FMG Borefields Network Connection

Flora and fauna survey

Horizon Power

14 July 2021

→ The Power of Commitment

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Executive summary

Horizon Power is proposing to develop additional infrastructure in the form of a 43 kilometre (km) single circuit 66 kV transmission line from near the end of Horizon Power's Goldworthy line to Fortescue Metals Group's (FMG) Borefields location in the Pilbara bioregion of Western Australia. GHD was engaged by Horizon Power to undertake a single season detailed and targeted flora and vegetation survey and basic and targeted fauna survey for the Borefields Network Connection survey area. The total survey area is approximately 135.38 hectares (ha). The post-wet season single season detailed and targeted flora and vegetation survey and basic and targeted fauna survey was undertaken on 21 to 24 June 2021. The outcomes of the assessment will be used to inform the project design and provide information to support environmental approvals.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.2 and the assumptions and qualifications contained throughout the Report.

Key findings

Flora and vegetation

Four vegetation types aligning with broad landforms were identified and described in the survey area, not including cleared areas for tracks.

No Threatened Ecological Communities (TECs) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or *Biodiversity Conservation Act 2016* (BC Act) or Priority Ecological Communities (PECs) listed by Department of Biodiversity Conservation and Attractions (DBCA) were identified within the survey area during the field survey.

The condition of vegetation within the survey area ranged from Excellent to Very Good. Native vegetation covered 135.23 ha and cleared areas 0.15 ha. The vegetation structure was intact with limited signs of cattle activity and a low number of introduced flora were recorded. The western end of the survey area had previous disturbance through cattle grazing and higher cover of introduced species *(*Cenchrus ciliaris*). There were limited number of tracks that dissected the survey area.

Seventy-seven flora taxa (including subspecies and varieties) representing 22 families and 45 genera were recorded from the survey area during the field survey. This total comprised 76 native species and 1 introduced flora taxa. None of the introduced/naturalised flora taxa identified during the survey are listed as a Declared Pest under the *Biosecurity and Management (BAM) Act 2007* or a Weed of National Significance (WoNS).

No EPBC Act or BC Act listed flora or priority flora listed by the DBCA were recorded from the survey area. The likelihood of occurrence assessment concluded that *Euphorbia clementii* (P3) may possibly occur based on the nearest record being within one km of the survey area and the presence of suitable habitat. While adequate search effort did not record the species, future disturbance events, such as fire, may allow the species to recruit from soil seed bank. All other conservation listed taxa are unlikely to occur within the survey area based on lack of suitable habitat and/or adequate search effort.

Fauna

The field survey recorded 55 vertebrate fauna species within the survey area. These comprise 35 birds from 25 different families, 12 reptiles from seven different families, and eight mammals from eight different families.

Two significant fauna species were recorded during the survey:

– Grey Falcon (*Falco hypoleucos*) listed as Vulnerable under the BC Act and EPBC Act
– Greater Bilby (*Macrotis lagotis*) listed as Vulnerable under the BC Act and EPBC Act (secondary recent evidence).

The Grey Falcon (VU) was recorded at three locations, most likely the same two individuals (adult and juvenile).

Secondary recent evidence of the Greater Bilby (VU) activity (foraging holes, burrows, scat) was recorded within the survey area. Bilby have been well-recorded in the area and suitable habitat is present. As the Bilby is a mobile species and may occupy various areas over time within the Sand Plain habitat (based on previous records) it its

considered likely that the species occurs, particularly in areas immediately west and further east of Shay Gap Road.

Six other significant species are considered likely to occur due to local occurrence and habitat availability, these include:

– Brush-tailed Mulgara (*Dasycercus blythi*) (VU)
– Peregrine Falcon (*Falco peregrinus*) (Specially protected fauna)
– Yellow Wagtail (*Motacilla tschutschensis*) (Migratory)
– Spectacled Hare Wallaby (*Lagorchestes conspicillatus* subsp. *leichardti*) (Priority 4)
– Lakeland Downs Mouse (*Leggadina lakedownensis*) (Priority 4)
– Black-eared Cuckoo (*Chalcites osculans*) (Marine)

The proposed powerline development is not considered likely to have a significant impact on likely to occur conservation listed fauna species at a local and regional scale due to the high representation and continuation of available habitat in the region outside of the survey area. Future vegetation clearing should consider a fauna clearance survey to detect potentially new Bilby burrows that may have been established during the project environmental approvals timeframe.

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Appendices

1. Introduction

1.1 Background

Horizon Power is proposing to develop additional infrastructure in the form of a 43 kilometre (km) single circuit 66 kV transmission line from near the end of Horizon Power's Goldworthy line to Fortescue Metals Group's (FMG) Borefields location in the Pilbara bioregion of Western Australia (WA).

1.2 Purpose of this report

GHD Pty Ltd (GHD) was engaged by Horizon Power to undertake a single-season detailed and targeted flora and vegetation survey and basic and targeted fauna survey for the Borefields Network Connection survey area. The purpose of the survey was to delineate key flora, vegetation and fauna values and their potential sensitivity to impact. The purpose of the assessment was to define sensitive environmental values, in particular their spatial location and conservation significance, so the impacts of the proposed works can be managed and to inform subsequent approvals and works to be undertaken. The outcomes of the assessment will be used to inform the project design and provide information to support environmental approvals.

