostellifera</i> communities but is differentiated on structure, being dominated by mallee eucalypts. The community occurs on limestone ridges, in some swales in the coastal dunes between Cape Burney and Dongara, on the Greenough Alluvial Flats on limestone soil and near Tarcoola Beach. Some very small occurrences have also been recorded on the limestone scarp north of the Buller River.	Very Unlikely (based on geographic position, soils and landform)
Ferricrete floristic community (Rocky Springs type)	VU	Not listed	This tall shrubland is located on irregularly inundated red brown sandy loams over ferricrete dominated by <i>Acacia blakelyi</i> , <i>Allocasuarina campestris</i> , <i>Dryandra stricta</i> and <i>Labichea lanceolata subsp. lanceolata</i> . Associated species include <i>Alyogyne hakeifolia</i> , <i>Borya sphaerocephala</i> , <i>Isotoma hypocrateriformis</i> , <i>Petrophile seminuda</i> , <i>Stylidium dichotomum</i> , <i>Thysanotus patersonii</i> and <i>Waitzia paniculata</i> .	Unlikely (based on mapped vegetation units, soils and landform)

Floristic Community	Conservation Status		Description	Likelihood of Occurrence
	BC Act	EPBC Act		
Subtropical and Temperate Coastal Saltmarsh	P3	VU	Consists of the assemblage of plants, animals and micro-organisms associated with saltmarsh in coastal regions of sub-tropical and temperate Australia (south of 23oS latitude). It occurs on the coastal margin, along estuaries and coastal embayments and on low wave energy coast in places with at least some tidal connection, including rarely-inundated supratidal areas, intermittently opened or closed lagoons, and groundwater tidal influences. The community occurs on sandy or muddy substrate and may include coastal clay pans and similar habitats. It consists of dense to patchy areas of characteristic coastal saltmarsh plant species that include salt- tolerant herbs, succulent shrubs or grasses, and may also include bare sediment as part of the mosaic. It can occur where the proportional cover by tree canopy such as mangroves, Melaleucas or Casuarinas or seagrass is not greater than 50%. The description, area and condition thresholds that apply to the EPBC-listed TEC of the same name, also apply to this Priority ecological community	Very Unlikely (based on geographic position, mapped vegetation units, soils and landform)

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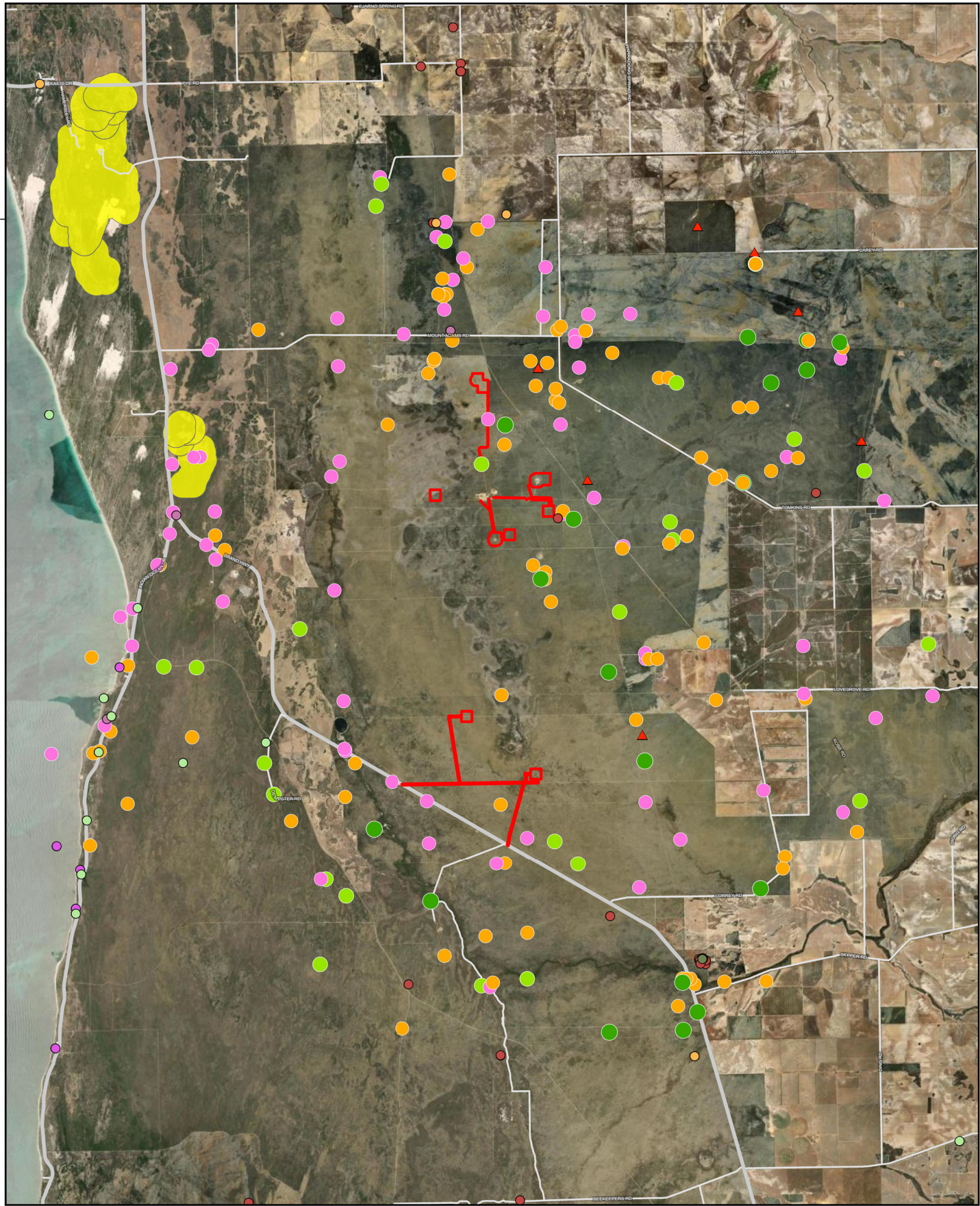
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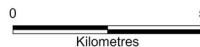


Legend

- Survey area
- Threatened and priority ecological communities (DBCAs)
 - Coastal sands dominated by *Acacia rostellifera*, *Eucalyptus oraria* and *Eucalyptus obtusiflora* (Geraldton area)
- Conservation significant flora (DBCAs)
 - Priority 1
 - Priority 2
 - Priority 3
 - Priority 4
 - ▲ Threatened

- Conservation significant fauna (DBCAs)
 - Conservation dependent
 - Critically endangered
 - Endangered
 - Migratory
 - Other specially protected
 - Priority 1
 - Priority 2
 - Priority 3
 - Priority 4
 - Vulnerable
- Major road
- Minor road

Scale: 1:200,000 at A4



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Perth Basin Ecological Studies

DATABASE SEARCH RESULTS

FIGURE 3.4



3.7 Conservation Significant Flora

A total of 72 conservation significant flora species were identified within the search area (Figure 3.4, Table 3-5). A likelihood of occurrence assessment was undertaken on all species and is provided in Appendix C.

The likelihood assessment for conservation significant flora was undertaken in line with the criteria outlined in Table 3-4.

Table 3-4: Criteria for Flora Likelihood Assessment

Likelihood	Criteria
Recorded	Species or community has been recorded previously and/or from the field survey.
Likely	Species or community likely to occur as suitable habitat is present and existing records are close to the Survey Area (within 4.5 km).
Possible	Species or community might occur as there are existing records in the vicinity (within 9 km) and suitable habitat is likely to be present. Species or community may also be present if there is insufficient information to exclude presence.
Unlikely	Species or community is unlikely to occur as habitat is not present, or habitat is present, but there are no records within the vicinity.

A total of 13 'Threatened' flora species as listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) (EPBC Act) and Section 19(1) of the *Biodiversity Conservation Act 2016* (WA) (BC Act) were identified in the search area (Table 3-5 and Figure 3.4).

The Threatened flora species with potential to occur in the Survey Area are shown in Table 3-5.

Table 3-5: Threatened Flora Species Potentially Occurring in the Survey Area

Taxon	Conservation Status		Description	Likelihood of occurrence
	WA status	C'wealth status		
<i>Andersonia gracilis</i>	VU	EN	A slender shrub up to 50 cm tall with few, spreading branches. Pink to pale mauve flowers are clustered in ovoid or oblong groups of 4 to 14 on terminal heads. Occurs on seasonally damp, black sandy clay flats near or on the margins of swamps, often on duplex soils supporting low open heath vegetation.	Unlikely (based on habitat preference)
<i>Conostylis dielsii</i> subsp. <i>teres</i>	VU	VU	A low, perennial monocot with terete leaves from 60-160 mm long and 0.5-1 mm wide. Short bristles of 0.8-1 mm long are present on the leaf margin and hairs on the leaf surface. Creamy yellow flowers appear from July to August. Occurs on sand/gravel.	Unlikely (based on lack of proximal records)
<i>Conostylis micrantha</i>	VU	VU	A low, perennial monocot with terete leaves from 70-145 mm long and 0.8-1 mm wide. Bristles of 8-10.5 mm length are present on the leaf margin, but the leaves are otherwise hairless. Yellow flowers appear from July to August. This species occurs in sandy areas.	Unlikely (based on lack of proximal records)
<i>Daviesia speciosa</i>	EN	EN	A low shrub with terete, pungent branchlets, that has a leafless appearance and red flowers that appear from April to May. Found in gravelly lateritic soils, undulating plains and rises.	Unlikely (based on lack of proximal records)
<i>Eucalyptus crispata</i>	EN	EN	A lignotuberous mallee from 3-7 m high, with rough bark on the trunk, in partly decorticated curls. Yellow-cream flowers appear from March to June. Prefers lateritic soils.	Unlikely (based on lack of proximal records)
<i>Eucalyptus leprophloia</i>	EN	EN	Lignotuberous mallee from 2-5(-8) m high with rough, loose & flaky bark to 1 m. Creamy white flowers appear from August to October. Occurs on a variety of soils.	Unlikely (based on lack of proximal records)

Taxon	Conservation Status		Description	Likelihood of occurrence
	WA status	C'wealth status		
<i>Hakea megalosperma</i>	VU	VU	A spreading, lignotuberous shrub from 1-2 m high. White-cream/pink flowers appear from May to June, nuts are retained year-round. Occurs on grey sand, loam, lateritic hills and rocks.	Unlikely (based on lack of proximal records)
<i>Hemiandra gardneri</i>	CR	EN	Prostrate, pungent shrub, 0.1-0.2 m high, to 1 m wide. Fl. red/pink-red, Aug to Oct. Grey or yellow sand, clayey sand. Sandplains.	Unlikely (based on lack of proximal records)
<i>Leucopogon obtectus</i> (<i>Styphelia obtecta</i> (Benth.) F.Muell.)	EN	EN	A spindly erect shrub from 0.5-1.7 m high, with leaves which closely clasp the stem, obscuring the ends of branchlets. Tiny white to creamy yellow flowers appear in the leaf axils from August to October. Occurs on grey sands.	Unlikely (Habitat not present and no records within the vicinity <9km)
<i>Paracaleana dixonii</i>	VU	EN	A tuberous perennial orchid from 90-200 mm high, with a single, small basal leaf. Brown-yellow-green-red flowers in the shape of a duck appear from October to December or January. Found in shrubland under <i>Banksia</i> on deep sand, or in heath on shallow sand over laterite.	Likely (based on habitat preference and location of previous records)
<i>Tetratheca nephelioides</i>	EN	CR	Caespitose, dwarf shrub, to 0.3 m high. Fl. purple, Sep. White-grey sand, yellow-brown clayey sand, gravel, laterite. Outcrops, undulating hills, ridges.	Unlikely (based on habitat preference)
<i>Thelymitra stellata</i>	EN	EN	A tuberous, perennial orchid from 150-250 mm high. Its yellow and brown flowers appear from October to November. Occurs on sand, gravel and lateritic loam.	Unlikely (based on lack of proximal records)
<i>Wurmbea tubulosa</i>	VU	VU	A cormous, perennial herb growing at ground level, from 10-30 mm tall with only three leaves, two of them larger. White-pink flowers appear from June to August. Found in clay and loam on river banks and seasonally-wet places.	Unlikely (based on lack of proximal records)

The remaining species were listed as 'Priority' flora species by the Department of Biodiversity, Conservation and Attractions (DBCA) as follows:

- Priority 1 flora (P1) – 5 taxa;
- Priority 2 flora (P2) – 12 taxa;
- Priority 3 flora (P3) – 29 taxa; and
- Priority 4 flora (P4) – 12 taxa.

A comprehensive likelihood assessment is included in Appendix C.

3.8 Conservation Significant Fauna

A total of 59 conservation significant fauna species were identified by the database search within 30 km of the Survey Area (Appendix B).

Of these, 24 'Threatened' fauna species were listed under Section 178 of the EPBC Act and Section 19(1) of the BC Act, with the closest being one record of *Calyptorhynchus latirostris* (Carnaby's Black-Cockatoo) located approximately 0.17 km to the south east of the northern section of the Survey Area (Figure 3.4).

A likelihood of occurrence assessment was undertaken on all fauna species returned from database searches and is provided in Appendix C. Criteria applied as part of the likelihood assessment are described in Table 3-6.

Marine Species

An additional 52 marine species were also returned in the database searches, mainly from the EPBC PMST. The Survey Area is inland from the ocean and does not contain marine habitat, as such, these species have been omitted from any further discussion.

Table 3-6: Criteria for Fauna Likelihood Assessment

Likelihood	Criteria
Recorded	Species has been recorded previously from the study site.
Likely	Species considered likely to occur as suitable habitat is present and multiple existing records are close to the Survey Area (within 7.5 km).
Possible	Species has potential to occur as suitable habitat is likely to be present, and there are existing records in the wider vicinity (within 15 km) or the area is insufficiently surveyed to exclude local occurrence.
Unlikely	Species is unlikely to occur as suitable habitat is not considered to be present, or habitat may be present but there are no recent (<25yr) existing records in the wider vicinity (within 15 km).
Very Unlikely	Species is very unlikely to occur as suitable habitat is not considered to be present, and there are no existing records in the wider vicinity (within 15 km).

The Threatened fauna species with potential to occur within the Survey Area are shown in Table 3-7.

Table 3-7: Threatened Fauna Species Potentially Occurring within the Survey Area

Taxon	Description	Likelihood of Occurrence
<i>Anous tenuirostris melanops</i> Australian Lesser Noddy (EN)	<p>The Australian lesser noddy is a small dark-plumaged, tropical tern with a long slender straight bill, long narrow wings and slightly wedge-shaped tail. It is confined to the tropical and subtropical Indian Ocean. It breeds only on three islands in the Houtman Abrolhos, off Western Australia, where it nests in mangroves.</p> <p>The Australian lesser noddy is only known to breed in Houtman Abrolhos, where colonies on Pelsaert, Wooded and Morley Islands occupy a total of 5 ha. Behaviourally, it tends to remain near the breeding islands all year. It has been hypothesised that a population thought to be Australian lesser noddy possibly breeds on Ashmore Reef and may be colonising Cocos (Keeling) Island; however, the subspecific identity has not been confirmed.</p> <p>The distribution and range of the Australian lesser noddy is largely unknown.</p>	Very Unlikely (habitat not considered to be present)
<i>Ardenna carneipes</i> Flesh-footed Shearwater, Flesh-footed Shearwater (VU)	<p>The Flesh-footed shearwater is a large broad-winged, black-brown shearwater with pale, black tipped horn bill and flesh pink legs and feet.</p> <p>It is common to the waters of the continental shelf and continental slope off Southern Australia. Known breeding grounds on Lord Howe Island. The distribution of the Flesh-footed Shearwater is naturally fragmented with colonies scattered across islands in the south-east Indian Ocean and the south-west Pacific Ocean</p>	Very Unlikely (habitat not considered to be present)
<i>Calidris canutus</i> Red Knot, Knot (EN) CALIDRIDINAE	<p>The Red Knot is a short-necked and long bodied wader with a short straight bill. Their wings extend beyond the tail and legs. Differs in appearance from the Great Knot, with a smaller body, shorter bill, and different markings on plumage.</p> <p>Populations of the Red Knot are largely found all around the coast of Australia, with their main populations in the north-west of Australia. It is occasionally recorded inland. Main habitats include intertidal mudflats, sandflats, and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours, sometimes on sandy ocean beaches. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools, and pans, and recorded on sewage ponds and saltwork but rarely in freshwater swamps or inland lakes.</p>	Very Unlikely (habitat not considered to be present)

Taxon	Description	Likelihood of Occurrence
<p><i>Calidris ferruginea</i> Curlew Sandpiper (CR) SCOLOPACIDAE</p>	<p>The Curlew Sandpiper is a small to medium-sized wader (migratory shorebird). It has a long, black bill with a down-curved end and black legs and feet. In its non-breeding plumage, it is grey-brown above, white below, with a white wing bar visible in flight. In breeding plumage, it is bright reddish brown below and the wings are barred black.</p> <p>The Curlew Sandpiper is a common summer migrant from north-eastern Siberia and Alaska, found in many Australian coastal sites and may also be seen inland in suitable habitats. It is most common in the far south-east and north-west of Australia. It is also found in Africa, across southern Asia to Indonesia and New Guinea, and in New Zealand.</p> <p>The Curlew Sandpiper is found on intertidal mudflats of estuaries, lagoons, mangroves, as well as beaches, rocky shores and around lakes, dams and floodwaters. Its breeding habitat is the lowland tundra of Siberia.</p>	<p>Unlikely (no local records)</p>
<p><i>Calyptorhynchus latirostris</i> Carnaby's Black-Cockatoo (EN) CACATUIDAE</p>	<p>The Carnaby's Black-Cockatoo is a large, dull-black cockatoo with a short erectile crest and a large bill. The bird is mostly grey-black, with narrow off-white fringes to the feathers, giving it a scaly appearance. This is relieved by a patch of cream-coloured feathers on the ear-coverts, and the tail has large white panels, especially noticeable when the bird is flying.</p> <p>Carnaby's Black-Cockatoos occur only in south-western Western Australia, between Cape Arid and Kalbarri.</p> <p>The Carnaby's Black-Cockatoo inhabits native woodlands dominated by eucalypts such as Wandoo and Salmon Gum, as well as nearby heathlands. From late winter till summer, they usually occupy inland parts of their range, in woodlands dominated by eucalypts such as Wandoo and Salmon Gum which are utilised for breeding. In late summer they move to coastal and near-coastal areas, where they forage within proteaceous shrublands or woodlands of <i>Banksia</i> and are sometimes observed in built-up areas.</p>	<p>Likely (recent proximal records)</p>
<p><i>Calyptorhynchus sp. 'white-tailed black cockatoo'</i> White-tailed black cockatoo (EN)</p>	<p>Carnaby's and Baudin's Black Cockatoo are very similar in appearance and often an identification cannot be confirmed in sightings. Both have brownish-black plumage with narrow off-white scalloped tips, white cheeks and white panels on their tails, visible in flight. The species can be distinguished by the shape of their bills. Carnaby's Black Cockatoo has a short and wide bill whilst Baudin's have a long narrow bill.</p> <p>Baudin's Black Cockatoo inhabits Jarrah and Marri Forest and is usually only found in woodlands and forests of the south-west of Western Australia.</p>	<p>Unlikely (no local records)</p>
<p><i>Diomedea amsterdamensis</i> Amsterdam Albatross (CR)</p>	<p>The Amsterdam Albatross is a very large, full-bodied albatross with extremely long wings (between 2.5 – 3.5m) and a short wedge-shaped tail. It has dark brown plumage with a contrasting white mask similar in appearance to the Wandering Albatross.</p> <p>The Amsterdam Albatross is a non-resident visitor to Australia and mainly occurs in the south-west and south Australian oceans.</p>	<p>Very Unlikely (habitat not considered to be present)</p>
<p><i>Diomedea epomophora</i> Southern Royal Albatross (VU)</p>	<p>The Southern Royal Albatross is a large bird with long, slender wings. Predominantly white with pinkish bill and black tips on the wings.</p> <p>This marine species occurs in the open oceans of the southern hemisphere, breeding on remote islands.</p>	<p>Very Unlikely (habitat not considered to be present) Very Unlikely (habitat not considered to be present)</p>
<p><i>Diomedea exulans</i> Wandering Albatross (VU)</p>	<p>The Wandering Albatross is a marine, pelagic and aerial species. In the Australian region it occurs inshore, offshore and in pelagic waters and in breeding season nests on coastal or inland ridges, slopes, plains, often with marshy ground.</p>	<p>Very Unlikely (habitat not considered to be present)</p>

Taxon	Description	Likelihood of Occurrence
<p><i>Falco hypoleucos</i> Grey Falcon (VU)</p>	<p>Known to occur widely in arid or semi-arid zones of Australia where annual rainfall does not exceed 500 mm, this species frequents lowland wooded plains and shrublands, especially <i>Acacia</i> shrublands netted by watercourses. It hunts primarily on avian prey including doves, pigeons, finches and small psittacines within grasslands.</p> <p>Breeding occurs from June to November, with young staying with the parents for more than 12 months after fledging, even if a new brood is reared. Nests are built in the tallest available tree along a watercourse, typically in species such as <i>Eucalyptus camaldulensis</i> (River Red Gum).</p> <p>This bird occurs at very low densities throughout Australia, and is considered to be an elusive species. It is unlikely to nest within the Survey Area due to lack of suitable nesting or roosting trees, however, use of the area as foraging habitat is possible.</p>	<p>Unlikely (no local records)</p>
<p><i>Leipoa ocellata</i> Malleefowl (VU) MEGAPODIIDAE</p>	<p>The Malleefowl is a large ground-dwelling bird with strong feet and a short bill. The head and neck are mostly grey, with a dark stripe extending down along foreneck from the throat to the upper breast, and the underparts are mostly creamy-coloured, but it is the upperparts that are most striking. The upperwings are a complex combination of mottles, barring and variegations of grey, cream, black and Rufous. The bill is blackish, and the legs and feet are pale greyish.</p> <p>The Malleefowl occurs in semi-arid parts of mainland Australia, ranging from New South Wales (west of the Great Divide), extending into north-western Victoria and the Riverland of South Australia; on the Eyre Peninsula of South Australia, extending into the Great Victoria Desert; and in southern and western parts of Western Australia.</p> <p>Malleefowl usually occur in mallee eucalypt woodlands with a dense but discontinuous canopy and varied shrubby understorey, especially where the mallee trees are multi-stemmed. They also very occasionally occur in other types of dry eucalypt forests. The key to their presence is the period since the habitat was last burnt, with habitat that has not been burnt for 40–60 years preferred; frequently burnt areas are unsuitable and do not support populations of Malleefowl.</p>	<p>Possible (recent records in the vicinity)</p>
<p><i>Limosa lapponica menzbieri</i> Northern Siberian Bar-tailed Godwit, Russkoye Bartailed Godwit (CR)</p>	<p>The Bar-tailed Godwit is a large migratory shorebird. It has streaked brown forehead, crown, and nape with scalloped upperparts. The underparts are white with fine brown streaking on the breast and flanks.</p> <p>The species is recorded along the coastline, mostly in the northern parts of Australia, including major islands. They forage in intertidal mudflats or occasionally in shallow waters.</p>	<p>Unlikely (habitat present but no local records)</p>
<p><i>Numenius madagascariensis</i> Eastern Curlew, Far Eastern Curlew (CR) SCOLOPACIDAE</p>	<p>Found in all states and territories of Australia in primarily coastal areas, this migratory bird occupies Australian habitat through the non-breeding season, moving north through Asia to breed from early May to late June.</p> <p>During its Australian inhabitation it is associated with estuaries and coastal lagoons, favouring large mudflats, saltmarsh and mangrove habitats. They roost on sandy spits or amongst vegetation of marshy areas, preferring to roost in large flocks separated from other shorebirds.</p> <p>Crustaceans such as crabs and prawns, molluscs and invertebrates form the bulk of the bird's diet. Feeding activity is governed by the tide and is thus both diurnal and nocturnal.</p>	<p>Unlikely (no local records)</p>

Taxon	Description	Likelihood of Occurrence
<p><i>Rostratula australis</i> Australian Painted Snipe (EN)</p>	<p>The Australian Painted Snipe is a snipe-like shorebird with a bulbous-tipped bill, broad, rounded wings and longish legs that protrude beyond the tip of the tail when in flight. The sexes differ. Males have a dark-brown crown with a buff median stripe; the rest of the head and neck are dark ashy-grey, with a cream-coloured, comma-shaped mark around the eye.</p> <p>The species occupies shallow freshwater or brackish wetlands, such as saltmarshes, swamps, claypans and waterlogged grasslands, where it forages for aquatic invertebrates and occasionally grass seeds. They may forage during day or night time, but generally remains in dense cover where available.</p>	<p>Unlikely (no local records)</p>
<p><i>Sternula nereis nereis</i> Australian Fairy Tern (VU)</p>	<p>A small and round bodied piscivorous bird. Pale grey-white plumage during breeding season with a black crown and nape, white forehead, and black patch in front of eyes. Their bill is an orange-yellow and legs are a dull yellow. During non-breeding season the plumage becomes mottled, and the bill turns black.</p> <p>The Australian Fairy Tern nests on sandy beach, spits, and banks above the high tide mark, but below vegetation. Occasionally found in estuaries and wetlands.</p>	<p>Very Unlikely (habitat not considered to be present)</p>
<p><i>Thalassarche carteri</i> Indian Yellow-nosed Albatross (EN)</p>	<p>A marine bird located in subtropical and subantarctic waters. The Indian Yellow-nosed Albatross has a white head and neck with a small dusky patch before the eye. Their cheeks, ear coverts and tail are grey, and beak is a glossy lack with distinctive yellow-orange strip.</p> <p>The Indian Yellow-nosed Albatross is located in subtropical and subantarctic waters, occupying inshore and offshore waters. Breeding grounds are on islands of the southern Indian Ocean.</p>	<p>Very Unlikely (habitat not considered to be present)</p>
<p><i>Thalassarche cauta</i> Shy Albatross (VU)</p>	<p>A medium sized albatross, with a white crown and forehead, pale grey face and grey-black upper wing and tail. It has a characteristic black thumb mark at the leading edge of the underwing. The bill is a grey yellow with prominent yellow tip.</p> <p>The Shy Albatross is pelagic and occurs in widely in the southern oceans and breeds on islands off Australia and New Zealand.</p>	<p>Very Unlikely (habitat not considered to be present)</p>
<p><i>Thalassarche impavida</i> Campbell Albatross, Campbell Black-browed Albatross (VU)</p>	<p>A medium sized albatross, with a white head and distinctive black brow, a broad black leading edge on the underwing, with a series of bold streaks from the base of the wing and a bright orange-yellow bill.</p> <p>The Campbell Albatross occurs in Antarctica waters, sub-Antarctic waters and subtropical waters of the South Pacific Ocean. They nest of cliffs and ledges by the ocean or on islands.</p>	<p>Very Unlikely (habitat not considered to be present)</p>
<p><i>Thalassarche melanophris</i> Black-browed Albatross (EN)</p>	<p>The Black-browed Albatross are white with a yellow-orange bill and a black brow, back, upper wing and blueish- grey legs.</p> <p>This marine species occurs in Antarctic, subantarctic and temperate waters and breeds on subantarctic and peri-antarctic islands.</p>	<p>Very Unlikely (habitat not considered to be present)</p>

Taxon	Description	Likelihood of Occurrence
<p><i>Idiosoma nigrum</i> Shield-backed Trapdoor Spider (VU) IDIOPIIDAE</p>	<p>The Shield-backed Trapdoor Spider is dark brown to black, large (females up to 30 mm in body length) and with a distinctive thick and hard cuticle on the abdomen. The end of the abdomen is flattened into a shield and the sides are deeply corrugated. The burrows always have a lightweight, leaf litter and silk door, with leaf and twig trip-lines fanning out from the centre of the front of the burrow rim.</p> <p>The Shield-backed Trapdoor Spider is endemic to semi-arid southwest WA. It occurs in a number of severely fragmented populations in the central and northern Wheatbelt. Further north, the species occurs in more arid, isolated ranges in the Midwest (e.g., Jack Hills, Weld Range, Blue Hills, etc.) and coastal areas of the Midwest (e.g., Murchison River, Shark Bay, etc.). The arid Midwest populations are naturally fragmented or isolated because they persist only on ranges, but the Wheatbelt and coastal Midwest populations are all severely fragmented as a result of land clearing.</p> <p>Arid Midwest populations are associated with rocky habitats, primarily in positions with increased moisture retention properties like gullies and drainage lines on southern facing slopes.</p>	<p>Very Unlikely (habitat not considered to be present)</p>
<p><i>Dasyurus geoffroii</i> Chuditch; Western Quoll (VU) DASYURIDAE</p>	<p>The Chuditch, also known as the Western Quoll, is the largest carnivorous marsupial that occurs in WA. It has mostly brown fur with distinctive white spots. It has large, rounded ears, a pointed muzzle and a mostly black, brushy tail about three-quarters the length of its head and body.</p> <p>At the time of European settlement, Chuditch were present in all Australian States (except Tasmania); however, they are now only present in approximately 5% of their former range. Most Chuditch are now found in varying densities throughout the jarrah forest and south coast of Western Australia. They also occur at lower densities in the goldfields and wheatbelt, as well as in Kalbarri National Park (translocated).</p> <p>Chuditch use a range of habitats including forest, mallee shrublands, woodland and desert. The densest populations have been found in riparian jarrah forest. Chuditch require adequate numbers of suitable den and refuge sites (horizontal hollow logs or earth burrows) and sufficient prey biomass (large invertebrates, reptiles and small mammals) to survive. They are capable of travelling long distances and have large home ranges, and even at their most abundant, Chuditch are generally present in low numbers. For this reason, they require habitats that are of a suitable size and not excessively fragmented.</p>	<p>Very Unlikely (habitat not considered to be present)</p>
<p><i>Macroderma gigas</i> Ghost Bat (VU) MEGADERMATIDAE</p>	<p>The ghost bat is the largest microchiropteran bat in Australia, with a head and body length of 10 – 13 cm and a forearm length of 10 – 11 cm. It is Australia's only carnivorous bat. Its fur is light to dark grey above and paler below. It has long ears which are joined together, large eyes, a simple noseleaf and no tail.</p> <p>Since the arrival of Europeans, ghost bats have contracted further northwards, with much of their arid zone distribution disappearing in the past few decades. Ghost bats occur in the Pilbara, Kimberley (including several islands, northern Northern Territory (including Groote Eylandt), and coastal and near coastal eastern Queensland from Cape York to near Rockhampton.</p> <p>Ghost bats disperse widely when not breeding, but concentrate in a relatively few maternity roost sites when breeding. Few of these sites are known and most are not protected or managed. Roost sites include caves, rock crevices and disused mine adits. Preferred roosting habitat is caves beneath bluffs of low rounded hills.</p>	<p>Very Unlikely (habitat not considered to be present)</p>

Taxon	Description	Likelihood of Occurrence
<p><i>Parantechinus apicalis</i> Dibbler (EN) DASYURIDAE</p>	<p>This small carnivorous marsupial was formerly widespread along the west and south coasts of Australia but is now restricted to a small number of sites of mainland Western Australia, and several offshore islands near Jurien.</p> <p>Although the species is known to utilise diverse habitats, preferred habitat includes heathland on sandy or occasionally lateritic soils, and long-unburnt vegetation over 1 m high with dense canopy. Diet includes predominantly invertebrates, with a portion comprised of plant matter which varies, likely due to conditions. It is thought that the availability of flowering shrubs from the Proteaceae and Myrtaceae families may be of importance within forage habitat.</p> <p>Breeding is seasonal, with mating taking place over 3-4 weeks from late March, after which males may die as part of a phenomenon termed “facultative male die-off”. Young are born in April or May, with litters of up to eight young carried in the female’s shallow pouch. Juveniles have been trapped in September.</p>	<p>Very Unlikely (habitat not considered to be present)</p>
<p><i>Egernia stokesii badia</i> Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink (EN) SCINCIDAE</p>	<p>The Western Spiny-tailed Skink is one of the larger subspecies of <i>Egernia stokesii</i>, growing to 194 mm (snout to vent length). Its skin is coloured with heavily keeled scales. It has a short, flattish, distinctively spiny tail which it uses as anchorage within crevices when defending. There are two forms of Western Spiny-tailed Skink: a reddish brown form, with angular pale blotches arranged in irregular bands and a paler underside, in the northern and central wheatbelt; and a wholly black form in the Murchison region.</p> <p>The Western Spiny-tailed Skink is known to occur in a broad semi-arid area in southwest Western Australia, between Shark Bay and Minnivale and east to Cue. Much of area now known as the wheatbelt has been cleared since the 1960s and suitable microhabitat is now far less abundant, although an increasing number of skinks are being located in altered habitat under piles of wood, scrap metal or under buildings on private property.</p> <p>Most records of the brown form Western Spiny-tailed Skink are in York Gum woodland with some records in Gimlet and Salmon Gum woodland. Populations persist in woodland patches as small as one hectare and completely surrounded by wheatfields. Sites with the greatest number of individuals contain numerous fallen logs and were subjected to low-intensity grazing by domestic.</p>	<p>Very Unlikely (habitat not considered to be present)</p>

The 35 remaining species were listed as either ‘Priority’ or ‘Other Specially Protected Species’ under the BC Act, or ‘Marine’ or ‘Migratory’ under the EPBC Act.

3.9 Matters of National Environmental Significance

MNES listed under the EPBC Act identified in the vicinity of the Survey Area using the Protected Matters Search Tool (PMST) included Threatened flora, fauna, and ecological communities, or fauna listed as Migratory or Marine (see Appendix B). The potential for these to occur in the Survey Area has been addressed in the above sections, and in Appendices B and C.

The key MNES that are assessed as having high potential to occur and therefore require particular consideration include Carnaby’s Black-Cockatoo (Endangered) and The Sandplain Duck Orchid (Endangered). These are discussed further below (with State and Commonwealth conservation status indicated respectively).

3.9.1 *Calyptorhynchus latirostris* (Carnaby’s Black Cockatoo) [EN; EN]

The desktop assessment identified records of Carnaby’s Black-Cockatoo (*Calyptorhynchus latirostris*) (including known roost sites) in proximity to the Survey Area, with the closest being located approximately 0.17 km to the southeast of the northern section of the Survey Area (Figure 3.4).

Carnaby’s Black-Cockatoo is listed as Endangered under the EPBC Act, and a National Recovery Plan is in place (DBCA [formerly the Department of Parks and Wildlife] 2013). However, there is no approved Conservation Advice or Listing Advice for the species. The National Recovery Plan

describes the species' distribution, habitat, and population, and identifies known threats to the species (DBCA 2013).

Distribution and Habitat

Carnaby's Black-Cockatoo is endemic to the southwest of Western Australia, ranging from the Lower Murchison in the north, Esperance in the south and Forrestania in the east. The species exists as two genetically distinct subpopulations: an eastern and western population, the latter subpopulation of which occurs within the broader region (EPA 2019).

There is no accurate estimate of the population number, and little is known about the species' occurrence within the region. Smaller, important populations for the long-term survival of the species have not been defined for Black Cockatoos, due to the mobile and widely dispersed nature of the species, and the variation in flock compositions (DSEWPaC 2012a; DAWE 2017). For this reason, it is more appropriate to consider significance in terms of impacts on habitat and individuals rather than a resident population (DAWE 2017).

Carnaby's Black Cockatoo is predominantly restricted to areas of remnant native woodland with an understory dominated by proteaceous species such as *Banksia*, *Hakea* and *Grevillea*. However, as the species is highly mobile and adaptive, they are able to access resources spread over a relatively large area (DBCA 2013). Mapping of the species has proven difficult due to seasonal migration and movement over long distances. This in combination with the adaptive behaviour of the species indicates that the significance of locations within the species' range, especially in reference to breeding, is likely to continue to change over time (DBCA 2013). Breeding occurs mainly in the Wheatbelt and extends to Hopetoun and Ravensthorpe (DAWE 2017). During the non-breeding season (January to July), the majority of individuals migrate to the Midwest, Swan Coastal Plain and South coastal regions (DAWE 2017).

Identified breeding and nearby feeding habitat, former breeding habitat that has hollows intact, and vegetation that provides habitat for feeding, watering and regular night roosting for Carnaby's Black-Cockatoo are defined as 'habitat critical to the survival' of the species (DBCA 2013). This includes all areas of breeding habitat including known nesting trees, and foraging areas that support breeding.

As stated above, the Survey Area does occur in proximity to known records of the species; however, it does not occur within the species' breeding range (DAWE 2017). Mapping of Carnaby's Black-Cockatoo foraging habitat carried out by Bamford (2020) designated the vegetation in the vicinity of the Survey Area as having 'Low to moderate foraging value'.

3.9.2 *Paracaleana dixonii* (Sandplain Duck Orchid) [VU; EN]

Numerous records of this taxon are known from the vicinity, particularly in areas of unfragmented native vegetation to the immediate east of the Survey Area. The closest records to the site are approximately 2 km from the eastern boundary, as shown in Figure 3.4. Conservation Advice published in 2008 (DEWHA 2008) estimated that there were 57 plants occurring within eight extant populations, distributed across an approximately 540 km² range between Gingin and Dongara.

This diminutive plant is most detectable when flowering in November to January, or after summer fires when flowers proliferate, however, vegetative structures are absent for the majority of the year. This means there is a very specific and narrow survey period within which to assess presence of the Sandplain Duck Orchid.

Following significant survey for the species south-east of Dongara, Woodman Environmental Consulting (2013) described the key local habitats for the taxon as:

- Low open woodland of Pricklybark (*Eucalyptus tottiana*) over mid to low shrubland of mixed species dominated by Dwarf Sheoak (*Allocasuarina humilis*), Burma Road Banksia (*Banksia scabrella*), *Calothamnus sanguineus*, *Eremaea beaufortoides* var. *microphylla*, *Melaleuca* aff. *leuropoma* and *Hibbertia hypericoides* over low shrubland and sedgeland of mixed species

including *Banksia dallanneyi* subsp. *media*, *Conostylis canteriata*, *Mesomelaena pseudostygia* and *Caustis dioica* on grey or brown sand on lower and mid slopes.

- Mid sparse to open shrubland of mixed species including *Calothamnus quadrifidus* subsp. *angustifolius*, *Grevillea biformis* subsp. *biformis* and Coast Banksia (*Banksia attenuata*) over low shrubland and sedgeland of mixed species dominated by *Ecdeiocolea monostachya*, *Melaleuca leuropoma*, *Daviesia divaricata* subsp. *divaricata* ms, *Mesomelaena pseudostygia* and *Banksia shuttleworthiana* on yellow-brown or occasionally grey sand on slopes and valley floors.
- Mid mallee woodland to isolated mallees of *Eucalyptus conveniens* or mid open shrubland of *Allocasuarina campestris* over low shrubland and sedgeland of mixed species dominated by Pink Dryandra (*Banksia carlinoides*), *Ecdeiocolea monostachya*, *Hakea incrassata*, *Hibbertia hypericoides* and *Melaleuca aspalathoides* on gravelly grey or brown clay loams or sands, usually with laterite on or near the surface, on slopes and crests.

It is considered that areas of suitable habitat are present broadly across the site in sections of native vegetation.

4. Field Survey Results

4.1 Reconnaissance Flora and Vegetation Survey

During the flora and vegetation survey undertaken in May and June of 2022, 26 relevés were assessed within the Survey Area.

A total of 174 vascular flora taxa were recorded (Table D.1 in Appendix D), from 81 genera, from the relevés and opportunistic observations. Of these, two taxa were introduced (1.15%) and 27 (15.52%) could not be identified to species level due to insufficient diagnostic material being present at the time of survey.

4.1.1 Conservation Significant Flora

No Commonwealth EPBC Act or Western Australian BC Act-listed Threatened Flora were recorded during the field survey.

One Priority-listed flora species was confirmed from taxonomic identifications recorded during the field survey:

- *Stawellia dimorphantha* (P4).

The occurrence observed during the survey consisted of two individuals recorded from relevé RR06 within vegetation adjacent to access tracks south of Tarantula well. DBCA records inspected as part of desktop assessment indicate that there are numerous records of this taxon from within close proximity (<2 km) of the Survey Area, including a record approximately 220 m south of RR06 along the access track.

4.1.2 Other Flora of Significance

No other significant flora taxa or flora specimens of taxonomic interest were recorded from the survey.

4.1.3 Introduced Flora

Two introduced flora taxa (1.15% of total flora) were recorded during the survey:

- **Ursinia anthemoides*
- **Hypochaeris* sp.

Both taxa were recorded from along, or within proximity of, access tracks in the southern (Floreat) portion of the Survey Area. Both are widespread in the region and commonly occur in agricultural and bushland areas. Individuals observed were in early growth stages and flowers were absent or underdeveloped, with the **Hypochaeris* sp. specimen unable to be confirmed to species level due to a lack of diagnostic reproductive material.

No WoNS or Declared Pest plant species were recorded during survey.

4.1.4 Vegetation Units

Six broad structural vegetation types were recorded from within the Survey Area (in addition to cleared areas devoid of native vegetation) as shown in Table 4-1, and mapped in Appendix G:



- **AspTS** – Isolated *Eucalyptus todtiana* over tall shrubland of *Acacia* spp. (*A. blakelyi* and/or *A. scirpifolia* and/or *A. spathulifolia*) over mixed sparse low shrubs, forbs and sedges.
- **BaEmMS** – Open mid shrubland of *Banksia attenuata*, with or without isolated emergent *Acacia* spp., *Eucalyptus todtiana* or *Xylomelum angustifolium*, over *Ecdeiocolea monostachya*, *Mesomelaena pseudostygia* and *Lepidobolus* sp. sparse sedgeland.




- **BmBaLW** – *Banksia menziesii* sparse low woodland over *Banksia attenuata* and *Scholtzia laxiflora* mid open shrubland, over *Melaleuca ?leuropoma*, *Jacksonia floribunda* and *Stirlingia latifolia* low shrubland over *Alexgeorgea nitens* and *Drosera* sp..
- **EmSL** – Isolated low shrubs of *Banksia attenuata*, *Banksia shuttleworthiana* and *Calothamnus glaber*, over *Ecdeiocolea monostachya*, *Mesomelaena pseudostygia* and *Lepidobolus* sp. sedgeland.
- **EtBaLW** – *Eucalyptus todtiana* and *Xylomelum angustifolium* sparse low woodland, over open mid shrubland of *Banksia attenuata*, over myrtaceous low open shrubland and *Ecdeiocolea monostachya* and *Mesomelaena pseudostygia* open sedgeland.
- **XdJaEmMS** – *Xanthorrhoea drummondii* sparse mid shrubland over *Jacksonia angulata* and *Calytrix depressa* low shrubland with *Ecdeiocolea monostachya* sedges.


The vegetation types were based on observations made during field survey, in conjunction with subsequent data analysis and interpretation.

The majority of the Survey Area (183.66 ha; 71.86%) is comprised of **BaEmMS** vegetation, dominated by open mid-shrubland of *Banksia attenuata* over sedges. This can also be characterised as Kwongan scrub or heath, and is a prominent vegetation type (VT) within the region. The **XdJaEmMS** grasstree shrubland was the most restricted vegetation unit of the survey area (1.56 ha; 0.61%), forming a small, discrete area within the southern (Floreat) section of the Survey Area. Aerial imagery interpretation suggests there may be further extent beyond the Survey Area boundary in the vicinity of sites RT16 and RT 20 (Appendix G).

Table 4-1: Vegetation Units of the Survey Area

Vegetation Type	Description	Other Key Species	Relevés	Representative Photograph	Extent in Survey Area (ha/%)
AsPTS	Isolated <i>Eucalyptus todtiana</i> over tall shrubland of <i>Acacia</i> spp. (<i>A. blakelyi</i> and/or <i>A. scirpifolia</i> and/or <i>A. spathulifolia</i>) over mixed sparse low shrubs, forbs and sedges.	<i>Xanthorrhoea drummondii</i> , <i>Jacksonia hakeoides</i> , <i>Banksia shuttleworthiana</i> , <i>Scholtzia laxiflora</i> , <i>Hakea polyanthema</i> , <i>Banksia leptophylla</i> var. <i>melletica</i> , <i>Conostylis candicans</i> subsp. <i>candicans</i> .	RT02 RT09 RT15		10.52 ha 4.12 %
BaEmMS	Open mid shrubland of <i>Banksia attenuata</i> , with or without isolated emergent <i>Acacia</i> spp., <i>Eucalyptus todtiana</i> or <i>Xylomelum angustifolium</i> , over <i>Ecdeiocolea monostachya</i> , <i>Mesomelaena pseudostygia</i> and <i>Lepidobolus</i> sp. sparse sedgeland.	<i>Banksia candolleana</i> , <i>Banksia hookeriana</i> , <i>Calothamnus glaber</i> , <i>Conospermum boreale</i> subsp. <i>ascendens</i> , <i>Scaevola canescens</i> , <i>Conostylis</i> spp.	RR02, RR04 RR05, RT01 RT03, RT05 RT04, RT06 RT08, RT13 RT14, RT17 RT18, RT19 RT20		183.66 ha 71.86 %

Vegetation Type	Description	Other Key Species	Relevés	Representative Photograph	Extent in Survey Area (ha/%)
BmBaLW	<i>Banksia menziesii</i> sparse low woodland over <i>Banksia attenuata</i> and <i>Scholtzia laxiflora</i> mid open shrubland, over <i>Melaleuca ?leuropoma</i> , <i>Jacksonia floribunda</i> and <i>Stirlingia latifolia</i> low shrubland over <i>Alexgeorgea nitens</i> and <i>Drosera sp.</i> .	<i>Pileanthus filifolius</i> , <i>Verticordia grandis</i> , <i>Eremaea beaufortoides</i> , <i>Schoenus curvifolius</i> , <i>Leucopogon sp. Northern ciliate</i> (R. Davis 3393).	RT10		16.29 ha 6.37 %
EmSL	Isolated low shrubs of <i>Banksia attenuata</i> , <i>Banksia shuttleworthiana</i> and <i>Calothamnus glaber</i> , over <i>Ecdeiocolea monostachya</i> , <i>Mesomelaena pseudostygia</i> and <i>Lepidobolus sp.</i> sedgeland.	<i>Conospermum boreale</i> subsp. <i>ascendens</i> , <i>Darwinia pauciflora</i> , <i>Leptospermum erubescens</i> .	RR01 RR03 RT07		6.22 ha 2.43 %
EtBaLW	<i>Eucalyptus todtiana</i> and <i>Xylomelum angustifolium</i> sparse low woodland, over open mid shrubland of <i>Banksia attenuata</i> , over myrtaceous low open shrubland and <i>Ecdeiocolea monostachya</i> and <i>Mesomelaena pseudostygia</i> open sedgeland.	<i>Banksia candolleana</i> , <i>Calothamnus glaber</i> , <i>Scholtzia laxiflora</i> , <i>Banksia shuttleworthiana</i> , <i>Beaufortia elegans</i> , <i>Hibbertia hypericoides</i> , <i>Leucopogon inflexus</i> , <i>Melaleuca ?leuropoma</i> .	RT11 RT12		24.39 ha 9.54 %

Vegetation Type	Description	Other Key Species	Relevés	Representative Photograph	Extent in Survey Area (ha/%)
XdJaEmMS	<i>Xanthorrhoea drummondii</i> sparse mid shrubland over <i>Jacksonia angulata</i> and <i>Calytrix depressa</i> low shrubland with <i>Ecdeiocolea monostachya</i> sedges.	<i>Stylidium repens</i> , <i>Hakea candolleana</i> .	RT16		1.56 ha 0.61 %
Cleared / Not Vegetated	Access track and cleared well pad sites.	n/a	n/a		12.94 ha 5.06 %
Total					255.58 ha 100%

4.1.5 Conservation Significant Vegetation

No vegetation of conservation significance was observed during the survey, and none was assessed as being consistent with any TECs or PECs.

Whilst Banksia woodland vegetation of the VT **BmBaWL** can be characterised floristically as meeting criteria for the *Banksia Woodlands of the Swan Coastal Plain* TEC, as the Survey Area is geographically positioned in the Geraldton Sandplains IBRA region, not the Swan Coastal Plain IBRA region, it is thus excluded from meeting the TEC conditions. No other vegetation was aligned with any State or Commonwealth-listed ecological communities.

4.1.6 Vegetation Condition

Vegetation condition ranged from Degraded to Pristine within the Survey Area, as shown in Appendix G. The vast majority of the Survey Area (230.86 ha, 90.33%) was found to be in Pristine condition according to the EPA condition scale, based on structural integrity and floristic composition observed at the time of survey. Several narrow areas along tracks and adjacent to Brand Highway in the southern (Floreat) portion of the Survey Area exhibited light weed burden and some disturbance, contributing to decreased condition score.

Table 4-2: Extent of vegetation condition within the survey area.

Condition	Extent
Pristine	230.86 ha; 90.33%
Excellent	0 ha; 0%
Very Good	10.44 ha; 4.08%
Good	0 ha; 0%
Degraded	1.34 ha; 0.53%
Completely Degraded	0 ha; 0%

4.1.7 Statistical Analysis

Results of the statistical floristic analysis indicated the **BaEmMS**, and **EmSL** vegetation units were reasonably well defined, however, interpretation against structural vegetation components and field observations was required in order to define the remaining groups and assess outliers. As the Reconnaissance level of survey involves a lower intensity of sampling it is not expected that statistical analysis of results are conclusive or robust in this case, but merely indicative of key vegetation unit alignments.

The preliminary dendrogram generated as part of analysis is shown in Figure 4.1

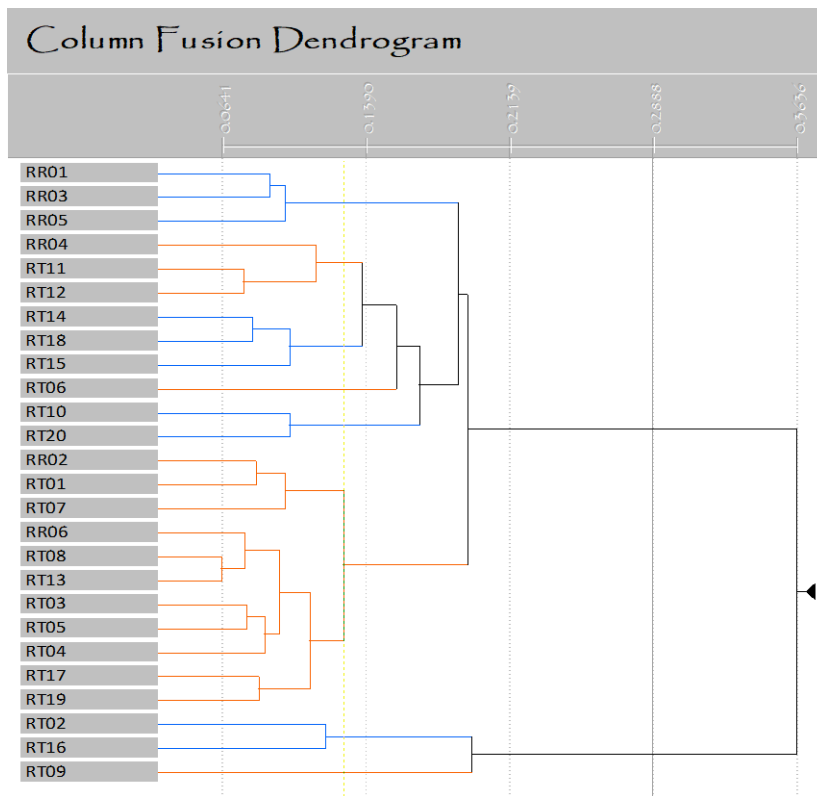


Figure 4.1: Floristic Dendrogram

A species accumulation curve was generated using relevé data (Figure 4.2). Opportunistic observations, which increase the number of species recorded, are not included in the analysis.

Figure 4.2 suggests that the curve is flattening and is gradually approaching an asymptote. However, the Bootstrap estimate of species richness is 255.58, which indicates that further survey is required in order to capture all species present within the Survey Area. A Reconnaissance level of survey is not expected to achieve a comprehensive inventory of flora, but the inclusion of opportunistic records and results of scheduled targeted spring searches will contribute towards reaching the estimated cumulative value.

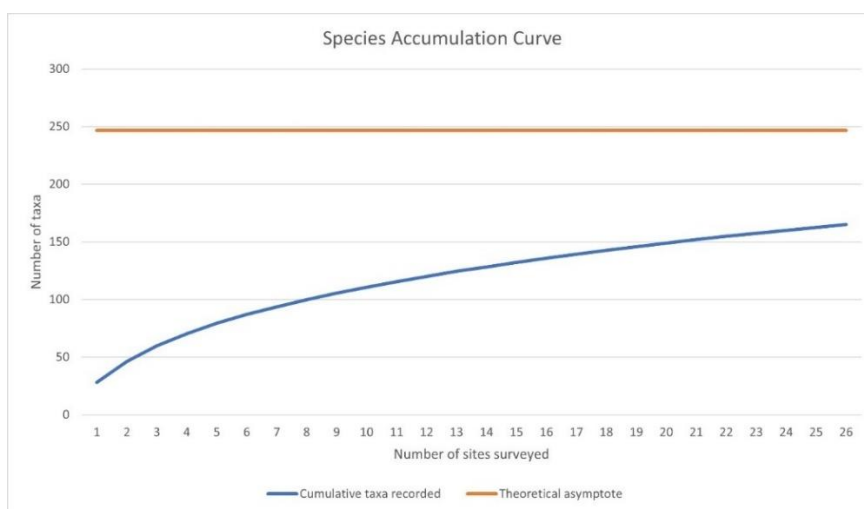


Figure 4.2: Adequacy of Survey

4.1.8 Limitations of Flora and Vegetation Survey

Table 4-3: Botanical Limitations

Possible limitations	Constraints (yes/no): Significant, moderate or negligible	Comment
Availability of contextual information at a regional and local scale	No	A number of flora and vegetation surveys have been conducted in proximity to the survey area, and the majority of the survey area is representative of kwongan vegetation that is well understood from the bioregion. As the role of a Reconnaissance survey is to broadly describe the flora and vegetation attributes of the survey area, this objective is deemed achieved without constraint.
Competence/experience of the team conducting the survey, including experience in the bioregion surveyed	No	The lead ecologist conducting the field survey has over 10 years experience conducting flora and vegetation surveys within Western Australia, including the bioregion.
Proportion of the flora recorded and/or collected, and any identification issues	Moderate	174 vascular flora taxa were recorded during the field survey of which 27 (15.52%) could not be identified with certainty to species level due to the lack of diagnostic reproductive material. This is considered a Moderate constraint for the Reconnaissance level of survey undertaken.
Was the appropriate area fully surveyed (effort and extent)	No	Spatial coverage of the survey area, and the survey effort applied, was sufficient to describe the flora and vegetation values of the survey area at Reconnaissance level.
Access restrictions within the survey area	No	No restrictions to access were encountered and the area was fully surveyed.
Survey timing, rainfall, season of survey	Moderate	The field survey was conducted during May-June which is not within the primary season for survey in the bioregion. Although it would have been ideal to conduct the survey during spring when a higher proportion of flora species are likely to be flowering, supplementary survey in the form of targeted flora searches for conservation-listed species is scheduled for spring of 2022 and 2023. Twenty-seven taxa (15.52% of the flora inventory) could not be identified with certainty due to a lack of flowering material required for identification. This represents a moderate constraint, however, the objectives of a Reconnaissance survey are to identify broad vegetation units and identify any need for further survey, which has confidently been achieved. The vegetation analysis resulting from the survey conducted was sufficient to characterise broad vegetation types and targeted flora searching within the survey area is scheduled for spring 2022 and 2023 to support identification of any conservation significant flora present.
Disturbance that may have affected the results of the survey e.g. fire, flood, clearing	No	Several portions of the survey area had been recently burnt (<2 yrs). However, immediately adjacent unburnt vegetation representing these vegetation units was available within the survey area thus it was not considered a constraint. There were no other recent disturbances that would have affected the results of the survey.

4.2 Basic Fauna Survey

During the Basic fauna survey undertaken in May and June of 2022, 29 habitat assessment points were evaluated and three dedicated bird surveys undertaken within the Survey Area (Table D.2 in Appendix D). The site was traversed on foot or by vehicle and all habitats were assessed for quality and capability of supporting both locally common and significant fauna species.

Fauna observations recorded during the survey were predominantly of avifauna (birds), with overall records consisting of 35 species including four mammals, 27 birds, three reptiles and one invertebrate group. No amphibians were observed.

Of the species recorded, one is conservation-listed:

- *Calyptorhynchus latirostris* (Carnaby's Cockatoo) – [EN; EN].

Three fauna species recorded are introduced:

- **Capra hircus* (Goat);
- **Oryctolagus cuniculus* (Rabbit); and
- **Vulpes vulpes* (Red Fox).

4.2.1 Conservation Significant Fauna

One Threatened fauna species was recorded during survey: Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) [EN; EN]. A small group (<10 individuals) was observed alighting in vegetation close to the Survey Area, along an access corridor in the southern (Floreat) section of the Survey Area. The group alighted briefly in canopy vegetation strata in an area of Acacia shrubland and Eucalyptus woodland, before flying over the corridor directly a short time later.

No Priority species or otherwise conservation-listed taxa were recorded.





4.2.2 Fauna Habitat Assessment



From the 29 habitat assessment points evaluated within the Survey Area, in conjunction with vegetation mapping, a total of six fauna habitat units (excluding cleared areas) were mapped:

- Banksia Scrub on Yellow Sand Dune;
- Banksia Woodland;
- Eucalypt Woodland;
- Kwongan;
- Sedgeland; and
- Shrubland.

These are described in Table 4.4 and mapped in Appendix G.

Table 4-4: Fauna Habitat Units of the Survey Area

Habitat Unit	Description	Representative Photograph
Banksia Scrub on Yellow Sand Dune	<p>Scrub or tall heath of Banksia on dunes of deep yellow sand, with isolated emergent tall shrubs or Eucalypts. Areas of open sand and diverse low or mid-height flowering Proteaceous and Myrtaceous shrubs. Suitable habitat for nectivorous birds (e.g. honeyeaters), Honey Possum, reptiles and predating raptors. Banksia vegetation present may provide forage for Carnaby's Cockatoo.</p> <p>Assessment points: FH26</p> <p>Extent: 0.62ha, 0.24%</p>	
Banksia Woodland	<p>Low woodland of <i>Banksia menziesii</i> over <i>Banksia attenuata</i> scrub and Myrtaceous low shrubland on pale sandplain. Areas of open sand and diverse low or mid-height flowering Proteaceous and Myrtaceous shrubs. Suitable habitat for nectivorous birds (e.g. honeyeaters), reptiles and predating raptors as well as small woodland birds. Banksia vegetation present may provide forage for Carnaby's Cockatoo.</p> <p>Assessment points: FH28, FH29</p> <p>Extent: 16.29 ha, 6.37%</p>	
Eucalypt Woodland	<p>Low woodland of <i>Eucalyptus todtiana</i> over mixed <i>Banksia</i> and Myrtaceous low shrubland and sedges on pale sandplain. Clumps of low trees or mallee with Proteaceous and Myrtaceous shrubs. Suitable habitat for insectivorous birds, reptiles. Eucalypts may provide tree-hollows for arboreal species and nesting birds and coarse woody debris for small reptiles.</p> <p>Assessment points: FH08, FH11</p> <p>Extent: 24.39 ha, 9.54%</p>	
Kwongan	<p>Low scrub or heath of Banksia and Myrtaceous low shrubs, with sedges on pale undulating sandplain. Areas of open sand and diverse low or mid-height flowering Proteaceous and Myrtaceous shrubs. Suitable habitat for nectivorous birds (e.g. honeyeaters), Honey Possum, reptiles and predating raptors. Banksia vegetation present may provide forage for Carnaby's Cockatoo.</p> <p>Assessment points: FH01, FH02, FH07, FH09, FH10, FH12, FH13, FH14, FH15, FH18, FH22, FH24, FH25</p> <p>Extent: 183.04 ha, 71.61%</p>	

Habitat Unit	Description	Representative Photograph
Sedgeland	<p>Low-lying heath or open sedgeland. Closed depressions or basin with loose, low cover. Exposed area preferable for raptors, some small reptiles and foraging Emu or Kangaroo. May support invertebrates when soils are seasonally damp.</p> <p>Assessment points: FH19, FH21</p> <p>Extent: 6.22 ha, 2.43%</p>	
Shrubland	<p>Tall shrubland of Grasstree or Acacia with deep litter and open understorey of herbs, forbs and low shrubs. Areas of scrub amongst tall or mid-height shrubs. Suitable habitat for small to medium woodland birds.</p> <p>Assessment points: BS02, BS03, FH20</p> <p>Extent: 12.08 ha, 4.72%</p>	
Cleared / Not Vegetated	<p>Cleared tracks, well pads and lay-down areas, devoid of vegetation. Unlikely to support fauna, although may be utilised by reptiles or feral mammals when travelling across the site.</p> <p>Assessment points: n/a</p> <p>Extent: 12.94 ha, 5.06%</p>	

4.2.3 SRE Habitat Assessment

No areas considered to have high potential to support SRE species, such as sheltered microhabitat, habitat isolates, drainage lines, outcrops or sustained dampland environments were observed during survey of vegetation and landforms of the Survey Area. The majority of the vegetation and habitat of the Survey Area is widespread and highly connected across the landscape. The most restricted habitat observed on site was Grasstree Shrubland in the vicinity of RT16, however it did not contain features considered to indicate high potential of SRE occurrence, and inspection did not reveal evidence of SRE presence.

No invertebrates considered likely to represent SRE taxa were observed during the survey, despite the survey being undertaken within the optimal season (May – October) (EPA 2009) and in seasonally wet conditions.

Secondary evidence of presence of Mygalomorph spider in the vicinity was however recorded in the form of a disused and displaced trapdoor burrow collar (webbing sock complete with attached hinged lid) found on the ground surface in absence of any visible burrow (Plate 4-1). The material could not be tied to a any confirmed species. This evidence was recorded from an area of alluvial fan near RT16, and as such was adjacent to the Grasstree Shrubland vegetation unit considered to have the greatest potential for SREs to occur. However, a thorough search of the immediate vicinity did not reveal any potential burrow, and no other indicators were observed in the surrounding vegetation units.



Plate 4-1: Disused trapdoor collar.

Overall, the potential for the Survey Area to house contain SRE species is considered low based on landform, vegetation and absence of suitable habitat isolates. There remains some potential for SRE to occur, particularly given the limited knowledge surrounding many of these species.

No other evidence of invertebrates of potential significance was recorded during survey.

4.2.4 Black Cockatoo Habitat Assessment

Although no significant trees likely to support Black Cockatoos nesting or roosting activity were observed within the Survey Area, much of the native vegetation present is suitable for Black Cockatoo foraging habitat. The known distribution maps for Black Cockatoo species indicate that Baudin’s Cockatoo and the Forest Red-tailed Cockatoo are highly unlikely to occur in the area, therefore these taxa have not been considered in assessment of Black Cockatoo habitat in the Survey Area. However, the Survey Area falls within the key range of Carnaby’s Cockatoo, and the vegetation units dominated by *Banksia*, other Proteaceous species and Eucalyptus comprising the majority of the Survey Area contain preferred forage species known to support seasonal flocks of Carnaby’s Cockatoo (DAWE 2022a).

The Commonwealth forage habitat scoring tool (DAWE 2022a) was utilised to assess and quantify Carnaby’s Cockatoo forage value of the Survey Area as a whole, incorporating all fauna habitat units, as is specified in the Black Cockatoo Referral Guidelines document. The resultant scores are presented in Table 4-5.

Table 4-5: Carnaby’s Cockatoo Forage Habitat Assessment

Starting score		Survey Area Scores
10		10
Attribute	Subtractions	
Foraging potential	-2	-2
Connectivity	-2	-0
Proximity to breeding	-2	-2
Proximity to roosting	-1	-1
Impact from significant plant disease	-1	-0
Total score		5
Appraisal		Banksia-dominated vegetation occurs across the majority of the site. No significant (>500mm DBH) trees have been observed and there is no confirmed breeding or roosting in the vicinity, although water resources are available within 12 km, there are a number of records in proximity and individuals and flocks have been observed overflying the area.

The Black Cockatoo Referral Guidelines indicate that a score of 5-10 is representative of High Quality native foraging habitat.

4.2.5 Limitations of Fauna Survey

Table 4-6: Zoological Limitations

Possible limitations	Constraints (yes/no): Significant, moderate or negligible	Comment
Availability of data and information	Negligible	There are several faunal surveys that have been conducted in proximity to the Survey Area in similar habitat that is well understood from the bioregion. In general, availability of data is not considered a constraint, despite there being limited information available with respect to invertebrate species, and a limited density of fauna records. The role of a Basic fauna survey is to broadly describe the habitat attributes of the Survey Area and potential for conservation listed fauna species to occur, which has been achieved.
Competency/experience of the survey team, including bioregion experience	No	The lead Ecologist has over 15 years' experience in fauna ecology, with over 10 years conducting fauna survey in Western Australia.
Scope of survey e.g. excluded fauna groups	No	All vertebrate fauna groups were surveyed for and all recorded with the exception of amphibians. Survey was conducted as a Basic survey, with the emphasis on describing habitat and assessing its suitability for conservation-listed species, thus the scope of survey is not a constraint.
Timing, weather, season	Moderate	The field survey was conducted during May-June, which is outside of the optimal timing for fauna survey in this region for all fauna groups excepting amphibians, which were not targeted during survey. The timing is considered a moderate constraint, although as a Basic level fauna survey, it is not considered a significant impediment to survey validity. The survey period encompassed a range of weather including predominantly fine days with periods of heavy rain preceding one survey period. There is no constraint posed by the preceding weather conditions for this level of survey.
Disturbances that may have affected results	No	Several portions of the survey area had been recently burnt (<2 yrs). However, immediately adjacent unburnt vegetation representing these vegetation units was available within the survey area thus it was not considered a constraint. There were no other recent disturbances that would have affected the results of the survey.
Proportion of fauna identified, recorded or collected	No	Fauna assemblage identified is representative of a Basic level survey with species that are identified in the field by observation and secondary evidence of presence e.g. scats and tracks.
Adequacy of survey intensity and proportion of survey achieved	No	A total of 32 fauna taxa were recorded during the survey, representing taxa from bird, mammal and reptile groups. The survey area is considered to be adequately evaluated for a Basic level of fauna survey.
Access	No	No restrictions to access were encountered and the area was fully surveyed.

5. Discussion

5.1 Flora and Vegetation

No Threatened flora species were recorded during the Reconnaissance flora survey. The Priority 4 species *Stawellia dimorphantha* was recorded in vegetation immediately adjacent to an access track in the northern (Beharra) portion of the Survey Area, in close proximity to a previously recorded occurrence. There are a number of records of this taxon in the area, and as such it is unlikely that the two individuals observed will present a significant constraint to proposed works.

Of the six broad vegetation units identified from the Survey Area, none are considered to be significant, or to represent any conservation-listed ecological community.

No Declared Pest plants or WoNS were identified on the site, and the two species of weed recorded are common and widespread in the area, and were observed at low densities along and adjacent to tracks and disturbed vegetation in the southern (Floreat) portion of the Survey Area where public vehicle access to the vegetation of the UCL is possible and anecdotally reported. The weed taxa recorded represent 1.15% of the overall 174 vascular flora taxa recorded during survey.

Overall, vegetation condition within the Survey Area was generally Pristine, with small extents of Very Good or Degraded vegetation recorded where weeds were present and disturbance had modified vegetation structure.

5.1.1 Likelihood of Flora Occurrence Post-survey

Following completion of the field survey, the likelihood of occurrence evaluation for taxa identified during desktop assessment was updated based on survey effort and habitat observed to occur in the Survey Area (Table C.1 in Appendix C). This allowed for validation and refinement of the potential for conservation-listed species to occur on site.

Fifteen taxa not observed during survey but considered to have a remaining high likelihood of occurrence include:

- *Banksia elegans* (P4);
- *Banksia fraseri* var. *crebra* (P3);
- *Banksia scabrella* (P4);
- *Beyeria gardneri* (P3);
- *Calytrix chrysantha* (P4);
- *Hemiandra* sp. Eneabba (H. Demarz 3687) (P3);
- *Hypocalymma gardneri* (P3);
- *Lasiopetalum ogilvieanum* (P1);
- *Mesomelaena stygia* subsp. *deflexa* (P3);
- *Paracaleana dixonii* VU (EN);
- *Schoenus griffinianus* (P4);
- *Schoenus* sp. Eneabba (F. Obbens & C. Godden I154) (P2);
- *Stylidium carnosum* subsp. Narrow leaves (J.A. Wege 490) (P1);
- *Stylidium drummondianum* (P3); and
- *Thysanotus glaucus* (P4).

These flora species are considered to have high potential to be present despite not being observed in recent survey, based on their low detectability during the period of survey. It is anticipated that the targeted survey to be conducted later in 2022 will provide adequate coverage to identify or excluded their presence.

5.1.2 *Paracaleana dixonii* (Sandplain Duck Orchid) [VU; EN]

One of the remaining likely species, *Paracaleana dixonii* [VU; EN], is a Threatened species and as such is a MNES.

Numerous records of this taxon are known within proximity of the Survey Area, in similar vegetation. The majority of the Survey Area is considered suitable habitat for the species. Although not detected during the Reconnaissance flora survey, this diminutive plant is effectively only detectable when flowering in November to January as vegetative structures are absent for the majority of the year. As the Reconnaissance survey was conducted outside of the flowering window for the species, it is unlikely to have been detected at that time, and its presence in the Survey Area cannot be excluded.

Given the availability of habitat, detection difficulty for the taxon and high number of proximal records in the vicinity, there remains a high potential for this species to be present in the Survey Area despite current survey having returned no overlying occurrences. It is anticipated that targeted survey in the appropriate period scheduled for spring 2022 will provide for a more accurate assessment of the occurrence of the *Paracaleana dixonii*.

5.2 Fauna and Habitat

The six habitat units mapped within the Survey Area are likely to support a typical faunal assemblage of the region, including nectivorous and insectivorous birds, reptiles, raptor species, macropods and potentially Honey Possum. Additionally, the dominant habitat (Kwongan) is supportive of Carnaby's Cockatoo seasonal foraging requirements. Those habitats which are less well represented proportionally within the Survey Area are still represented in the wider landscape and have connectivity beyond the Survey Area boundary.

5.2.1 Likelihood of Fauna Occurrence Post-survey

Following conduction of the field survey, the likelihood of occurrence evaluation for taxa identified during desktop assessment was updated based on survey effort and habitat observed to occur in the Survey Area (**Error! Reference source not found.** in Appendix C). This allowed for validation and refinement of the potential for conservation-listed species to occur on site. Only one conservation-listed fauna taxon (*Neelaps calanotus* [P3]) was not observed during survey but is still considered to have remaining high likelihood of occurrence.

5.2.2 Black-striped Snake (*Neelaps calanotos*) – P3

This species is now primarily restricted to the sandy coastal strip near Perth between Mandurah and Cataby. It inhabits dunes and sand-plains vegetated with heaths and Eucalypt/Banksia woodlands (Wilson & Swan 2017), and feeds largely on *Lerista praepedita*, which is the smallest of the burrowing skinks within its range.

Despite being mostly restricted to areas further south of the Survey Area, this taxon was recorded within 7 km to the north in 2007. Given the availability of highly suitable habitat for the species, its cryptic nature, and the proximal record, it is considered likely that it may occur in the Survey Area. It is unlikely that it is reliant on any portion of the Survey Area habitat for survival; however, it has potential to be directly impacted by clearing activities.

5.2.3 SRE Habitat

No habitats identified within the Survey Area were considered to represent likely habitat for SRE species. The discovery of a displaced trapdoor spider burrow collar does indicate that there are Mygalomorph spiders in at least the vicinity of the Survey Area which may include SRE species. It is

possible that potential SREs do occur within the Survey Area, however, it cannot be ruled out that the secondary evidence of trapdoor spider observed was translocated into the Survey Area by a predating bird or reptile, or perhaps more likely that the burrow was washed out from somewhere higher in the landscape and deposited in the alluvial outwash during heavy rains prior to the survey.

Overall, the potential for the Survey Area to house contain SRE species is considered low based on landform, vegetation and absence of suitable habitat isolates. There remains some potential for SRE to occur, particularly given the limited knowledge surrounding many of these species.

5.2.4 Black Cockatoo Habitat

Although no significant trees likely to support Black Cockatoos nesting or roosting activity were observed within the Survey Area, much of the native vegetation present is suitable for Black Cockatoo foraging habitat, and Carnaby's Cockatoo were observed in adjacent vegetation during survey. Values calculated using the Commonwealth forage habitat scoring tool (DAWE 2022a), with a resultant overall habitat score of five for the Survey Area, indicate the vegetation of the Survey Area is of High Quality as forage habitat for Carnaby's Cockatoo.

The Referral thresholds presented in Table 3 of the Black Cockatoo Referral Guidelines indicate that a score of 5-10 is representative of High Quality native foraging habitat, and as such, loss of greater than or equal to 1 ha is likely to require referral to DCCEEW.

6. Conclusions

Ecological studies including a Reconnaissance flora and vegetation survey, Basic fauna survey, SRE habitat survey and Black Cockatoo habitat assessment were undertaken by JBS&G in May – June 2022 by experienced ecologists.

Findings of the Reconnaissance flora and vegetation survey undertaken included:

- 26 relevés were assessed;
- 174 vascular flora taxa were recorded;
- No Threatened flora taxa were recorded;
- One Priority flora species (*Stawellia dimorphantha* P4) was recorded;
- A further 15 Priority taxa and one Threatened flora taxon (*Paracaleana dixonii* [VU;EN]) are considered likely to occur in the Survey Area despite not being recorded during the current survey. Supplementary targeted survey in Spring will enable identification of conservation significant species not detectable at the time of the current survey;
- Two weed species commonly occurring in the region were recorded (*Hypochaeris* sp. and *Ursinia anthemoides*), neither representing a WoNS or Declared Pest;
- 27 taxa (15.52%) could not be identified to species level due to insufficient diagnostic material being present at the time of survey – primarily due to season of survey;
- Six broad vegetation units were identified from the Survey Area – all are represented outside the Survey Area boundary;
- No vegetation of conservation significance was observed during the survey, and none was assessed as being consistent with any TECs or PECs; an
- Vegetation condition ranged from Degraded to Pristine with the vast majority found to be in Pristine condition.

Findings of the Basic fauna and habitat survey undertaken included:

- 29 habitat assessment points were evaluated;
- Six fauna habitat units were mapped, none of which are considered restricted;
- 35 fauna species including four mammals, 27 birds, three reptiles and one invertebrate group were recorded;
- One Threatened fauna taxon was recorded: *Calyptorhynchus latirostris* (Carnaby's Cockatoo) – [EN; EN];
- No Priority fauna species were recorded;
- One conservation significant species (*Neelaps calonotus* – Black-striped Snake [P3]) is considered to have high potential to occur in the Survey Area despite not being observed during survey; and
- Three introduced fauna species were observed: *Capra hircus* (Goat), *Oryctolagus cuniculus* (Rabbit) and *Vulpes vulpes* (Red Fox).

No areas of habitat considered to have high potential to support SRE species were observed. No invertebrates considered likely to represent SRE taxa were recorded, however, secondary evidence of Mygalomorph spider occurrence was observed as a displaced trapdoor burrow collar found on the ground surface in absence of any visible burrow.

There remains potential for SRE species to occur but likelihood is considered to be low based on the absence of likely suitable habitat.

The majority of the Survey Area constitutes High Quality foraging habitat for Carnaby's Black Cockatoo based on scores calculated using the Black Cockatoo Referral Guidelines (DAWE 2022a). No trees likely to support breeding or roosting activity were observed in the Survey Area.

Impacts anticipated to cause the loss of 1 ha or more of High Quality foraging habitat for Black Cockatoo species are likely to require referral to DCCEE.

7. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

8. References

- Bamford (2020). *Beach Energy's Zemira 3D Seismic Survey Fauna Values Assessment*. Report prepared for Strategen-JBS&G. Perth by M.J. & A.R. Bamford Consulting Ecologists, Perth, Western Australia.
- Belbin, L & Collins, A (2013). *PATN Version 4.0*. Available at: <https://patn.org/>
- Colwell, R K (2013). *EstimateS: Statistical estimation of species richness and shared species from samples*. Version 9. User's Guide and application published at: <http://purl.oclc.org/estimates>.
- DAWE (2017). *Revised Referral Guideline for Three Threatened Black Cockatoo Species: Carnaby's Cockatoo, Baudin's Cockatoo, Forest Red-tailed Cockatoo*. The Department of Agriculture, Water and the Environment (formerly as the Department of the Environment and Energy). Perth, Western Australia.
- DAWE (2022a). *Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black- cockatoo*, Department of Agriculture, Water and the Environment, Canberra, February.
- DAWE (2022b). *Species Profile and Threats Database*. The Department of Agriculture, Water and the Environment (formerly as the Department of the Environment and Energy). Australia. Available at: <https://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>
- DBCA (2013). *Carnaby's Black Cockatoo (Calyptorhynchus latirostris) Recovery Plan*. The Department of Biodiversity, Conservation and Attractions (formerly as the Department of Parks and Wildlife). Perth, Western Australia.
- DBCA (2019a). *Black Cockatoo Breeding Sites - Buffered (DBCA-063) spatial dataset*. The Department of Biodiversity, Conservation and Attractions. Dataset available at: <https://catalogue.data.wa.gov.au/dataset/black-cockatoo-breeding-sites-buffered>
- DBCA (2019b). *Black Cockatoo Roosting Sites - Buffered (DBCA-064) spatial dataset*. The Department of Biodiversity, Conservation and Attractions. Dataset available at: <https://catalogue.data.wa.gov.au/dataset/black-cockatoo-roosting-sites-buffered>
- DBCA (2020a). *How to Collect Herbarium Vascular Plant Specimens*. Western Australian Herbarium, Perth, Western Australia.
- DBCA (2020b). *Conservation codes for Western Australian Flora and Fauna (10 December 2020)*. Available at: <https://www.dpaw.wa.gov.au/images/Conservation%20codes%20for%20Western%20Australia%20Flora%20and%20Fauna%20179KB.pdf>
- DEC (2013). *Definitions, categories and criteria for Threatened and Priority Ecological Communities*. Available at: https://www.dpaw.wa.gov.au/images/plants-animals/threatened-species/definitions_categories_and_criteria_for_threatened_and_priority_ecological_communities.pdf
- DEWHA (2008). *Approved Conservation Advice for Paracaleana dixonii Hopper & A.P.Br. nom. inval. (Sandplain Duck Orchid)*. Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: <http://www.environment.gov.au/biodiversity/threatened/species/pubs/82050-conservation-advice.pdf>. In effect under the EPBC Act from 16-Dec-2008.
- DPIRD (2017). *Soil Landscape Mapping - Best Available (DPIRD-027)*. Soil and landform spatial dataset, published by the Department of Primary Industries and Regional Development, Western Australia. Available at: <https://catalogue.data.wa.gov.au/dataset/soil-landscape-mapping-best-available>.

- DSEWPaC (2012). *Environmental Protection and Biodiversity Conservation Act 1986 (C'th) referral guidelines for three threatened black-cockatoo species: Carnaby's Cockatoo (Endangered) Calyptorhynchus latirostris, Baudin's Cockatoo (Vulnerable) Calyptorhynchus baudinii, Forest Red-tailed Black-Cockatoo (Vulnerable) Calyptorhynchus banksia naso*. Canberra, Australian Capital Territory. Available from: <http://www.environment.gov.au/system/files/resources/895d4094-af63-4dd3-8dff-ad2b9b943312/files/referral-guidelines-wa-black-cockatoo.pdf>.
- Eco Logical Australia (2020). *West Erregulla Pipeline Flora and Fauna Survey*. Document prepared for Australian Gas Infrastructure Group.
- EPA (2009). *Technical Guidance – Sampling of short range endemic invertebrate fauna*. EPA, Western Australia. Available at: <https://www.epa.wa.gov.au/policies-guidance/technical-guidance-sampling-short-range-endemic-invertebrate-fauna>
- EPA (2016a). *Environmental Factor Guideline: Flora and Vegetation*. EPA, Western Australia. Available at: https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Guideline-Flora-Vegetation-131216_4.pdf
- EPA (2016b). *Environmental Factor Guideline: Terrestrial Fauna*. EPA, Western Australia. Available at: https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Guideline-Terrestrial-Fauna-131216_3.pdf
- EPA (2016c). *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment*. EPA, Western Australia. Available at: <http://www.epa.wa.gov.au/policies-guidance/technical-guidance-flora-and-vegetation-surveys-environmental-impact-assessment>
- EPA (2019). *EPA Advice: Carnaby's Black Cockatoo in Environmental Impact Assessment in the Perth and Peel Region in accordance with section 16 (j) of the Environmental Protection Act 1986*. The Environmental Protection Authority. Perth, Western Australia.
- EPA (2020). *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment*, EPA, Western Australia. Available at: https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/2020.09.17%20-%20EPA%20Technical%20Guidance%20-%20Vertebrate%20Fauna%20Surveys%20-%20Final.pdf
- Maia Environmental Consultancy Pty Ltd (2013). *Drover - 01 Study Area Reconnaissance and Targeted Flora Surveys*. Document prepared for AWE Limited.
- Mattiske Consulting Pty Ltd (2017). *Targeted Flora Survey Trieste 3D Seismic Project, Arrowsmith*. Report prepared for Lattice Energy, Perth, Western Australia.
- Mattiske Consulting Pty Ltd (2021a). *Flora and Vegetation Assessment Arrowsmith North Survey Area*. Document prepared for VRX Silica Ltd.
- Mattiske Consulting Pty Ltd (2021b). *Flora and Vegetation Assessment Arrowsmith North Transport Corridor Survey Area*. Document prepared for VRX Silica Ltd.
- NVIS Technical Working Group (2017). *Australian Vegetation Attribute Manual: National Vegetation Information System, Version 7.0*. Department of the Environment and Energy, Canberra. Prep by Bolton, M.P., deLacey, C. and Bossard, K.B. (Eds)
- Strategen-JBS&G (2020). *Flora and Vegetation Assessment of Zemira 3D Seismic Survey Area – Interim Report*. Report prepared for Beach Energy Ltd by JBS&G Australia Pty Ltd. Perth, Western Australia.
- Western Australian Herbarium (1998–2022). *Florabase—the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. <https://florabase.dpaw.wa.gov.au/> (Accessed 27 July 2022).

Western Wildlife (2017). *Trieste 3D Seismic Survey: Level 1 Vertebrate Fauna Survey and Black-Cockatoo Habitat Survey November 2017*. Report prepared for Lattice Energy Services Pty Limited, Western Australia.

Woodman Environmental Consulting (2013). *West Erregulla Project Flora and Vegetation Assessment*. Prepared for Warrego Energy Limited.

Woodman Environmental Consulting (2018a). *Proposed Xyris Lateral Flora and Vegetation Assessment*. Document prepared for AWE Limited.

Woodman Environmental Consulting (2018b). *Waitsia 3 Flowline Corridor Flora, Vegetation and Fauna Assessment*. Document prepared for AWE Limited.

Woodman Environmental Consulting (2020b). *West Erregulla Wells 4 & 5 Flora and Vegetation Risk Assessment*. Document prepared for Strike Energy Limited

Appendix A – Definitions and Classification

Table A.1: EPBC Act categories for flora, fauna and ecological communities

Category	Threatened species	Threatened Ecological Communities
Extinct	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.	n/a
Extinct in the wild	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) 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.	n/a
Critically Endangered (CE)	A native species is eligible to be included in the <i>critically endangered</i> category 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.	An ecological community is eligible to be included in the <i>critically endangered</i> category 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
Endangered (EN)	A native species is eligible to be included in the <i>endangered</i> category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the <i>endangered</i> category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable (VU)	A native species is eligible to be included in the <i>vulnerable</i> category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the <i>vulnerable</i> category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
Conservation Dependent	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (a) 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 (b) the following subparagraphs are satisfied: (i) the species is a species of fish; (ii) 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; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.	n/a

Table A.2: Conservation codes for Western Australian flora and fauna (DBCA 2020b)

Conservation Codes for Western Australian Flora and Fauna	
<p>Threatened, Extinct and Specially Protected fauna or flora¹ are species² 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.</p> <p><i>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 species³ under Part 2 of the Biodiversity Conservation Act 2016.</i></p> <p>Categories of Threatened, Extinct and Specially Protected fauna and flora are:</p>	
T	<p>Threatened species</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 the species of fauna that are listed as critically endangered, endangered or vulnerable threatened species.</p> <p>Threatened flora is the species of flora that are listed as critically endangered, endangered or vulnerable threatened species.</p> <p>The assessment of the conservation status of threatened species is in accordance with the BC Act listing criteria and the requirements of Ministerial Guideline (Number 1) and Ministerial Guideline (Number 2) that adopts the use of the International Union for Conservation of Nature (IUCN) Red List of Threatened Species Categories and Criteria⁴, and is based on the national distribution of the species.</p>
CR	<p>Critically endangered species</p> <p>Threatened species considered to be <i>“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”</i>.</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.</p>
EN	<p>Endangered species</p> <p>Threatened species considered to be <i>“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”</i>.</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.</p>
VU	<p>Vulnerable species</p> <p>Threatened species considered to be <i>“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”</i>.</p> <p>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.</p>
<p>Extinct species</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>	
EX	<p>Extinct species</p> <p>Species where <i>“there is no reasonable doubt that the last member of the species has died”</i>, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).</p>
EW	<p>Extinct in the wild species</p> <p>Species that <i>“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”</i>, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).</p> <p>Currently there are no fauna or flora species listed as extinct in the wild.</p>
<p>Specially protected species</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>Migratory species</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>Migratory species include birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA)⁵, China (CAMBA)⁶ or The Republic of Korea (ROKAMBA)⁷, and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)⁸, 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>
CD	<p>Species of special conservation interest (conservation dependent fauna)</p> <p>Species of special conservation need that are 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>

Conservation Codes for Western Australian Flora and Fauna	
	Currently only fauna are listed as species of special conservation interest.
OS	<p>Other specially protected species Species 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). Currently only fauna are listed as species otherwise in need of special protection.</p>
P	<p>Priority species <u>Priority is not a listing category under the BC Act.</u> All fauna and flora are protected in WA following the provisions in Part 10 of the BC Act. The protection applies even when a species is not listed as threatened or specially protected, and regardless of land tenure (State managed land (Crown land), private land, or Commonwealth land). Species that may possibly be threatened species that do not meet the criteria for listing under the BC Act because of insufficient survey 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 prioritisation for survey and evaluation of conservation status so that consideration can be given to potential listing as threatened. Species that are adequately known, meet criteria for near threatened, or are rare but not threatened, or that have been recently removed from the threatened species list or conservation dependent or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Assessment of priority status 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>
1	<p>Priority 1: Poorly-known species - known from few locations, none on conservation lands 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, for example, 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 for threatened listing and appear to be under immediate threat from known threatening processes. These species are in urgent need of further survey.</p>
2	<p>Priority 2: Poorly-known species - known from few locations, some on conservation lands 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, for example, 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 for threatened listing and appear to be under threat from known threatening processes. These species are in urgent need of further survey.</p>
3	<p>Priority 3: Poorly-known species - known from several locations 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. These species need further survey.</p>
4	<p>Priority 4: Rare, Near Threatened and other species in need of monitoring (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. (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 a conservation dependent specially protected species. (c) Species that have been removed from the list of threatened species or lists of conservation dependent or other specially protected species, during the past five years for reasons other than taxonomy. (d) Other species in need of monitoring.</p>
<p>¹ The definition of flora includes algae, fungi, and lichens. ² 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). ³ Schedules are not referred to when stating the listing status of threatened, extinct or specially protected species under the BC Act. See the examples provided under each listing category. ⁴ Western Australia has assigned species to threat categories using the IUCN Red List of Threatened Species Categories and Criteria since 1996 (referencing all criteria). At the national level, threatened species listings under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) reference only some of the IUCN criteria (http://www.environment.gov.au/biodiversity/threatened/nominations/forms-and-guidelines). ⁵ JAMBA - first included in the WA migratory species list in 1980. ⁶ CAMBA - first included in the WA migratory species list in 2010. ⁷ ROKAMBA - first included in the WA migratory species list in 2010. ⁸ Bonn Convention (Birds) - first included in the WA migratory species list in 2015</p>	

Table A.3: DBCA definitions and criteria for TECs and PECs (DEC 2013)

Criteria	Definition
Threatened Ecological Communities	
Presumed Totally Destroyed (PD)	<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>Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or</p> <p>All occurrences recorded within the last 50 years have since been destroyed</p>
Critically Endangered (CR)	<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>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>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>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>Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <p>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>there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes;</p> <p>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>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>
Endangered (EN)	<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>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>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>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.</p> <p>Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <p>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);</p> <p>there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes;</p> <p>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.</p>

Criteria	Definition
	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).
Vulnerable (VU)	<p>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.</p> <p>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):</p> <p>The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.</p> <p>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.</p> <p>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.</p>
Priority ecological communities	
Priority One	<p><i>Poorly known ecological communities</i></p> <p>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.</p>
Priority Two	<p><i>Poorly known ecological communities</i></p> <p>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.</p>
Priority Three	<p><i>Poorly known ecological communities</i></p> <p>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>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>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, 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>
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>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</p> <p>These communities are usually represented on conservation lands.</p> <p>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.</p> <p>Ecological communities that have been removed from the list of threatened communities during the past five years.</p>
Priority Five	<p><i>Conservation Dependent Ecological Communities</i></p> <p>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.</p>

Table A.4: NVIS structural formation terminology, terrestrial vegetation (NVIS Technical Working Group 2017)

	Cover characteristics							
	Foliage cover *	70-100	30-70	10-30	<10	» 0 (scattered)	0-5 (clumped)	unknown
	Cover code	d	c	i	r	bi	bc	unknown
Growth Form	Height Ranges (m)	Structural Formation Classes						
tree, palm	<10,10-30, >30	closed forest	open forest	woodland	open woodland	isolated trees	isolated clumps of trees	tree, palm
tree mallee	<3, <10, 10-30	closed mallee forest	open mallee forest	mallee woodland	open mallee woodland	isolated mallee trees	isolated clumps of mallee trees	tree mallee
shrub, cycad, grass-tree, tree-fern	<1,1-2,>2	closed shrubland	shrubland	open shrubland	sparse shrubland	isolated shrubs	isolated clumps of shrubs	shrub, cycad, grass-tree, tree-fern
mallee shrub	<3, <10, 10-30	closed mallee shrubland	mallee shrubland	open mallee shrubland	sparse mallee shrubland	isolated mallee shrubs	isolated clumps of mallee shrubs	mallee shrub
heath shrub	<1,1-2,>2	closed heathland	heathland	open heathland	sparse heathland	isolated heath shrubs	isolated clumps of heath shrubs	heath shrub
chenopod shrub	<1,1-2,>2	closed chenopod shrubland	chenopod shrubland	open chenopod shrubland	sparse chenopod shrubland	isolated chenopod shrubs	isolated clumps of chenopod shrubs	chenopod shrub
samphire shrub	<0.5,>0.5	closed samphire shrubland	samphire shrubland	open samphire shrubland	sparse samphire shrubland	isolated samphire shrubs	isolated clumps of samphire shrubs	samphire shrub
hummock grass	<2,>2	closed hummock grassland	hummock grassland	open hummock grassland	sparse hummock grassland	isolated hummock grasses	isolated clumps of hummock grasses	hummock grass
tussock grass	<0.5,>0.5	closed tussock grassland	tussock grassland	open tussock grassland	sparse tussock grassland	isolated tussock grasses	isolated clumps of tussock grasses	tussock grass
other grass	<0.5,>0.5	closed grassland	grassland	open grassland	sparse grassland	isolated grasses	isolated clumps of grasses	other grass
sedge	<0.5,>0.5	closed sedgeland	sedgeland	open sedgeland	sparse sedgeland	isolated sedges	isolated clumps of sedges	sedge
rush	<0.5,>0.5	closed rushland	rushland	open rushland	sparse rushland	isolated rushes	isolated clumps of rushes	rush
herb	<0.5,>0.5	closed herbland	herbland	open herbland	sparse herbland	isolated herbs	isolated clumps of herbs	herb
fern	<1,1-2,>2	closed fernland	fernland	open fernland	sparse fernland	isolated ferns	isolated clumps of ferns	fern

Cover characteristics								
bryophyte	<0.5	closed bryophyte-land	bryophyte-land	open bryophyteland	sparse bryophyteland	isolated bryophytes	isolated clumps of bryophytes	bryophyte
lichen	<0.5	closed lichenland	lichenland	open lichenland	sparse lichenland	isolated lichens	isolated clumps of lichens	lichen
vine	<10,10-30, >30	closed vineland	vineland	open vineland	sparse vineland	isolated vines	isolated clumps of vines	vine

Table A.5: NVIS height classes (NVIS Technical Working Group 2017)

Height		Growth form				
Height Class	Height Range (m)	Tree, vine (M & U), palm (single-stemmed)	Shrub, heath shrub, chenopod shrub, ferns, samphire shrub, cycad, tree-fern, grass-tree, palm (multi-stemmed)	Tree mallee, mallee shrub	Tussock grass, hummock grass, other grass, sedge, rush, forbs, vine (G)	Bryophyte, lichen, seagrass, aquatic
8	>30	tall	NA	NA	NA	NA
7	10-30	mid	NA	tall	NA	NA
6	<10	low	NA	mid	NA	NA
5	<3	NA	NA	low	NA	NA
4	>2	NA	tall	NA	tall	NA
3	1-2	NA	mid	NA	tall	NA
2	0.5-1	NA	low	NA	mid	tall
1	<0.5	NA	low	NA	low	low

Source: (based on Walker & Hopkins 1990)

Table A.6: Foraging quality scoring tool template (DAWE 2022a)

Starting score		Baudin's Cockatoo	Carnaby's Cockatoo	Forest Red-tailed Black-Cockatoo
10		Start at a score of 10 if your site is native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly Marri, within the range of the species, including along roadsides and parkland cleared areas. Can include planted vegetation. This tool only applies to sites equal to or larger than 1 hectare in size.	Start at a score of 10 if your site is native shrubland, kwongan heathland or woodland, dominated by proteaceous plant species such as <i>Banksia</i> spp. (including <i>Dryandra</i> spp.), <i>Hakea</i> spp. and <i>Grevillea</i> spp., as well as native eucalypt woodland and forest that contains foraging species, within the range of the species, including along roadsides and parkland cleared areas. Also includes planted native vegetation. This tool only applies to sites equal to or larger than 1 hectare in size.	Start at a score of 10 if your site is Jarrah or Marri woodland and/or forest, or if it is on the edge of Karri forest, or if Wandoo and Blackbutt occur on the site, within the range of the subspecies, including along roadsides and parkland cleared areas. This tool only applies to sites equal to or larger than 1 hectare in size.
Attribute	Sub-tractions	Context adjustor (attributes reducing functionality of foraging habitat)		
Foraging potential	-2	Subtract 2 from your score if there is no evidence of feeding debris on your site.	Subtract 2 from your score if there is no evidence of feeding debris on your site.	Subtract 2 from your score if there is no evidence of feeding debris on your site.
Connectivity	-2	Subtract 2 from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	Subtract 2 from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	Subtract 2 from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.
Proximity to breeding	-2	Subtract 2 if you have evidence to conclude that your site is more than 12 km from breeding habitat.	Subtract 2 if you have evidence to conclude that your site is more than 12 km from breeding habitat.	Subtract 2 if you have evidence to conclude that your site is more than 12 km from breeding habitat.
Proximity to roosting	-1	Subtract 1 if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	Subtract 1 if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	Subtract 1 if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.
Impact from significant plant disease	-1	Subtract 1 if your site has disease present (e.g. <i>Phytophthora</i> spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	Subtract 1 if your site has disease present (e.g. <i>Phytophthora</i> spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	Subtract 1 if your site has disease present (e.g. <i>Phytophthora</i> spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.
Total score		<i>Enter score</i>	<i>Enter score</i>	<i>Enter score</i>
Appraisal		To support your habitat score, you should provide an overall appraisal of the habitat on the impact site and within 20km of the impact area to clearly explain and justify the score. It should include discussion on the foraging habitat's proximity to other resources (e.g. exact distance to proximate resources), frequency of use of proximate sites, the degree of evidence and description of vegetation type and condition.		

Appendix B – PMST Search Results



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: 14-Feb-2023

[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](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	53
Listed Migratory Species:	42

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.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	66
Whales and Other Cetaceans:	11
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	6
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	19
Key Ecological Features (Marine):	None
Biologically Important Areas:	10
Bioregional Assessments:	None
Geological and Bioregional Assessments:	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
BIRD			
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black- browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Zanda latirostris listed as Calyptorhynchus latirostris Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat known to occur within area	In feature area
FISH			
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only
MAMMAL			
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Parantechinus apicalis Dibbler [313]	Endangered	Species or species habitat may occur within area	In feature area
PLANT			
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area	In feature area
Caleana dixonii listed as Paracaleana dixonii Sandplain Duck Orchid [87944]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Conostylis dielsii subsp. teres Irwin's Conostylis [3614]	Endangered	Species or species habitat likely to occur within area	In feature area
Conostylis micrantha Small-flowered Conostylis [17635]	Endangered	Species or species habitat may occur within area	In feature area
Daviesia speciosa Beautiful Daviesia [56698]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eucalyptus crispata Yandanooka Mallee [24268]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eucalyptus leprophloia Scaly Butt Mallee, Scaly-butt Mallee [56712]	Endangered	Species or species habitat known to occur within area	In buffer area only
Hakea megalosperma Lesueur Hakea [10505]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Hemiandra gardneri Red Snakebush [7945]	Endangered	Species or species habitat may occur within area	In buffer area only
Leucopogon marginatus Thick-margined Leucopogon [12527]	Endangered	Species or species habitat may occur within area	In buffer area only
Leucopogon obtectus Hidden Beard-heath [19614]	Endangered	Species or species habitat likely to occur within area	In feature area
Tetratheca nephelioides [83217]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Wurmbea tubulosa Long-flowered Nancy [12739]	Endangered	Species or species habitat may occur within area	In buffer area only
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Egernia stokesii badia Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink [64483]	Endangered	Species or species habitat may occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
SHARK			
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only

SPIDER

Idiosoma nigrum Shield-backed Trapdoor Spider, Black Rugose Trapdoor Spider [66798]	Vulnerable	Species or species habitat may occur within area	In buffer area only
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Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text	Buffer Status
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Migratory Marine Birds

Anous stolidus Common Noddy [825]		Species or species habitat may occur within area	In buffer area only
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Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
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Ardeenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
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Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In buffer area only
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Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
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Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area	In buffer area only
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Hydroprogne caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
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Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
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Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Marine Species			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may 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
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat may occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area	In buffer area only
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat may occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Stercorarius skua as Catharacta skua Great Skua [823]		Species or species habitat may occur within area	In buffer area only
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Sternula albifrons as Sterna albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In buffer area only

Fish

Scientific Name	Threatened Category	Presence Text	Buffer Status
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area	In buffer area only
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area	In buffer area only
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In buffer area only
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area	In buffer area only
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area	In buffer area only
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In buffer area only
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area	In buffer area only
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area	In buffer area only
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In buffer area only
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area	In buffer area only
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In buffer area only
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In buffer area only
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In buffer area only
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In buffer area only
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In buffer area only
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In buffer area only
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In buffer area only
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In buffer area only
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In buffer area only
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In buffer area only
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Reptile			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Aipysurus pooleorum Shark Bay Seasnake [66061]		Species or species habitat may occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area	In buffer area only

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In buffer area only
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In buffer area only
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In buffer area only
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Beekeepers	Nature Reserve	WA	In buffer area only
NTWA Bushland covenant (0084)	Conservation Covenant	WA	In buffer area only
NTWA Bushland covenant (0101)	Conservation Covenant	WA	In buffer area only
Unnamed WA25495	Nature Reserve	WA	In buffer area only
Unnamed WA47436	Nature Reserve	WA	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Yardanogo	Nature Reserve	WA	In buffer area only

EPBC Act Referrals [[Resource Information](#)]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Arrowsmith Central Silica Sand Project	2021/9067		Referral Decision	In buffer area only
BEHARRA SILICA SAND PROJECT	2022/09308		Assessment	In buffer area only
West Erregulla Processing Plant and Pipeline	2021/8907		Assessment	In buffer area only

Controlled action

Arrowsmith North Silica Sand Project	2020/8788	Controlled Action	Proposed Decision	In buffer area only
construction and operation of a unmanned platform at the Cliff Head oil field, a	2003/1300	Controlled Action	Post-Approval	In buffer area only
Expansion of mineral sand mine	2008/4192	Controlled Action	Completed	In buffer area only
Natta 3D Seismic Acquisition Survey, 36 km east of Dongara	2021/8992	Controlled Action	Referral Decision	In buffer area only
Tiwest Dongara Project, mineral sands mining and concentrating operation, 25km	2009/5032	Controlled Action	Post-Approval	In feature area
Trieste 3D seismic survey, WA	2017/8133	Controlled Action	Post-Approval	In buffer area only
Undertake seismic survey to assess shale resources	2013/7088	Controlled Action	Post-Approval	In buffer area only
West Erregulla 3D onshore seismic survey & appraisal drilling exploration program WA	2013/7054	Controlled Action	Post-Approval	In buffer area only
West Erregulla Field Development Program, 40 km southeast of Dongara, WA	2021/8991	Controlled Action	Assessment Approach	In buffer area only
Zemira 3D Seismic Survey	2020/8658	Controlled Action	Assessment Approach	In feature area

Not controlled action

Cliff Head 6 appraisal well	2004/1702	Not Controlled Action	Completed	In buffer area only
Drilling between Kalbarri and Cliff Head	2005/2185	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Indian Ocean Drive Passing Lane and Widening 52-258 SLK	2017/7884	Not Controlled Action	Completed	In buffer area only
Waitsia Gas Project Stage 2, Yardarino WA	2020/8633	Not Controlled Action	Completed	In buffer area only

Referral decision

Transmission Line Rebuild and Extension	2009/4972	Referral Decision	Completed	In buffer area only
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Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging (in high numbers)	Known to occur	In buffer area only
Hydroprogne caspia Caspian Tern [808]	Foraging (provisioning young)	Known to occur	In buffer area only
Larus pacificus Pacific Gull [811]	Foraging (in high numbers)	Known to occur	In buffer area only
Puffinus assimilis tunneyi Little Shearwater [59363]	Foraging (in high numbers)	Known to occur	In buffer area only
Sterna dougallii Roseate Tern [817]	Foraging	Known to occur	In buffer area only
Sternula nereis Fairy Tern [82949]	Foraging (in high numbers)	Known to occur	In buffer area only
Seals			
Neophoca cinerea Australian Sea Lion [22]	Foraging (male and female)	Known to occur	In buffer area only

Sharks

Scientific Name	Behaviour	Presence	Buffer Status
Carcharodon carcharias White Shark [64470]	Foraging	Known to occur	In buffer area only
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In buffer area only
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur	In buffer area only

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 – Likelihood of Occurrence Assessments

Table C.1: Flora Likelihood of Occurrence

Taxon	Conservation Status		Description	PMST Attribution	Desktop Likelihood of occurrence	Post-field Likelihood of occurrence
	BC Act	EPBC Act				
<i>Acacia latipes</i> subsp. <i>licina</i>	P3		Pungent shrub, 0.4-1.2 m high. Fl. yellow, Jun to Sep. White sand, granitic soils. Limestone hills, sandplains.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Acacia vittata</i>	P2		Dense, rounded shrub, 1-4 m high. Fl. yellow, Aug. Grey sand, sandy clay. Margins of seasonal lakes.		Possible Habitat present and records within the vicinity	Unlikely Limited potential habitat observed during survey
<i>Andersonia gracilis</i>	VU	EN	Slender erect or open straggly shrub, 0.1-0.5(-1) m high. Fl. white-pink-purple, Sep to Nov. White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	Species or species habitat likely to occur within area	Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Anthocercis intricata</i>	P3		Dense, spinescent shrub, 0.9-3 m high. Fl. white-cream, Jun to Sep. Sand or loam over limestone. Consolidated sand dunes.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Baeckea</i> sp. Walkaway (A.S. George 11249)	P3		Dense, multi-stemmed shrub, 0.5-2 m high. Fl. white, Dec or Jan. Yellow/brown or white sand. Undulating plains, hillslopes.		Possible Habitat present and records within the vicinity	Possible
<i>Banksia cypholoba</i>	P3		Prostrate, dwarf, lignotuberous shrub, to 0.3 m high. Fl. yellow-brown, Aug. Sand & gravelly loam.		Possible Habitat present but no records within the vicinity (<9km)	Possible
<i>Banksia elegans</i>	P4		Shrub (with fire-tolerant rootstock, often suckering), 1-4 m high. Fl. yellow/green-yellow, Oct to Nov. Yellow, white or red sand. Sandplains, low consolidated dunes.		Likely Habitat present and existing close records	Likely
<i>Banksia fraseri</i> var. <i>crebra</i>	P3		Shrub usually less than 50 cm high. Leaf lobes linear, glaucous. Sandy loam or sandy clay over laterite, in kwongan. Fl. July and August.		Likely Habitat present and records within the vicinity	Likely
<i>Banksia scabrella</i>	P4		Much-branched, lignotuberous shrub, 0.6-2 m high. Fl. yellow & cream & purple, Sep to Dec or Jan. White, grey or yellow sand, sometimes with lateritic gravel. Sandplains, lateritic ridges.		Likely Habitat present and existing close records	Likely
<i>Beyeria cinerea</i> subsp. <i>cinerea</i>	P3		A spreading, erect or prostrate succulent shrub to 70cm, with both male and female, inconspicuous flowers that lack noticeable petals, with flowers consisting of a yellow-green calyx. Flowers appear in July and from September to November. Subspecies <i>cinerea</i> has leaf blades with truncate to cuneate bases rather than cordate bases. It grows in coastal heath and shrubland on sandy soils over limestone.		Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely

Taxon	Conservation Status		Description	PMST Attribution	Desktop Likelihood of occurrence	Post-field Likelihood of occurrence
	BC Act	EPBC Act				
<i>Beyeria gardneri</i>	P3		Shrub, 0.25-0.5 m high. Fl. yellow, Aug to Sep. Yellow sand.		Likely Habitat present and existing close records	Likely
<i>Caladenia denticulata</i> subsp. <i>albicans</i>	P1		15-35 cm height. Flowers dull white or cream. Labellum white with red stripes, spots and blotches. Column opaque cream with red stripes, spots and blotches. Grows in a variety of habitats as well as moist, calcareous sand under Eucalyptus camaldulensis and Acacia species. Also known as Caladenia denticulata subsp. Arrowsmith. Flowers 7-10cm long x 5-9 cm wide.		Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Calytrix chrysantha</i>	P4		Shrub, 0.3-1.3 m high. Fl. yellow, Dec or Jan to Feb. White, grey or yellow/brown sand. Flats.		Likely Habitat present and existing close records	Likely
<i>Calytrix eneabensis</i>	P4		Shrub, 0.3-1 m high. Fl. purple & pink & yellow, Jul to Oct. White, grey or yellow sand over laterite. Sandplains.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Calytrix superba</i>	P4		Shrub, 0.2-1 m high. Fl. pink-red, Dec or Jan to Feb. Sand over laterite. Flats.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Centrolepis milleri</i>	P3		Specimens of <i>C. milleri</i> grow with their leaves mostly buried by sand. <i>Centrolepis milleri</i> superficially resembles <i>C. drummondiana</i> , but differs from it in the presence of two to five cataphylls at the base of a scape, in the absence of a spikelet in the axil of the lower primary bract, in the dimorphic morphology of the primary bracts and in the presence of one long and one short tepal-like phyllome associated with each flower. The absence of a spikelet in the axil of the lower primary bract and the dimorphic nature of the primary bracts are shared with species such as <i>C. polygyna</i> and <i>C. glabra</i> , to which <i>C. milleri</i> is apparently related. Spring flowering.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Comesperma griffinii</i>	P2		Annual or perennial, herb, to 0.15 m high. Fl. white, Oct. Yellow or grey sand. Plains.		Possible Habitat present and records within the vicinity	Possible
<i>Comesperma rhadinocarpum</i>	P3		Perennial, herb. Fl. blue, Oct to Nov. Sandy soils.		Possible Habitat present and records within the vicinity	Possible
<i>Conostylis dielsii</i> subsp. <i>teres</i>	VU	EN	Shortly rhizomatous, tufted perennial, grass-like or herb, 0.13-0.33 m high, leaves terete. Fl. cream-yellow, Jul to Aug. White, grey or yellow sand, gravel. Low open woodland.	Species or species habitat likely to occur within area	Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Conostylis micrantha</i>	VU	EN	Rhizomatous, tufted perennial, grass-like or herb, 0.13-0.24 m high. Fl. yellow-cream/red, Jul to Aug. White or grey sand. Sandplains.	Species or species habitat known to occur within area	Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely

Taxon	Conservation Status		Description	PMST Attribution	Desktop Likelihood of occurrence	Post-field Likelihood of occurrence
	BC Act	EPBC Act				
<i>Dampiera tephrea</i>			Ascending to erect perennial, herb or shrub, 0.3-0.6 m high, with grey or yellowish hairs on abaxial surface of leaves. Fl. blue, Jul. Sand, gravelly loam.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Daviesia speciosa</i>	EN	EN	Many-stemmed shrub, 0.3-0.8 m high. Fl. red, Apr to May. Gravelly lateritic soils. Undulating plains, rises.	Species or species habitat known to occur within area	Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Eucalyptus crispata</i>	EN	EN	A lignotuberous mallee from 3-7 m high, with rough bark on the trunk, in partly decorticated curls. Yellow-cream flowers appear from March to June. Prefers lateritic soils.	Species or species habitat likely to occur within area	Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Eucalyptus foecunda</i> subsp. <i>aeolica</i>	P2		Distinguished from <i>E. foecunda</i> subsp. <i>foecunda</i> by its consistently dull, grey-green seedling leaves that are pruinose, at least on the new growth. White, yellowish or pale brown coastal sands overlying limestone, often on limestone dunes, in mallee shrubland or low open woodland. Associated eucalypts include <i>Eucalyptus erythrocoris</i> , <i>E. obtusiflora</i> subsp. <i>dongarrensis</i> , <i>E. petrensis</i> and <i>E. zopherophloia</i> .		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Eucalyptus leprophloia</i>	EN	EN	(Mallee), 2-5(-8) m high, bark rough loose & flaky to 1 m. Fl. cream-white, Aug to Oct. White or grey sand over laterite. Valley slopes.	Species or species habitat known to occur within area	Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Eucalyptus macrocarpa</i> subsp. <i>elachantha</i>	P4		(Spreading or sprawling mallee), 0.8-4 m high, bark smooth, grey over salmon pink. Fl. red-pink, Aug to Sep or Nov to Dec. White or grey sand over laterite. Hillslopes, ridges, sandplains.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Eucalyptus macrocarpa</i> x <i>pyriformis</i>	P3		Erect, open mallee tree, 1.2-6 m high. Fl. red, Apr or Aug to Oct. Sand, lateritic sandy soils. Hills, rocky ironstone ridges, sandplains.		Likely Habitat present and existing close records	Unlikely
<i>Eucalyptus zopherophloia</i>	P4		(Spreading mallee), 2.5-4(-6) m high, bark rough, fibrous. Fl. cream-white, Oct to Dec or Jan. Grey/white sand with limestone rubble. Coastal areas.		Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Grevillea erinacea</i>	P3		Spindly, prickly, sparingly branched shrub, (0.3-)0.6-1.8 m high. Fl. green-white-cream, Jul to Dec. White, grey or yellow sand, often with lateritic gravel.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Guichenotia alba</i>	P3		Slender, lax, few-branched shrub, 0.1-0.45 m high. Fl. white, Jul to Aug. Sandy & gravelly soils. Low-lying flats, depressions.		Likely Habitat present and existing close records	Possible Limited suitable habitat observed during survey

Taxon	Conservation Status		Description	PMST Attribution	Desktop Likelihood of occurrence	Post-field Likelihood of occurrence
	BC Act	EPBC Act				
<i>Guichenotia quasicalva</i>	P2		Erect, compact shrub, to 0.5 m high. Fl. blue-purple, Sep to Oct. Sandy clay over laterite. Drainage line.		Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Hakea megalosperma</i>	VU	VU	Spreading, lignotuberous shrub, 1-2 m high. Fl. white-cream/pink, May to Jun. Grey sand, loam. Lateritic hills & rocks.	Species or species habitat may occur within area	Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Haloragis foliosa</i>	P3		Perennial, herb or shrub, 0.2-0.5 m high. White/grey sand over limestone.		Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Hemiandra gardneri</i>	CR	EN	Prostrate, pungent shrub, 0.1-0.2 m high, to 1 m wide. Fl. red/pink-red, Aug to Oct. Grey or yellow sand, clayey sand. Sandplains.	Species or species habitat may occur within area	Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Hemiandra</i> sp. Eneabba (H. Demarz 3687)	P3		Straggly, erect shrub, 0.5-0.9 m high, to 0.4 m wide. Fl. blue/violet, Feb. Sand. Disturbed sites.		Likely Habitat present and existing close records	Likely
<i>Hemigenia saligna</i>	P3		Shrub, 0.3-1 m high. Fl. blue-purple/violet, Jul to Oct. Lateritic & sandy soils.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Hopkinsia anoectocolea</i>	P3		Rhizomatous, tufted perennial, herb, 0.5-1 m high, to 1 m in diameter. Fl. brown, Sep to Dec. White or grey sand, often saline. Winter-wet depressions, floodplains, salt lakes.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Hypocalymma gardneri</i>	P3		Shrub, to 0.3 m high. Fl. yellow, Aug to Sep. Grey-brown sand, laterite. Sandplains, upper slopes, heathland.		Likely Habitat present and existing close records	Likely
<i>Hypocalymma tetrapterum</i>	P3		Shrub, 0.4-0.9 m high. Fl. white, Aug. Grey sand, loam, lateritic gravel. Riverbanks, breakaways.		Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Lasiopetalum ogilvieanum</i>	P1		Shrub, 0.45-1.5 m high. Fl. pink-white, Jul to Oct. White/grey or yellow sand, stony loam. Undulating plains, lateritic rises.		Likely Habitat present and existing close records	Likely
<i>Leucopogon obtectus</i> (<i>Styphelia obtecta</i> (Benth.) F.Muell.)	EN	EN	A spindly erect shrub from 0.5-1.7 m high, with leaves which closely clasp the stem, obscuring the ends of branchlets. Tiny white to creamy yellow flowers appear in the leaf axils from August to October. Occurs on grey sands.	Species or species habitat likely to occur within area	Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely

Taxon	Conservation Status		Description	PMST Attribution	Desktop Likelihood of occurrence	Post-field Likelihood of occurrence
	BC Act	EPBC Act				
<i>Mesomelaena stygia</i> subsp. <i>deflexa</i>	P3		Tufted perennial, grass-like or herb (sedge), 0.1-0.5 m high. Fl. brown-black, Mar to Oct. White, grey or lateritic sand, clay, gravel.		Likely Habitat present and existing close records	Likely
<i>Micromyrtus rogeri</i>	P1		Shrub, 0.2-0.4 m high. Fl. white, Jul to Oct. Yellow-brown sandy soils, gravel, laterite. Breakaways.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Paracaleana dixonii</i>	VU	EN	A tuberous perennial orchid from 90-200 mm high, with a single, small basal leaf. Brown-yellow-green-red flowers in the shape of a duck appear from October to December or January. Found in shrubland under Banksia on deep sand, or in heath on shallow sand over laterite.	Species or species habitat known to occur within area	Likely Habitat present and existing close records	Likely
<i>Persoonia chapmaniana</i>	P3		Erect, spreading shrub, 1-2 m high. Fl. yellow, Sep to Nov. White sandy clay, yellow sand. Vicinity of salt lakes.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Persoonia filiformis</i>	P3		Erect, spreading, lignotuberous shrub, 0.07-0.4 m high. Fl. yellow, Nov to Dec. Yellow or white sand over laterite.		Likely Habitat present and existing close records	Possible Limited suitable habitat observed during survey
<i>Persoonia rudis</i>	P3		Erect, often spreading shrub, 0.2-1 m high. Fl. yellow, Sep to Dec or Jan. White, grey or yellow sand, often over laterite.		Likely Habitat present and existing close records	Possible Limited suitable habitat observed during survey
<i>Pityrodia viscida</i>	P4		Viscid shrub, 0.3-0.6(-1) m high. Fl. white, Sep to Dec or Jan to Feb. Lateritic sand.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Schoenus badius</i>	P2		Slender annual, grass-like or herb (sedge), 0.05-0.12 m high. Fl. brown-green, Sep to Oct. Grey sand. Moist areas.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Schoenus griffinianus</i>	P4		Small, tufted perennial, grass-like or herb (sedge), to 0.1 m high. Fl. Sep to Oct. White sand.		Likely Habitat present and existing close records	Likely
<i>Schoenus</i> sp. Eneabba (F. Obbens & C. Godden 1154)	P2		Erect, clumped rhizomatous, perennial, grass-like or herb (sedge), to 0.75 m high. Grey, yellow or white sand. Undulating sandplains, mid slopes, tops of rises.		Likely Habitat present and existing close records	Likely
<i>Scholtzia calcicola</i>	P2		Erect, dense shrub to 2 m high, with tiny, pale pink flowers in a raceme-like arrangement and a wrinkled hypanthium. It has the smallest flowers in the genus at 2.5-3.5 mm diameter and with petals 1-1.2 mm long. Commonly has 5 stamens, with 0-2 opposite each sepal. Recorded from near Dongara south to Drovers Cave National Park in heath on shallow sand over limestone.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Stawellia dimorphantha</i>	P4		Stilt-rooted perennial, herb, 0.05-0.2 m high. Fl. purple/cream, Jun to Nov. White, grey, yellow sand.		Likely Habitat present and existing close records	Recorded

Taxon	Conservation Status		Description	PMST Attribution	Desktop Likelihood of occurrence	Post-field Likelihood of occurrence
	BC Act	EPBC Act				
<i>Stylidium carnosum</i> subsp. Narrow leaves (J.A. Wege 490)	P1		Cormaceous herb to 1m with white flowers between Oct – Nov.		Likely Habitat present and existing close records	Likely
<i>Stylidium drummondianum</i>	P3		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 paniculate. Fl. pink, Aug to Oct. Sand or clayey sand over laterite. Upper hillslopes, breakaways. Low heath, mallee shrubland.		Likely Habitat present and existing close records	Likely
<i>Stylidium longitubum</i>	P4		Erect annual (ephemeral), herb, 0.05-0.12 m high. Fl. pink, Oct to Dec. Sandy clay, clay. Seasonal wetlands.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Stylidium pseudocaespitosum</i>	P2		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. Inflorescence racemose. Fl. yellow, Sep to Nov. White, grey or yellow sand over laterite. Breakaways and hillslopes.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Stylidium</i> sp. Three Springs (J.A. Wege & C. Wilkins JAW 600)	P2		Occurs in yellow-brown clayey sand over laterite, yellow-brown clayey loam over granite, ironstone breakaway, loamy soils over granite, clay loams with scattered gravel, rocky hill with lateritic stones.		Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Stylidium torticarpum</i>	P3		Caespitose perennial, herb, 0.12-0.27 m high, Leaves tufted, broadly linear, (2-) 5-13 cm long, 0.6-1.5 mm wide, apex mucronate, margin hyaline and serrulate, glabrous. Scape glandular throughout. Inflorescence paniculate. Capsule twisted. Fl. pink, Sep to Nov. Sandy clay and clay loam over laterite. Adjacent to creeklines, depressions, and beneath breakaways. Heath or mallee shrubland.		Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Synaphea oulopha</i>	P3		Compact shrub, ca 0.2 m high. Fl. yellow, Jul to Oct. Grey sand, gravelly loam, clay. Lateritic breakaways & rises.		Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Synaphea sparsiflora</i>	P2		Shrub, to 0.6 m high, to 1 m wide. Fl. yellow, Aug to Sep. Sandy loam over laterite.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Tetrateca nephelioides</i>	EN	CR	Caespitose, dwarf shrub, to 0.3 m high. Fl. purple, Sep. White-grey sand, yellow-brown clayey sand, gravel, laterite. Outcrops, undulating hills, ridges,.	Species or species habitat may occur within area	Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Thelymitra stellata</i>	EN	EN	A tuberous, perennial orchid from 150-250 mm high. Its yellow and brown flowers appear from October to November. Occurs on sand, gravel and lateritic loam.	Species or species habitat likely to occur within area	Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely

Taxon	Conservation Status		Description	PMST Attribution	Desktop Likelihood of occurrence	Post-field Likelihood of occurrence
	BC Act	EPBC Act				
<i>Thryptomene</i> sp. Lancelin (M.E. Trudgen 14000)	P3		Shrub, ca 0.5 m high. Fl. pink, Sep. Calcareous sand.		Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Thysanotus glaucus</i>	P4		Caespitose, glaucous perennial, herb, 0.1-0.2 m high. Fl. purple, Oct to Dec or Jan to Mar. White, grey or yellow sand, sandy gravel.		Likely Habitat present and existing close records	Likely
<i>Tricoryne</i> sp. Wongan Hills (B.H. Smith 794)	P2		Multi-stemmed, open, caespitose rhizomatous, perennial, herb, to 0.2 m high. Yellow to grey sand, gravelly clay quartz, laterite, limestone. Midslopes and uplands.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Triglochin protuberans</i>	P3		Annual, herb, 0.03-0.13 m high. Red loam, grey mud over clay. Winter-wet sites, claypans, near salt lakes, margins of pools.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Verticordia argentea</i>	P2		Erect, open shrub, 0.9-2 m high. Fl. pink & white, Nov to Dec or Jan to Apr. White, grey or yellow sand. Sand ridges, undulating plains.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Verticordia dasystylis</i> subsp. <i>oestopoa</i>	P1		Spreading shrub, 0.1-0.4 m high. Fl. cream-yellow, Oct. Gritty soils over granite. Outcrops.		Unlikely Habitat not present and no records within the vicinity (<9km)	Unlikely
<i>Verticordia fragrans</i>	P3		Openly branched shrub, 1-3 m high. Fl. pink-white, Sep to Nov. White, grey or yellow sand, clay loam. Low-lying areas, sandplains.		Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely
<i>Verticordia luteola</i> var. <i>luteola</i>	P3		Slender shrub, 0.5-1.4 m high. Fl. white-yellow, Nov to Dec. Grey sand over gravel. Flats.		Likely Habitat present and existing close records	Possible Limited suitable habitat observed during survey
<i>Wurmbea tubulosa</i>	VU	EN	Cormous, perennial, herb, 0.01-0.03 m high, dioecious or sometimes andromonoecious. Fl. white-pink, Jun to Aug. Clay, loam. River banks, seasonally-wet places.	Species or species habitat may occur within area	Unlikely Habitat present but no records within the vicinity (<9km)	Unlikely

Table C.2: Fauna Likelihood of Occurrence

Class	Scientific Name	Common Name	WA Status	C'wealth Status	BCA Search	PMST Search	PMST Attribution	Desktop Likelihood of Occurrence	Post-Field Likelihood of Occurrence
MAMMAL	<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	VU	VU	x	x	Species or species habitat likely to occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
MAMMAL	<i>Macroderma gigas</i>	Ghost Bat	VU	VU		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
MAMMAL	<i>Notamacropus irma</i>	Western Brush Wallaby	P4	-	x			Unlikely (no local records)	Unlikely (no local records)
MAMMAL	<i>Parantechinus apicalis</i>	Dibbler	EN	EN		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Actitis hypoleucos</i>	Common Sandpiper	MI	MI, MA	x	x	Species or species habitat known occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Anous stolidus</i>	Common Noddy	-	MI,MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Anous tenuirostris melanops</i>	Australian Lesser Noddy	MI	MI	x			Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Apus pacificus</i>	Fork-Tailed Swift	MI	MI, MA		x	Species or species habitat likely to occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Bubbulcus coromandus (Ardea ibis)</i>	Cattle Egret	MI	MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Ardenna carneipes</i>	Flesh-Footed Shearwater, Fleshy-Footed Shearwater	VU	MI,MA		x	Foraging, feeding or related behaviour known to occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Arenaria interpres</i>	Ruddy Turnstone	MI	MI	x			Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Calidris acuminata</i>	Sharp-Tailed Sandpiper	MI	MI, MA	x	x	Species or species habitat may occur	Unlikely (no local records)	Unlikely (no local records)
BIRD	<i>Calidris canutus</i>	Red Knot, Knot	EN	EN		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Calidris ferruginea</i>	Curlew Sandpiper	CR, MI	CR, MI, MA		x	Species or species habitat likely to occur	Unlikely (no local records)	Unlikely (no local records)

Class	Scientific Name	Common Name	WA Status	C'wealth Status	DBCA Search	PMST Search	PMST Attribution	Desktop Likelihood of Occurrence	Post-Field Likelihood of Occurrence
BIRD	<i>Calidris melanotos</i>	Pectoral Sandpiper	-	MI, MA		x	Species or species habitat may occur	Unlikely (no local records)	Unlikely (no local records)
BIRD	<i>Calidris ruficollis</i>	Red-Necked Stint	MI	MI	x			Unlikely (no local records)	Unlikely (no local records)
BIRD	<i>Calyptorhynchus latirostris</i>	Carnaby's Black Cockatoo, Short-Billed Black-Cockatoo	EN	EN	x	x	Species or species habitat known to occur	Likely (recent proximal records)	Recorded
BIRD	<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo'	White-Tailed Black Cockatoo	EN	EN	x			Unlikely (Baudin's Cockatoo habitat not present)	Unlikely (Baudin's Cockatoo habitat not present)
BIRD	<i>Catharacta skua</i>	Great Skua	-	MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Chalcites osculans</i> (<i>Chrysococcyx osculans</i>)	Black-Eared Cuckoo	-	MA		x	Species or species habitat likely to occur	Unlikely (no local records)	Unlikely (no local records)
BIRD	<i>Diomedea amsterdamensis</i>	Amsterdam Albatross	CR	EN,MI,MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Diomedea epomophora</i>	Southern Royal Albatross	VU	VU,MI,MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Diomedea exulans</i>	Wandering Albatross	VU	VU,MI,MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Falco hypoleucos</i>	Grey Falcon	VU	VU		x	Species or species habitat may occur	Unlikely (no local records)	Unlikely (no local records)
BIRD	<i>Falco peregrinus</i>	Peregrine Falcon	OS		x			Unlikely (no local records)	Unlikely (no local records)
BIRD	<i>Haliaeetus leucogaster</i>	White-Bellied Sea-Eagle	MI	MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Hydroprogne caspia</i>	Caspian Tern	-	MI,MA	x	x	Foraging, feeding or related behaviour known to occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Larus pacificus</i>	Pacific Gull	-	MA		x	Foraging, feeding or related behaviour known to occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Leipoa ocellata</i>	Malleefowl	VU	VU	x	x	Species or species habitat likely to occur	Possible (recent records in the vicinity)	Possible (recent records in the vicinity)
BIRD	<i>Limosa lapponica</i>	Bar-Tailed Godwit	MI	MI	x	x	Species or species habitat may occur	Unlikely (no local records)	Unlikely (no local records)

Class	Scientific Name	Common Name	WA Status	C'wealth Status	DBCA Search	PMST Search	PMST Attribution	Desktop Likelihood of Occurrence	Post-Field Likelihood of Occurrence
BIRD	<i>Limosa lapponica menzbieri</i>	Northern Siberian Bar-Tailed Godwit, Russkoye Bartailed Godwit	CR	CR		x	Species or species habitat may occur	Unlikely (habitat present but no local records)	Unlikely (habitat present but no local records)
BIRD	<i>Macronectes giganteus</i>	Southern Giant-Petrel, Southern Giant Petrel	-	EN,MI,MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Macronectes halli</i>	Northern Giant Petrel	-	VU,MI,MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Merops ornatus</i>	Rainbow Bee-Eater	-	MA		x	Species or species habitat may occur	Possible (widespread despite lack of local records)	Possible (widespread despite lack of local records)
BIRD	<i>Motacilla cinerea</i>	Grey Wagtail	MI	MI		x	Species or species habitat known to occur	Unlikely (no local records)	Unlikely (no local records)
BIRD	<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	VU, MI	CR, MI, MA		x	Species or species habitat may occur	Unlikely (no local records)	Unlikely (no local records)
BIRD	<i>Pandion cristatus (Pandion haliaetus)</i>	Osprey, Eastern Osprey	MI	MI	x	x	Species or species habitat known to occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Pterodroma mollis</i>	Soft-Plumaged Petrel	-	VU, MI		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Puffinus assimilis</i>	Little Shearwater	-	MA		x	Foraging, feeding or related behaviour known to occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Rostratula australis (Rostratula benghalensis)</i>	Australian Painted Snipe	EN, MI	EN, MA		x	Species or species habitat may occur	Unlikely (no local records)	Unlikely (no local records)
BIRD	<i>Rostratula benghalensis (sensu lato)</i>	Painted Snipe		MA		x	Foraging, feeding or related behaviour known to occur	Unlikely (no local records)	Unlikely (no local records)
BIRD	<i>Sterna albifrons</i>	Little Tern	-	MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Sterna dougallii</i>	Roseate Tern	-	MI,MA		x	Foraging, feeding or related behaviour known to occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Sternula albifrons</i>	Little Tern	-	MI,MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Sternula nereis nereis</i>	Australian Fairy Tern	VU	VU		x	Foraging, feeding or related behaviour known to occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)

Class	Scientific Name	Common Name	WA Status	C'wealth Status	DBCA Search	PMST Search	PMST Attribution	Desktop Likelihood of Occurrence	Post-Field Likelihood of Occurrence
BIRD	<i>Thalasseus bergii</i>	Crested Tern	MI	MI	x			Unlikely (no local records)	Unlikely (no local records)
BIRD	<i>Thalassarche carteri</i>	Indian Yellow-Nosed Albatross	EN	VU,MI,MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Thalassarche cauta</i>	Shy Albatross	VU	EN,MI,MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Thalassarche impavida</i>	Campbell Albatross, Campbell Black-Browed Albatross	VU	VU,MI,MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Thalassarche melanophris</i>	Black-Browed Albatross	EN	VU,MI,MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Thalassarche steadi</i>	White-Capped Albatross		VU,MI,MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Thinornis rubricollis</i>	Hooded Plover, Hooded Dotterel	P4	MA		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
BIRD	<i>Tringa nebularia</i>	Common Greenshank, Greenshank	MI	MI, MA	x	x	Species or species habitat likely to occur	Unlikely (no local records)	Unlikely (no local records)
BIRD	<i>Tringa stagnatilis</i>	Marsh Sandpiper, Little Greenshank			x			Unlikely (no local records)	Unlikely (no local records)
REPTILE	<i>Egernia stokesii badia</i>	Western Spiny-Tailed Skink, Baudin Island Spiny-Tailed Skink	VU	EN	x	x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
REPTILE	<i>Neelaps calonotos</i>	Black-Striped Snake, Black-Striped Burrowing Snake	P3		x			Likely (recent proximal records)	Likely (recent proximal records)
INVERTEBRATE	<i>Hylaeus globuliferus</i>	Woolybush Bee	P3		x			Unlikely (no local records)	Very Unlikely (<i>Adenanthos</i> spp. not observed during survey)
INVERTEBRATE	<i>Idiosoma nigrum</i>	Shield-Backed Trapdoor Spider, Black Rugose Trapdoor Spider	EN	VU		x	Species or species habitat may occur	Very Unlikely (habitat not considered to be present)	Very Unlikely (habitat not considered to be present)
INVERTEBRATE	<i>Phasmodes jeeba</i>	Springtime Corroboree Stick Katydid (Eneabba)	P3	-	x			Unlikely (no local records)	Unlikely (no local records)

Appendix D – Field Survey Results

Table D.1: Flora taxa recorded within the Survey Area during survey

Taxon	Status	Site																				Opps						
		RR01	RR02	RR03	RR04	RR05	RR06	RT01	RT02	RT03	RT04	RT05	RT06	RT07	RT08	RT09	RT10	RT11	RT12	RT13	RT14		RT15	RT16	RT17	RT18	RT19	RT20
<i>Acacia blakelyi</i>									X	X																		
<i>Acacia cavealis</i>													X															
<i>Acacia comans</i>				X																								
<i>Acacia dilitata</i>																						X						
<i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i>																					X				X	X		
<i>Acacia saligna</i>																												X
<i>Acacia scirpifolia</i>												X										X			X	X		X
<i>Acacia sessilis</i>												X																
<i>Acacia</i> sp.																												
<i>Acacia spathulifolia</i>																												
<i>Acacia sphacelata</i> subsp. <i>sphacelata</i>							X																					
<i>Acacia stenoptera</i>																												
<i>Acanthocarpus</i> sp.		X									X																	
<i>Acanthocarpus</i> sp. Ajana (C.A. Gardner 8596)			X	X	X	X	X						X								X	X	X		X	X	X	
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>																												X
<i>Alexgeorgea nitens</i>																												X
<i>Allocasuarina campestris</i>							X	X						X														X
<i>Allocasuarina humilis</i>						X		X																			X	
<i>Allocasuarina microstachya</i>																												
<i>Allocasuarina thuyoides</i>				X																								
<i>Amphipogon turbinatus</i>																												
<i>Andersonia heterophylla</i>																											X	X
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>																										X		
<i>Anigozanthos</i> sp.																												
<i>Austrostipa macalpinei</i>																												
<i>Banksia ?dallanneyi</i>						X	X																					
<i>Banksia attenuata</i>			X		X		X	X		X	X	X	X		X		X		X	X				X		X	X	X
<i>Banksia candolleana</i>			X					X							X			X	X	X	X						X	
<i>Banksia dallanneyi</i>		X						X		X																		
<i>Banksia dallanneyi</i> subsp. <i>media</i>																												X
<i>Banksia hookeriana</i>						X	X			X	X	X	X		X						X				X			
<i>Banksia leptophylla</i> var. <i>melletica</i>											X																	
<i>Banksia menziesii</i>																												X
<i>Banksia prionotes</i>																												X
<i>Banksia sessilis</i> var. <i>flabellifolia</i>																												X
<i>Banksia shuttleworthiana</i>		X	X	X	X	X		X							X			X	X	X	X	X			X	X		
<i>Beaufortia elegans</i>			X			X		X		X					X				X	X								
<i>Burchardia congesta</i>														X	X	X							X			X	X	
<i>Calectasia hispida</i>		X																										
<i>Callitris arenaria</i>																												
<i>Calothamnus blepharospermus</i>						X																						
<i>Calothamnus glaber</i>		X	X	X			X	X		X	X				X						X	X	X	X		X		
<i>Calothamnus quadrifidus</i> subsp. <i>angustifolius</i>															X							X		X				
<i>Calothamnus sanguineus</i>																										X		
<i>Calytrix ?sapphirina</i>																X												
<i>Calytrix depressa</i>																												X
<i>Calytrix fraseri</i>																												X
<i>Calytrix sapphirina</i>						X																						
<i>Cassytha aurea</i> var. <i>hirta</i>													X															
<i>Cassytha flava</i>																X												
<i>Cassytha glabella</i> forma <i>casuarinae</i>								X				X		X					X	X	X	X	X		X	X		
<i>Cassytha</i> sp.		X			X	X																						
<i>Caustis dioica</i>		X		X																							X	
<i>Chaetospora curvifolia</i>																												
<i>Chordifex sinuosus</i>		X	X	X		X	X					X									X							

Taxon	Status	Site																				Opps						
		RR01	RR02	RR03	RR04	RR05	RR06	RT01	RT02	RT03	RT04	RT05	RT06	RT07	RT08	RT09	RT10	RT11	RT12	RT13	RT14		RT15	RT16	RT17	RT18	RT19	RT20
<i>Conospermum boreale</i> subsp. <i>ascendens</i>		X	X		X	X	X	X		X	X	X	X	X	X				X	X	X	X		X	X	X		
<i>Conospermum brachyphyllum</i>																			X									
<i>Conospermum</i> sp.									X																			
<i>Conostephium preissii</i>												X																
<i>Conostylis ?aculeata</i>																							X		X			
<i>Conostylis ?resinosa</i>																												X
<i>Conostylis aculeata</i>																					X							
<i>Conostylis candicans</i> subsp. <i>candicans</i>									X													X		X				
<i>Conostylis canteriata</i>				X		X								X	X			X	X	X					X		X	
<i>Conostylis crassinerva</i> subsp. <i>absens</i>																				X								
<i>Conostylis resinosa</i>													X											X		X		
<i>Conostylis setigera</i> subsp. <i>setigera</i>										X	X																	
<i>Corynotheca micrantha</i> var. <i>micrantha</i>									X											X								
<i>Cristonia stenophylla</i>																							X		X			
<i>Cyanothamnus ramosus</i> subsp. <i>anethifolius</i>									X													X						
<i>Dampiera oligophylla</i>					X	X							X		X			X	X									
<i>Dampiera</i> sp.	X																											
<i>Darwinia pauciflora</i>				X		X	X	X			X			X	X					X				X				
<i>Darwinia speciosa</i>					X																							
<i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>			X	X	X			X		X								X			X				X	X		
<i>Daviesia triflora</i>					X					X																		X
<i>Desmodcladus semiplanus</i>			X											X	X			X	X	X					X			
<i>Drosera ?echinoblastus</i>			X														X											X
<i>Drosera ?erythrorhiza</i>	X																											
<i>Drosera ?menziesii</i>																						X						
<i>Drosera erythrorhiza</i>				X				X	X				X	X		X		X	X			X		X	X	X		
<i>Drosera</i> sp. (climbing)				X		X		X										X		X				X				
<i>Ecdeiocolea monostachya</i>	X	X	X	X	X	X		X		X	X	X	X	X	X			X		X			X	X	X	X		
<i>Eremaea beaufortoides</i> var. <i>beaufortoides</i>				X	X		X				X				X			X	X	X	X	X				X	X	
<i>Eremaea ectadioclada</i>			X																									
<i>Eremaea violacea</i>	X							X																				
<i>Eucalyptus todtiana</i>									X							X		X	X		X	X						
<i>Geleznovia verrucosa</i>	X			X																								
<i>Gompholobium tomentosum</i>									X	X											X	X				X		
<i>Grevillea eriostachya</i>													X		X						X	X				X		
<i>Grevillea leucopteris</i>					X																							
<i>Guichenotia ledifolia</i>																												X
<i>Hakea candolleana</i>						X																	X					X
<i>Hakea circumalata</i>													X	X														
<i>Hakea eneabba</i>					X																							
<i>Hakea polyanthema</i>			X	X			X	X		X	X	X	X				X			X	X			X	X	X		
<i>Hibbertia acerosa</i>																							X					
<i>Hibbertia crassifolia</i>																				X								X
<i>Hibbertia hypericoides</i>						X		X	X	X	X			X			X	X	X	X	X	X	X	X	X	X	X	
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	X	X	X		X																							
<i>Hibbertia robur</i>																												X
<i>Hypocalymma xanthopetalum</i>								X																				
* <i>Hypochaeris</i> sp.	Weed								X																			
<i>Isopogon tridens</i>			X			X														X								
<i>Isotropis cuneifolia</i> subsp. <i>cuneifolia</i>														X							X							
<i>Jacksonia angulata</i>																							X					
<i>Jacksonia floribunda</i>					X							X					X	X	X								X	
<i>Jacksonia hakeoides</i>												X									X	X	X	X	X	X	X	X
<i>Lasiopetalum erectifolium</i>					X												X	X	X									X
<i>Laxmannia sessiliflora</i> subsp. <i>drummondii</i>							X							X	X					X	X			X	X	X		
<i>Laxmannia squarrosa</i>						X			X		X																	
<i>Lechenaultia linarioides</i>																X												
<i>Lepidobolus preissianus</i>								X		X	X	X	X	X	X					X				X	X	X		

Taxon	Status	Site																				Opps						
		RR01	RR02	RR03	RR04	RR05	RR06	RT01	RT02	RT03	RT04	RT05	RT06	RT07	RT08	RT09	RT10	RT11	RT12	RT13	RT14		RT15	RT16	RT17	RT18	RT19	RT20
<i>Lepidobolus</i> sp.		X																										
<i>Lepidosperma</i> ? <i>apricola</i>		X													X													
<i>Lepidosperma pubisquameum</i>																								X				
<i>Lepidosperma</i> sp.		X		X																								
<i>Leporella fimbriata</i>				X																								
<i>Leptospermum erubescens</i>		X		X	X					X				X				X									X	
<i>Leptospermum spinescens</i>		X		X	X		X	X			X				X			X		X	X	X		X		X		
<i>Leucopogon inflexus</i>										X	X	X							X		X	X	X					
<i>Leucopogon</i> sp. Northern ciliate (R. Davis 3393)									X	X			X				X					X	X		X	X	X	
<i>Lomandra hastilis</i>													X															
<i>Lyginia imberbis</i>																	X	X										X
<i>Lysinema pentapetalum</i>																			X		X							X
<i>Macrozamia riedlei</i>																												X
<i>Melaleuca</i> ? <i>leuropoma</i>		X	X	X	X	X	X	X		X	X	X		X			X	X	X	X	X	X	X	X	X	X	X	X
<i>Melaleuca</i> ? <i>trichophylla</i>																		X										
<i>Mesomelaena pseudostygia</i>		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X		X	X	X		X	X	X	X	
<i>Monotaxis bracteata</i>		X																										
<i>Neurachne alopecuroidea</i>										X					X							X	X	X	X			
<i>Opercularia vaginata</i>														X														
<i>Persoonia acicularis</i>		X	X		X	X	X	X		X	X	X		X	X			X		X				X				
<i>Petrophile</i> ? <i>brevifolia</i>			X	X									X	X													X	
<i>Petrophile drummondii</i>					X															X								
<i>Petrophile linearis</i>										X								X										
<i>Petrophile macrostachya</i>					X						X		X		X					X				X		X	X	
<i>Phlebocarya ciliata</i>		X	X			X	X																					
<i>Pileanthus filifolius</i>							X	X		X	X	X	X	X	X		X			X				X	X	X	X	
<i>Scaevola canescens</i>						X	X			X	X	X	X	X	X				X		X			X	X	X	X	
<i>Schoenus clandestinus</i>										X	X	X	X							X				X		X		
<i>Schoenus curvifolius</i>												X					X											
<i>Schoenus latitans</i>		X	X	X		X	X	X						X	X			X	X		X		X		X			
<i>Schoenus pleiostemoneus</i>																			X		X							
<i>Schoenus</i> sp. A3 Ciliate Sheaths (K.R. Newbey 9402)																		X										
<i>Scholtzia chapmanii</i>													X															
<i>Scholtzia laxiflora</i>		X	X	X	X	X	X		X	X		X		X	X		X	X	X	X	X	X			X	X	X	
<i>Stawellia dimorphantha</i>	P4						X																					
<i>Stenanthemum notiale</i> subsp. <i>notiale</i>						X				X			X			X				X		X	X	X	X	X	X	
<i>Stirlingia latifolia</i>					X							X					X	X										X
<i>Stylidium</i> ? <i>diuroides</i>											X			X														X
<i>Stylidium crossocephalum</i>																			X		X				X			X
<i>Stylidium repens</i>							X	X		X		X			X				X		X	X	X		X	X		
<i>Styphelia hamulosa</i>													X												X			
<i>Styphelia hispida</i>		X	X	X		X		X						X														
<i>Styphelia microdonta</i>										X										X	X				X			
<i>Styphelia xerophyllum</i>																	X	X	X					X	X	X		
<i>Tersonia cyathiflora</i>						X	X																					
<i>Thysanotus dichotomus</i>			X	X																								
* <i>Ursinia anthemoides</i>	Weed									X																		X
<i>Verticordia aurea</i>															X													
<i>Verticordia densiflora</i>																						X						
<i>Verticordia densiflora</i> var. <i>densiflora</i>				X																					X			X
<i>Verticordia grandis</i>		X			X	X	X	X				X	X		X		X	X	X	X	X				X		X	
<i>Verticordia nobilis</i>			X																									
<i>Verticordia</i> sp.		X					X																					
<i>Xanthorrhoea drummondii</i>																						X	X					
<i>Xylomelum angustifolium</i>							X										X	X										
? <i>Daviesia hakeoides</i> subsp. <i>subnuda</i>			X			X		X		X	X	X	X		X				X	X				X		X	X	
? <i>Daviesia triflora</i>							X																					
? <i>Desmodadus flexuosus</i>					X																							

Taxon	Status	Site																				Opps						
		RR01	RR02	RR03	RR04	RR05	RR06	RT01	RT02	RT03	RT04	RT05	RT06	RT07	RT08	RT09	RT10	RT11	RT12	RT13	RT14		RT15	RT16	RT17	RT18	RT19	RT20
? <i>Hibbertia</i> sp.													X															
? <i>Lomandra hastilis</i>																			X									
? <i>Wahlenbergia preissii</i>										X																		

* Denotes invasive flora (weed) taxon.

? Denotes unable to be confirmed to taxon level due to lack of diagnostic material.

Table D.2: Fauna recorded within the Survey Area during survey

Class	Taxon	Common Name	C'wealth Status	WA Status
MAMMAL	* <i>Capra aegagrus</i> subsp. <i>hircus</i>	Goat	Invasive	Invasive
MAMMAL	* <i>Oryctolagus cuniculus</i>	Rabbit	Invasive	Invasive
MAMMAL	* <i>Vulpes vulpes</i>	Fox	Invasive	Invasive
MAMMAL	<i>Macropus fuliginosus</i> subsp. <i>melanops</i>	Western grey		
BIRD	<i>Acanthagenys rufogularis</i>	Spiny cheeked honeyeater		
BIRD	<i>Anthochaera carunculata</i>	Red wattlebird		
BIRD	<i>Anthus richardi</i>	Richard's Pippit		
BIRD	<i>Artamus cinereus</i>	Black-faced woodswallow		
BIRD	<i>Barnardius zonarius</i> subsp. <i>semitorquatus</i>	Australian Ringneck (Twenty-Eight)		
BIRD	<i>Calyptrorhynchus latirostris</i>	Carnaby's black cockatoo	Endangered	Endangered
BIRD	<i>Chalcites basalis</i>	Horsefield's Cuckoo		
BIRD	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike		
BIRD	<i>Corvus coronoides</i>	Raven		
BIRD	<i>Cracticus torquatus</i>	Grey Butcherbird		
BIRD	<i>Dromaius novaehollandiae</i>	Emu		
BIRD	<i>Eolophus roseicapilla</i>	Galah		
BIRD	<i>Falco cenchroides</i>	Nankeen kestrel		
BIRD	<i>Gavialis virescens</i> subsp. <i>virescens</i>	Singing honeyeater		
BIRD	<i>Gliciphila melanops</i>	Tawny crowned honeyeater		
BIRD	<i>Hirundo neoxena</i>	Welcome swallow		
BIRD	<i>Lichmera indistincta</i>	Brown honeyeater		
BIRD	<i>Malurus lamberti</i>	Variiegated wren		
BIRD	<i>Malurus leucopterus</i>	White winged fairy-wren		
BIRD	<i>Malurus</i> sp.	Wren		
BIRD	<i>Ocyphaps lophotes</i>	Crested Pigeon		
BIRD	<i>Phaps chalcoptera</i>	Bronzewing		
BIRD	<i>Phaps elegans</i>	Brush Bronzewing		
BIRD	<i>Phylidonyris niger</i>	White cheeked honeyeater		
BIRD	<i>Purnella albifrons</i>	White-fronted honeyeater		
BIRD	<i>Rhipidura leucophrys</i>	Willie wagtail		
BIRD	<i>Sugomel niger</i>	Black Honeyeater		
REPTILE	<i>Ctenophorus adelaidensis</i>	Western heath dragon		
REPTILE	<i>Ctenophorus maculatus</i>	Spotted military dragon		
REPTILE	<i>Pogona minor</i> subsp. <i>minor</i>	Western Bearded Dragon		
INVERTEBRATE	<i>Mygalomorphae</i> sp.	Trapdoor Spider		

Table D.3: Fauna Habitat Assessment Point Locations (GDA2020 MGA Zone 50)

Site	Latitude	Longitude	Site Type	Landform	Aspect	Slope	Rock	Soil	Soil Description	Outcrop	Bare Ground	Litter	Large trees	Fire Age	Habitat Unit
BS01	-29.4318	115.1427	Ornithological Survey	plain	SW	Gentle	Nil	sand	Cream sand over yellow	no	35	4	no	3	Kwongan
BS02	-29.5625	115.1173	Ornithological Survey	plain		Flat	Nil	sand	Cream	no	2	95	no	10	Shrubland
BS03	-29.5618	115.1555	Ornithological Survey	plain		Flat	Nil	sandy clay	Cream sand over peach sandy clay	no	12	85	no	5-10	Shrubland
FH01	-29.4237	115.1373	Habitat Assessment	plain	W	Gentle	Nil	sand	Cream over yellow sand	no	35	4	no	3	Kwongan
FH02	-29.4211	115.1392	Habitat Assessment	plain	N	Gentle	Nil	sand	Cream over yellow sand	no	40	6	no	3	Kwongan
FH03	-29.4318	115.1428	Habitat Assessment	plain	S	Very gentle	Nil	sand	Cream over yellow sand	no	45	5	no	3	Kwongan
FH04	-29.4418	115.1425	Habitat Assessment	plain	W	Very gentle	Nil	sand	Cream over yellow sand	no	30	12	no	3	Kwongan
FH05	-29.447	115.1392	Habitat Assessment	plain	W	Very gentle	Nil	sand	Cream over yellow sand	no	20	18	no	3	Kwongan
FH06	-29.4635	115.1501	Habitat Assessment	plain	W	Very gentle	Nil	sand	Cream grey over brown sand	no	40	15	no	3	Kwongan
FH07	-29.4588	115.1641	Habitat Assessment	plain		Flat	Nil	sand	Cream over yellow	no	38	12	no	10	Kwongan
FH08	-29.4572	115.1662	Habitat Assessment	plain		Flat	Nil	sand	Cream	no	35	22	no	10	Eucalypt Woodland
FH09	-29.4579	115.1597	Habitat Assessment	plain		Flat	Nil	sand	Cream sand	no	25	20	no	10	Kwongan
FH10	-29.4643	115.1658	Habitat Assessment	plain		Flat	Nil	sand	Cream sand	no	42	5	no	10	Kwongan
FH11	-29.4688	115.1669	Habitat Assessment	plain	SE	Very gentle	Nil	sand	Cream sand	no	43	10	no	10	Eucalypt Woodland
FH12	-29.5629	115.1258	Habitat Assessment	plain	SW	Very gentle	Nil	sand	Cream sand	no	15	75	no	10	Shrubland
FH13	-29.5555	115.128	Habitat Assessment	plain		Flat	Nil	sand	Cream sand over grey	no	25	18	no	10	Kwongan
FH14	-29.5411	115.1257	Habitat Assessment	plain		Flat	Nil	sand	Cream over yellow	no	30	18	no	10	Kwongan
FH15	-29.5395	115.1312	Habitat Assessment	plain	NE	Very gentle	Nil	sand	Cream over yellow sand	no	40	8	no	10	Kwongan
FH16	-29.466	115.1411	Habitat Assessment	plain		Flat	Nil	sand	Cream over yellow sand	no	30	12	no	10	Kwongan
FH17	-29.472	115.1439	Habitat Assessment	hill	E	Gentle	Nil	sand	Cream over yellow sand	no	26	9	no	10	Kwongan
FH18	-29.4791	115.1458	Habitat Assessment	hill	N	Gentle	Nil	sand	Cream over brown/yellow sand	no	20	14	no	10	Kwongan
FH19	-29.4757	115.1501	Habitat Assessment	depression			Nil	clayey sand	Grey sand over clayey sand	no	50	2	no	10	Sedgeland
FH20	-29.5625	115.1178	Habitat Assessment	plain		Flat	Nil	sand	Cream	no	2	95	no	10	Shrubland
FH21	-29.425	115.1419	Habitat Assessment	depression		Flat	Nil	clayey sand	Cream/yellow over yellow	no	58	2	no	3	Sedgeland
FH22	-29.5801	115.1488	Habitat Assessment	plain		Flat	Nil	sandy clay	Cream sand over grey clayey	no	28	18	no	2-5	Kwongan
FH23	-29.5605	115.1556	Habitat Assessment	plain		Flat	Nil	sandy clay	Cream sand over peach sandy clay	no	6	92	no	5-10	Shrubland
FH24	-29.5598	115.1596	Habitat Assessment	plain		Flat	Nil	sand	Cream	no	20	40	no	5-10	Shrubland
FH25	-29.5626	115.1583	Habitat Assessment	plain		Flat	Nil	sand	Cream	no	50	18	no	5-10	Kwongan
FH26	-29.5627	115.1498	Habitat Assessment	dune	E	Gentle	Nil	sand	Yellow yellow	no	25	38	no	5-10	Banksia Scrub on Yellow Sand Dune
FH27	-29.5696	115.1526	Habitat Assessment	plain		Flat	Nil	sand	White over cream	no	20	30	no	5-10	Kwongan
FH28	-29.4613	115.1205	Habitat Assessment	plain	NW	Very gentle	Nil	sand	White on white	no	65	10	no	2-5	Banksia Woodland
FH29	-29.4632	115.1229	Habitat Assessment	plain	NE	Very gentle	Nil	sand	White	no	20	25	no	5-10	Banksia Woodland

Appendix E – Floristic Relevé Data

Project: 62676 Flora

Date: 5/26/2022 **Recorder:** LP

Site: RR01 **Coordinates:** -29.478421, 115.146836 **Datum:** WGS84 MGA Zone 50 **Site Type:** Relevé

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: depression/ basin

Aspect: **Slope:** Nil

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand

Surface: 50% bare ground, % outcropping, 3% litter

Years Since Fire: >10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nil

Vegetation Description: Sedgeland of *Ecdeiocolea monostachya*, *Mesomelaena pseudostygia* and *Lepidobolus* with isolated low shrubs of *Calothamnus glaber*, *Banksia shuttleworthiana* and *Leptospermum erubescens*.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Mesomelaena pseudostygia	50	10		
Ecdeiocolea monostachya	80	5		
Banksia shuttleworthiana	60	2		
Lepidobolus sp.	40	0.5		
Cassytha sp.	30	0.5		
Melaleuca ?leuropoma	40	0.5		
Calothamnus glaber	120	0.1		
Drosera ?erythrorhiza	1	0.1		
Schoenus latitans	3	0.1		
Phlebocarya ciliata	30	0.1		
Caustis dioica	30	0.05		
Eremaea violacea	35	0.02		
Leptospermum spinescens	50	0.01		
Persoonia acicularis	30	0.01		
Conospermum boreale subsp. ascendens	30	0.01		
Banksia dallanneyi	25	0.001		
Verticordia sp.	20	0.001		
Lepidosperma sp.	30	0.001		
Monotaxis bracteata	25	0.001		
Chordifex sinuosus	25	0.001		
Hibbertia hypericoides subsp. hypericoides / H. ?crassifolia	25	0.001		
Verticordia grandis	30	0.001		
Acanthocarpus sp.	35	0.001		
Lepidosperma ?apricola	50	0.001		
Styphelia hispida	20	0.001		
Geleznovia verrucosa	25	0.001		
Dampiera sp.	30	0.001		
Leptospermum erubescens				
Calectasia hispida				
Scholtzia laxiflora				

Project: 62676 Flora

Date: 5/26/2022 **Recorder:** RP

Site: RR02 **Coordinates:** -29.468169, 115.143399 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: S **Slope:** Low

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand

Surface: 50% bare ground, % outcropping, 10% litter

Years Since Fire: >10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Excellent

Disturbance Notes: Nearby track

Vegetation Description: Open shrubland of *Banksia attenuata*, *Calothamnus glaber* and *Beaufortia elegans* over *Mesomelaena pseudostygia*, sparse *Ecdeiocolea monostachya* and *Lepidobolus* sp. sedges.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Beaufortia elegans	60	10		
Banksia attenuata	110	3		
?Daviesia hakeoides subsp. subnuda	70	3		
Calothamnus glaber	80	2		
Mesomelaena pseudostygia	40	2		
Banksia candolleana	60	2		
Ecdeiocolea monostachya	70	1		
Hakea polyanthema	80	1		
Conospermum boreale subsp. ascendens	60	1		
Banksia shuttleworthiana	60	0.5		
Isopogon tridens	80	0.5		
Desmocladius semiplanus	35	0.5		
Styphelia hispida	20	0.5		
Chordifex sinuosus	30	0.1		
Melaleuca ?leuropoma	60	0.1		
Persoonia acicularis	30	0.1		
Hibbertia hypericoides subsp. hypericoides / H. ?crassifolia	35	0.1		
Phlebocarya ciliata	30	0.1		
Petrophile ?brevifolia	30	0.01		
Verticordia nobilis	100	0.01		P4 7 individuals
Daviesia nudiflora subsp. nudiflora	35	0.01		
Eremaea ectadioclada	35	0.01		
Schoenus latitans	3	0.01		
Scholtzia laxiflora	35	0.001		
Acanthocarpus sp. Ajana (C.A. Gardner 8596)	25	0.001		
Thysanotus dichotomus	25	0.001		
Drosera ?echinoblastus	2	0.001		
Styphelia hispida	30	0.001		

Project: 62676 Flora

Date: 5/26/2022 **Recorder:** RP

Site: RR03 **Coordinates:** -29.476531, 115.150666 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: **Slope:** n/a

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand over yellow sand

Surface: 50% bare ground, % outcropping, 3% litter

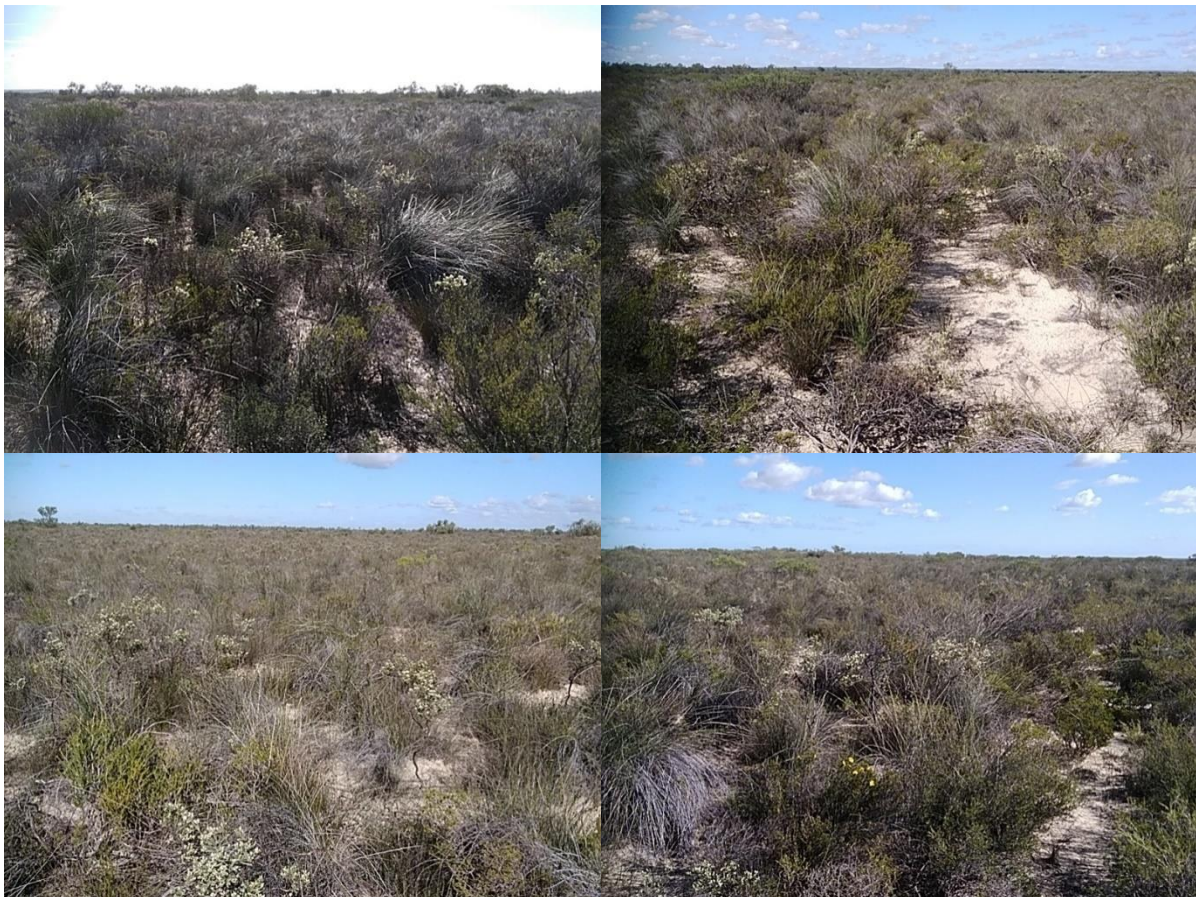
Years Since Fire: >10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Excellent

Disturbance Notes: Old exploration track, nearly indiscernible

Vegetation Description: Darwinia pauciflora shrubs over Ecdeiocolea monostachya, Mesomelaena pseudostygia and Lepidobolus sp. sedgeland.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Mesomelaena pseudostygia	40	15		
Ecdeiocolea monostachya	70	10		
Melaleuca ?leuropoma	45	7		
Chordifex sinuosus	25	5		
Cautis dioica	35	5		
Darwinia pauciflora	70	3		
Leptospermum erubescens	90	0.5		
Schoenus latitans	3	0.5		
Eremaea beaufortioides var. beaufortioides	100	0.5		
Hibbertia hypericoides subsp. hypericoides / H. ?crassifolia	45	0.1		
Allocasuarina thuyoides	50	0.1		
Lepidosperma sp.	35	0.1		
Scholtzia laxiflora	110	0.1		
Banksia shuttleworthiana	40	0.1		
Calothamnus glaber	65	0.1		
Drosera erythrorhiza	1	0.01		
Geleznowia verrucosa	40	0.01		
Verticordia densiflora var. densiflora	110	0.01		
Acacia comans	120	0.01		
Thysanotus dichotomus	25	0.01		
Daviesia nudiflora subsp. nudiflora	30	0.01		
Leptospermum spinescens	50	0.01		
Hakea polyanthema	25	0.01		
Petrophile ?brevifolia	45	0.01		
Conostylis canterriata	20	0.001		
Acanthocarpus sp. Ajana (C.A. Gardner 8596)	30	0.001		
Styphelia hispida	25	0.001		
Leporella fimbriata	1	0.001		
Drosera sp. (climbing)	20	0.001		

Project: 62676 Flora

Date: 5/26/2022 **Recorder:** RP

Site: RR04 **Coordinates:** -29.463742, 115.155724 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: **Slope:** n/a

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand over yellow sand

Surface: 70% bare ground, % outcropping, 10% litter

Years Since Fire: 5-10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Excellent

Disturbance Notes: Fire, track

Vegetation Description: Isolated patches of *Eucalyptus todtiana* over open shrubland of *Banksia attenuata* and *Banksia candolleana* over *Melaleuca ?leuropoma* and *Ecdeiocolea monostachya* and *Mesomelaena pseudostygia* sedges.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
<i>Ecdeiocolea monostachya</i>	100	4		
<i>Banksia attenuata</i>	150	3		
<i>Melaleuca ?leuropoma</i>	30	2		
<i>Conospermum boreale</i> subsp. <i>ascendens</i>	50	2		
<i>Eremaea beaufortioides</i> var. <i>beaufortioides</i>	70	2		
<i>Leptospermum erubescens</i>	75	2		
<i>Mesomelaena pseudostygia</i>	45	1.5		
<i>Allocasuarina humilis</i>	110	1		
<i>Grevillea leucopteris</i>	400	1		
<i>Petrophile drummondii</i>	65	1		
<i>Banksia shuttleworthiana</i>	45	0.5		
<i>Scholtzia laxiflora</i>	60	0.5		
<i>Lasiopetalum erectifolium</i>	40	0.5		
<i>Jacksonia floribunda</i>	110	0.5		
<i>Stirlingia latifolia</i>	60	0.5		
<i>Hakea eneabba</i>	120	0.5		
<i>Banksia ?dallanneyi</i>	20	0.2		
<i>Petrophile macrostachya</i>	70	0.1		
<i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>	60	0.1		
<i>Cassytha</i> sp.	25	0.05		
<i>Leptospermum spinescens</i>	60	0.01		
<i>Persoonia acicularis</i>	20	0.01		
<i>Verticordia grandis</i>	110	0.01		
<i>?Desmocladius flexuosus</i>	25	0.01		
<i>Dampiera oligophylla</i>	10	0.001		
<i>Acanthocarpus</i> sp. <i>Ajana</i> (C.A. Gardner 8596)	30	0.001		
<i>Darwinia speciosa</i>	40	0.001		
<i>Daviesia triflora</i>	60	0.001		

Project: 62676 Flora

Date: 6/6/2022 **Recorder:** RP

Site: RR05 **Coordinates:** -29.445852, 115.142247 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: NW **Slope:** Low

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand over yellow sand

Surface: 60% bare ground, % outcropping, 3% litter

Years Since Fire: unclear yrs

Large Trees Present (>500 mm DBH): no

Condition: Excellent

Disturbance Notes: Track

Vegetation Description: Open shrubland of *Calothamnus glaber*, *Conospermum boreale* subsp. *ascendens* and *Darwinia pauciflora* with isolated *Banksia attenuata*, over *Ecdeiocolea monostachya*, *Mesomelaena pseudostygia* and *Lepidobolus* sp. sedges.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
<i>Calothamnus blepharospermus</i>	80	10		
<i>Ecdeiocolea monostachya</i>	90	7		
<i>Mesomelaena pseudostygia</i>	50	7		
<i>Banksia hookeriana</i>	120	3		Growing alongside the track
<i>Conospermum boreale</i> subsp. <i>ascendens</i>	70	2		
<i>Darwinia pauciflora</i>	65	2		
<i>Chordifex sinuosus</i>	25	2		
<i>Melaleuca ?leuropoma</i>	50	1.5		
<i>Beaufortia elegans</i>	60	1		
<i>Banksia shuttleworthiana</i>	40	1		
? <i>Daviesia hakeoides</i> subsp. <i>subnuda</i>	80	1		? <i>Leptomeria</i>
<i>Scaevola canescens</i>	25	0.5		
<i>Styphelia hispida</i>	25	0.5		
<i>Isopogon tridens</i>	50	0.5		
<i>Hakea candolleana</i>	30	0.4		
<i>Scholtzia laxiflora</i>	70	0.2		
<i>Banksia ?dallanneyi</i>	20	0.2		
<i>Acacia sphaelata</i> subsp. <i>sphaelata</i>	50	0.2		
<i>Schoenus latitans</i>	3	0.1		
<i>Acanthocarpus</i> sp. <i>Ajana</i> (C.A. Gardner 8596)	30	0.02		
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i> / <i>H. ?crassifolia</i>	30	0.01		
<i>Phlebocarya ciliata</i>	20	0.01		
<i>Persoonia acicularis</i>	25	0.01		
<i>Cassytha</i> sp.	25	0.01		
<i>Verticordia grandis</i>	40	0.005		
<i>Allocasuarina campestris</i>	40	0.001		
<i>Dampiera oligophylla</i>	30	0.001		
<i>Conostylis canteriata</i>	20	0.001		
<i>Stenanthemum notiale</i> subsp. <i>notiale</i>	12	0.001		
<i>Drosera</i> sp. (climbing)	20	0.001		
<i>Laxmannia squarrosa</i>	10	0.001		
<i>Calytrix sapphirina</i>	30	0.001		
<i>Chordifex sinuosus</i>	30	0.001		
<i>Tersonia cyathiflora</i>	0	0		Fruit only

Project: 62676 Flora

Date: 6/6/2022 **Recorder:** RP

Site: RR06 **Coordinates:** -29.434050, 115.142607 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: dune

Aspect: NW **Slope:** Mild

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Yellow sand

Surface: 70% bare ground, % outcropping, 2% litter

Years Since Fire: 2-5 yrs

Large Trees Present (>500 mm DBH): no

Condition: Excellent

Disturbance Notes: Track, recent fire

Vegetation Description: Sparse *Xylomelum angustifolium* and *Eucalyptus todtiana* over open shrubland of *Calothamnus glaber*, *Banksia attenuata* and *Banksia hookeriana*, over *Ecdeiocolea monostachya* and *Phlebocarya ciliata*



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Banksia hookeriana	80	10		
Banksia attenuata	75	5		
Xylomelum angustifolium	200	3	1	
Calothamnus glaber	70	3		
Eremaea beaufortioides var. beaufortioides	90	2		
?Daviesia triflora	100	1.5		
Acacia scirpifolia	150	1.5		
Conospermum boreale subsp. ascendens	50	1		
Darwinia pauciflora	60	1		
Melaleuca ?leuropoma	45	0.5		
Hakea polyanthema	65	0.2		
Phlebocarya ciliata	20	0.01		
Pileanthus filifolius	25	0.01		
Verticordia grandis	45	0.01		
Stawellia dimorphantha	8	0.001		Abundance 2
Laxmannia sessiliflora subsp. drummondii	10	0.001		
Chordifex sinuosus	25	0.001		
Scaevola canescens	15	0.001		
Persoonia acicularis	20	0.001		
Schoenus latitans	3	0.001		
Mesomelaena pseudostygia	25	0.001		
Verticordia sp.	25	0.001		
Stylidium repens	10	0.001		
Allocasuarina humilis	3	0.001		Seedling
Hibbertia hypericoides	12	0.001		
Acanthocarpus sp. Ajana (C.A. Gardner 8596)	20	0.001		
Leptospermum spinescens	70	0.001		
Allocasuarina campestris	20	0.001		
Scholtzia laxiflora	10	0.001		
Tersonia cyathiflora	0	0		Fruit only

Project: 62676 Flora

Date: 5/27/2022 **Recorder:** LP

Site: RT01 **Coordinates:** -29.477113, 115.14547 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: N **Slope:** Very Gentle

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand over yellow sand

Surface: 50% bare ground, % outcropping, 4% litter

Years Since Fire: yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: No

Vegetation Description: Open shrubland of *Banksia attenuata*, *Calothamnus glaber* and *Beaufortia elegans* over *Ecdeicola monostachya*, *Mesomelaena pseudostygia* and *Schoenus latitans*.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
<i>Ecdeiocolea monostachya</i>	70	15		
<i>Beaufortia elegans</i>	55	5		
<i>Calothamnus glaber</i>	1.3	3		
<i>Mesomelaena pseudostygia</i>	35	3		
<i>Darwinia pauciflora</i>	85	2		
<i>Hakea polyanthema</i>	70	2		
<i>Banksia shuttleworthiana</i>	35	2		
? <i>Daviesia hakeoides</i> subsp. <i>subnuda</i>	80	2		
<i>Melaleuca ?leuropoma</i>	40	1.5		
<i>Banksia attenuata</i>	120	1		
<i>Schoenus latitans</i>	3	1		
<i>Lepidobolus preissianus</i>	20	0.5		
<i>Conospermum boreale</i> subsp. <i>ascendens</i>	115	0.1		
<i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>	0.5	0.1		
<i>Melaleuca ?leuropoma</i>	30	0.1		
<i>Eremaea violacea</i>	20	0.1		
<i>Pileanthus filifolius</i>	40	0.1		
<i>Banksia dallanneyi</i>	20	0.1		
<i>Persoonia acicularis</i>	30	0.01		
<i>Stylidium repens</i>	0.05	0.01		
<i>Verticordia grandis</i>	100	0.01		
<i>Cassytha glabella</i> forma <i>casuarinae</i>	30	0.01		
<i>Hypocalymma xanthopetalum</i>	20	0.01		
<i>Banksia candolleana</i>	50	0.01		
<i>Leptospermum spinescens</i>	50	0.01		
<i>Styphelia hispida</i>	20	0.01		
<i>Hypocalymma xanthopetalum</i>	15	0.01		
<i>Drosera</i> sp. (climbing)	5	0.001		
<i>Drosera erythrorhiza</i>	2	0.001		

Project: 62676 Flora

Date: 5/25/2022 **Recorder:** LP

Site: RT02 **Coordinates:** -29.562609, 115.119427 **Datum:** WGS84 MGA Zone 50 **Site Type:** Revele

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: **Slope:** n/a

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand over cream sand

Surface: 1% bare ground, % outcropping, 95% litter

Years Since Fire: >10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Very Good

Disturbance Notes: Nearby track

Vegetation Description: Isolated *Eucalyptus todtiana* mallee over *Acacia blakelyi* tall shrubland over sparse *Hibbertia hypericoides* low shrubs, *Conostylis candicans* forbs and *Mesomalaena pseudostylia* sedges.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Acacia blakelyi	250	30		
Conostylis candicans subsp. candicans	30	1.5		
Eucalyptus todtiana	350	1		
Banksia leptophylla var. melletica	130	1		
Mesomelaena pseudostygia	30	0.5		
Hibbertia hypericoides	40	0.2		
* Ursinia anthemoides	10	0.1		
* Hypochaeris sp.	1	0.1		
Scholtzia laxiflora	150	0.1		
Drosera erythrorhiza	1	0.1		
Corynotheca micrantha var. micrantha	15	0.1		
Neurachne alopecuroidea	4	0.1		
Alexgeorgea nitens	3	0.1		
Cyanothamnus ramosus subsp. anethifolius	35	0.1		
Gompholobium tomentosum	20	0.01		
Laxmannia squarrosa	5	0.01		
?Wahlenbergia preissii	6	0.01		
Conospermum sp.	10	0.01		
Leucopogon sp. Northern ciliate (R. Davis 3393)	15	0.01		
Austrostipa macalpinei	20	0.01		

Project: 62676 Flora

Date: 5/26/2022 **Recorder:** LP

Site: RT03 **Coordinates:** -29.562367, 115.140383 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: **Slope:** n/a

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream over yellow

Surface: 40% bare ground, % outcropping, 10% litter

Years Since Fire: >10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nearby track

Vegetation Description: Isolated *Acacia blakelyi* or *Eucalyptus todtiana* over *Banksia attenuata*, *Banksia hookeriana*, *Conospermum boreale* subsp. *ascendens*, *Hakea polyantha* and *Pileanthus filifolius* low shrubland, over *Ecdeicola monostachya*, *Conostylis resinosa* and *Scaevola cane*



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Scaevola canescens	15	8		
Banksia attenuata	100	4		
Conospermum boreale subsp. ascendens	110	3.5		
Hakea polyanthema	100	3		
Ecdeiocolea monostachya	100	2.5		
Pileanthus filifolius	60	2		
Banksia hookeriana	150	1.5		
Conostylis setigera subsp. setigera	20	1.5		
Hibbertia hypericoides	50	0.5		
Mesomelaena pseudostygia	50	0.5		
Melaleuca ?leuropoma	30	0.3		
Stenanthemum notiale subsp. notiale	30	0.2		
Calothamnus glaber	80	0.2		
Banksia dallanneyi	15	0.1		
Styphelia microdonta	15	0.1		
Acacia blakelyi	220	0.1		
Leptospermum erubescens	110	0.1		
Gompholobium tomentosum	60	0.1		
Leucopogon inflexus	50	0.1		
Daviesia nudiflora subsp. nudiflora	40	0.1		
Melaleuca ?leuropoma	40	0.1		
?Daviesia hakeoides subsp. subnuda	60	0.1		
Alexgeorgea nitens	10	0.1		
Daviesia triflora	50	0.1		
Schoenus clandestinus	3	0.1		
Scholtzia laxiflora	100	0.1		
Lepidobolus preissianus	30	0.1		
Beaufortia elegans	80	0.1		
Petrophile linearis	50	0.1		
Leucopogon sp. Northern ciliate (R. Davis 3393)	15	0.01		
Stylidium repens	5	0.01		
Persoonia acicularis	20	0.01		

Project: 62676 Flora

Date: 5/27/2022 **Recorder:** TJ

Site: RT04 **Coordinates:** -29.539675, 115.132476 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: NW **Slope:** Gentle

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Yellow sand

Surface: 25% bare ground, % outcropping, 18% litter

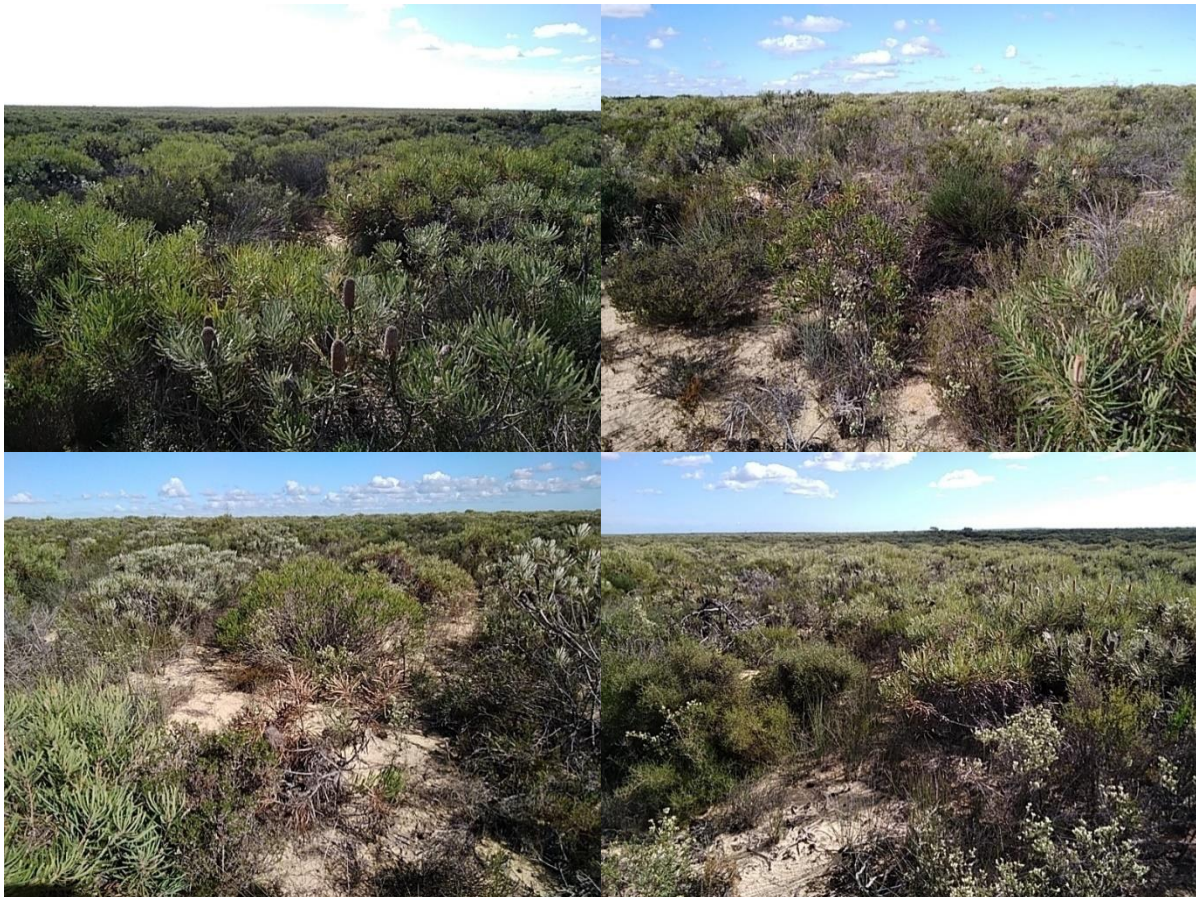
Years Since Fire: >10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nearby tracks

Vegetation Description: Banksia attenuata, Banksia hookeriana and Calothamnus glaber mid shrubland over Darwinia pauciflora sparse low shrubland over Ecdeicola monostachya, Mesomelaena pseudostygia and Lepidobolus sp. open sedgeland.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Banksia attenuata	140	6		
Banksia hookeriana	100	5		
Ecdeiocolea monostachya	80	4.5		
Darwinia pauciflora	80	3		
Melaleuca ?leuropoma	60	2		
Conospermum boreale subsp. ascendens	90	1.5		
Lepidobolus preissianus	30	1.5		
Calothamnus glaber	130	1		
Hakea polyanthema	100	1		
Mesomelaena pseudostygia	40	0.8		
Pileanthus filifolius	40	0.4		
Schoenus clandestinus	4	0.3		
Eremaea beaufortioides var. beaufortioides	50	0.1		
?Daviesia hakeoides subsp. subnuda	80	0.1		
Petrophile macrostachya	80	0.1		
Leptospermum spinescens	40	0.1		
Hibbertia hypericoides	30	0.1		
Conostylis setigera subsp. setigera	20	0.05		
Stylidium ?diuroides	5	0.01		
Laxmannia squarrosa	5	0.01		
Leucopogon inflexus	70	0.01		
Persoonia acicularis	15	0.01		
Acanthocarpus sp.	20	0.01		

Project: 62676 Flora

Date: 5/25/2022 **Recorder:** TJ

Site: RT05 **Coordinates:** -29.552371, 115.127412 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: N **Slope:** Very Gentle

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand

Surface: 35% bare ground, % outcropping, 12% litter

Years Since Fire: >10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nearby tracks

Vegetation Description: *Banksia attenuata* and *Banksia hookeriana* open mid shrubland over *Leptospermum erubescens* and *Melaleuca ?leuropoma* open low shrubland over *Ecdeicola monostachya* and *Mesomelaena pseudostygia* sedges.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Banksia attenuata	140	5		
Conospermum boreale subsp. ascendens	100	5		
Melaleuca ?leuropoma	50	2.5		
Banksia hookeriana	150	2		
?Daviesia hakeoides subsp. subnuda	100	2		
Ecdeiocolea monostachya	90	2		
Stirlingia latifolia	60	2		
Hakea polyanthema	110	1		
Mesomelaena pseudostygia	30	1		
Cassytha glabella forma casuarinae	20	1		
Chordifex sinuosus	30	0.8		
Leucopogon inflexus	50	0.3		
Lepidobolus preissianus	20	0.1		
Schoenus clandestinus	4	0.1		
Pileanthus filifolius	30	0.1		
Hibbertia hypericoides	40	0.1		
Scaevola canescens	10	0.1		
Verticordia grandis	60	0.1		
Conostephium preissii	50	0.1		
Jacksonia floribunda	50	0.1		
Scholtzia laxiflora	80	0.1		
Schoenus curvifolius	20	0.1		
Acacia sessilis	40	0.1		
Persoonia acicularis	20	0.01		
Stylidium repens	5	0.01		

Project: 62676 Flora

Date: 5/27/2022 **Recorder:** TJ

Site: RT06 **Coordinates:** -29.562004, 115.109997 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: S **Slope:** Very Gentle

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand over yellow sand

Surface: 15% bare ground, % outcropping, 12% litter

Years Since Fire: >10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nearby tracks

Vegetation Description: Isolated tall shrubs of *Acacia blakelyi*, *Banksia prionotes* and *Grevillea eriostachya* over sparse *Banksia attenuata* and *Banksia hookeriana* shrubland over *Acacia cavealis* and *Ecdeicola monostachya* low shrubs and sedges.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Acacia cavealis	70	40		
Banksia attenuata	120	3		
Banksia hookeriana	140	3		
Ecdeiocolea monostachya	80	2		
Hakea polyanthema	70	1.5		
Schoenus clandestinus	4	1.5		
?Daviesia hakeoides subsp. subnuda	80	1		
Conostylis resinosa	30	1		
Verticordia grandis	60	0.8		
Grevillea eriostachya	160	0.5		
Acanthocarpus sp. Ajana (C.A. Gardner 8596)	20	0.4		
Cassytha aurea var. hirta	40	0.4		
Mesomelaena pseudostygia	30	0.3		
Drosera erythrorhiza	1	0.3		
Conospermum boreale subsp. ascendens	60	0.2		
Lepidobolus preissianus	20	0.2		
Pileanthus filifolius	30	0.1		
Styphelia hamulosa	40	0.1		
?Hibbertia sp.	50	0.1		
Dampiera oligophylla	40	0.1		
Lomandra hastilis	70	0.1		
Alexgeorgea nitens	10	0.1		
Petrophile macrostachya	50	0.1		
Allocasuarina campestris	100	0.1		
Petrophile ?brevifolia	40	0.1		
Jacksonia hakeoides	50	0.1		
Stenanthemum notiale subsp. notiale	25	0.1		
Scholtzia chapmanii	15	0.1		
Leucopogon sp. Northern ciliate (R. Davis 3393)	20	0.1		
Dampiera oligophylla	30	0.1		
Scaevola canescens	10	0.01		
Burchardia congesta	30	0.01		

Project: 62676 Flora

Date: 5/27/2022 **Recorder:** TJ

Site: RT07 **Coordinates:** -29.425155, 115.141525 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: **Slope:** n/a

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand over yellow sand

Surface: 62% bare ground, % outcropping, 4% litter

Years Since Fire: 2-5 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nil

Vegetation Description: Scholtzia laxiflora, Melaleuca ?leuropoma and Pileanthus filifolius open low shrubland, over Ecdeicola monostachya, Mesomelaena pseudostygia and Lepidobolus preissianus open sedgeland with Stylium repens and Conostylis canterriata forbs.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Melaleuca ?leuropoma	40	2.2		
Ecdeiocolea monostachya	70	2		
Mesomelaena pseudostygia	40	2		
Scholtzia laxiflora	40	1.2		Resprouter
Lepidobolus preissianus	20	0.7		
Pileanthus filifolius	22	0.5		
Conospermum boreale subsp. ascendens	30	0.5		
Drosera erythrorhiza	1	0.2		
Calothamnus quadrifidus subsp. angustifolius	50	0.2		
Leptospermum erubescens	3	0.1		
Petrophile ?brevifolia	25	0.1		
Hakea circumalata	40	0.1		
Persoonia acicularis	15	0.1		
Darwinia pauciflora	20	0.1		
Cassytha glabella forma casuarinae	15	0.1		
Conostylis canterinata	15	0.05		
Styphelia hispida	6	0.05		
Schoenus latitans	3	0.04		
Laxmannia sessiliflora subsp. drummondii	5	0.01		
Opercularia vaginata	6	0.01		
Burchardia congesta	15	0.01		
Stylidium ?diuroides	5	0.01		
Isotropis cuneifolia subsp. cuneifolia	10	0.01		

Project: 62676 Flora

Date: 6/10/2022 **Recorder:** TJ

Site: RT08 **Coordinates:** -29.422788, 115.137324 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: W **Slope:** Gentle

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand

Surface: 43% bare ground, % outcropping, 8% litter

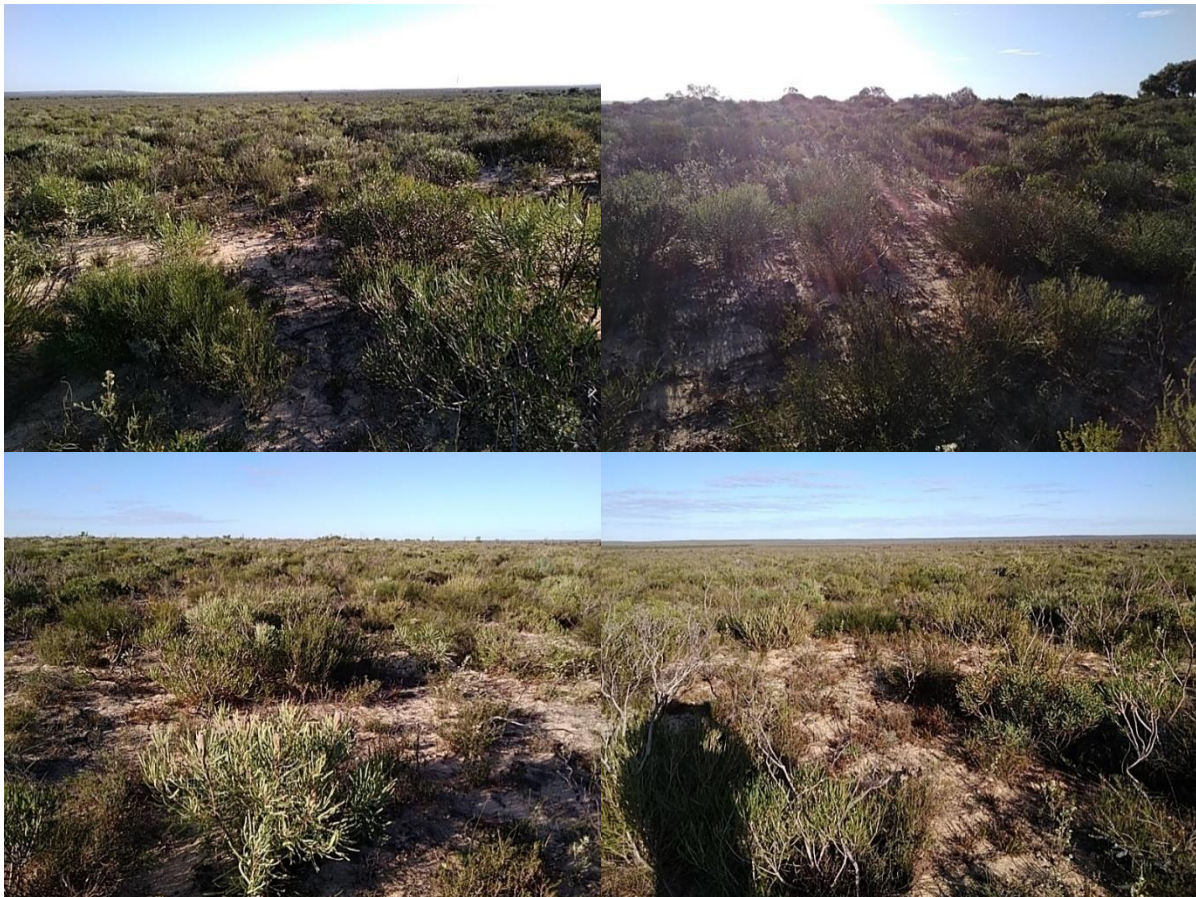
Years Since Fire: 1-2 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Fire <2, old tracks nearby

Vegetation Description: Banksia candolleana, Banksia hookeriana, Banksia attenuata and Calothamnus glaber low open scrub, over Eremaea beaufortioides var. beaufortioides, Darwinia pauciflora and Banksia shuttleworthiana low open shrubland with Lepidobolus preissianus, Mesomelaen



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Banksia hookeriana	100	3		
Banksia candolleana	100	2		
Calothamnus glaber	90	2		
Banksia shuttleworthiana	50	2		
Conostylis canterriata	20	1.8		
Lepidobolus preissianus	30	1.7		
Darwinia pauciflora	60	1.2		
Schoenus latitans	3	1.2		
Eremaea beaufortoides var. beaufortoides	50	1.2		
Cassytha flava	15	1		
Pileanthus filifolius	40	0.8		
Hibbertia hypericoides	40	0.6		
Ecdeiocolea monostachya	70	0.5		
Mesomelaena pseudostygia	40	0.5		
Banksia attenuata	80	0.3		
Hakea circumalata	30	0.2		
Conospermum boreale subsp. ascendens	70	0.1		
?Daviesia hakeoides subsp. subnuda	50	0.1		
Verticordia aurea	30	0.1		1 plt
Verticordia grandis	40	0.1		
Petrophile macrostachya	40	0.1		
Persoonia acicularis	30	0.1		
Leptospermum spinescens	30	0.1		
Beaufortia elegans	50	0.1		
Scholtzia laxiflora	60	0.1		
Dampiera oligophylla	40	0.1		
Scaevola canescens	6	0.1		
Laxmannia sessiliflora subsp. drummondii	4	0.05		
Burchardia congesta	30	0.01		
Stylidium repens	2	0.01		
Desmocladius semiplanus	15	0.01		
Neurachne alopecuroidea	30	0.01		
Calytrix ?sapphirina	20	0.01		
Lepidosperma ?apricola	20	0	0.01	

Project: 62676 Flora

Date: 5/27/2022 **Recorder:** TJ

Site: RT09 **Coordinates:** -29.436357, 115.142149 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: SW **Slope:** Gentle

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand

Surface: 12% bare ground, % outcropping, 67% litter

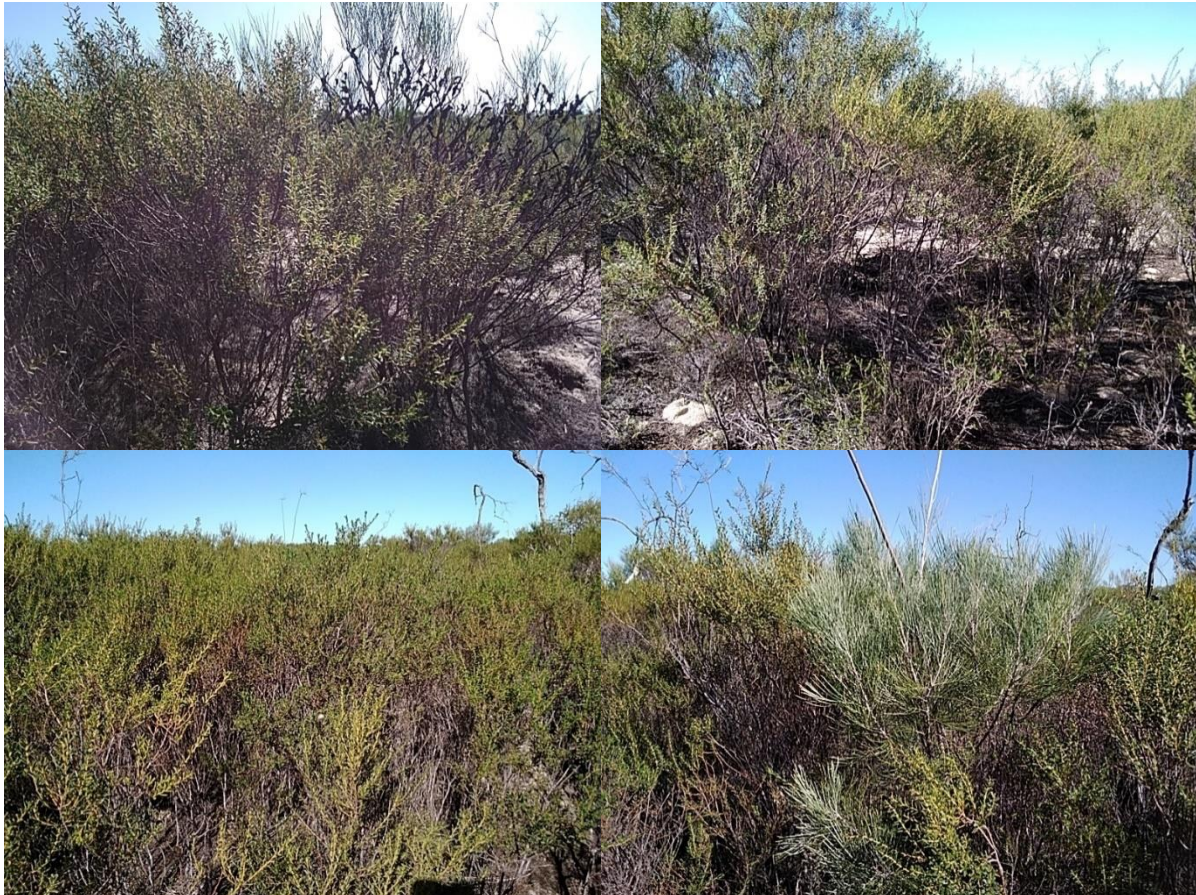
Years Since Fire: 5-10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Track nearby

Vegetation Description: Isolated *Eucalyptus todtiana* and *Grevillea eriostachya* over closed mid shrubland of *Acacia spathuifolia* over *Scaevola canescens* and *Stenanthemum notiale* subsp. *notiale* sparse hermland.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Acacia spathulifolia	160	65		
Grevillea eriostachya	180	2		
Eucalyptus todtiana	250	1	1	
Acacia scirpifolia	250	1		
Acacia sp.	1	0.6		
Stenanthemum notiale subsp. notiale	25	0.5		
Scaevola canescens	6	0.3		
Lechenaultia linarioides	55	0.2		
Drosera erythrorhiza	1	0.2		
Desmocladus semiplanus	15	0.01		

Project: 62676 Flora

Date: 5/28/2022 **Recorder:** TJ

Site: RT10 **Coordinates:** -29.462641, 115.121615 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: NE **Slope:** Very gentle

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: White sand

Surface: 35% bare ground, % outcropping, 50% litter

Years Since Fire: >10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Old tracks and firebreak/scar nearby.

Vegetation Description: *Banksia menziesii* sparse low woodland over *Banksia attenuata* and *Scholtzia laxiflora* mid open shrubland, over *Melaleuca ?leuropoma*, *Jacksonia floribunda* and *Stirlingia latifolia* low shrubland over *Alexgeorgia nitens* and *Drosera* sp..



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Scholtzia laxiflora	175	6		
Melaleuca ?leuropoma	70	5		
Banksia attenuata	160	4		
Alexgeorgea nitens	5	3	5	
Banksia menziesii	280	2.5		
Jacksonia floribunda	110	2		
Stirlingia latifolia	60	1.8		
Pileanthus filifolius	60	1.5		
Drosera ?echinoblastus	0.5	1		
Eremaea beaufortioides var. beaufortioides	90	0.6		
Lyginia imberbis	40	0.2		
Verticordia grandis	140	0.1		
Schoenus curvifolius	15	0.1		
Amphipogon turbinatus	15	0.1		
Leucopogon sp. Northern ciliate (R. Davis 3393)	20	0.1		
Styphelia xerophyllum	50	0.1		

Project: 62676 Flora

Date: 5/28/2022 **Recorder:** TJ

Site: RT11 **Coordinates:** -29.45674, 115.165623 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: N **Slope:** Very gentle

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: White sand over cream sand

Surface: 30% bare ground, % outcropping, 20% litter

Years Since Fire: >10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Old tracks nearby

Vegetation Description: Xylomelum angustifolium and Eucalyptus todtiana open woodland, over Leptospermum spp., Banksia candolleana, Calothamnus glaber and Scholtzia laxiflora open mid shrubland, over Hibbertia hypericoides and Melaleuca ?leuropoma low open shrubland and Ecdeicol



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Xylomelum angustifolium	400	6		
Hibbertia hypericoides	60	2.2		
Eucalyptus todtiana	450	2		
Banksia candolleana	125	2		
Ecdeiocolea monostachya	70	1.9		
Melaleuca ?leuropoma	50	1.8		
Leptospermum erubescens	130	1.5		
Leptospermum spinescens	100	1		
Calothamnus glaber	120	0.8		
Mesomelaena pseudostygia	45	0.7		
Jacksonia floribunda	100	0.7		
Hakea polyanthema	130	0.6		
Scholtzia laxiflora	140	0.5		
Schoenus sp. A3 Ciliate Sheaths (K.R. Newbey 9402)	35	0.5		Approx 10 clumps
Alexgeorgia nitens	6	0.5	0.6	
Verticordia grandis	120	0.3		
Cassytha glabella forma casuarinae	15	0.2		
Stirlingia latifolia	70	0.2		
Banksia shuttleworthiana	40	0.1		
Chordifex sinuosus	25	0.1		
Daviesia nudiflora subsp. nudiflora	35	0.1		
Persoonia acicularis	20	0.1		
Desmocladus semiplanus	18	0.1		
Styphelia xerophyllum	45	0.1		
Petrophile linearis	40	0.1		
Lasiopetalum erectifolium	30	0.1		
Conostylis canteriata	26	0.1		
Melaleuca ?trichophylla	30	0.1		
Lyginia imberbis	25	0.08		
Schoenus latitans	3	0.03		
Drosera sp. (climbing)	5	0.01		
Dampiera oligophylla	50	0.01		
Chaetospira curvifolia	11	0.01		
Drosera erythrorhiza	1	0.01		

Project: 62676 Flora

Date: 5/28/2022 **Recorder:** TJ

Site: RT12 **Coordinates:** -29.468811, 115.167123 **Datum:** WGS84 MGA Zone 50 **Site Type:** Revele

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: **Slope:** n/a

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand

Surface: 32% bare ground, % outcropping, 28% litter

Years Since Fire: >10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nearby tracks

Vegetation Description: Xylomelum angustifolium and Eucalyptus todtiana sparse woodland, over Banksia attenuata, Banksia candolleana and Calothamnus glaber sparse mid shrubland, over Beaufortia elegans, Hibbertia hypericoides, Banksia shuttleworthiana and Leucopogon inflexus low



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Xylomelum angustifolium	350	4.5		
Beaufortia elegans	110	3.8		
Eucalyptus todtiana	460	3		
Hibbertia hypericoides	60	3		
Calothamnus glaber	120	2.8		
Banksia shuttleworthiana	60	2.8		
Banksia attenuata	130	1.5		
Banksia candolleana	100	1.5		
Leucopogon inflexus	90	1.2		
Conospermum boreale subsp. ascendens	90	1		
Scholtzia laxiflora	95	0.9		
Lasiopetalum erectifolium	40	0.6		
Melaleuca ?leuropoma	25	0.5		
Lysinema pentapetalum	130	0.4		
Allocasuarina humilis	60	0.3		
Andersonia heterophylla	40	0.3		
Conospermum brachyphyllum	70	0.3		
Alexgeorgea nitens	10	0.3		
Styphelia xerophyllum	80	0.15		
Eremaea beaufortioides var. beaufortioides	100	0.1		
Jacksonia floribunda	100	0.1		
Isopogon tridens	60	0.1		
Scaevola canescens	15	0.1		
Schoenus latitans	4	0.1		
Cassytha glabella forma casuarinae	50	0.1		
Verticordia grandis	60	0.1		
?Lomandra hastilis	100	0.1		
Conostylis canteriata	18	0.02		
Desmocladius semiplanus	20	0.02		
Schoenus pleiostemoneus	18	0.02		
Stylidium repens	3	0.01		
Drosera erythrorhiza	2	0.01		
Stylidium crossocephalum	6	0.01		3 plts
Dampiera oligophylla	45	0.01		

Project: 62676 Flora

Date: 5/28/2022 **Recorder:** TJ

Site: RT13 **Coordinates:** -29.463214, 115.145126 **Datum:** WGS84 MGA Zone 50 **Site Type:** Revele

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: NE **Slope:** Very gentle

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand over yellow sand

Surface: 28% bare ground, % outcropping, 22% litter

Years Since Fire: 5-10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nearby tracks

Vegetation Description: Banksia attenuata, Banksia hookeriana and Calothamnus glaber open mid shrubland over Banksia candolleana, Conospermum boreale subsp. ascendens, ?Daviesia hakeoides subsp. subnuda and Beaufortia elegans open low shrubland, over Ecdeicola monostachya, meso



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Banksia attenuata	140	6		
?Daviesia hakeoides subsp. subnuda	80	3.8		
Beaufortia elegans	70	3.8		
Banksia hookeriana	140	3		
Calothamnus glaber	130	3		
Lepidobolus preissianus	30	2.8		
Ecdeiocolea monostachya	90	2.5		
Mesomelaena pseudostygia	50	2		
Banksia candolleana	100	1.8		
Conospermum boreale subsp. ascendens	110	1.5		
Conostylis canterriata	20	1.2		
Melaleuca ?leuropoma	40	1		
Schoenus clandestinus	3	0.9		
Darwinia pauciflora	80	0.6		
Alexgeorgea nitens	7	0.6		
Lasiopetalum erectifolium	35	0.5		
Cassytha glabella forma casuarinae	50	0.3		
Pileanthus filifolius	40	0.3		
Acanthocarpus sp. Ajana (C.A. Gardner 8596)	20	0.3		
Scholtzia laxiflora	130	0.3		
Eremaea beaufortioides var. beaufortioides	50	0.2		
Petrophile macrostachya	80	0.1		
Verticordia grandis	120	0.1		
Leptospermum spinescens	40	0.1		
Hibbertia hypericoides	30	0.1		
Stenanthemum notiale subsp. notiale	20	0.1		
Banksia shuttleworthiana	65	0.1		
Corynotheca micrantha var. micrantha	60	0.1		
Desmocladius semiplanus	30	0.1		
Petrophile drummondii	100	0.1		
Persoonia acicularis	15	0.05		
Hibbertia crassifolia	40	0.01		

Project: 62676 Flora

Date: 6/10/2022 **Recorder:** TJ

Site: RT14 **Coordinates:** -29.580165, 115.148876 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: **Slope:** n/a

Outcropping: no

Rock Type: Nil

Soil Type: sandy clay

Soil Notes: Cream sand with grey clay component

Surface: 28% bare ground, % outcropping, 18% litter

Years Since Fire: 2-5 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nearby track

Vegetation Description: Occasional *Eucalyptus todtiana* over *Callitris arenaria* over *Banksia candolleana* and *Hakea polyanthema* open low shrubland over *Mesomelaena pseudostygia*, *Chordifex sinuosus* and *Scaevola canescens* open sedgeland/forbland



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Hakea polyanthema	110	6		
Mesomelaena pseudostygia	35	4		
Banksia shuttleworthiana	60	4		
Banksia candolleana	120	3		
Callitris arenaria	170	2		
Chordifex sinuosus	45	2		
Eucalyptus todtiana	250	1		
Scaevola canescens	20	1		
?Daviesia hakeoides subsp. subnuda	70	1		
Allocasuarina humilis	70	1		
Stylidium crossoccephalum	6	0.2		3 plants
Conospermum boreale subsp. ascendens	60	0.2		
Calothamnus glaber	120	0.2		
Hibbertia hypericoides	55	0.2		
Leucopogon inflexus	60	0.2		
Leptospermum spinescens	70	0.2		
Acanthocarpus sp. Ajana (C.A. Gardner 8596)	20	0.1		
Lysinema pentapetalum	100	0.1		
Verticordia grandis	50	0.1		
Stylidium repens	20	0.1		
Schoenus latitans	5	0.1		
Drosera sp. (climbing)	5	0.1		
Daviesia nudiflora subsp. nudiflora	40	0.1		
Cassytha glabella forma casuarinae	50	0.1		
Gompholobium tomentosum	66	0.1		
Eremaea beaufortoides var. beaufortoides	70	0.1		
Styphelia microdonta	20	0.1		
Scholtzia laxiflora	50	0.1		
Acacia lasiocarpa var. lasiocarpa	75	0.1		
Melaleuca ?leuropoma	50	0.1		
Calothamnus quadrifidus subsp. angustifolius	80	0.1		
Conostylis crassinerva subsp. absens	5	0.1		
Conostylis aculeata	5	0.1		
Laxmannia sessiliflora subsp. drummondii	7	0.05		
Alexgeorgea nitens	20	0.01		
Isotropis cuneifolia subsp. cuneifolia	10	0.01		
Schoenus pleiostemoneus	2	0.01		

Project: 62676 Fauna

Date: 6/9/2022 **Recorder:** EB

Site: RT15 **Coordinates:** -29.56185, 115.155401 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: **Slope:** n/a

Outcropping: no

Rock Type: Nil

Soil Type: sandy clay

Soil Notes: Cream sand over peach sandy clay

Surface: 12% bare ground, % outcropping, 80% litter

Years Since Fire: 5-10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nearby track

Vegetation Description: Acacia scirpifolia and isolated Eucalyptus todtiana tall open shrubland over Xanthorrhoea drummondii sparse mid shrubland over Melaleuca ?leuropoma and Scholtzia laxiflora and Jacksonia hakeoides low shrubland over Mesomelaena pseudostygia and Conostylis



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Acacia scirpifolia	200	35		
Melaleuca ?leuropoma	50	8		
Jacksonia hakeoides	40	6		
Banksia shuttleworthiana	50	2		
Hakea polyanthema	80	2		
Xanthorrhoea drummondii	180	1		
Eucalyptus todtiana	300	1		
Scholtzia laxiflora	70	1		
Stenanthemum notiale subsp. notiale	15	0.5		
Conostylis candicans subsp. candicans	22	0.5		
Mesomelaena pseudostygia	40	0.5		
Hibbertia hypericoides	50	0.2		
Drosera erythrorhiza	2	0.1		
Gompholobium tomentosum	40	0.1		
Cassytha glabella forma casuarinae	50	0.1		
Laxmannia sessiliflora subsp. drummondii	5	0.1		
Leucopogon inflexus	70	0.1		
Conospermum boreale subsp. ascendens	50	0.1		
Leucopogon sp. Northern ciliate (R. Davis 3393)	30	0.1		
Cyanothamnus ramosus subsp. anethifolius	26	0.1		
Eremaea beaufortioides var. beaufortioides	55	0.1		
Styphelia microdonta	30	0.1		
Acanthocarpus sp. Ajana (C.A. Gardner 8596)	20	0.1		
Alexgeorgea nitens	5	0.1		
Acacia dilatata	40	0.1		
Leptospermum spinescens	50	0.1		
Drosera ?menziesii	20	0.01		
Burchardia congesta	20	0.01		
Stylidium repens	7	0.01		
Anigozanthos sp.	8	0.01		
Neurachne alopecuroidea	5	0.01		
Acacia stenoptera	40	0.01		
Verticordia densiflora	50	0.01		

Project: 62676 Flora

Date: 6/12/2022 **Recorder:** TJ

Site: RT16 **Coordinates:** -29.559581, 115.157664 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: **Slope:** n/a

Outcropping: no

Rock Type: Nil

Soil Type: clay,sand

Soil Notes: White sand over grey clay

Surface: 50% bare ground, % outcropping, 15% litter

Years Since Fire: 5-10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nil

Vegetation Description: Sparse mid shrubland of *Xanthorrhoea drummondii* over *Jacksonia angulata* and *Calytrix depressa* low shrubland with *Ecdeicola monostachya* sedges.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Jacksonia angulata	35	9		
Calytrix depressa	40	6		
Ecdeiocolea monostachya	70	3		
Xanthorrhoea drummondii	150	2		
Hakea candolleana	25	1		
Stylidium repens	5	0.5		
Melaleuca ?leuropoma	40	0.3		
Schoenus latitans	3	0.2		
Alexgeorgea nitens	5	0.2		
Hibbertia hypericoides	30	0.2		
Conostylis ?aculeata	15	0.2		
Leucopogon inflexus	60	0.2		
Stenanthemum notiale subsp. notiale	20	0.1		
Allocasuarina microstachya	20	0.1		
Leucopogon sp. Northern ciliate (R. Davis 3393)	18	0.1		
Jacksonia hakeoides	25	0.1		
Neurachne alopecuroidea	6	0.1		
Calothamnus quadrifidus subsp. angustifolius	60	0.1		
Hibbertia acerosa	15	0.1		
Orchidaceae sp.	1	0.04		
Cristonia stenophylla	10	0.01		

Project: 62676 Flora

Date: 6/12/2022 **Recorder:** TJ

Site: RT17 **Coordinates:** -29.5626920, 115.148885 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: dune

Aspect: W **Slope:** Very gentle

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Deep yellow sand

Surface: 35% bare ground, % outcropping, 28% litter

Years Since Fire: 5-10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nearby tracks

Vegetation Description: Banksia attenuata, Banksia hookeriana and Calothamnus glaber mid shrubland over Darwinia pauciflora open low shrubland over Ecdeicola monostachya, Mesomelaena pseudostygia and Lepidobolus sp. sparse sedgeland.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Banksia hookeriana	175	10		
Calothamnus glaber	140	10		
Darwinia pauciflora	90	3.5		
Banksia attenuata	140	2		
?Daviesia hakeoides subsp. subnuda	80	1.2		
Conospermum boreale subsp. ascendens	70	1		
Ecdeiocolea monostachya	70	0.8		
Hakea polyanthema	90	0.6		
Conostylis resinosa	18	0.5		
Stenanthemum notiale subsp. notiale	20	0.5		
Mesomelaena pseudostygia	30	0.2		
Hibbertia hypericoides	50	0.2		
Grevillea eriostachya	120	0.2		
Petrophile macrostachya	100	0.2		
Lepidobolus preissianus	30	0.1		
Laxmannia sessiliflora subsp. drummondii	5	0.1		
Schoenus clandestinus	3	0.1		
Melaleuca ?leuropoma	60	0.1		
Pileanthus filifolius	40	0.1		
Leptospermum spinescens	30	0.1		
Persoonia acicularis	20	0.1		
Acanthocarpus sp. Ajana (C.A. Gardner 8596)	20	0.1		
Scaevola canescens	8	0.1		
Lepidosperma pubisquamum	50	0.1		
Styphelia hamulosa	50	0.1		
Jacksonia hakeoides	20	0.1		
Drosera erythrorhiza	2	0.05		
Drosera sp. (climbing)	5	0.01		
Conostylis candicans subsp. candicans	25	0.01		
Neurachne alopecuroidea	4	0.01		

Project: 62676 Flora

Date: 6/12/2022 **Recorder:** TJ

Site: RT18 **Coordinates:** -29.569512, 115.15246 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: **Slope:** n/a

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: White sand over cream sand

Surface: 20% bare ground, % outcropping, 30% litter

Years Since Fire: 5-10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nearby track

Vegetation Description: Isolated *Xylomelum angustifolium* and *Acacia scirpifolia* over *Hakea polyantha* and *Scholtzia laxiflora* low shrubland over *Ecdeicola monostachya* and *Mesomalaena pseudostygia* sedges and *Stenanthemum notiale* subsp. *notiale* and *Scaevola canescens* forbland.



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
<i>Ecdeiocolea monostachya</i>	80	2.8		
<i>Hakea polyanthema</i>	90	2		
<i>Scaevola canescens</i>	12	2		
<i>Scholtzia laxiflora</i>	70	1.2		
<i>Melaleuca ?leuropoma</i>	60	1.2		
<i>Mesomelaena pseudostygia</i>	50	1.2		
<i>Hibbertia hypericoides</i>	60	1		
<i>Stylidium repens</i>	10	1		
<i>Conospermum boreale</i> subsp. <i>ascendens</i>	50	0.6		
<i>Leucopogon</i> sp. Northern ciliate (R. Davis 3393)	40	0.6		
<i>Stenanthemum notiale</i> subsp. <i>notiale</i>	20	0.5		
<i>Caustis dioica</i>	25	0.5		
<i>Drosera erythrorhiza</i>	2	0.3		
<i>Verticordia densiflora</i> var. <i>densiflora</i>	60	0.3		
<i>Daviesia nudiflora</i> subsp. <i>nudiflora</i>	40	0.2		
<i>Lepidobolus preissianus</i>	20	0.2		
<i>Jacksonia hakeoides</i>	30	0.2		
<i>Acacia scirpifolia</i>	200	0.1		
<i>Banksia shuttleworthiana</i>	22	0.1		
<i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i>	30	0.1		
<i>Cassytha glabella</i> forma <i>casuarinae</i>	40	0.1		
<i>Acanthocarpus</i> sp. <i>Ajana</i> (C.A. Gardner 8596)	15	0.1		
<i>Laxmannia sessiliflora</i> subsp. <i>drummondii</i>	10	0.1		
<i>Verticordia grandis</i>	80	0.1		
<i>Desmodcladus semiplanus</i>	35	0.1		
<i>Pileanthus filifolius</i>	30	0.1		
<i>Styphelia xerophyllum</i>	40	0.1		
<i>Styphelia microdonta</i>	25	0.1		
<i>Calothamnus sanguineous</i>	60	0.1		
<i>Schoenus latitans</i>	2	0.1		
<i>Conostylis canteriata</i>	15	0.01		
<i>Burchardia congesta</i>	30	0.01		
<i>Neurachne alopecuroidea</i>	3	0.01		
<i>Conostylis ?aculeata</i>	15	0.01		
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	10	0.01		
<i>Stylidium crossoccephalum</i>	7	0.01		1 plant
<i>Cristonia stenophylla</i>	20	0.01		

Project: 62676 Flora

Date: 6/12/2022 **Recorder:** TJ

Site: RT19 **Coordinates:** -29.5757971, 115.150515 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site) **Photo Location:** Central facing N,E,S,W

Landform: plain

Aspect: **Slope:** n/a

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: White sand over cream sand

Surface: 40% bare ground, % outcropping, 18% litter

Years Since Fire: 5-10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nearby track

Vegetation Description: Isolated *Xylomelum* and *Acacia scirpifolia* over *Banksia attenuata* sparse mid shrubland over *Hakea polyantha*, *Conospermum boreale* subsp. *ascendens* and *Scholtzia laxiflora* open low shrubland over *Ecdeicola monostachya* and *Mesomalaena pseudostygia* and *Scaevola*



TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Ecdeiocolea monostachya	90	4		
Banksia attenuata	150	3		
Mesomelaena pseudostygia	50	2.8		
Hakea polyanthema	100	2.6		
Scholtzia laxiflora	80	1.5		
Conospermum boreale subsp. ascendens	100	1.5		
Scaevola canescens	7	1.5		
Banksia shuttleworthiana	60	1.5		
Conostylis resinosa	15	1		
Melaleuca ?leuropoma	40	0.6		
Leucopogon sp. Northern ciliate (R. Davis 3393)	40	0.6		
Hibbertia hypericoides	100	0.5		
Lepidobolus preissianus	30	0.2		
Jacksonia hakeoides	40	0.2		
Pileanthus filifolius	40	0.2		
?Daviesia hakeoides subsp. subnuda	60	0.2		
Scaevola canescens	8	0.2		
Acacia scirpifolia	200	0.1		
Drosera erythrorhiza	2	0.1		
Stylidium repens	7	0.1		
Acacia lasiocarpa var. lasiocarpa	30	0.1		
Stenanthemum notiale subsp. notiale	20	0.1		
Daviesia nudiflora subsp. nudiflora	40	0.1		
Cassytha glabella forma casuarinae	40	0.1		
Acanthocarpus sp. Ajana (C.A. Gardner 8596)	20	0.1		
Laxmannia sessiliflora subsp. drummondii	10	0.1		
Styphelia xerophyllum	40	0.1		
Schoenus clandestinus	5	0.1		
Petrophile macrostachya	80	0.1		
Eremaea beaufortioides var. beaufortioides	40	0.1		
Allocasuarina humilis	60	0.1		
Leptospermum spinescens	70	0.1		
Gompholobium tomentosum	50	0.1		
Daviesia triflora	40	0.1		
Daviesia triflora	35	0.1		
Petrophile ?brevifolia	50	0.04		
Burchardia congesta	30	0.01		

Project: 62676 Flora

Date: 6/12/2022 **Recorder:** TJ

Site: RT20 **Coordinates:** -29.561433, 115.160317 **Datum:** WGS84 MGA Zone 50 **Site Type:** Releve

Site Size: 10 m diameter **Site Marker:** No marker (temporary site)

Photo Location: n/a

Landform: plain

Aspect: NE **Slope:** Very gentle

Outcropping: no

Rock Type: Nil

Soil Type: sand

Soil Notes: Cream sand over yellow sand

Surface: 28% bare ground, % outcropping, 22% litter

Years Since Fire: 5-10 yrs

Large Trees Present (>500 mm DBH): no

Condition: Pristine

Disturbance Notes: Nearby tracks

Vegetation Description: Banksia attenuata open mid shrubland over Banksia candolleana, Stirlingia latifolia, Jacksonia floribunda and Conostephium sp. open low shrubland, over Mesomalaena pseudostygia sedges.









No Photos.

TAXA

Taxon	Height (m)	Cover (%)	Dead Cover (%)	Comment
Banksia attenuata	140	4		
Jacksonia floribunda	70	2.5		
Styphelia xerophyllum	60	2.2		
Mesomelaena pseudostygia	45	1		
Banksia candolleana	70	1		
Verticordia grandis	130	0.6		
Leptospermum erubescens	90	0.6		
Scholtzia laxiflora	100	0.3		
Leucopogon sp. Northern ciliate (R. Davis 3393)	45	0.3		
Stirlingia latifolia	50	0.2		
Eremaea beaufortoides var. beaufortoides	70	0.1		
Cassytha glabella forma casuarinae	40	0.1		
?Daviesia hakeoides subsp. subnuda	40	0.1		
Petrophile macrostachya	90	0.1		
Melaleuca ?leuropoma	50	0.1		
Pileanthus filifolius	40	0.1		
Hibbertia hypericoides	40	0.1		
Alexgeorgea nitens	7	0.1		
Conostylis canteriata	18	0.1		
Andersonia heterophylla	35	0.1		
Hibbertia crassifolia	30	0.01		
Stylidium ?diuroides	10	0.01		

Appendix F – Well Site Photographic Records

Well Site 01		-29.5393171, 115.1325475	
			
Looking North	Looking East	Looking South	Looking West
Well Site 02		-29.4217291, 115.1391219	
			
Looking North	Looking East	Looking South	Looking West

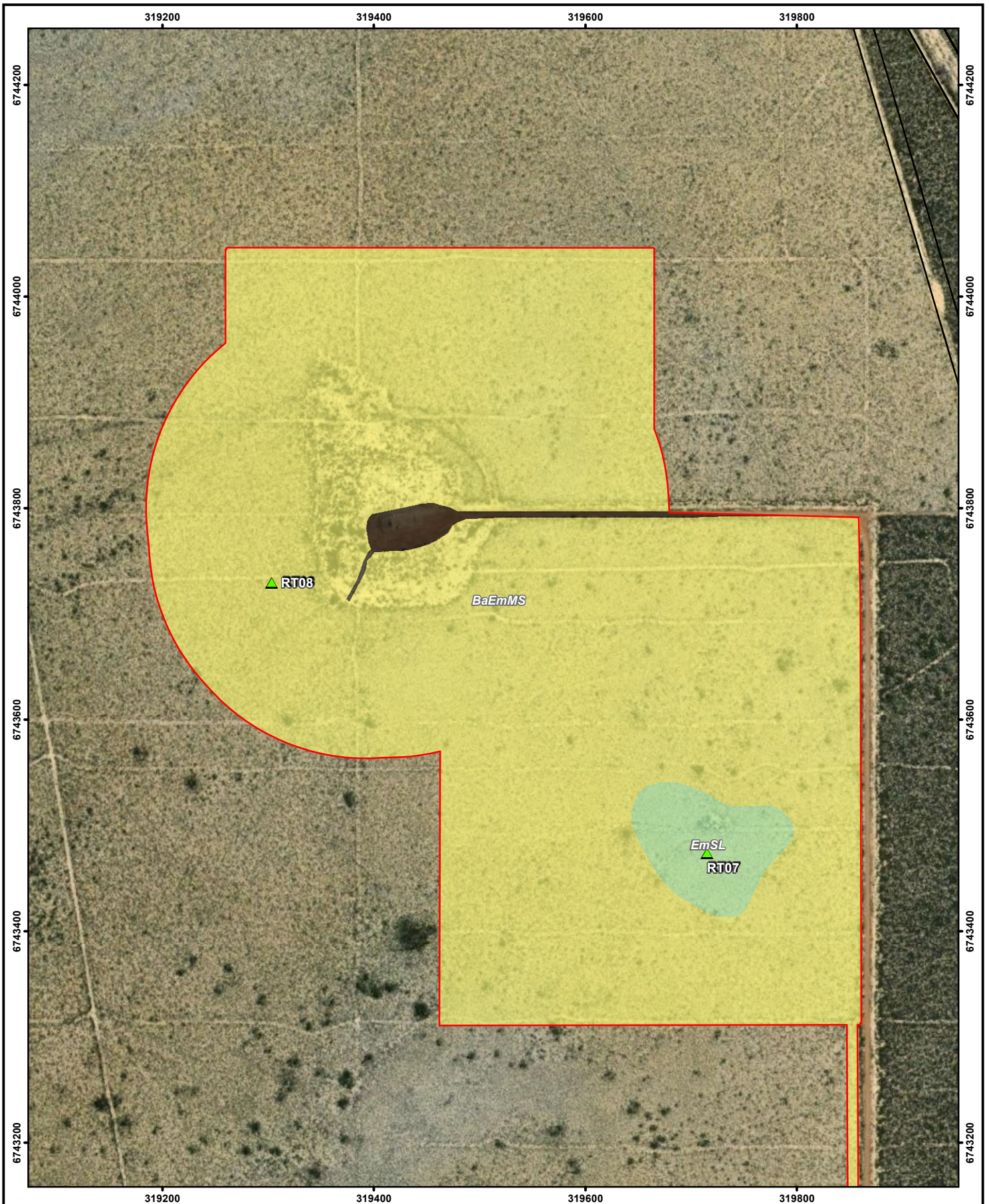
Well Site 03			-29.4243793, 115.1410298
			
Looking North	Looking East	Looking South	Looking West
Well Site 04			-29.4622627, 115.121494
			
Looking North	Looking East	Looking South	Looking West

Well Site 05			-29.4573174, 115.164282
			
Looking North	Looking East	Looking South	Looking West
Well Site 06			-29.4683977, 115.1662517
			
Looking North	Looking East	Looking South	Looking West

Well Site 07			-29.4581864, 115.1622692
			
Looking North	Looking East	Looking South	Looking West
Well Site 08			-29.5597684, 115.1596046
			
Looking North	Looking East	Looking South	Looking West

Well Site 09 (Tarantula)			-29.42235857, 115.1385487
			
Looking North	Looking East	Looking South	Looking West
Well Site 10			-29.4778633, 115.1449783
			
Looking North	Looking East	Looking South	Looking West

Appendix G – Vegetation and Habitat Mapping



Legend Survey area Cadastral boundary Vegetation type BaEmMS EmSL Cleared / Not vegetated Flora releve	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION TYPES TARANTULA 1 AND TARANTULA DEEP 1	
		Coord. Sys. GDA2020 MGA Zone 50		Appendix G Page 1 of 25
		Job No: 62676	Client: Beach Energy Limited	
		Version: A	Date: 13-Feb-2023	
Drawn By: ianandagoda	Checked By: BN			



Legend

- Survey area
- Cadastral boundary
- Vegetation type
- BaEmMS
- ▲ Flora releve
- Conservation significant flora
- *Stawellia dimorphantha* (P4)

Indicator Map

Scale 1:4,750 at A4 0 50 100 metres

Coord. Sys. GDA2020 MGA Zone 50

Job No: 62676

Client: Beach Energy Limited

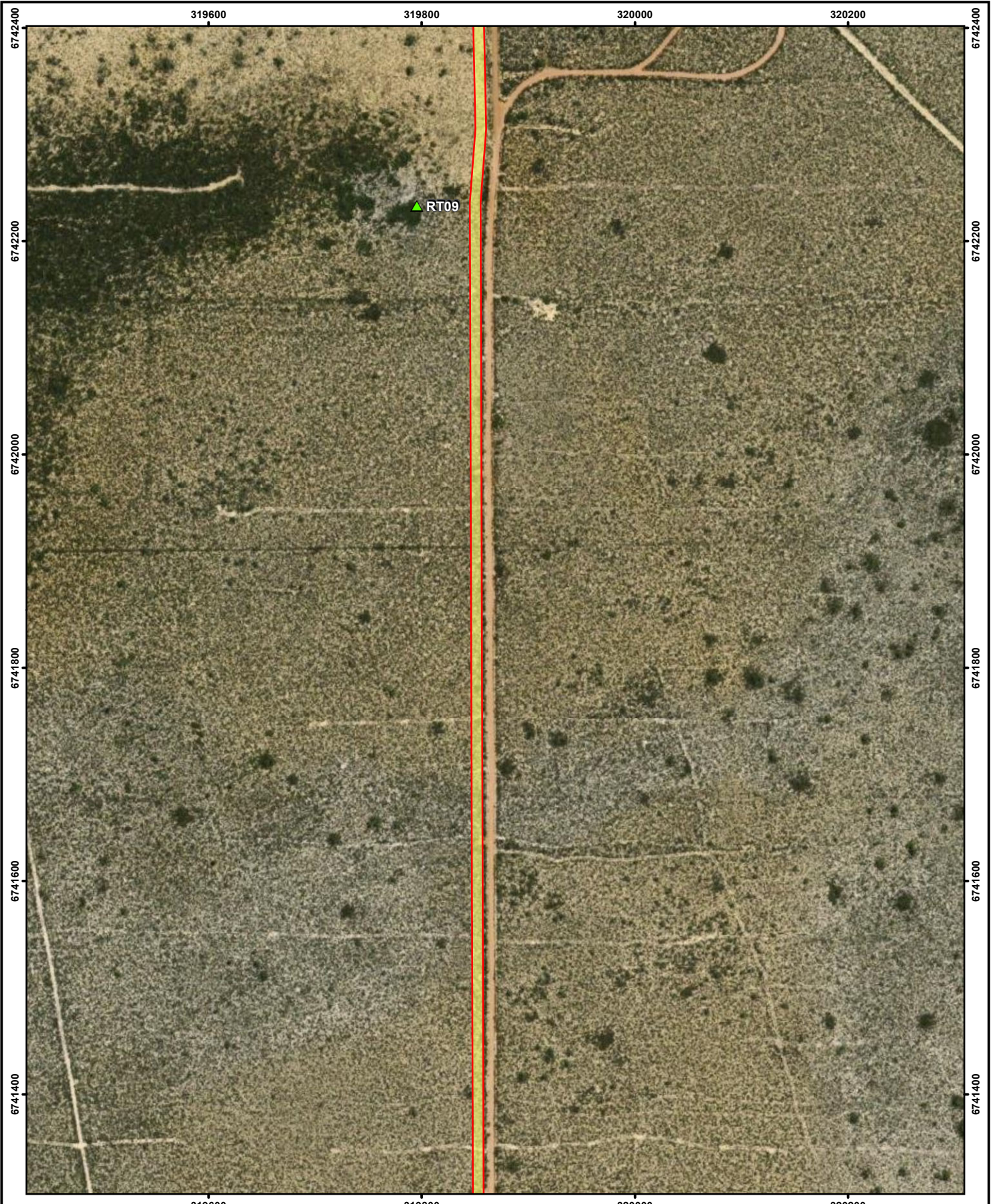
Version: A Date: 13-Feb-2023

Drawn By: ianandagoda Checked By: BN

Perth Basin Ecological Studies

VEGETATION TYPES
TARANTULA 1 AND TARANTULA DEEP 1

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Legend Survey area Cadastral boundary Vegetation type BaEmMS Flora releve	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION TYPES TARANTULA 1 AND TARANTULA DEEP 1	
		Coord. Sys. GDA2020 MGA Zone 50		Appendix G Page 3 of 25
		Job No: 62676		
		Client: Beach Energy Limited		
		Version: A Date: 13-Feb-2023		
Drawn By: ianandagoda Checked By: BN				



Legend

- Survey area
- Cadastral boundary
- Vegetation type
- BaEmMS
- Cleared / Not vegetated
- ▲ Flora releve

Indicator Map

Scale 1:4,750 at A4 0 50 100 metres

Coord. Sys. GDA2020 MGA Zone 50

Job No: 62676

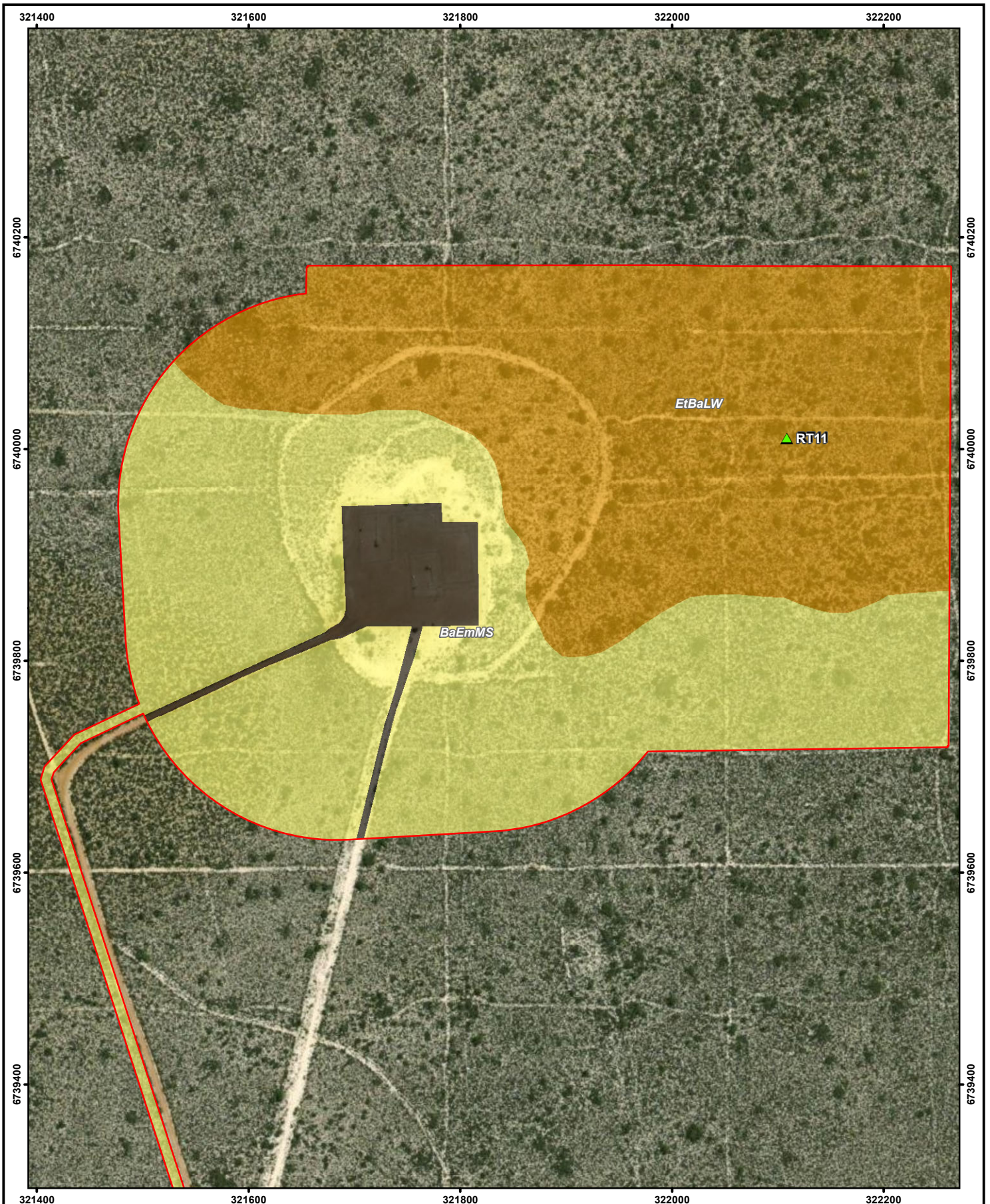
Client: Beach Energy Limited

Version: A	Date: 13-Feb-2023
Drawn By: ianandagoda	Checked By: BN

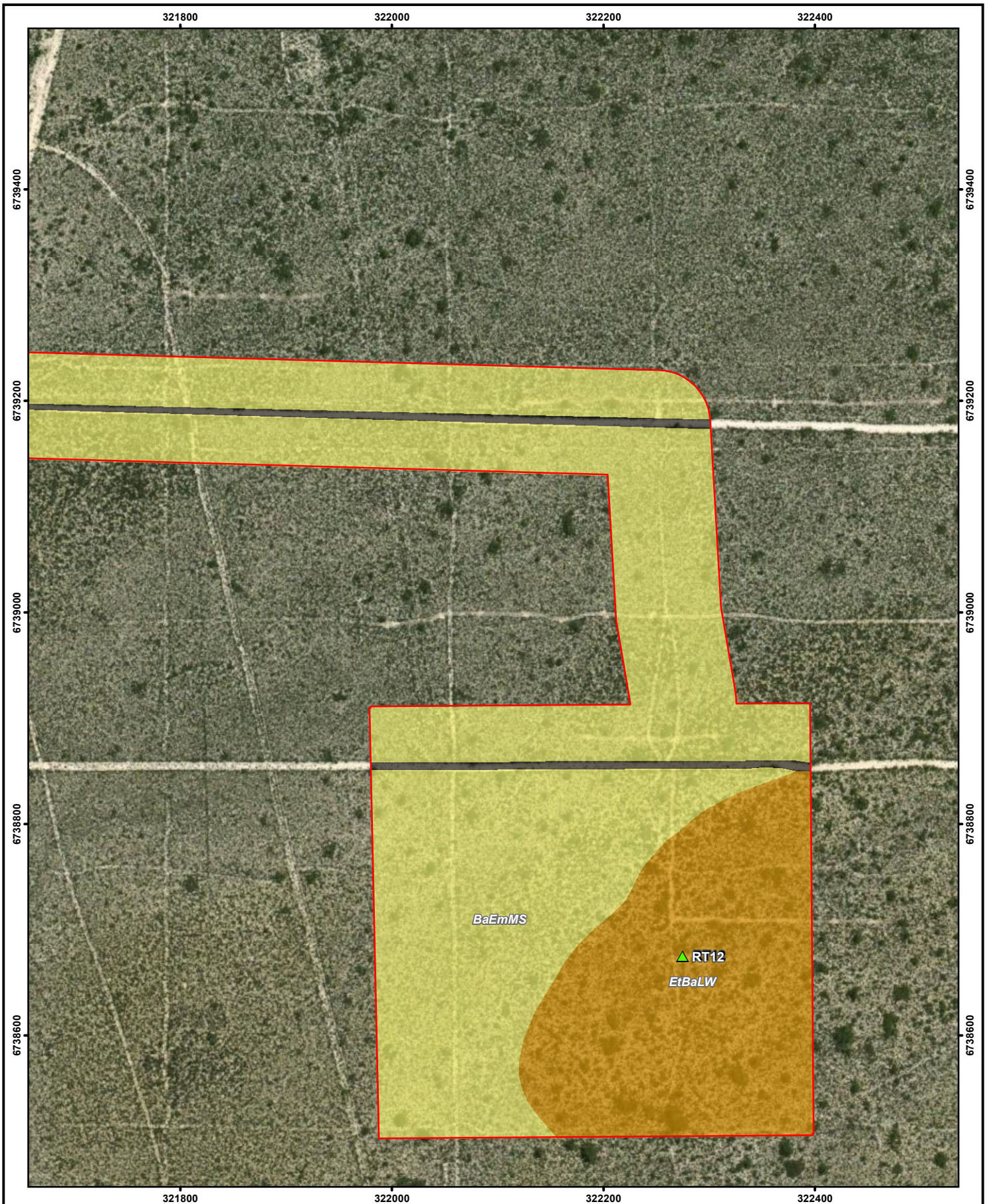
Perth Basin Ecological Studies

**VEGETATION TYPES
TARANTULA 1 AND TARANTULA DEEP 1**

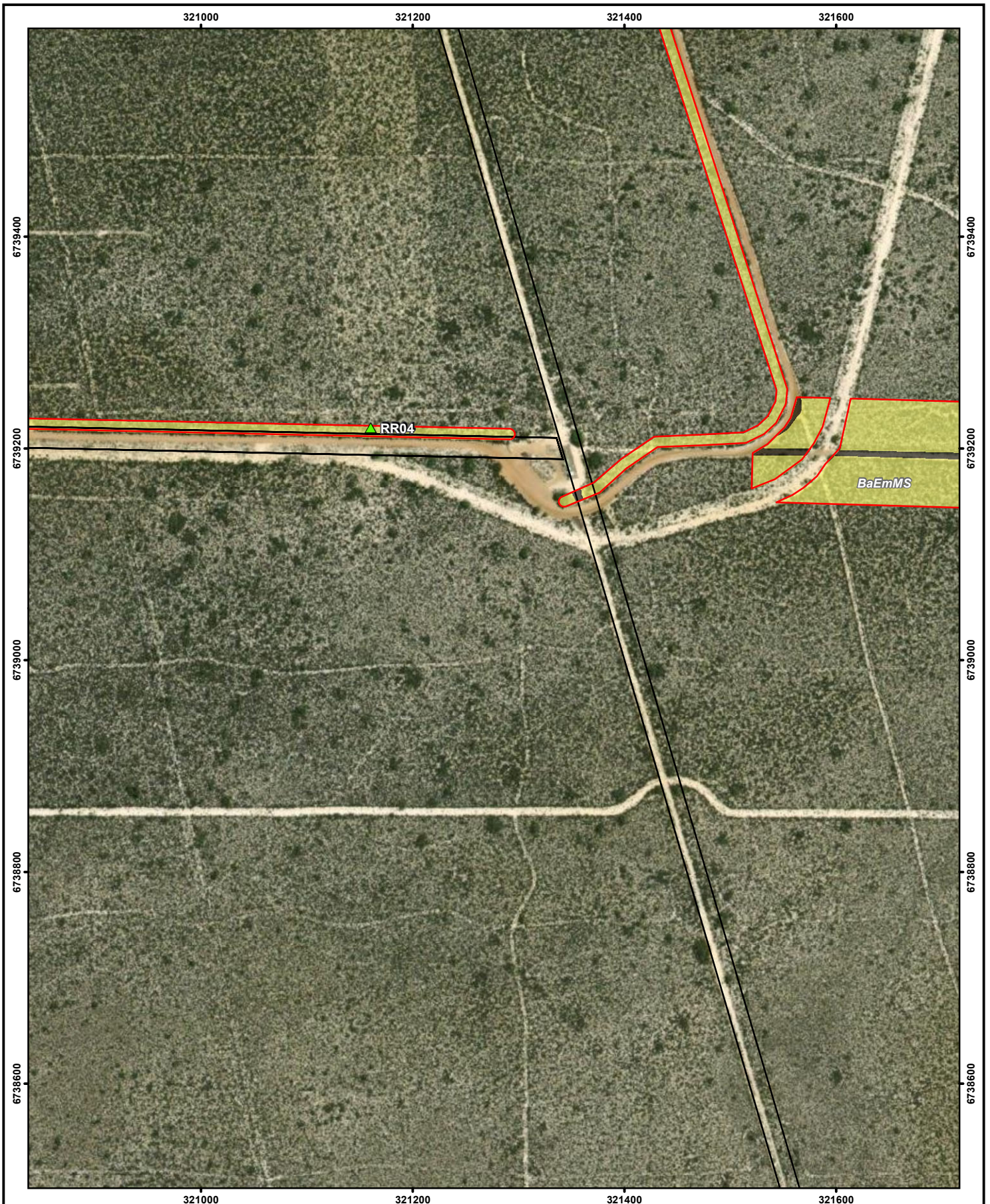
Appendix G Page 4 of 25



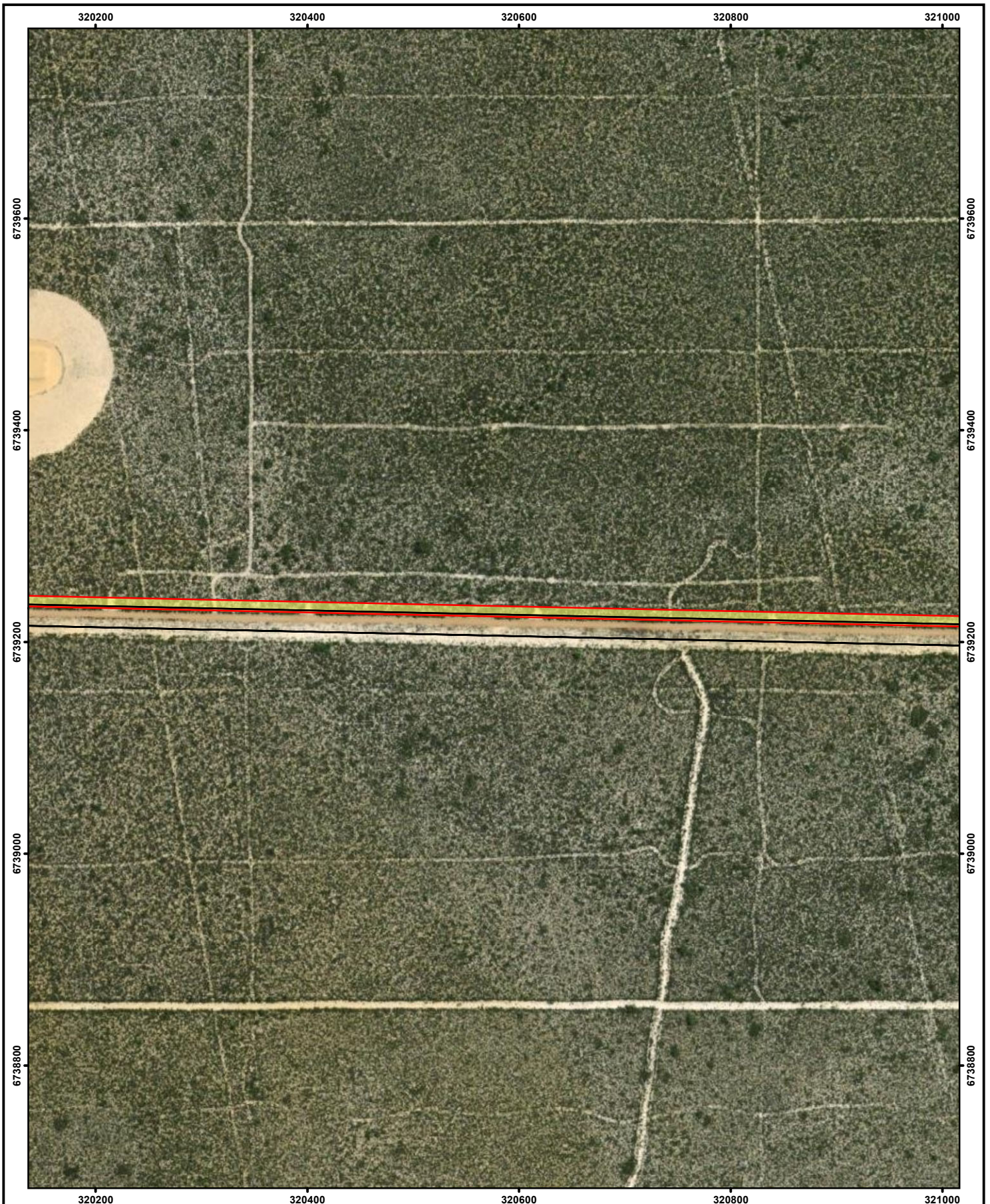
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	Coord. Sys. GDA2020 MGA Zone 50 	Job No: 62676	VEGETATION TYPES REDBACK 1 AND REDBACK DEEP 1	
	Client: Beach Energy Limited	Version: A	Date: 13-Feb-2023	Appendix G Page 5 of 25
	Drawn By: ianandagoda	Checked By: BN		
	File Name: \\008PMPMR004V001.jbsg.aust\JBS Perth\Projects\1)\Open\Beach Energy\62676 Perth Basin Ecological Surveys\GIS\Maps\VR01_Rev_A\62676_AppG_MB_VegTypes.mxd Image Reference: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community			



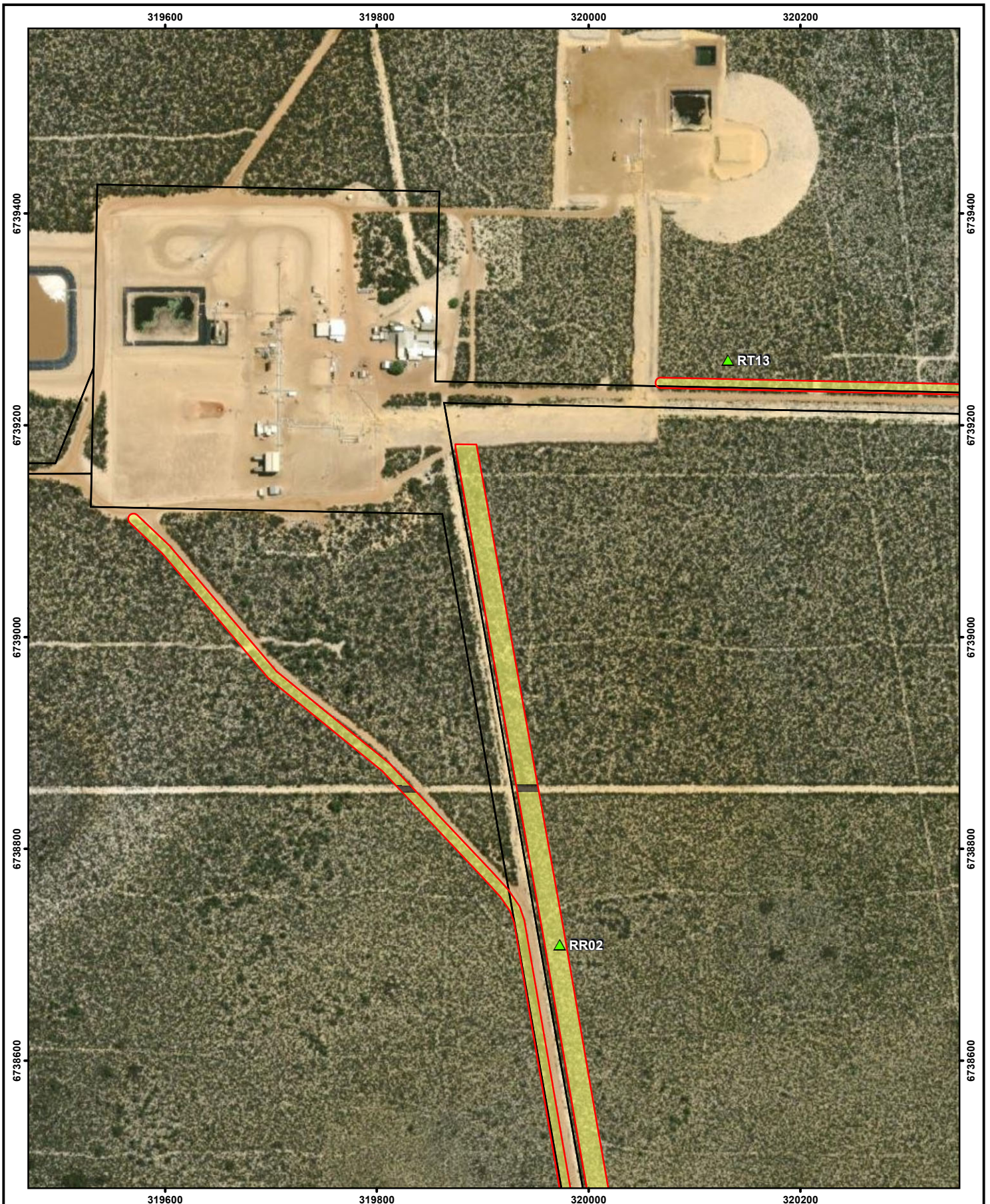
Legend Survey area Cadastral boundary Vegetation type BaEmMS EtBaLW Cleared / Not vegetated Flora releve	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies
		Coord. Sys. GDA2020 MGA Zone 50	VEGETATION TYPES REDBACK DEEP SOUTH 1
		Job No: 62676	Appendix G Page 6 of 25
		Client: Beach Energy Limited	
Version: A	Date: 13-Feb-2023	Drawn By: ianandagoda	Checked By: BN



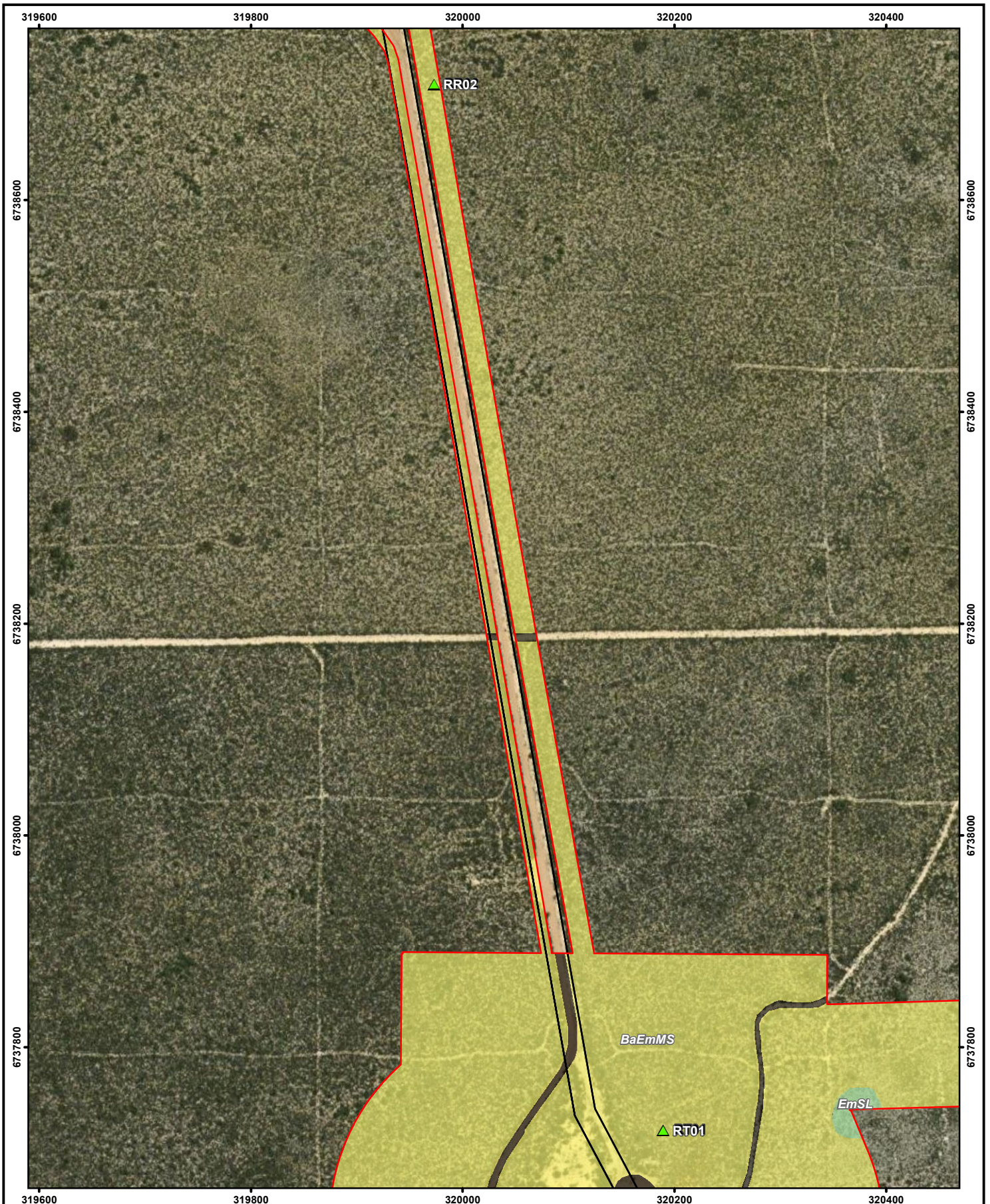
Legend Survey area Cadastral boundary Vegetation type BaEmMS Cleared / Not vegetated Flora releve	Indicator Map 		Scale 1:4,750 at A4 	Perth Basin Ecological Studies		
	Coord. Sys. GDA2020 MGA Zone 50 		Job No: 62676	VEGETATION TYPES REDBACK DEEP SOUTH 1		
	Client: Beach Energy Limited		Appendix G		Page 7 of 25	
	Version: A	Date: 13-Feb-2023				
	Drawn By: ianandagoda	Checked By: BN				



Legend Survey area Cadastral boundary Vegetation type BaEmMS Flora releve	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION TYPES REDBACK DEEP SOUTH 1
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	
		Client: Beach Energy Limited Version: A Date: 13-Feb-2023 Drawn By: ianandagoda Checked By: BN	



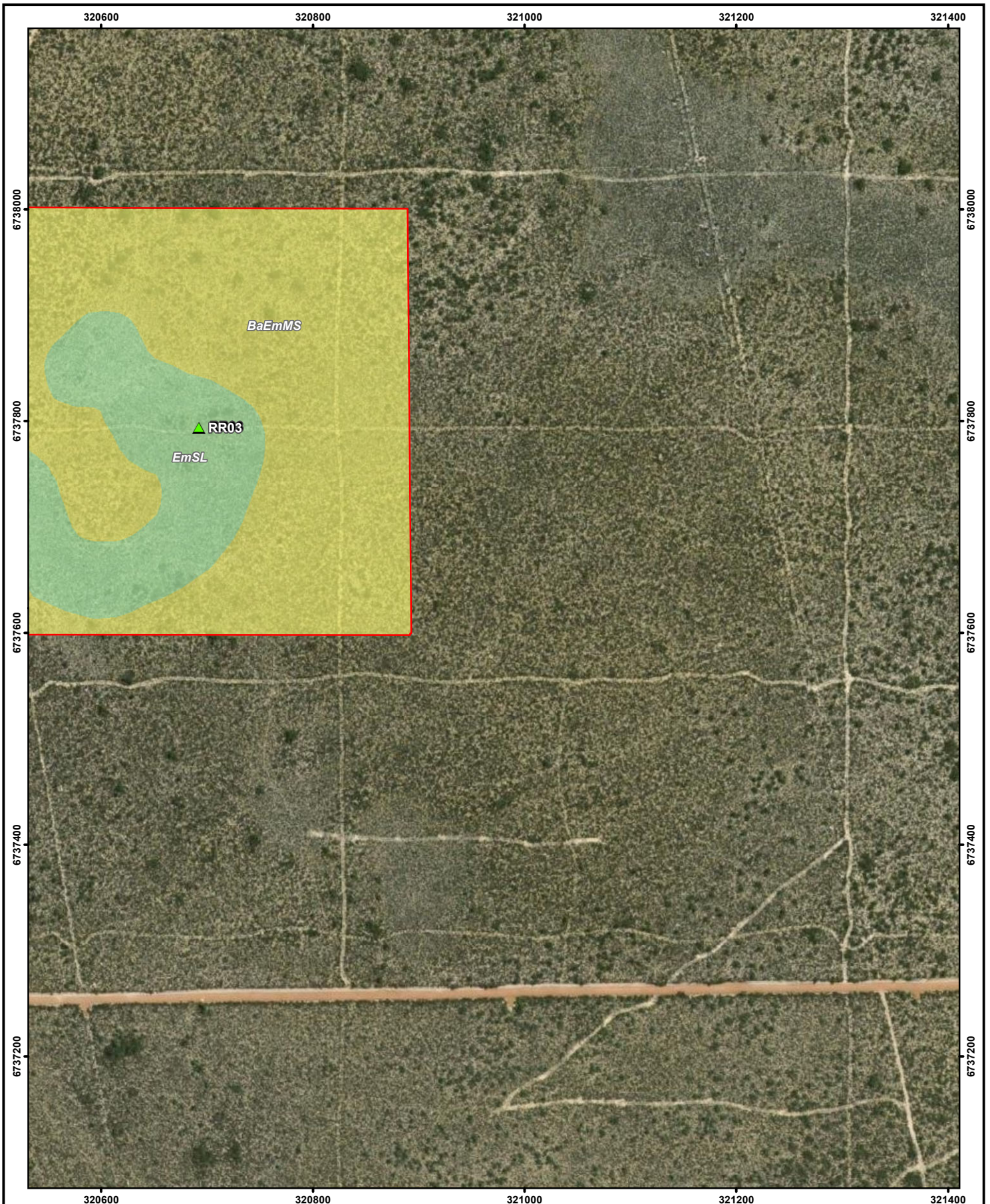
Legend Survey area Cadastral boundary Vegetation type BaEmMS Cleared / Not vegetated Flora releve	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION TYPES ACCESS TRACKS - REDBACK AND BEHARRA SPRINGS 2
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	
		Client: Beach Energy Limited	
		Version: A Date: 13-Feb-2023	
Drawn By: ianandagoda Checked By: BN			



Legend Survey area Cadastral boundary Vegetation type BaEmMS EmSL Cleared / Not vegetated Flora releve	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION TYPES BEHARRA SPRINGS 2	
		Coord. Sys. GDA2020 MGA Zone 50		Appendix G Page 10 of 25
		Job No: 62676		
		Client: Beach Energy Limited		
		Version: A Date: 13-Feb-2023		
Drawn By: ianandagoda Checked By: BN				



Legend Survey area Cadastral boundary Vegetation type BaEmMS EmSL Cleared / Not vegetated Flora releve	Indicator Map 	Scale 1:4,750 at A4		Perth Basin Ecological Studies VEGETATION TYPES BEHARRA SPRINGS 2
		Coord. Sys. GDA2020 MGA Zone 50		
		Job No: 62676		
		Client: Beach Energy Limited	Version: A	



Legend Survey area Cadastral boundary Vegetation type BaEmMS EmSL Flora releve	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies	
		Coord. Sys. GDA2020 MGA Zone 50	VEGETATION TYPES BEHARRA SPRINGS DEEP 2	
		Job No: 62676	Appendix G Page 12 of 25	
		Client: Beach Energy Limited		
		Version: A Date: 13-Feb-2023	Drawn By: ianandagoda Checked By: BN	



Legend

- Survey area
- Cadastral boundary
- Vegetation type
- BmBaLW
- Cleared / Not vegetated
- ▲ Flora releve

Indicator Map

Scale 1:4,750 at A4

Coord. Sys. GDA2020 MGA Zone 50

Job No: 62676

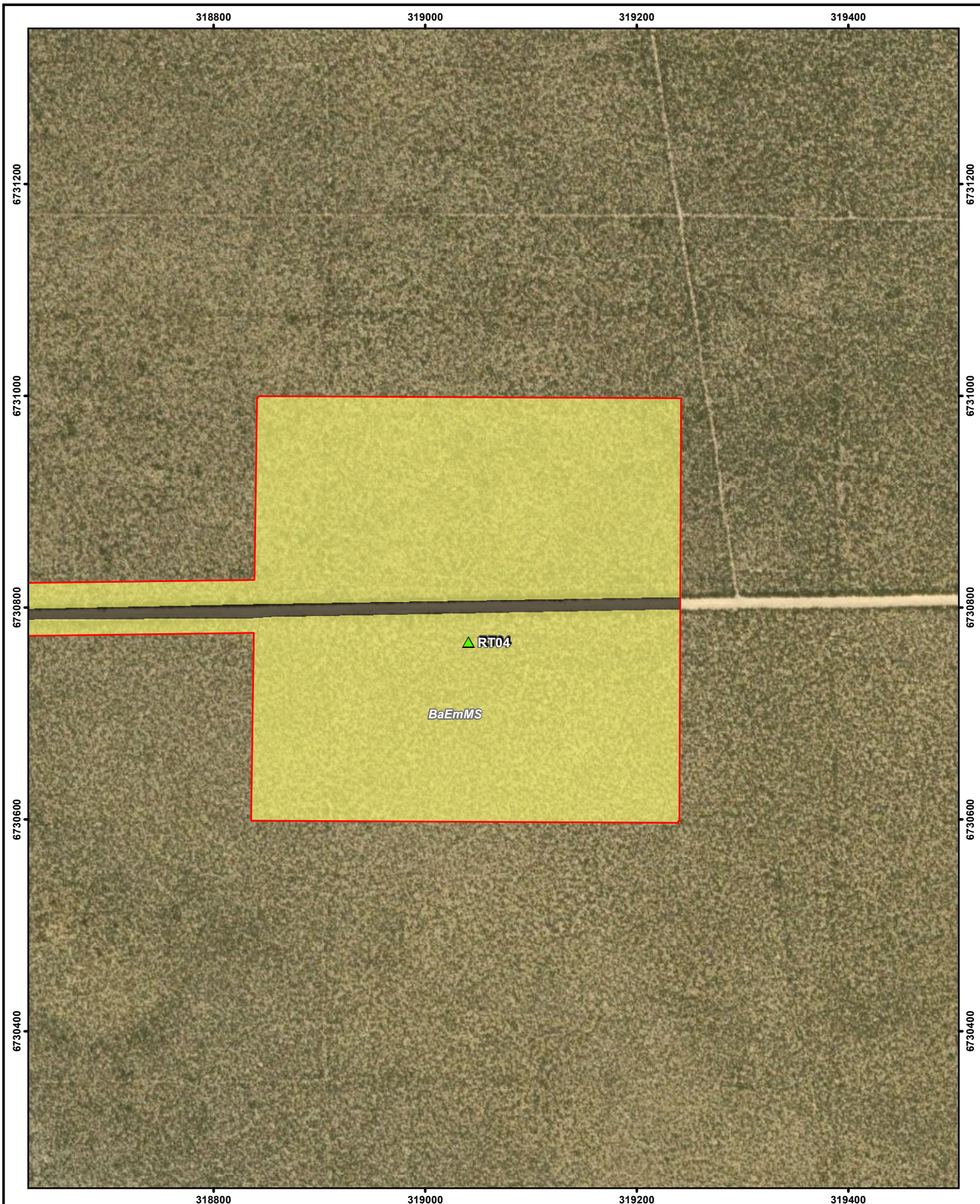
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Version: A	Date: 13-Feb-2023
Drawn By: ianandagoda	Checked By: BN

Perth Basin Ecological Studies

**VEGETATION TYPES
BEHARRA SPRINGS DEEP 3**

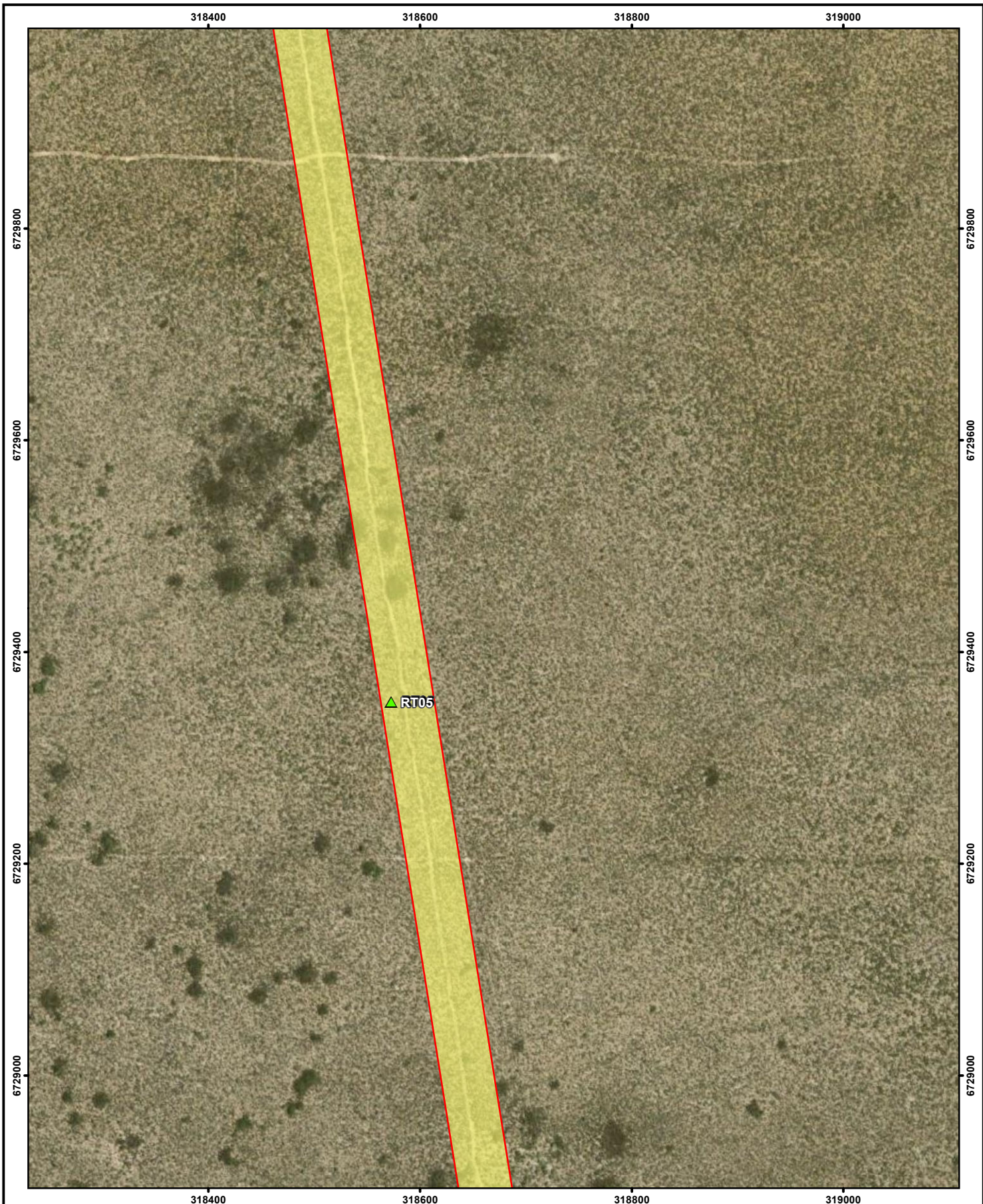
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Legend Survey area Cadastral boundary Vegetation type BaEmMS Cleared / Not vegetated Flora releve	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION TYPES FLOREAT 2
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	Appendix G Page 14 of 25
		Client: Beach Energy Limited Version: A Drawn By: ianandagoda	Date: 13-Feb-2023 Checked By: BN



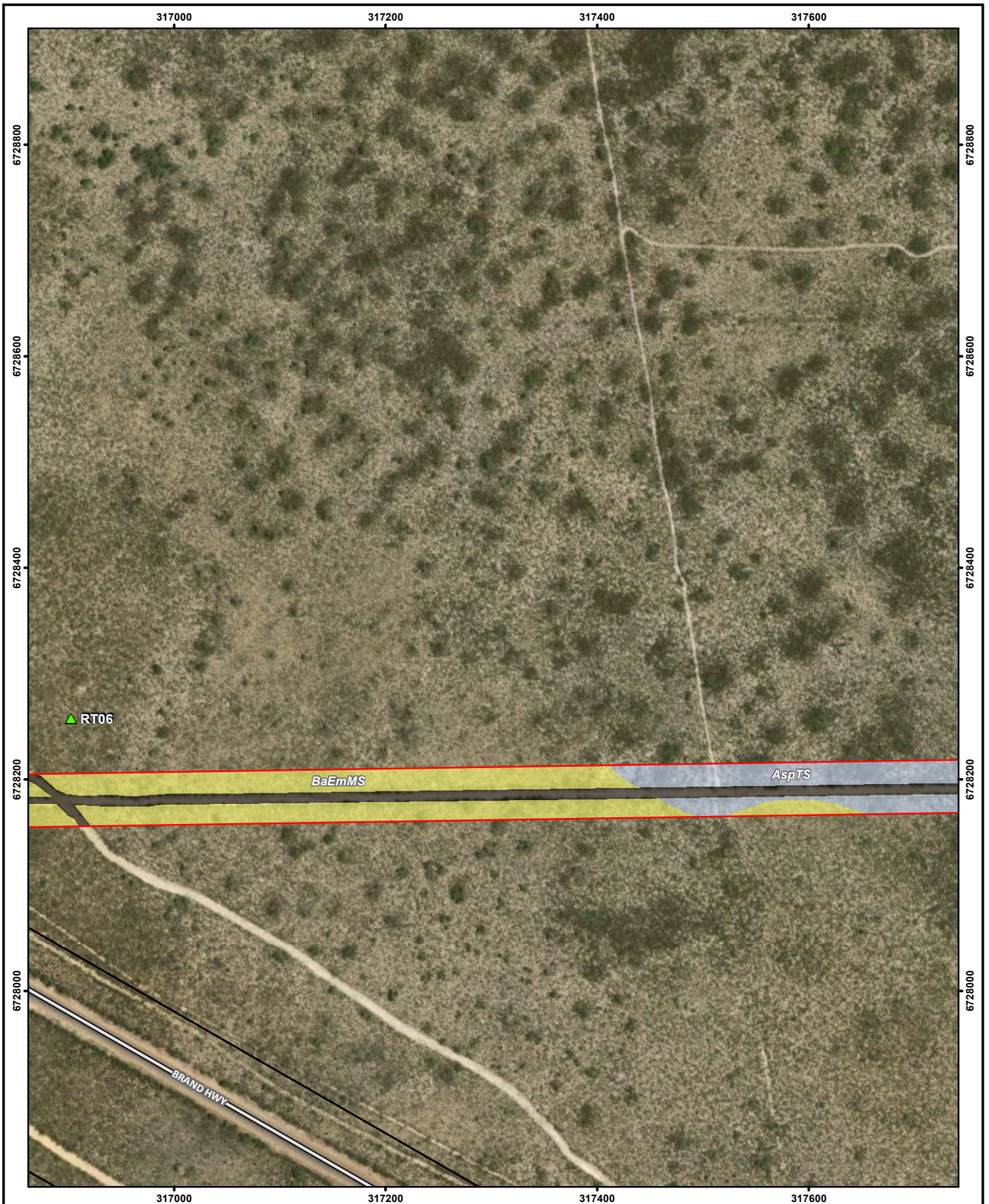
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			Job No: 62676		Appendix G Page 15 of 25	
			Client: Beach Energy Limited			
			Version: A Date: 13-Feb-2023			
		Drawn By: ianandagoda Checked By: BN				



Legend Survey area Cadastral boundary Vegetation type BaEmMS Flora releve	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION TYPES FLOREAT 2
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	Appendix G Page 16 of 25
		Client: Beach Energy Limited	
		Version: A Date: 13-Feb-2023	
Drawn By: ianandagoda Checked By: BN			



Legend Survey area Cadastral boundary Vegetation type BaEmMS Cleared / Not vegetated Highways	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION TYPES FLOREAT 2
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		Version: A Date: 13-Feb-2023	Drawn By: ianandagoda Checked By: BN



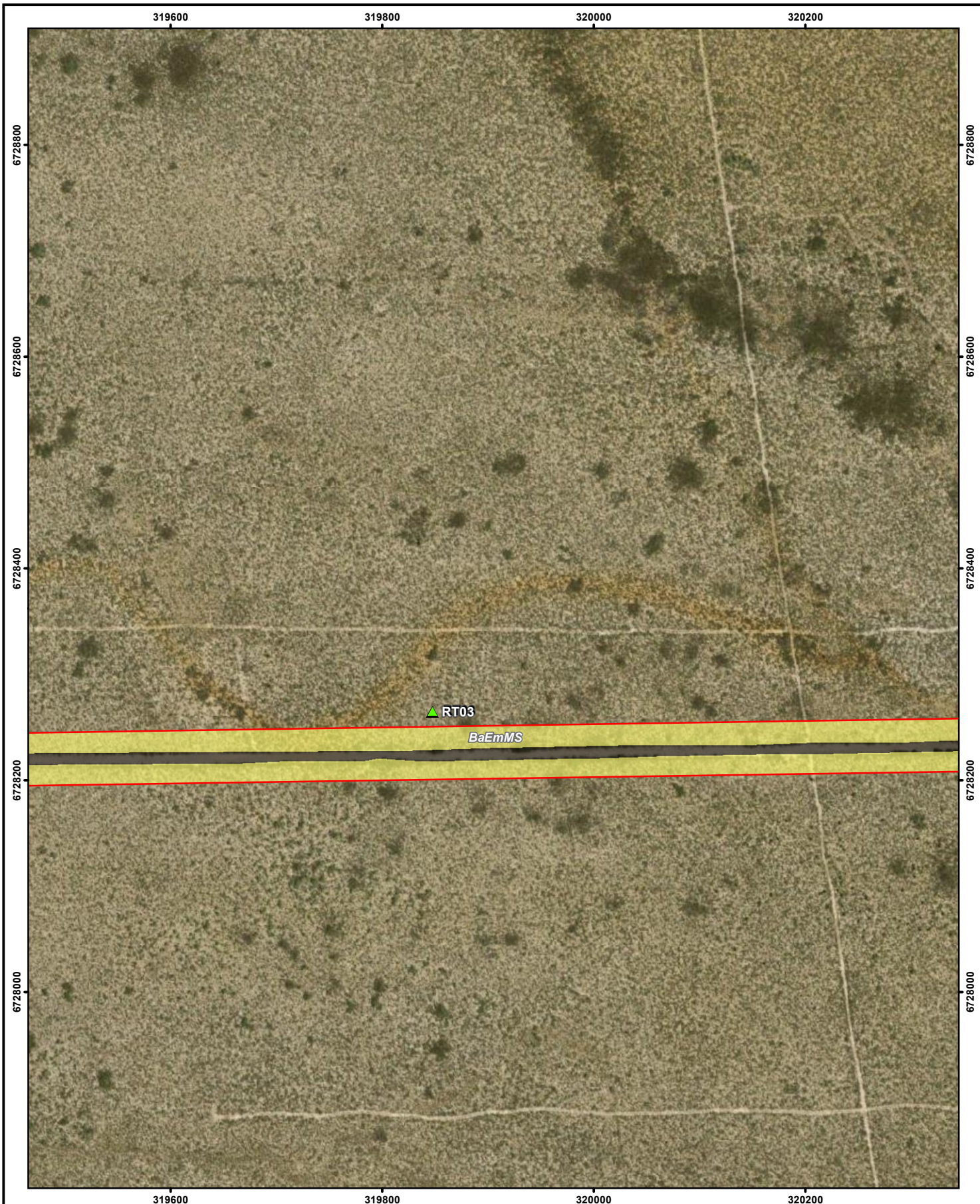
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		Coord. Sys. GDA2020 MGA Zone 50		Appendix G Page 18 of 25
		Job No: 62676	Client: Beach Energy Limited	
		Version: A	Date: 13-Feb-2023	
Drawn By: ianandagoda	Checked By: BN			



Legend Survey area Cadastral boundary Vegetation type AspTS BaEmMS Cleared / Not vegetated Flora releve	Indicator Map 	Scale 1:4,750 at A4		Perth Basin Ecological Studies	
		Coord. Sys. GDA2020 MGA Zone 50		VEGETATION TYPES FLOREAT 2	
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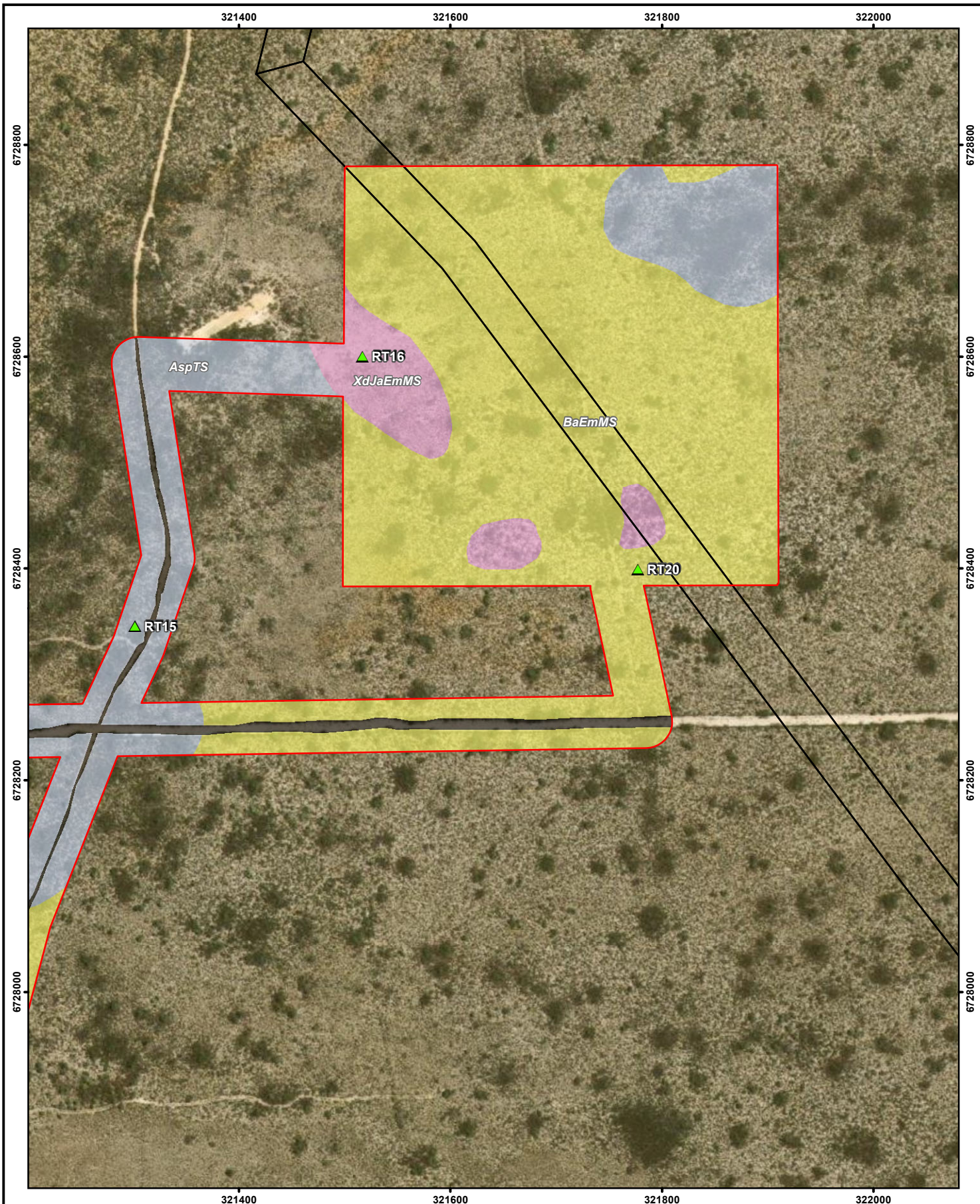
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		Job No: 62676	Appendix G Page 20 of 25	
		Client: Beach Energy Limited	strategen JBS&G	Version: A Date: 13-Feb-2023 Drawn By: ianandagoda Checked By: BN



Legend Survey area Cadastral boundary Vegetation type BaEmMS Cleared / Not vegetated Flora releve	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies	
		Coord. Sys. GDA2020 MGA Zone 50	VEGETATION TYPES FLOREAT 2	
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		Version: A Date: 13-Feb-2023 Drawn By: ianandagoda Checked By: BN		



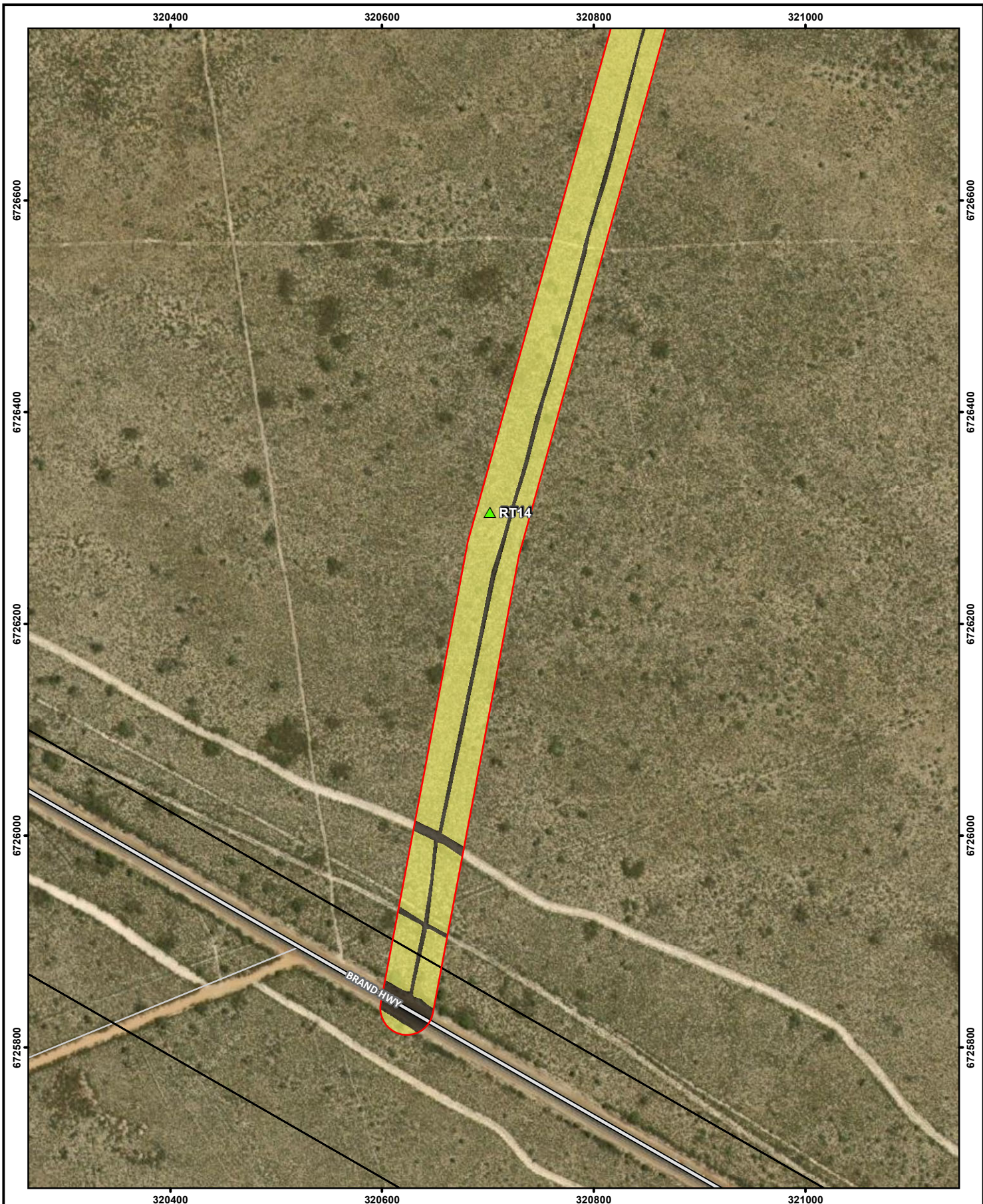
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		Job No: 62676		Appendix G		Page 22 of 25
		Client: Beach Energy Limited		Version: A		Date: 13-Feb-2023
Drawn By: ianandagoda		Checked By: BN				



Legend Survey area Cadastral boundary Vegetation type AspTS BaEmMS XdJaEmMS Cleared / Not vegetated Flora releve	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION TYPES FLOREAT 1	
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		Job No: 62676	Client: Beach Energy Limited	
		Version: A	Date: 13-Feb-2023	
Drawn By: ianandagoda	Checked By: BN			



Legend Survey area Cadastral boundary Vegetation type AspTS BaEmMS Cleared / Not vegetated Flora releve	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies
		Coord. Sys. GDA2020 MGA Zone 50	VEGETATION TYPES FLOREAT 1
		Job No: 62676	Appendix G Page 24 of 25
		Client: Beach Energy Limited	
		Version: A Date: 13-Feb-2023	
Drawn By: ianandagoda Checked By: BN			



Legend

- Survey area
- Cadastral boundary
- Vegetation type
- BaEmMS
- Cleared / Not vegetated
- Highways
- Minor road
- ▲ Flora releve

Indicator Map

Scale 1:4,750 at A4 0 50 100 metres

Coord. Sys. GDA2020 MGA Zone 50

Job No: 62676

Client: Beach Energy Limited

Version: A Date: 13-Feb-2023

Drawn By: ianandagoda Checked By: BN

Perth Basin Ecological Studies

**VEGETATION TYPES
FLOREAT 1**

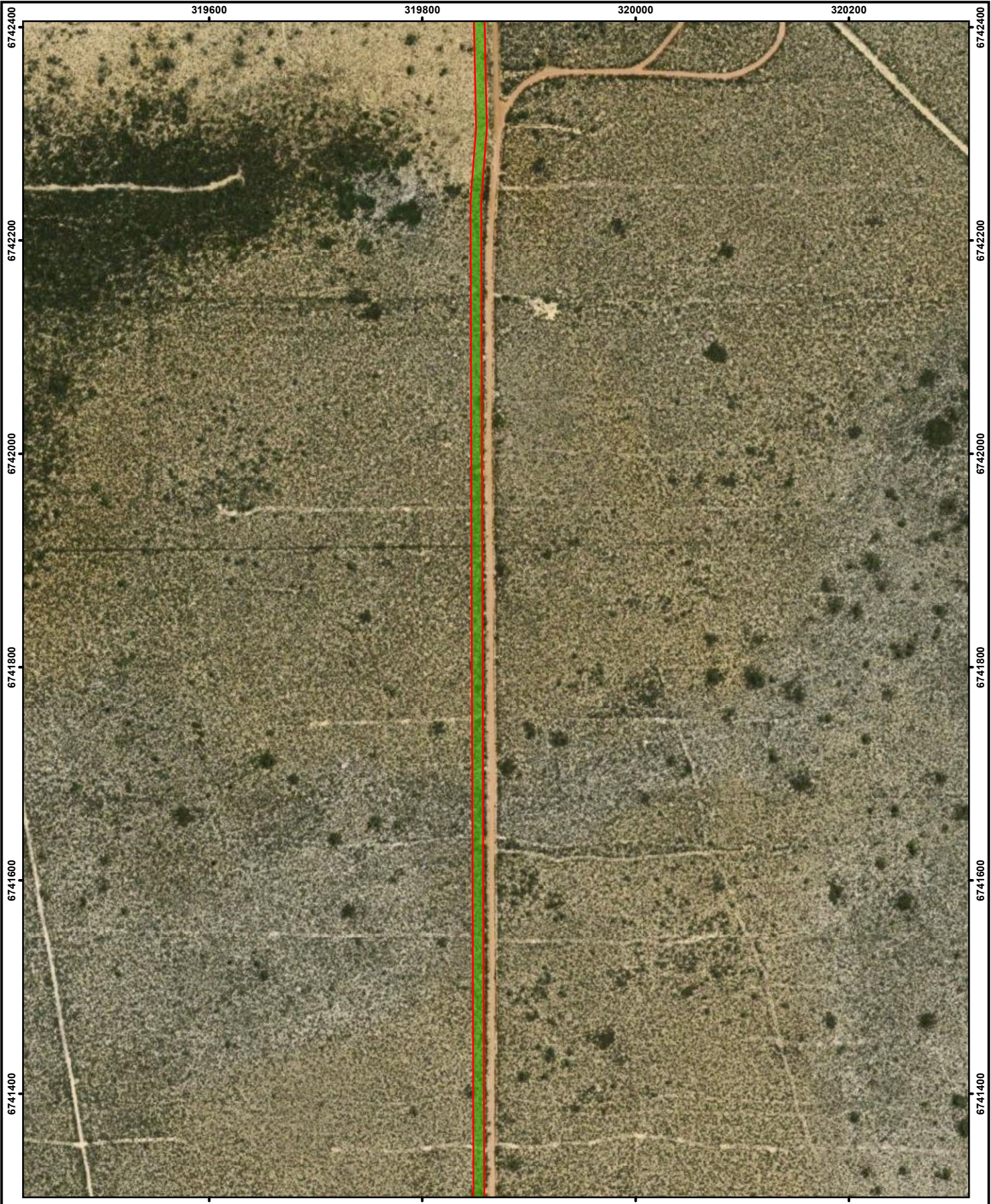
Appendix G Page 25 of 25



Legend Survey area Cadastral boundary Vegetation condition Pristine Very good Cleared/Not vegetated	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION CONDITION TARANTULA 1 AND TARANTULA DEEP 1
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	Appendix G Page 1 of 25
		Client: Beach Energy Limited Version: A Drawn By: ianandagoda	Date: 13-Feb-2023 Checked By: BN



Legend Survey area Cadastral boundary Vegetation condition Pristine	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION CONDITION TARANTULA 1 AND TARANTULA DEEP 1 Appendix G Page 2 of 25
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	
		Client: Beach Energy Limited	
		Version: A Date: 13-Feb-2023	
Drawn By: ianandagoda Checked By: BN			



Legend Survey area Cadastral boundary Vegetation condition Pristine	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION CONDITION TARANTULA 1 AND TARANTULA DEEP 1 Appendix G Page 3 of 25
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	
		Client: Beach Energy Limited	
		Version: A Date: 13-Feb-2023	
Drawn By: ianandagoda Checked By: BN			



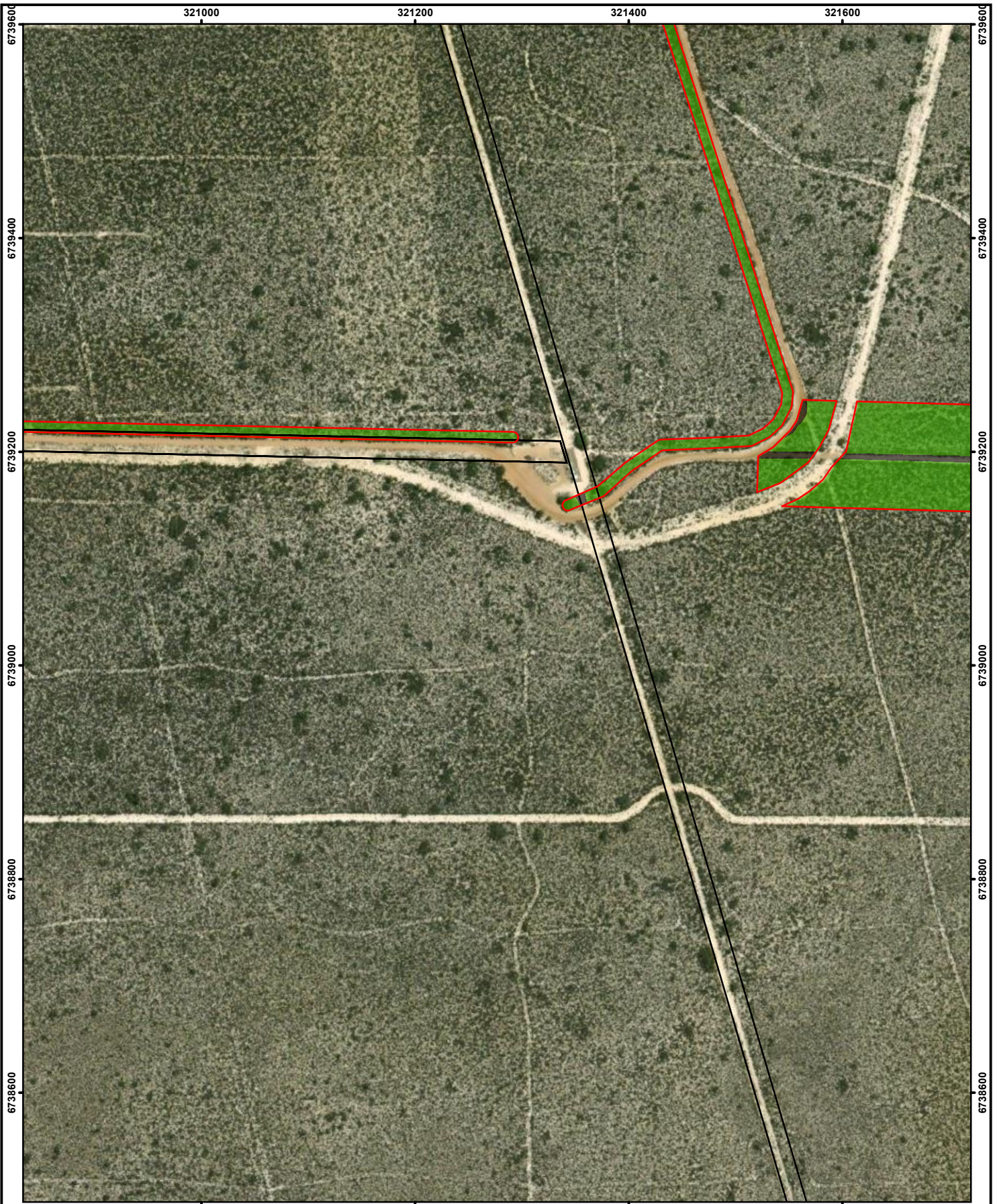
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	Job No: 62676		Client: Beach Energy Limited		Appendix G Page 4 of 25	
	Version: A		Date: 13-Feb-2023			
	Drawn By: ianandagoda		Checked By: BN			



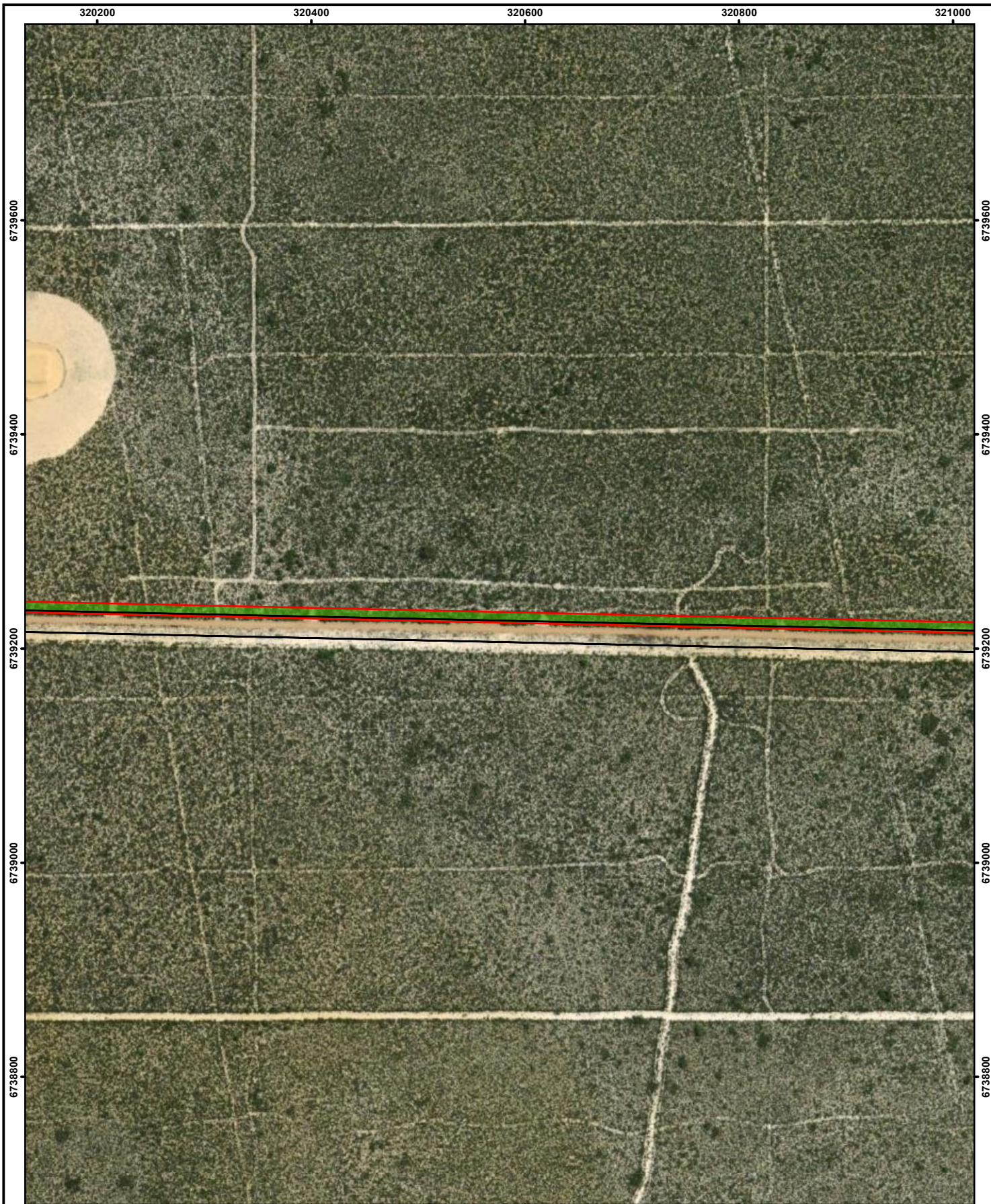
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		Job No: 62676	Appendix G Page 5 of 25		
		Client: Beach Energy Limited	Version: A	Date: 13-Feb-2023	
		Drawn By: ianandagoda	Checked By: BN		



Legend Survey area Cadastral boundary Vegetation condition Pristine Cleared/Not vegetated	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION CONDITION REDBACK DEEP SOUTH 1	
		Coord. Sys. GDA2020 MGA Zone 50		Appendix G Page 6 of 25
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		Client: Beach Energy Limited		
		Version: A Date: 13-Feb-2023		
Drawn By: ianandagoda Checked By: BN				



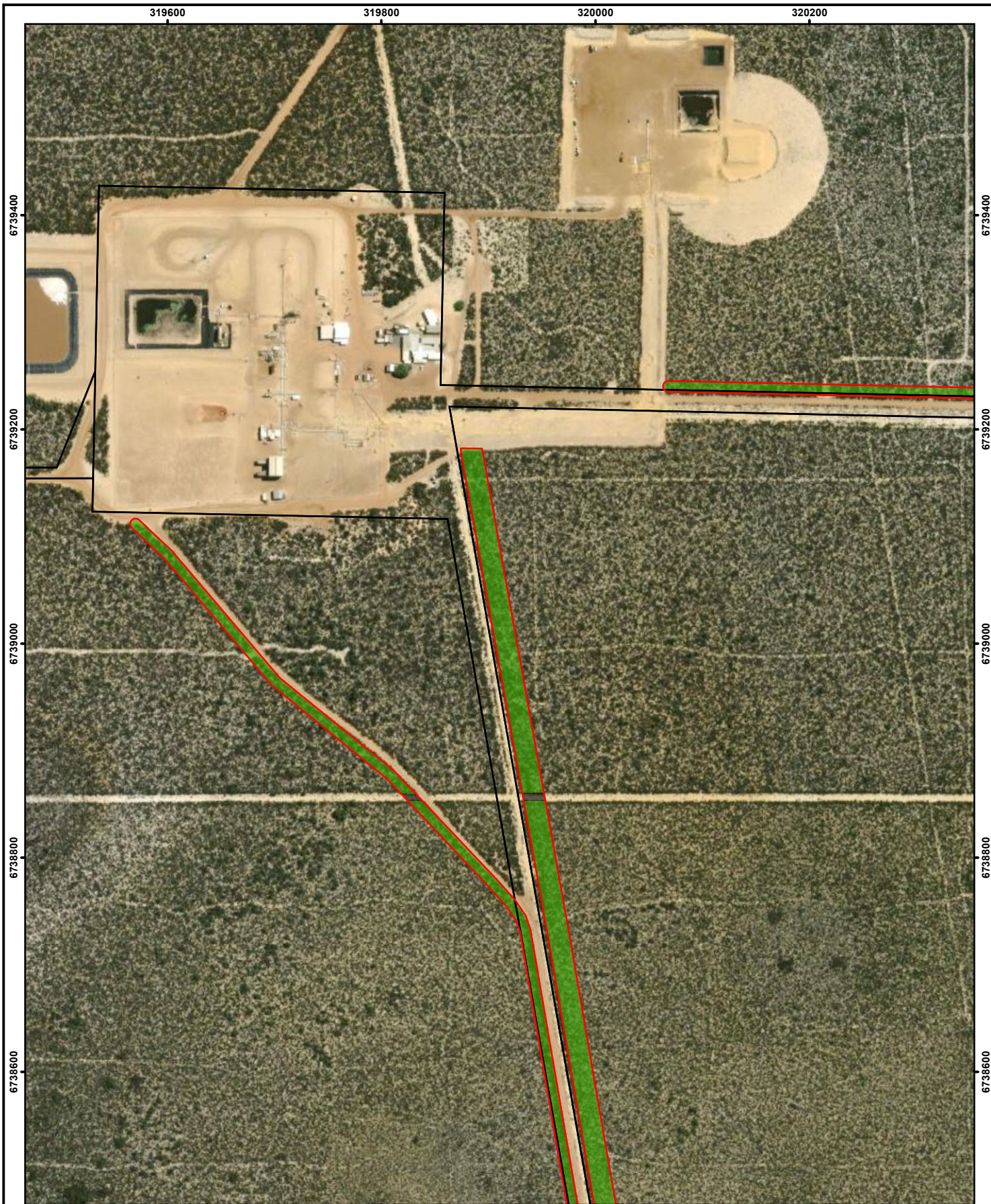
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		Job No: 62676	Appendix G Page 7 of 25		
		Client: Beach Energy Limited	Version: A	Date: 13-Feb-2023	
		Drawn By: ianandagoda	Checked By: BN		



320200 320400 320600 320800 321000

6739600 6739400 6739200 6739000 6738800

Legend Survey area Cadastral boundary Vegetation condition Pristine	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies	
		Coord. Sys. GDA2020 MGA Zone 50	VEGETATION CONDITION REDBACK DEEP SOUTH 1	
Client: Beach Energy Limited		Appendix G Page 8 of 25		
Version: A	Date: 13-Feb-2023			
Drawn By: ianandagoda	Checked By: BN			



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319600 319800 320000 320200 320400

6738600 6738400 6738200 6738000 6737800

Legend Survey area Cadastral boundary Vegetation condition Pristine Very good Degraded Cleared/Not vegetated	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION CONDITION BEHARRA SPRINGS 2
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	Appendix G Page 10 of 25
		Client: Beach Energy Limited Version: A Drawn By: ianandagoda	Date: 13-Feb-2023 Checked By: BN



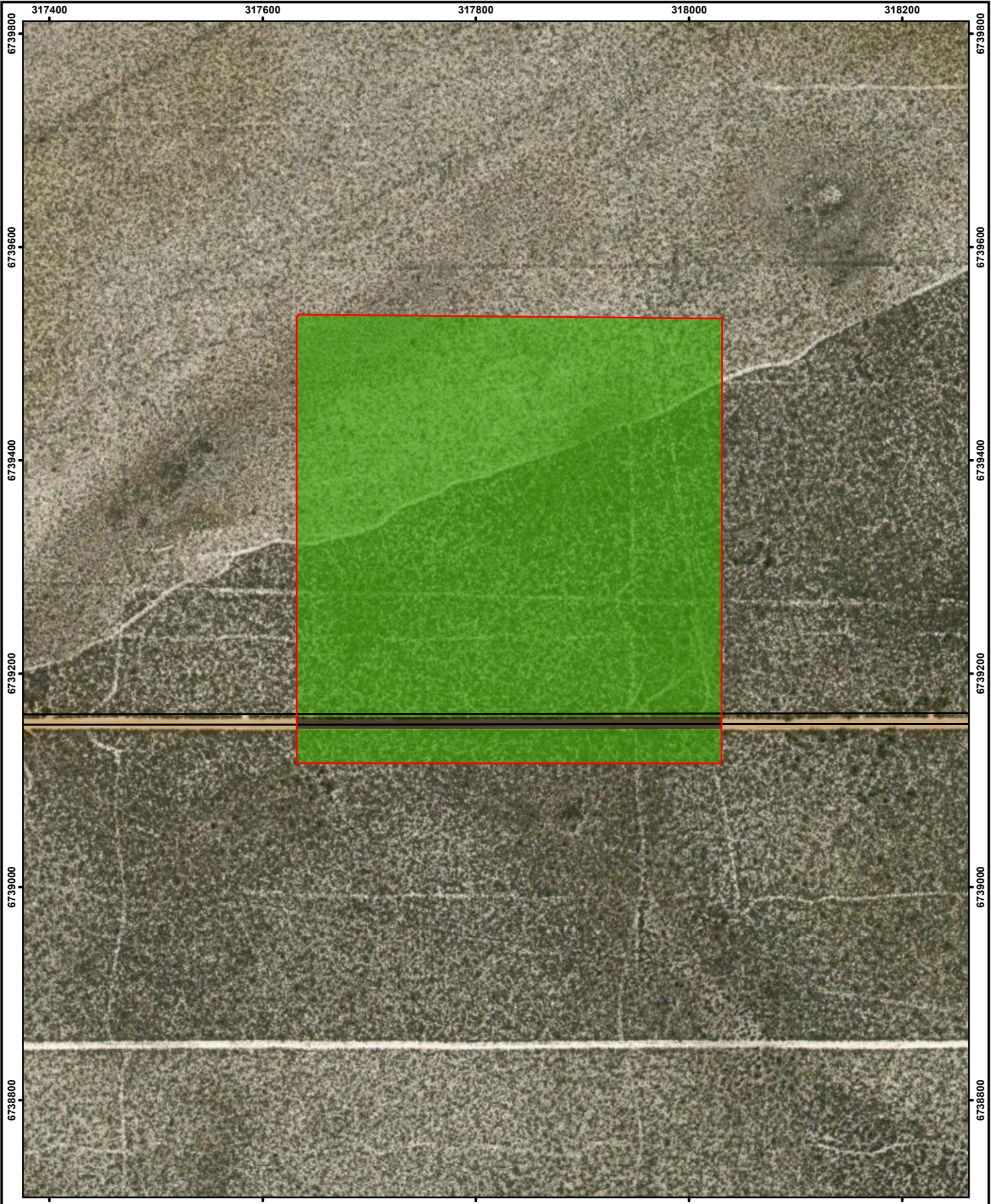
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Legend Survey area Cadastral boundary Vegetation condition Pristine Very good Degraded Cleared/Not vegetated	Indicator Map 	Scale 1:4,750 at A4		Perth Basin Ecological Studies VEGETATION CONDITION BEHARRA SPRINGS 2
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		Client: Beach Energy Limited	Version: A	

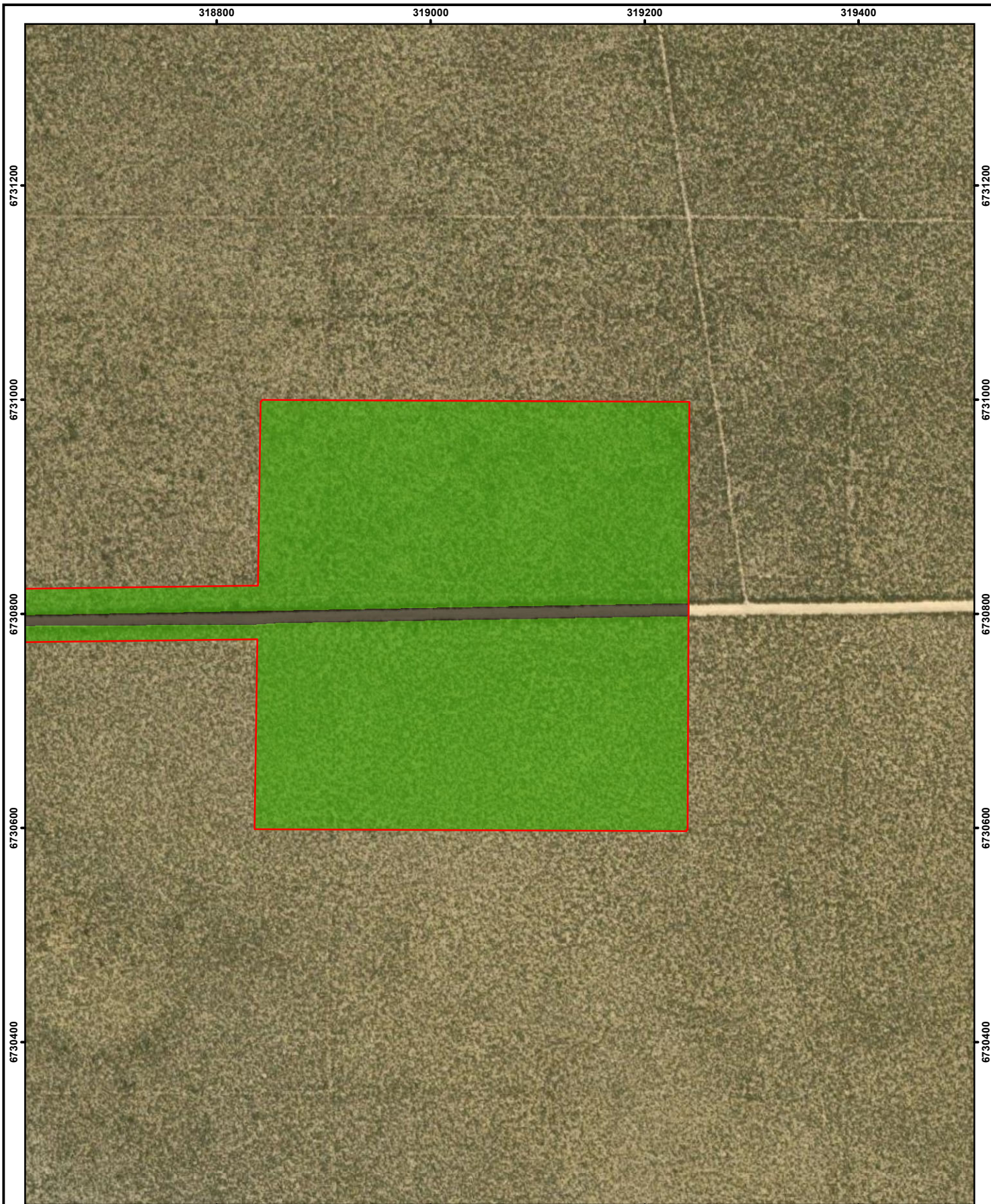


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Legend Survey area Cadastral boundary Vegetation condition Pristine	Indicator Map 	Scale 1:4,750 at A4		Perth Basin Ecological Studies	
		Coord. Sys. GDA2020 MGA Zone 50		VEGETATION CONDITION BEHARRA SPRINGS DEEP 2	
		Job No: 62676		Appendix G Page 12 of 25	
		Client: Beach Energy Limited			
		Version: A	Date: 13-Feb-2023		
Drawn By: ianandagoda	Checked By: BN				



Legend Survey area Cadastral boundary Vegetation condition Pristine Cleared/Not vegetated	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION CONDITION BEHARRA SPRINGS DEEP 3	
	Coord. Sys. GDA2020 MGA Zone 50		Appendix G Page 13 of 25	
	Job No: 62676			
	Client: Beach Energy Limited	Version: A	Date: 13-Feb-2023	
	Drawn By: ianandagoda	Checked By: BN		



Legend Survey area Cadastral boundary Vegetation condition Pristine Cleared/Not vegetated	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION CONDITION FLOREAT 2
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	strategen JBS&G
		Client: Beach Energy Limited Version: A Drawn By: ianandagoda	Date: 13-Feb-2023 Checked By: BN



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Legend

- Survey area
- Cadastral boundary

Vegetation condition

- Pristine
- Cleared/Not vegetated

Indicator Map

Scale 1:4,750 at A4

Coord. Sys. GDA2020 MGA Zone 50

Job No: 62676

Client: Beach Energy Limited

Version: A Date: 13-Feb-2023

Drawn By: ianandagoda Checked By: BN

Perth Basin Ecological Studies

VEGETATION CONDITION FLOREAT 2

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Legend Survey area Cadastral boundary Vegetation condition Pristine	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION CONDITION FLOREAT 2
		Coord. Sys. GDA2020 MGA Zone 50	
		Client: Beach Energy Limited	Appendix G Page 16 of 25
		Version: A Date: 13-Feb-2023	
		Drawn By: ianandagoda Checked By: BN	



Legend Survey area Cadastral boundary Vegetation condition Pristine Very good Cleared/Not vegetated Highways	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies	
		Coord. Sys. GDA2020 MGA Zone 50	VEGETATION CONDITION FLOREAT 2	
		Job No: 62676	Appendix G Page 17 of 25	
		Client: Beach Energy Limited		
Version: A	Date: 13-Feb-2023	Drawn By: ianandagoda	Checked By: BN	



Legend Survey area Cadastral boundary Vegetation condition Pristine Very good Cleared/Not vegetated Highways	Indicator Map 	Scale 1:4,750 at A4		Perth Basin Ecological Studies		
		Coord. Sys. GDA2020 MGA Zone 50		VEGETATION CONDITION FLOREAT 2		
		Job No: 62676		Appendix G		Page 18 of 25
		Client: Beach Energy Limited	Version: A	Date: 13-Feb-2023		
Drawn By: ianandagoda	Checked By: BN					



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Legend Survey area Cadastral boundary Vegetation condition Pristine Very good Cleared/Not vegetated	Indicator Map 	Scale 1:4,750 at A4		Perth Basin Ecological Studies		
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		Job No: 62676		Appendix G		Page 19 of 25
		Client: Beach Energy Limited		Version: A		
		Date: 13-Feb-2023		Drawn By: ianandagoda		
Checked By: BN						



Legend Survey area Cadastral boundary Vegetation condition Pristine Cleared/Not vegetated	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies	
		Coord. Sys. GDA2020 MGA Zone 50	VEGETATION CONDITION FLOREAT 2	
		Job No: 62676	Appendix G Page 20 of 25	
		Client: Beach Energy Limited		
		Version: A Drawn By: ianandagoda	Date: 13-Feb-2023 Checked By: BN	



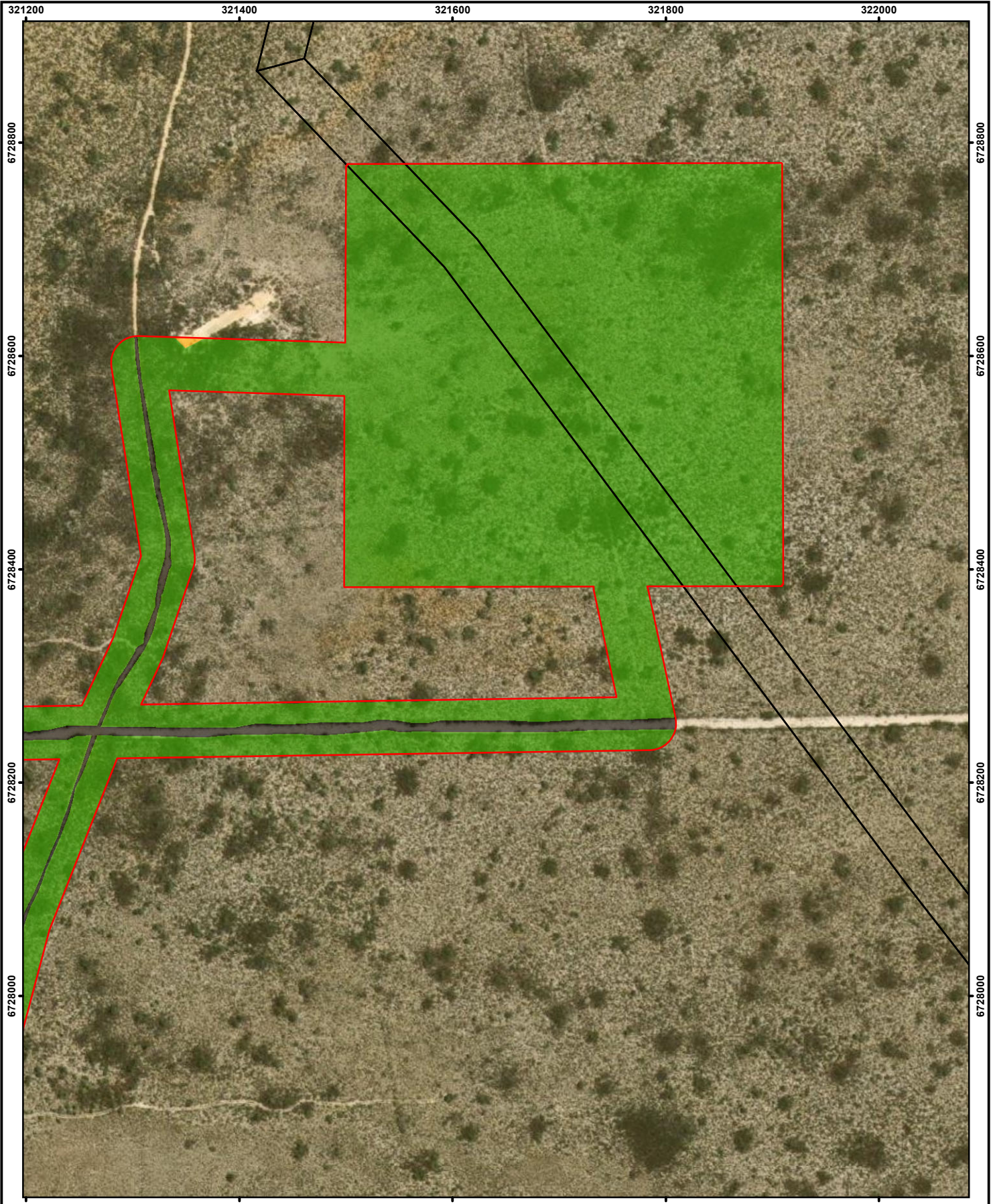
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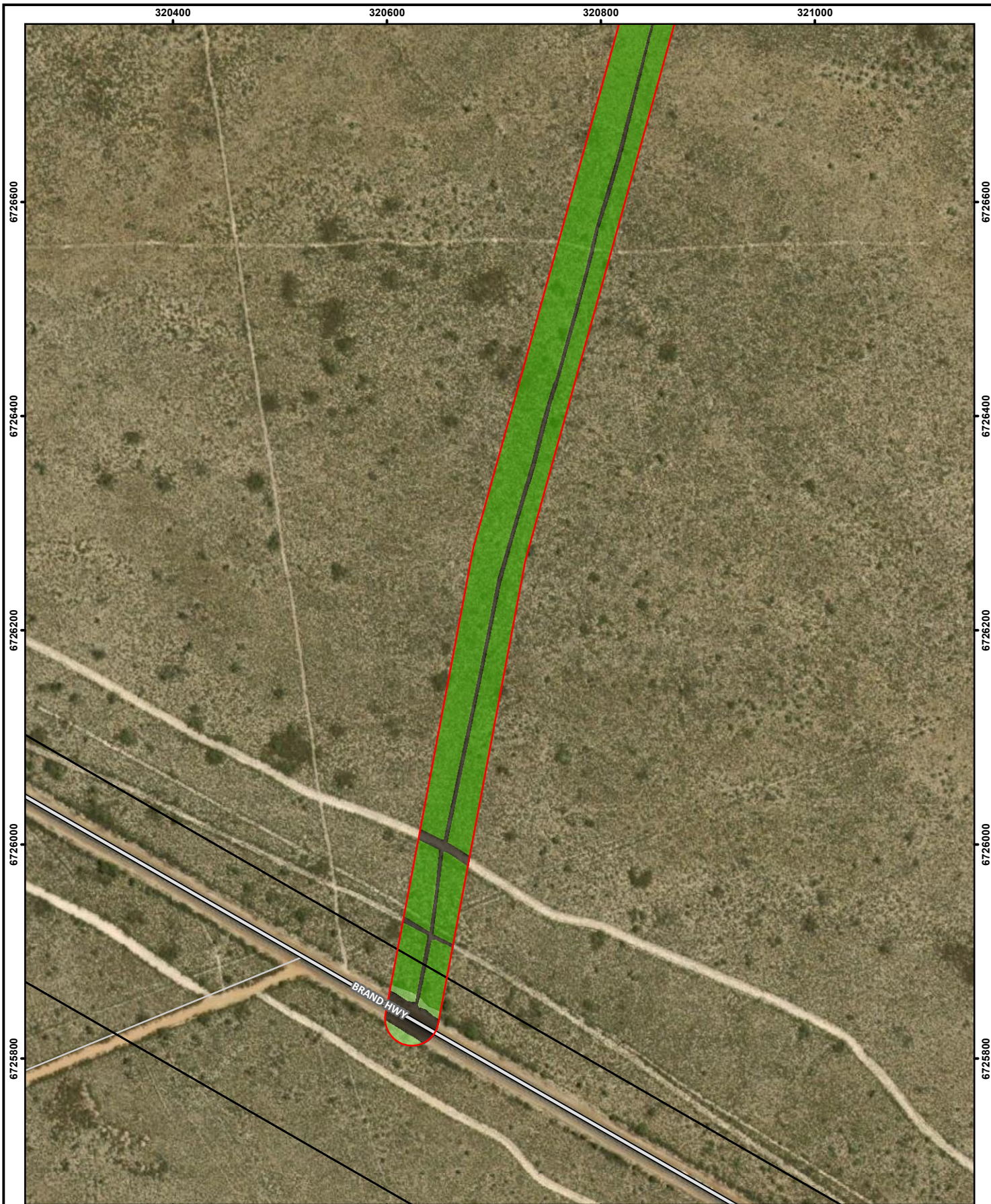
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		Job No: 62676		Appendix G		Page 22 of 25
		Client: Beach Energy Limited	Version: A	Date: 13-Feb-2023		
Drawn By: ianandagoda	Checked By: BN					



Legend Survey area Cadastral boundary Vegetation condition Pristine Degraded Cleared/Not vegetated	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies VEGETATION CONDITION FLOREAT 1
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	Appendix G Page 23 of 25
		Client: Beach Energy Limited	
		Version: A Date: 13-Feb-2023	
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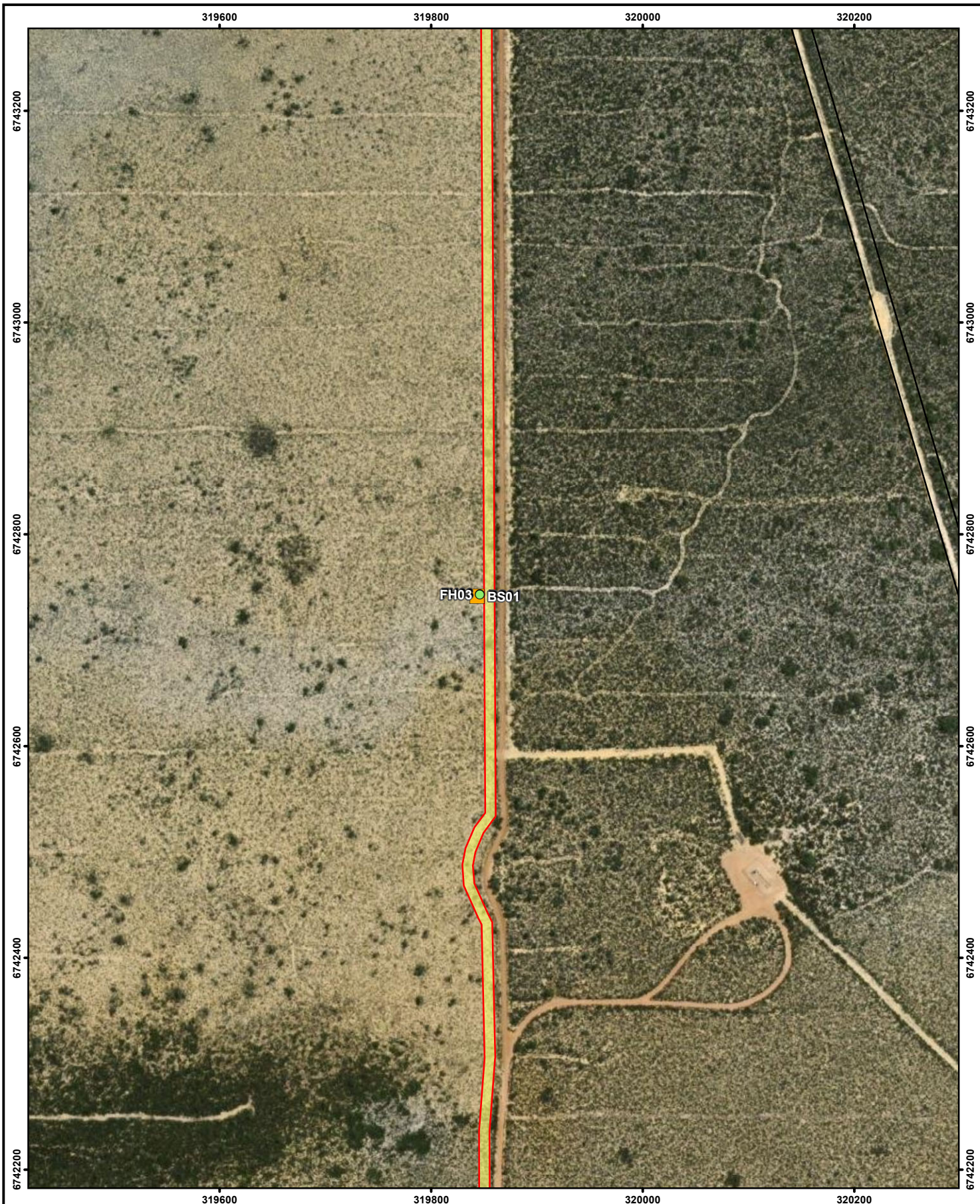
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		Coord. Sys. GDA2020 MGA Zone 50	
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		Client: Beach Energy Limited	
		Version: A Date: 13-Feb-2023	
Drawn By: ianandagoda Checked By: BN			



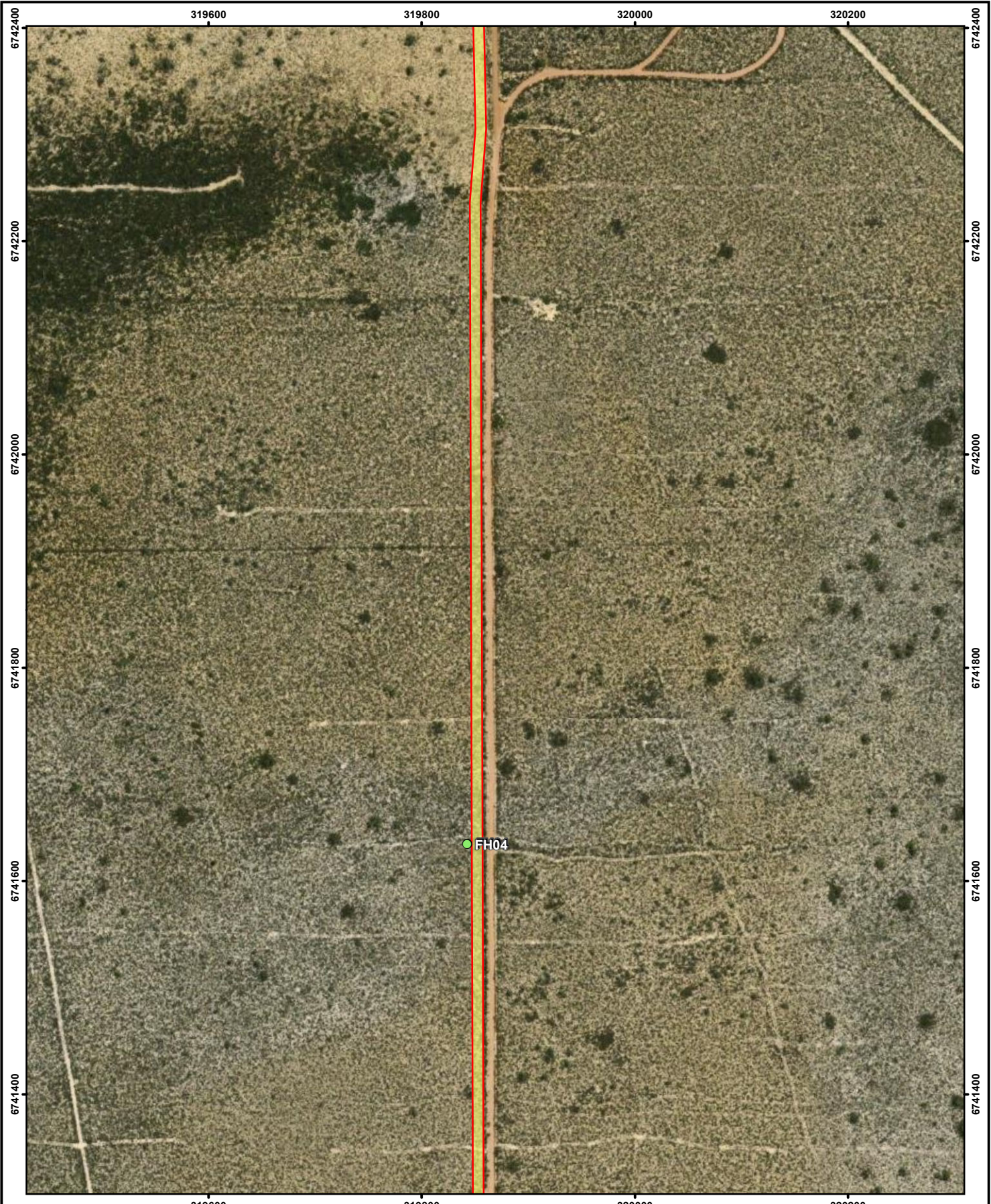
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		Job No: 62676	Appendix G Page 25 of 25
		Client: Beach Energy Limited	
		Version: A	Date: 13-Feb-2023
		Drawn By: ianandagoda	Checked By: BN



Legend Survey area Cadastral boundary Fauna habitat Kwongan Sedgeland Cleared / Not vegetated Habitat assessment site	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA TARANTULA 1 AND TARANTULA DEEP 1
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	APPENDIX G Page 1 of 25
		Client: Beach Energy Limited	
Version: A	Date: 13-Feb-2023	Drawn By: ianandagoda	Checked By: BN



Legend Survey area Cadastral boundary Fauna habitat Kwongan Habitat assessment site Ornithological survey site	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA TARANTULA 1 AND TARANTULA DEEP 1
		Coord. Sys. GDA2020 MGA Zone 50	
		Client: Beach Energy Limited	APPENDIX G Page 2 of 25
		Version: A Date: 13-Feb-2023	
Drawn By: ianandagoda Checked By: BN			



Legend

- Survey area
- Cadastral boundary
- Fauna habitat**
- Kwongan
- Habitat assessment site

Indicator Map

Scale 1:4,750 at A4

Coord. Sys. GDA2020 MGA Zone 50

Job No: 62676

Client: Beach Energy Limited

Version: A	Date: 13-Feb-2023
Drawn By: ianandagoda	Checked By: BN

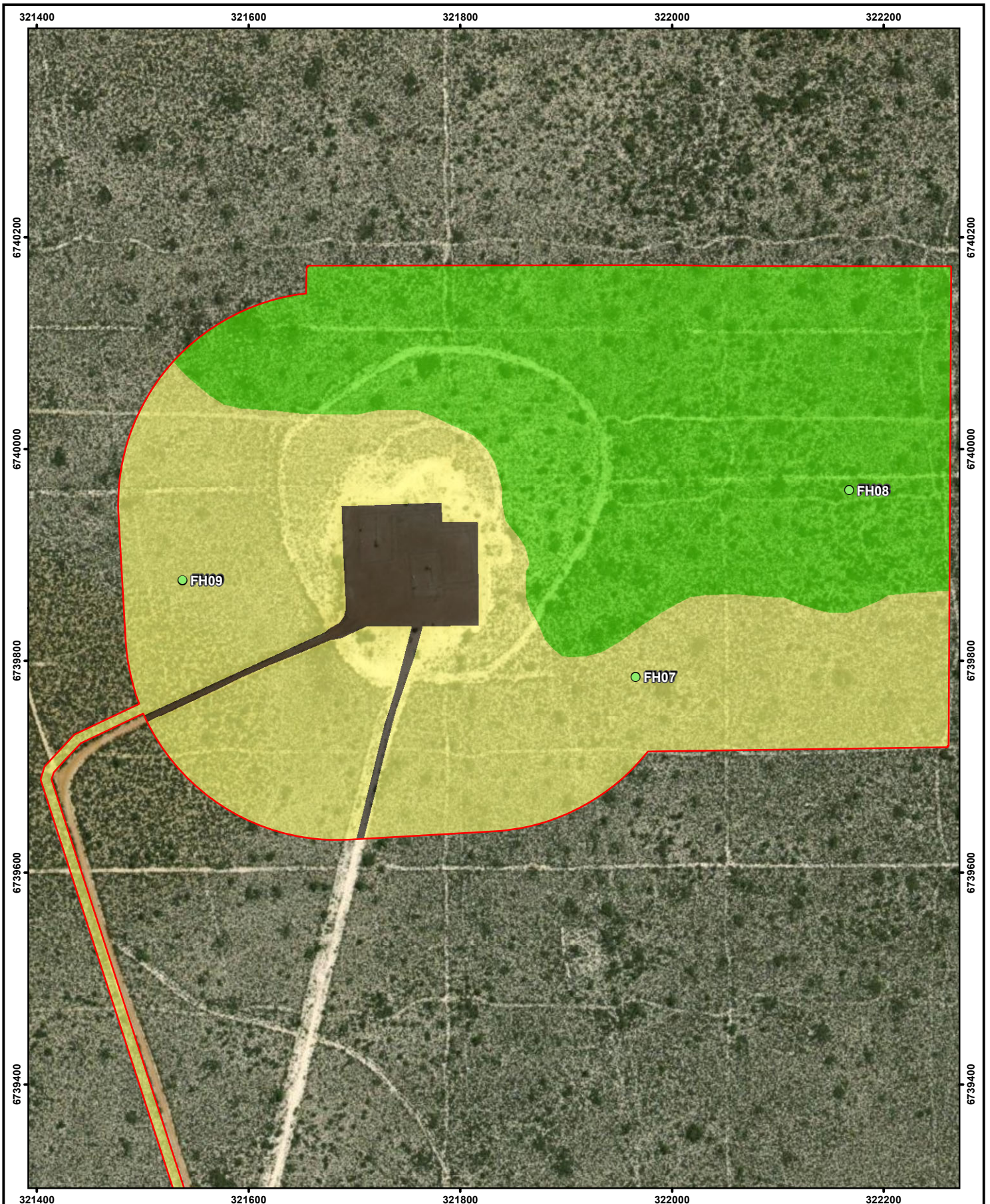
Perth Basin Ecological Studies

FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA TARANTULA 1 AND TARANTULA DEEP 1

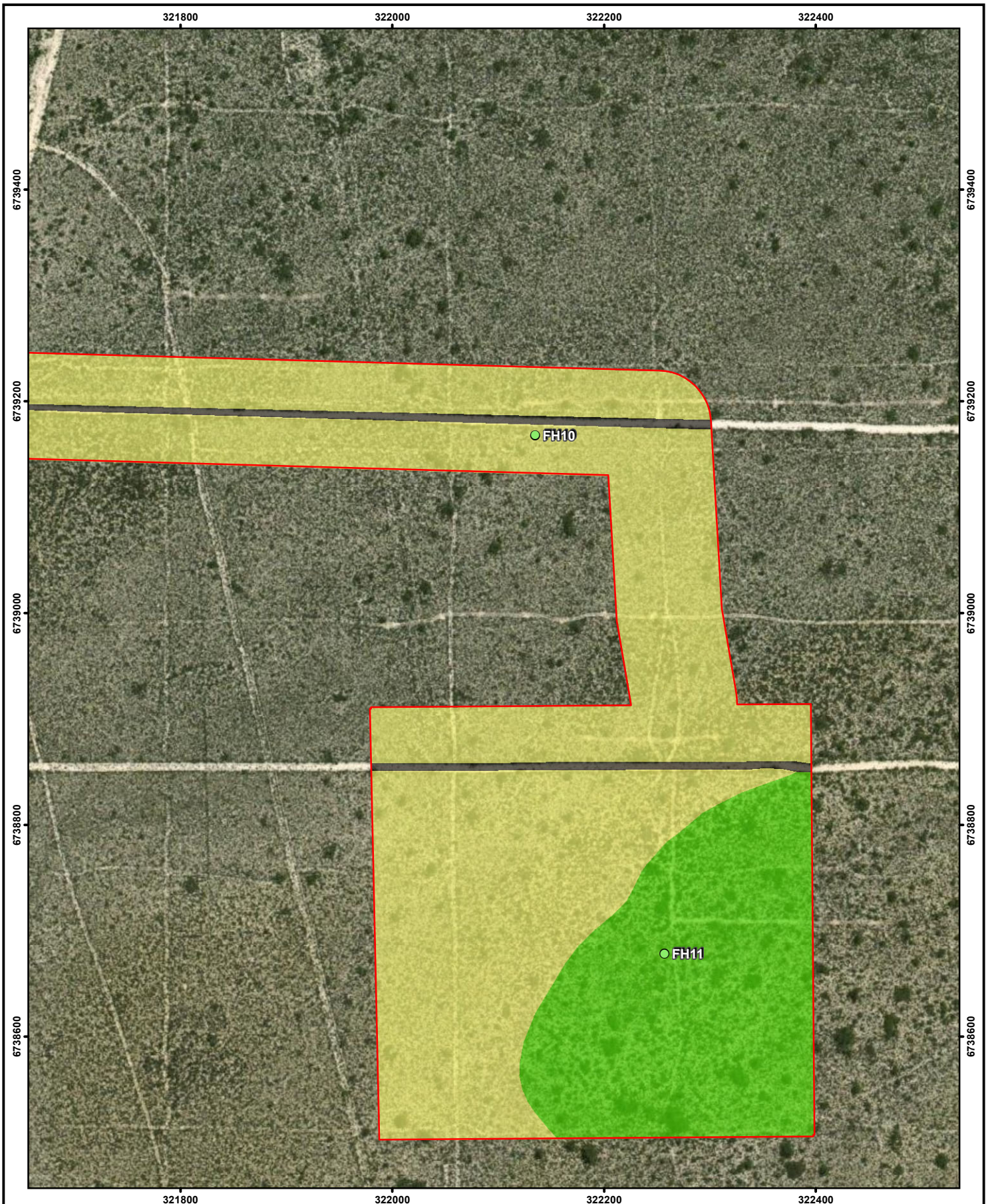
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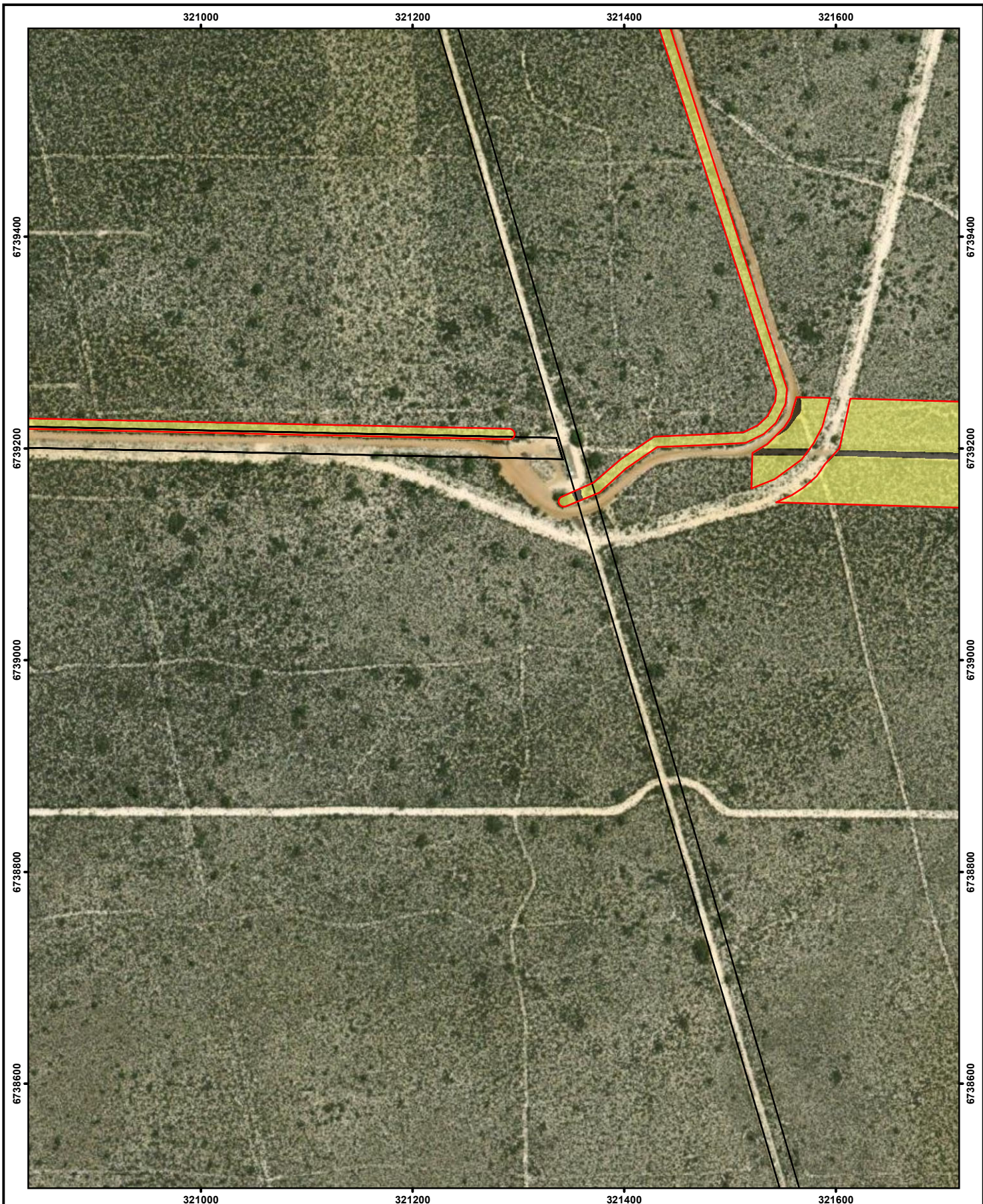
Legend Survey area Cadastral boundary Fauna habitat Kwongan Cleared / Not vegetated Habitat assessment site	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA TARANTULA 1 AND TARANTULA DEEP 1	
		Coord. Sys. GDA2020 MGA Zone 50		APPENDIX G Page 4 of 25
		Job No: 62676	Client: Beach Energy Limited	
		Version: A	Date: 13-Feb-2023	
Drawn By: ianandagoda	Checked By: BN			



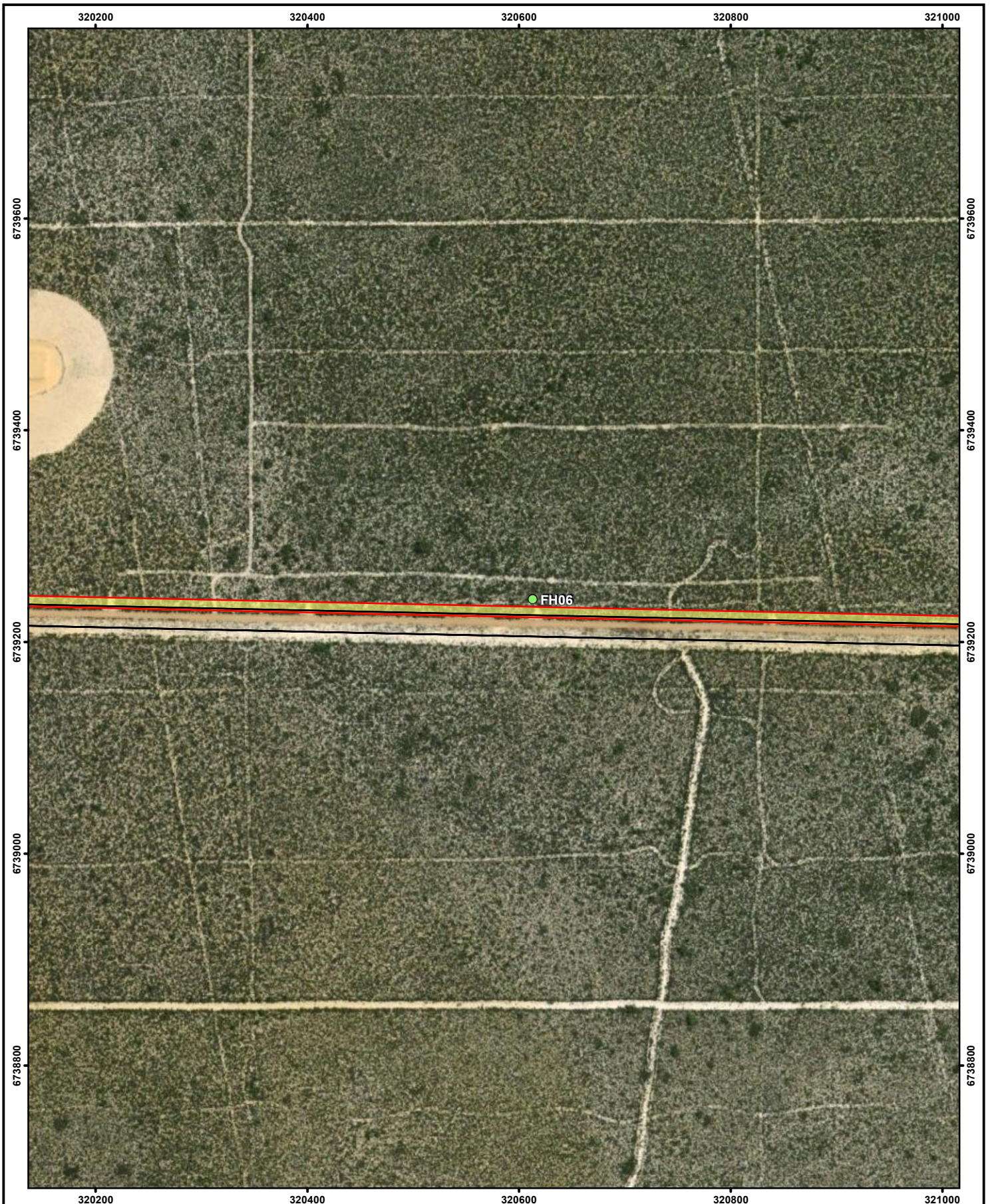
Legend Survey area Cadastral boundary Fauna habitat Eucalypt woodland Kwongan Cleared / Not vegetated Habitat assessment site	Indicator Map 	Scale 1:4,750 at A4 	Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA REDBACK 1 AND REDBACK DEEP 1	
	Coord. Sys. GDA2020 MGA Zone 50 	Job No: 62676	Client: Beach Energy Limited	APPENDIX G Page 5 of 25
	Version: A	Date: 13-Feb-2023		
	Drawn By: ianandagoda	Checked By: BN		



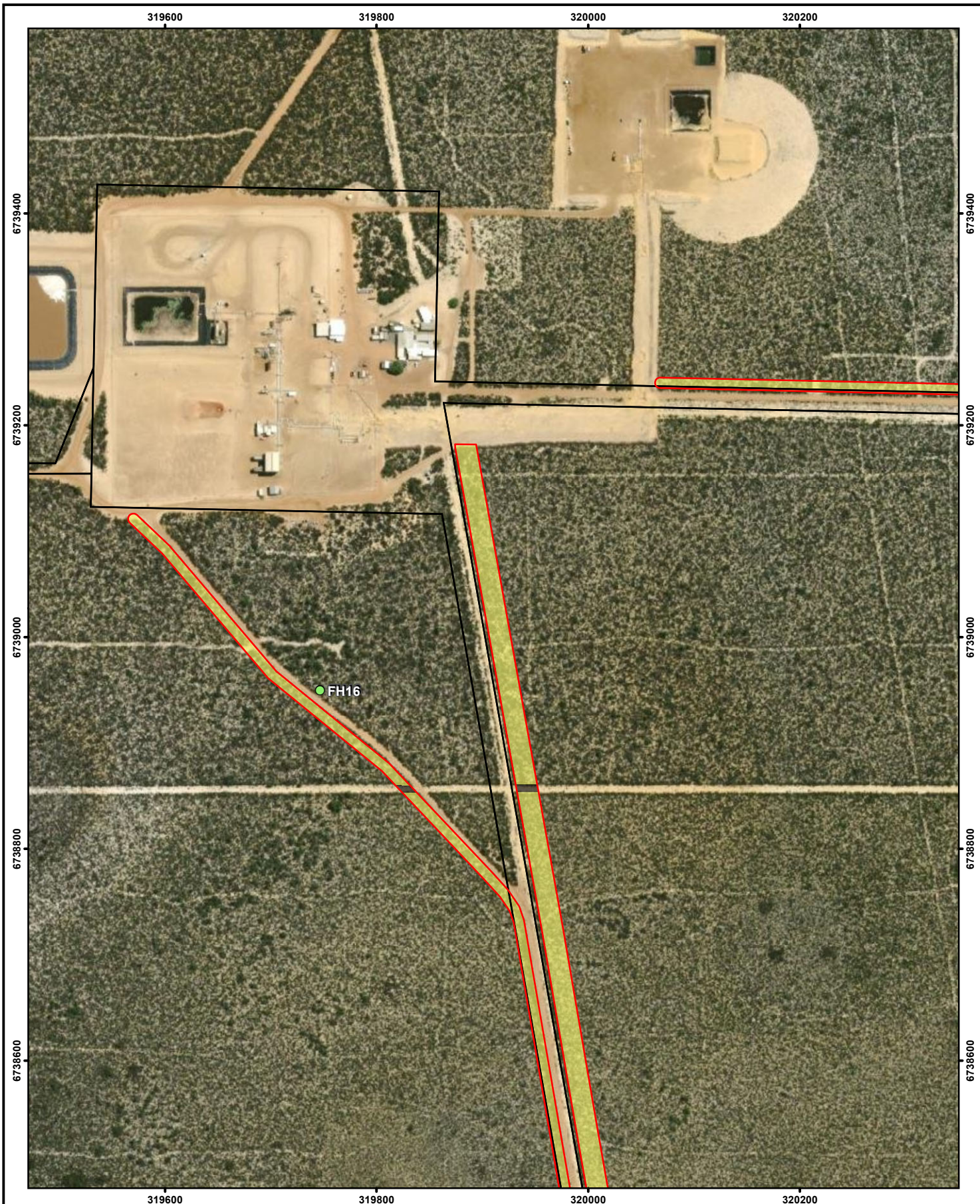
Legend Survey area Cadastral boundary Fauna habitat Eucalypt woodland Kwongan Cleared / Not vegetated Habitat assessment site	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA REDBACK DEEP SOUTH 1	
		Coord. Sys. GDA2020 MGA Zone 50		APPENDIX G Page 6 of 25
		Job No: 62676	Client: Beach Energy Limited	
		Version: A	Date: 13-Feb-2023 Drawn By: ianandagoda	



Legend Survey area Cadastral boundary Fauna habitat Kwongan Cleared / Not vegetated	Indicator Map 	Scale 1:4,750 at A4 	Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA REDBACK DEEP SOUTH 1
	Coord. Sys. GDA2020 MGA Zone 50 	Job No: 62676	APPENDIX G Page 7 of 25
	Client: Beach Energy Limited	Version: A Date: 13-Feb-2023	
	Drawn By: ianandagoda Checked By: BN		



Legend Survey area Cadastral boundary Fauna habitat Kwongan Habitat assessment site	Indicator Map 	Scale 1:4,750 at A4		Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA REDBACK DEEP SOUTH 1			
		Coord. Sys. GDA2020 MGA Zone 50					
		Job No: 62676		Client: Beach Energy Limited		APPENDIX G Page 8 of 25	
		Version: A		Date: 13-Feb-2023			
Drawn By: ianandagoda		Checked By: BN					



Legend

- Survey area
- Cadastral boundary
- Fauna habitat**
- Kwongan
- Cleared / Not vegetated
- Habitat assessment site

Indicator Map

Scale 1:4,750 at A4

Coord. Sys. GDA2020 MGA Zone 50

Job No: 62676

Client: Beach Energy Limited

Version: A

Drawn By: ianandagoda

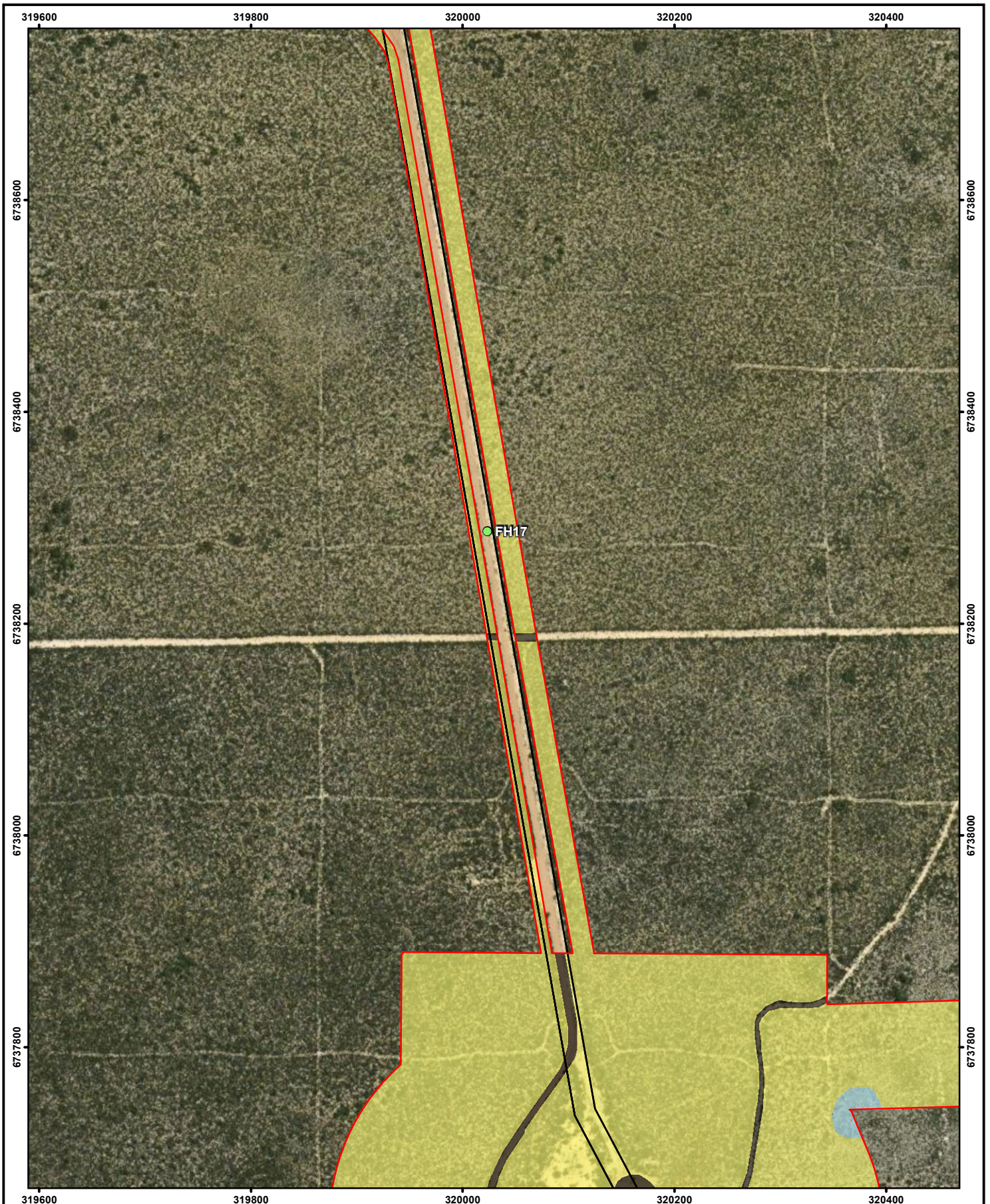
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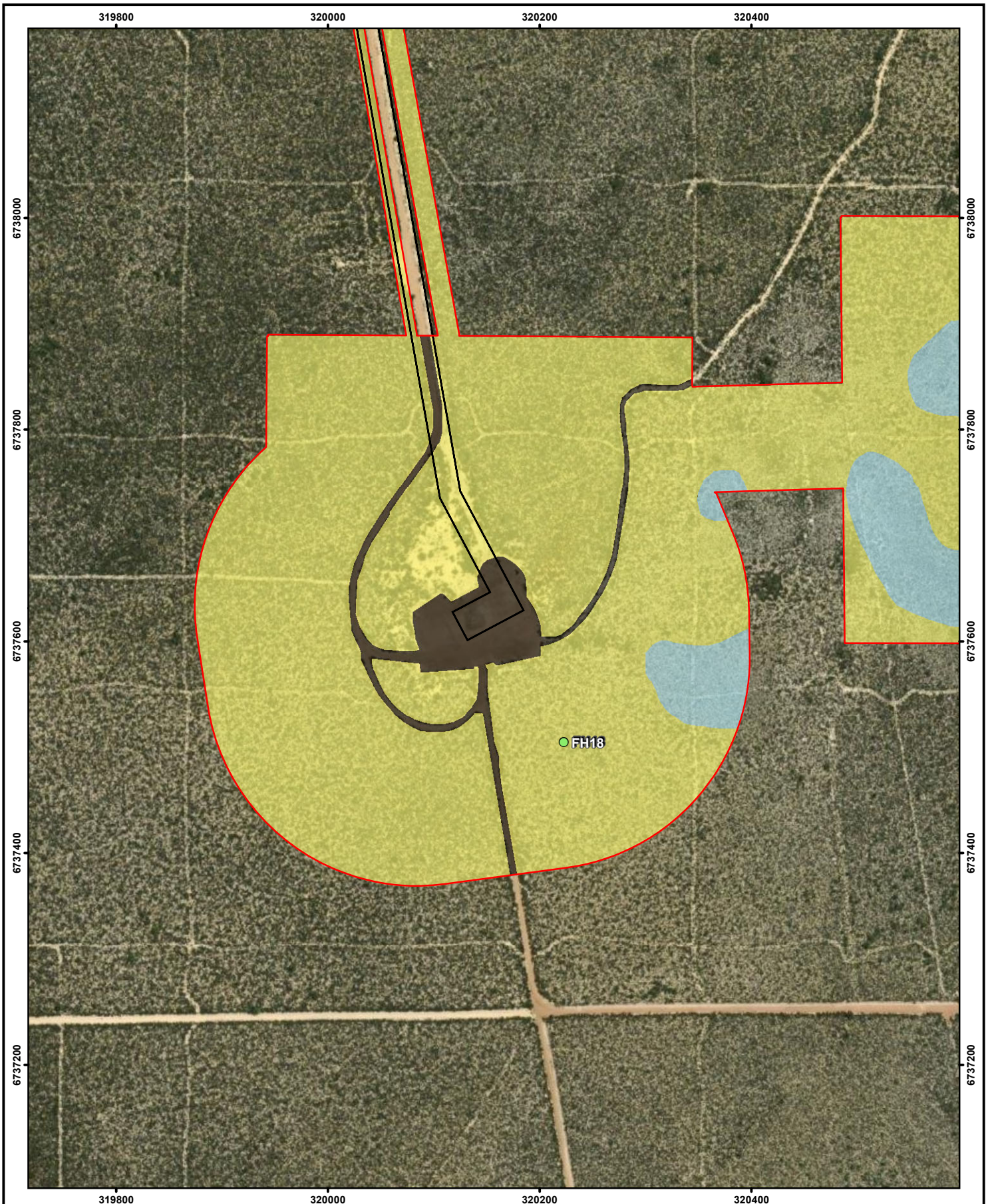
Perth Basin Ecological Studies

FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA ACCESS TRACKS - REDBACK AND BEHARRA SPRINGS 2

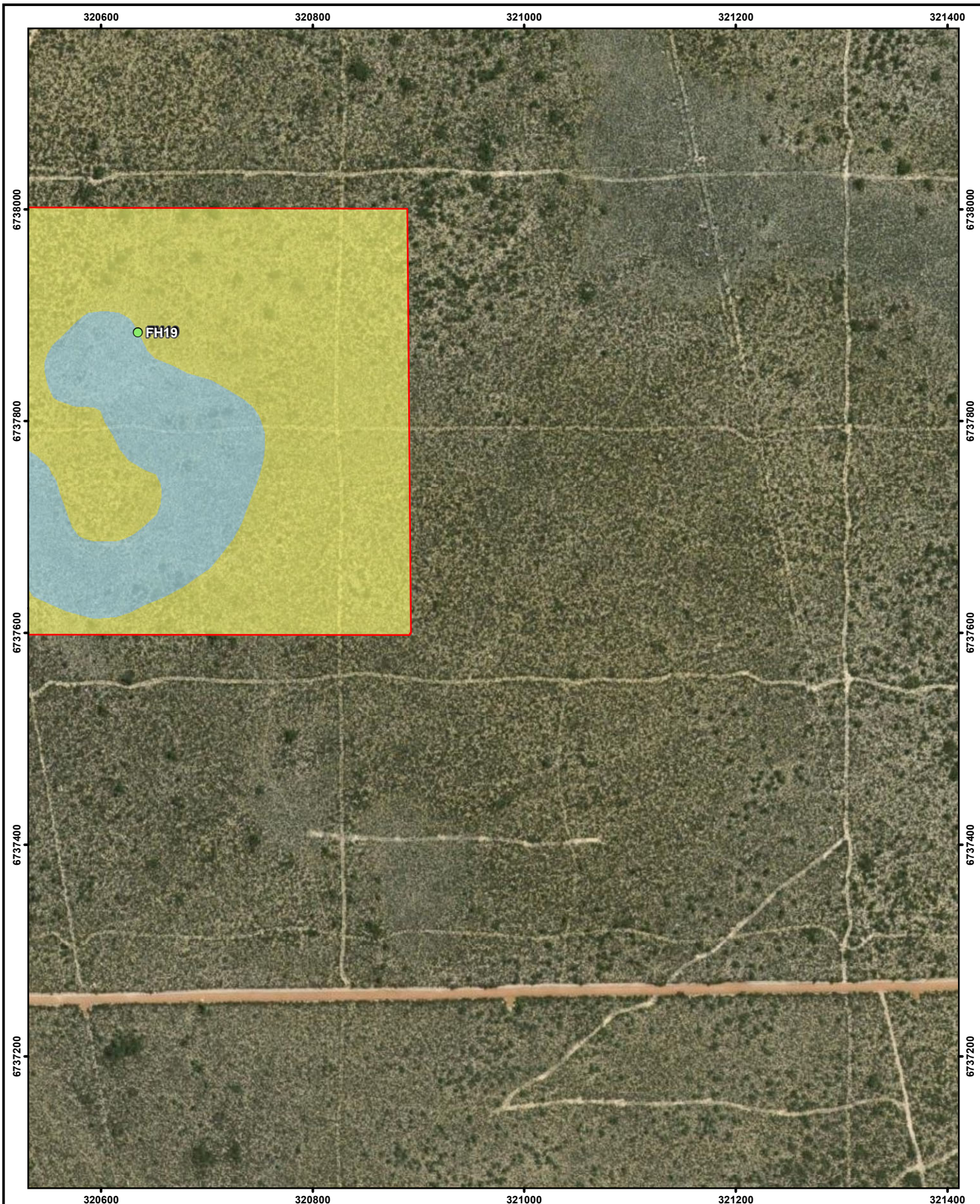
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Legend Survey area Cadastral boundary Fauna habitat Kwongan Sedgeland Cleared / Not vegetated Habitat assessment site	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA BEHARRA SPRINGS 2
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	
		Client: Beach Energy Limited	



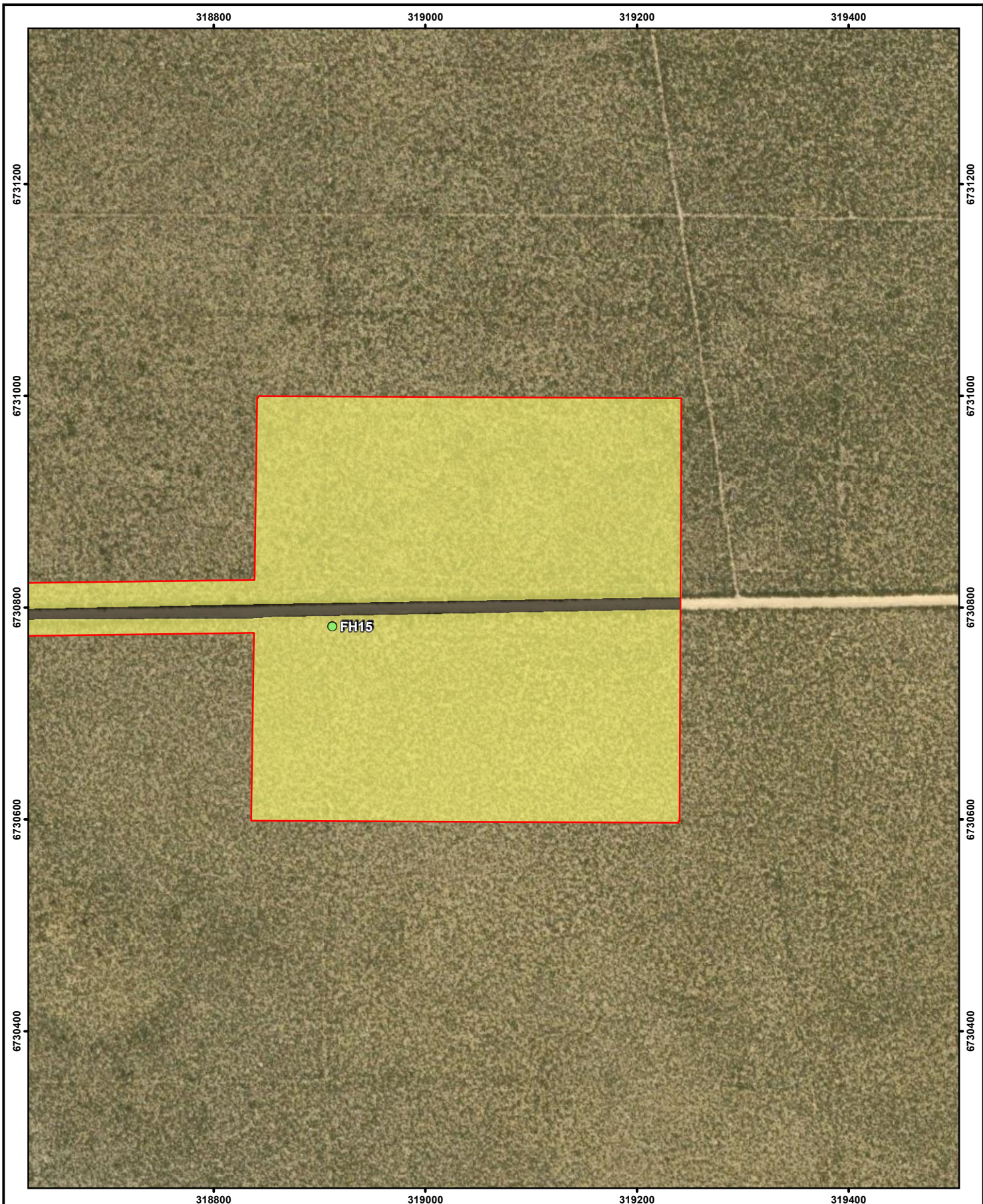
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	Coord. Sys. GDA2020 MGA Zone 50 	Job No: 62676	APPENDIX G Page 11 of 25
	Client: Beach Energy Limited	Version: A Date: 13-Feb-2023	
	Drawn By: ianandagoda Checked By: BN		



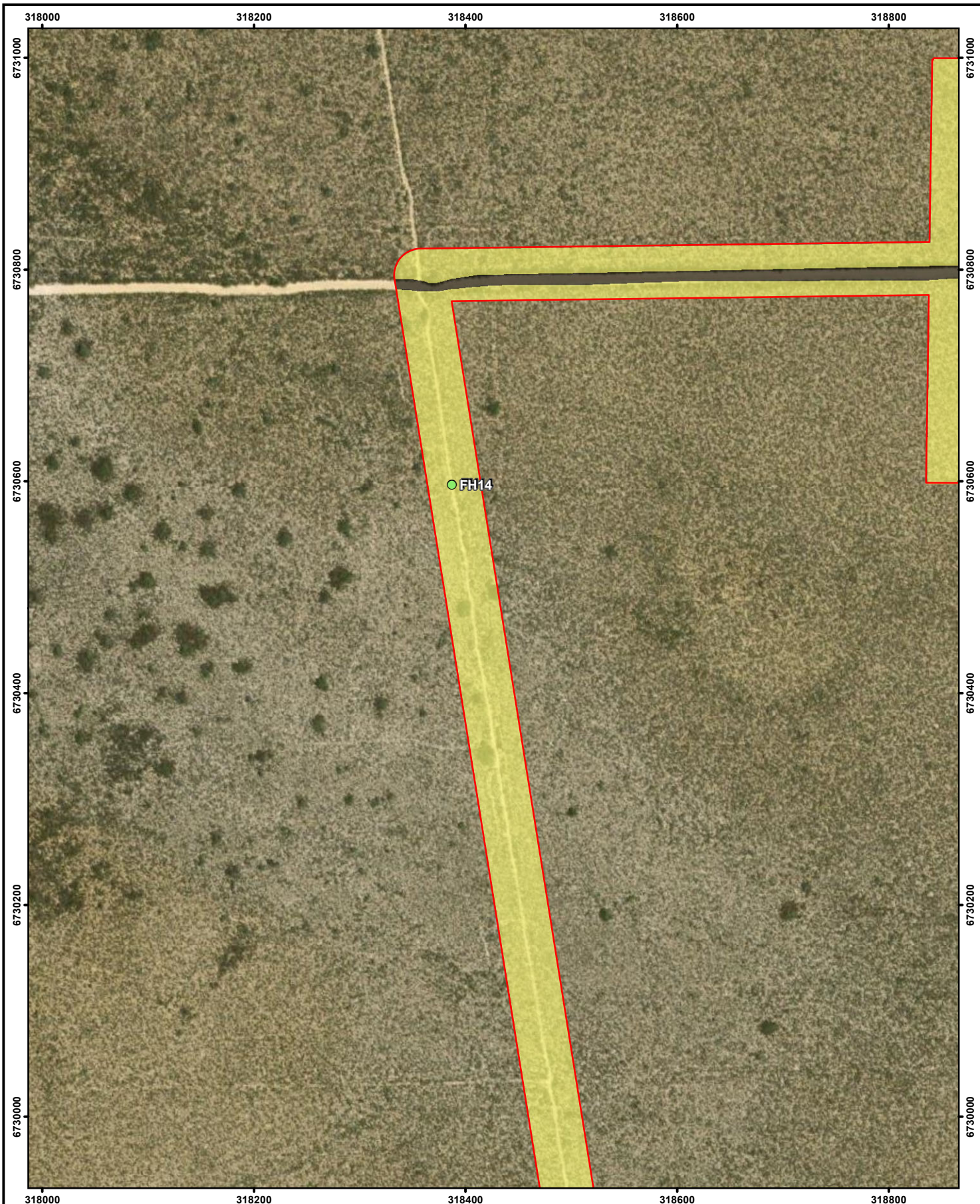
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		Coord. Sys. GDA2020 MGA Zone 50		FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA BEHARRA SPRINGS DEEP 2		
		Job No: 62676		APPENDIX G		Page 12 of 25
		Client: Beach Energy Limited		Version: A		
		Date: 13-Feb-2023		Drawn By: ianandagoda		Checked By: BN



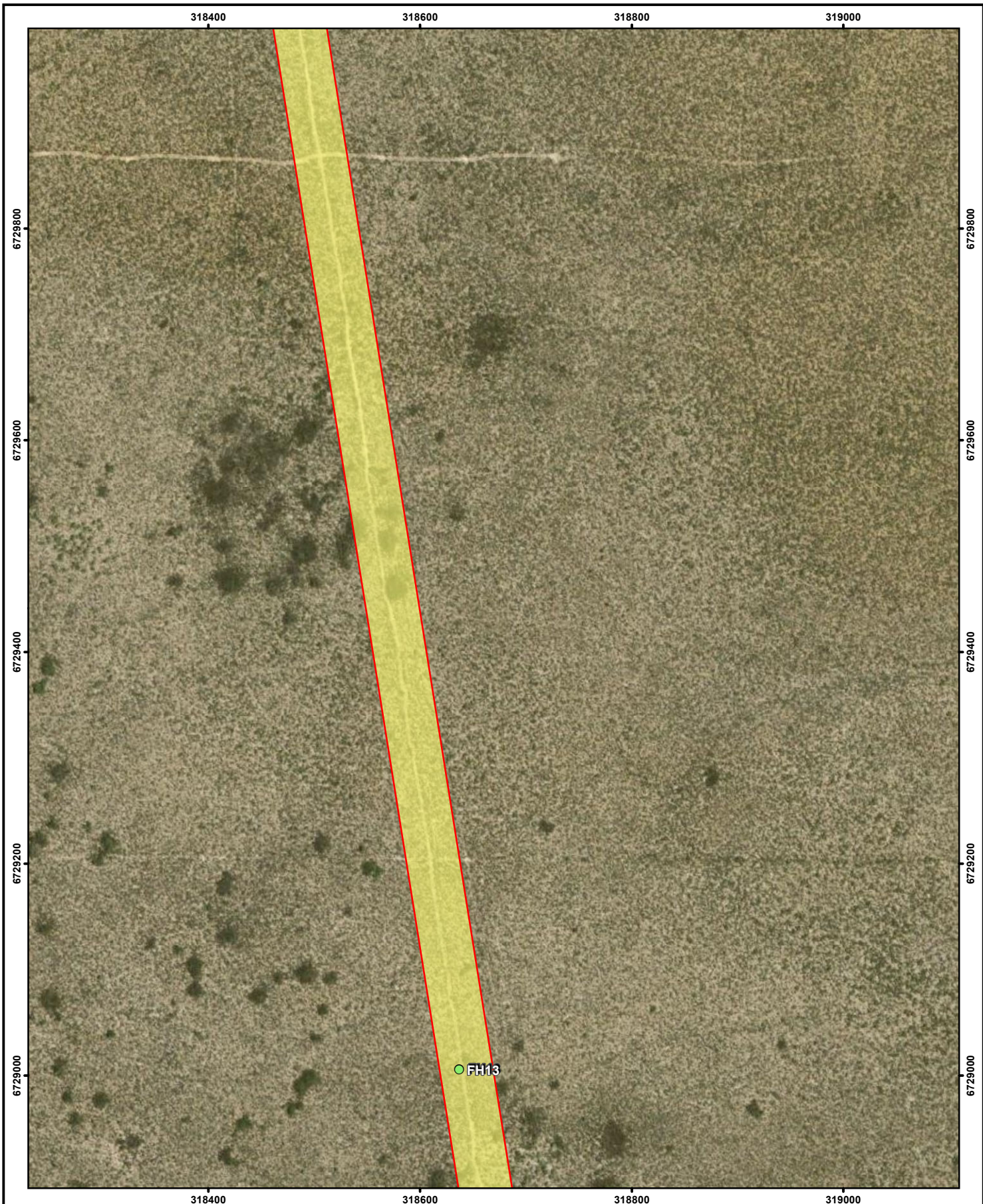
Legend Survey area Cadastral boundary Fauna habitat Banksia woodland Cleared / Not vegetated Habitat assessment site	Indicator Map 	Scale 1:4,750 at A4 	Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA BEHARRA SPRINGS DEEP 3	
		Coord. Sys. GDA2020 MGA Zone 50 	Job No: 62676	
		Client: Beach Energy Limited	APPENDIX G Page 13 of 25	
		Version: A Date: 13-Feb-2023	Drawn By: ianandagoda Checked By: BN	



Legend Survey area Cadastral boundary Fauna habitat Kwongan Cleared / Not vegetated Habitat assessment site	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA FLOREAT 2
		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	APPENDIX G Page 14 of 25
		Client: Beach Energy Limited Version: A Drawn By: ianandagoda	Date: 13-Feb-2023 Checked By: BN



Legend Survey area Cadastral boundary Fauna habitat Kwongan Cleared / Not vegetated Habitat assessment site	Indicator Map 		Scale 1:4,750 at A4 	Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA FLOREAT 2	
	Coord. Sys. GDA2020 MGA Zone 50 		Job No: 62676		
	Client: Beach Energy Limited		APPENDIX G Page 15 of 25		
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	Drawn By: ianandagoda	Checked By: BN			



Legend

- Survey area
- Cadastral boundary
- Fauna habitat**
- Kwongan
- Habitat assessment site

Indicator Map

Scale 1:4,750 at A4 0 50 100
metres

Coord. Sys. GDA2020 MGA Zone 50

Job No: 62676

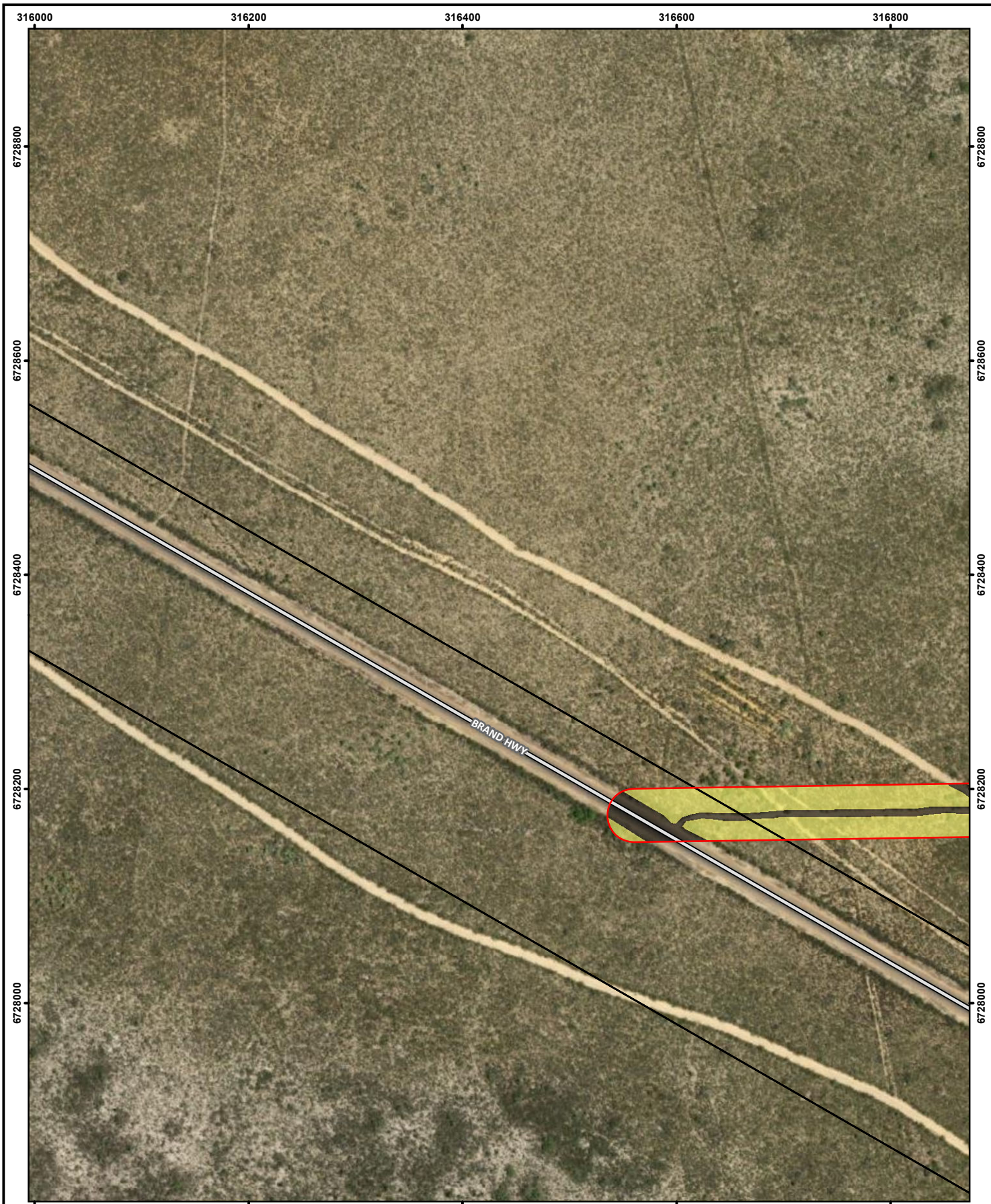
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Perth Basin Ecological Studies

FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA FLOREAT 2

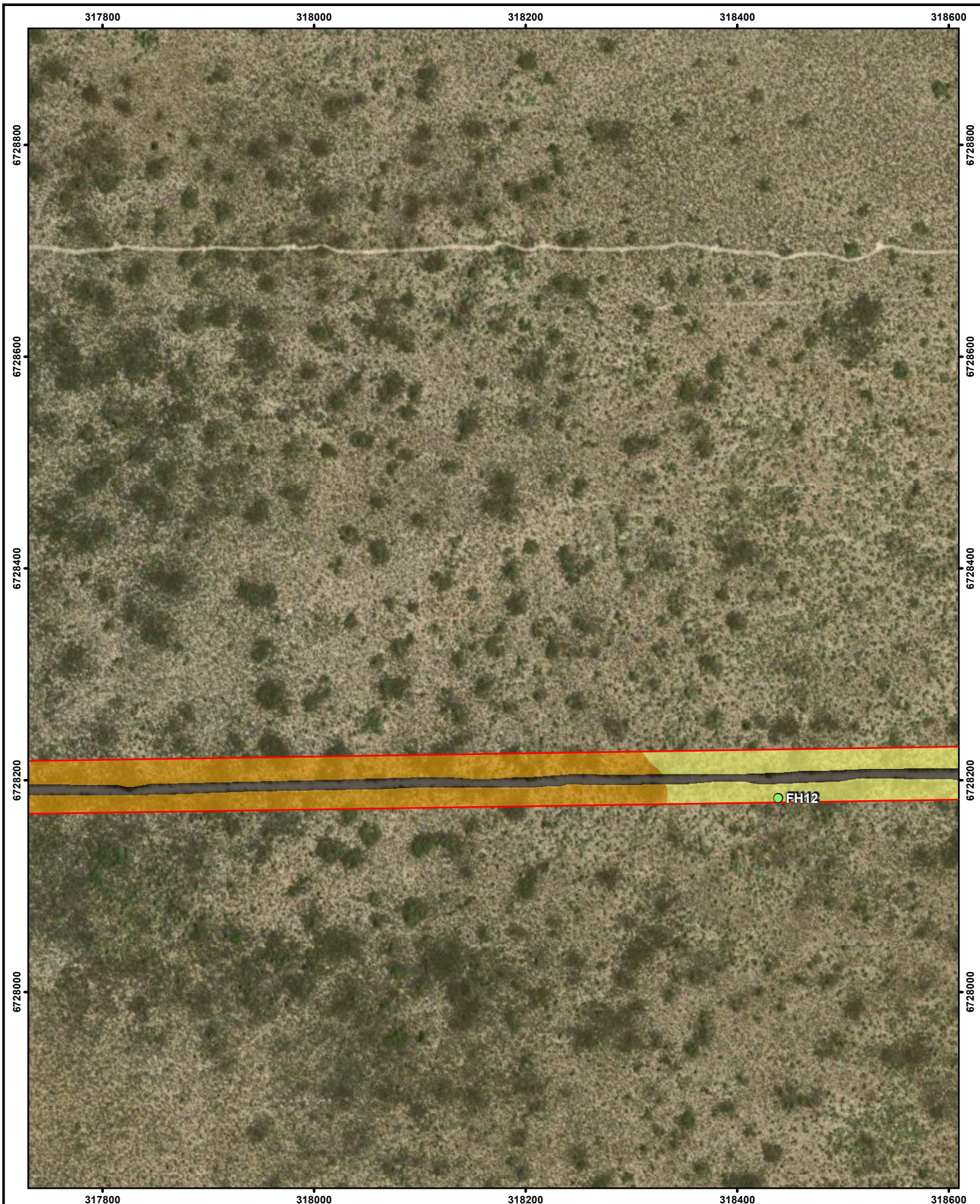
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Legend Survey area Cadastral boundary Fauna habitat Kwongan Cleared / Not vegetated Highways	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies	
		Coord. Sys. GDA2020 MGA Zone 50	FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA FLOREAT 2	
		Job No: 62676	APPENDIX G Page 17 of 25	
		Client: Beach Energy Limited	Version: A	Date: 13-Feb-2023
Drawn By: ianandagoda	Checked By: BN			



Legend Survey area Cadastral boundary Fauna habitat Kwongan Shrubland Cleared / Not vegetated Highways Habitat assessment site Ornithological survey site	Indicator Map 	Scale 1:4,750 at A4		Perth Basin Ecological Studies	
		Coord. Sys. GDA2020 MGA Zone 50		FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA FLOREAT 2	
		Job No: 62676		APPENDIX G Page 18 of 25	
		Client: Beach Energy Limited	Version: A	Date: 13-Feb-2023	
Drawn By: ianandagoda	Checked By: BN				



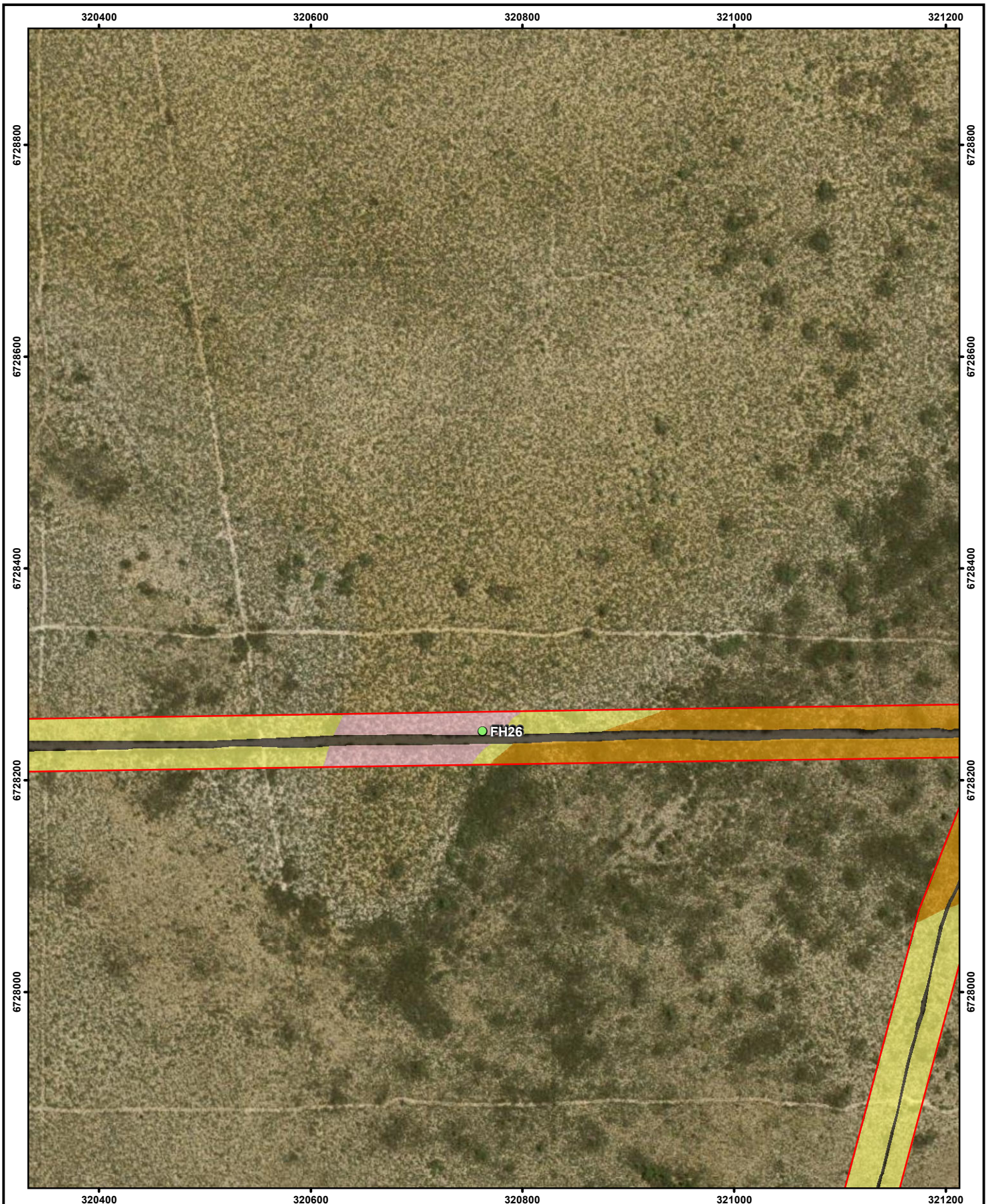
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		Coord. Sys. GDA2020 MGA Zone 50		FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA FLOREAT 2	
		Job No: 62676		APPENDIX G Page 19 of 25	
		Client: Beach Energy Limited	Version: A	Date: 13-Feb-2023	
Drawn By: ianandagoda	Checked By: BN				



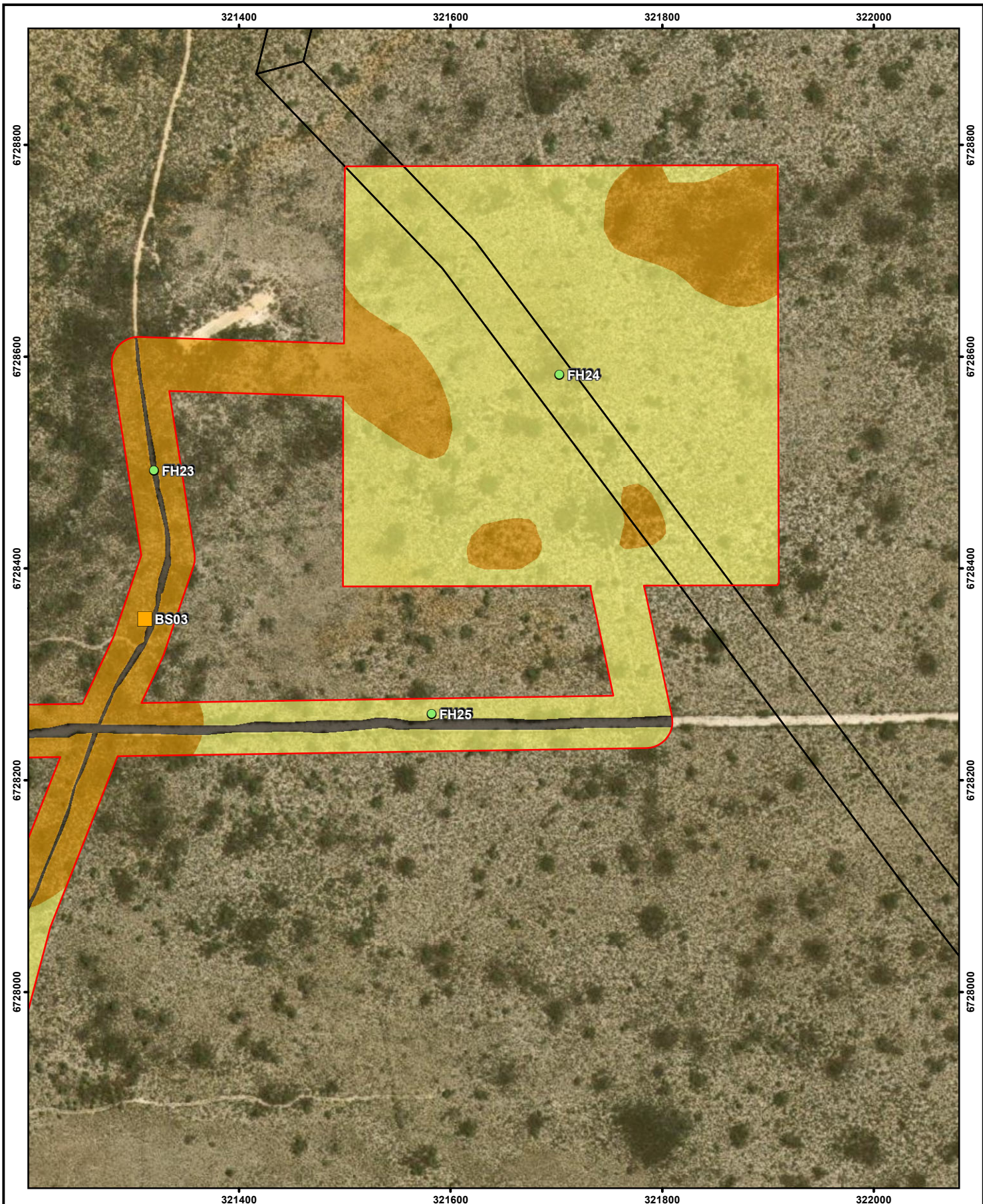
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		Coord. Sys. GDA2020 MGA Zone 50	
		Job No: 62676	
		Client: Beach Energy Limited	



Legend Survey area Cadastral boundary Fauna habitat Kwongan Cleared / Not vegetated	Indicator Map 	Scale 1:4,750 at A4		Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA FLOREAT 2	
		Coord. Sys. GDA2020 MGA Zone 50			APPENDIX G Page 21 of 25
		Job No: 62676			
		Client: Beach Energy Limited			
		Version: A	Date: 13-Feb-2023		
Drawn By: ianandagoda	Checked By: BN				



Legend Survey area Cadastral boundary Fauna habitat Banksia scrub on yellow sand dune Kwongan Shrubland Cleared / Not vegetated Habitat assessment site	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies	
		Coord. Sys. GDA2020 MGA Zone 50	FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA FLOREAT 2	
		Job No: 62676	APPENDIX G Page 22 of 25	
		Client: Beach Energy Limited	Version: A	Date: 13-Feb-2023
Drawn By: ianandagoda	Checked By: BN			



Legend Survey area Cadastral boundary Fauna habitat Kwongan Shrubland Cleared / Not vegetated Habitat assessment site Ornithological survey site	Indicator Map 	Scale 1:4,750 at A4	Perth Basin Ecological Studies FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA FLOREAT 1	
		Coord. Sys. GDA2020 MGA Zone 50		APPENDIX G Page 23 of 25
		Job No: 62676	Client: Beach Energy Limited	
		Version: A	Date: 13-Feb-2023 Drawn By: ianandagoda	



Legend

- Survey area
- Cadastral boundary
- Fauna habitat**
- Kwongan
- Shrubland
- Cleared / Not vegetated
- Habitat assessment site

Indicator Map

Scale 1:4,750 at A4 0 50 100 metres

Coord. Sys. GDA2020 MGA Zone 50

Job No: 62676

Client: Beach Energy Limited

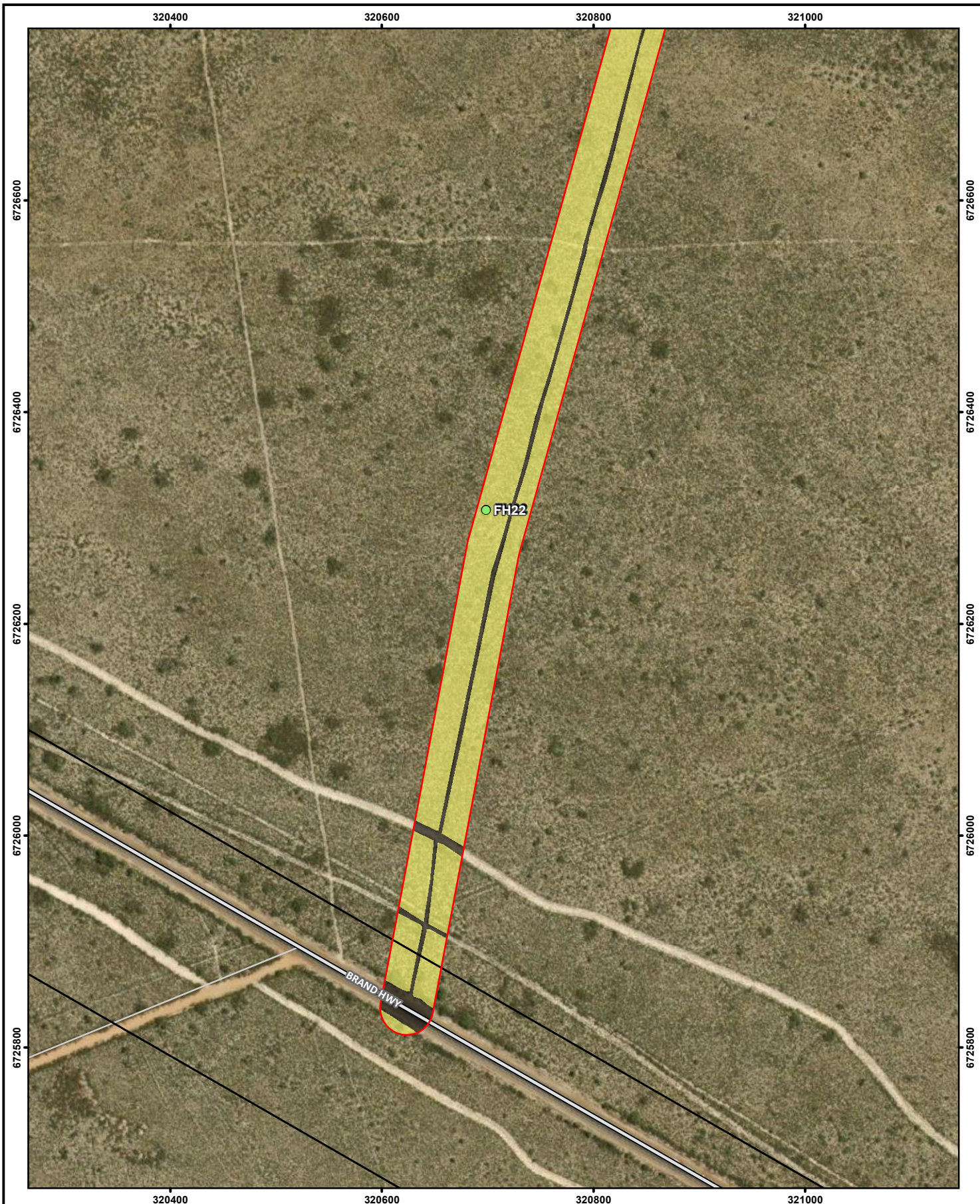
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Perth Basin Ecological Studies

FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA FLOREAT 1

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Legend

- Survey area
- Cadastral boundary
- Fauna habitat**
- Kwongan
- Cleared / Not vegetated
- Highways
- Minor road
- Habitat assessment site

Indicator Map

Scale 1:4,750 at A4

Coord. Sys. GDA2020 MGA Zone 50

Job No: 62676

Client: Beach Energy Limited

Version: A Date: 13-Feb-2023

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Perth Basin Ecological Studies

FAUNA HABITAT UNITS AND CONSERVATION SIGNIFICANT FAUNA FLOREAT 1

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