1.3 Location

The Borefields Network Connection survey area is located within the Pilbara and Great Sandy Desert bioregions. The total survey area is approximately 135.37 hectares (ha). The location of the survey area is shown on Figure 1, Appendix A.

A desktop study area (study area) was defined for the desktop-based searches of the assessment and includes a 30 km buffer of the survey area.

1.4 Scope of works

The scope of works was to undertake an assessment of the fauna and flora and vegetation values of the survey area. The following actions were completed to fulfil the scope:

- A desktop review of the relevant databases and publicly available information to determine the flora, vegetation and fauna values of the survey area
- A detailed and targeted flora and vegetation survey
- A basic fauna and targeted Bilby survey
- Habitat assessments conducted at fauna sampling sites to describe fauna habitat types and inform mapping of those habitats with a focus on conservation significant species
- A concise technical report (this document) detailing the findings of the biological survey
- All mapping provided in electronic form, in Geocentric Datum of Australia (GDA) 94 with data to be submitted in the required Index of Biodiversity Surveys for Assessment (IBSA) format including statement forms.

1.5 Relevant legislation, conservation codes and background information

In WA some ecological communities, flora and fauna are protected under both Federal and State Government legislation. In addition, regulatory authorities also provide a range of guidance and information on expected standards and protocols for environmental surveys.

An overview of key legislation and guidelines, conservation codes and background information relevant to this biological survey is provided in Appendix B.

1.6 Report limitations and assumptions

This report: has been prepared by GHD for Horizon Power and may only be used and relied on by Horizon Power for the purpose agreed between GHD and Horizon Power as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Horizon Power arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Site conditions may change after the date of this report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

This report has assessed desktop environmental aspects and biological factors in the field for the survey area. Should these areas change or be refined, further assessment may be required.

2. Methodology

2.1 Desktop assessment

A desktop assessment of the study area to identify environmental values and constraints was undertaken by viewing geographic information system (GIS) spatial files largely sourced from Government of Western Australia (GoWA) (2021a) and reviewing publicly available, government managed databases. The information sources utilised in this assessment are presented in Table 1.

Table 1 Information sources

Aspect	Information source
Climate	Bureau of Meteorology (BoM) Climate Data Online (2021)
Geology, landforms and soil	1:500 000 State linear structures layer (DMIRS-015) Soil Landscape Mapping – Systems (DPIRD-064)
Environmentally Sensitive Areas (ESAs)	Clearing Regulations - Environmentally Sensitive Areas (DWER-046)
Conservation reserves and areas	Department of Biodiversity, Conservation and Attractions (DBCA) – Legislated Lands and Waters (DBCA-011) DBCA – Lands of Interest (DBCA-012)
Hydrology	Public Drinking Water Source Areas (PDWSAs) (DWER-033) Rights in Water and Irrigation (RIWI) Act, Surface Water Areas and Irrigation Districts (DWER-037) RIWI Act, Groundwater Areas (DWER-034) RIWI Act, Rivers (DWER-036) Waterways Conservation Act Management Areas (DWER-072) Ramsar Sites (DBCA-010) Directory of Important Wetlands in Australia - Western Australia (DBCA-045)
Vegetation	Pre-European Vegetation (DPIRD-006) Native Vegetation Extent (DPIRD-005) (GoWA 2021a) Statewide Vegetation Statistics (GoWA 2021b)
Threatened and Priority Ecological Communities (TECs and PECs)	DBCA Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) spatial dataset (DBCA 2021a) Priority Ecological Communities for Western Australia Version 28
Conservation significant flora and fauna	DBCA NatureMap database (DBCA 2007–) DBCA Threatened and Priority Flora database (TPFL) WA Herbarium database (WAHERB) (DBCA 2021b, c)
Matters of National Environmental Significance	EPBC Act Protected Matters Search Tool (PMST) (DAWE 2021a)

2.1.1 Flora and vegetation

Prior to the commencement of the field survey, a desktop assessment was undertaken to identify relevant environmental information pertaining to the project areas and within 30 km (desktop study area). The flora and vegetation desktop assessment included a review of:

– The Department of Agriculture, Water and the Environment (DAWE) PMST to identify communities and species listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) potentially occurring within the study area (DAWE 2021a) (Appendix C)
– The DBCA TEC and PEC database (DBCA 2021a) to determine the potential for significant ecological communities to be present within the study area

– The DBCA Threatened and Priority Flora and WA Herbarium databases for Threatened flora listed under the Biodiversity Conservation (BC) Act 2016 and as Priority by the DBCA previously recorded in the desktop study area (DBCA 2021b)
– The DBCA NatureMap database for flora and fauna species previously recorded within the study area (DBCA 2007–) (Appendix C)
– Aerial photography, geology/soils, land systems and hydrology information to provide background information on the variability of the environment and likely vegetation and habitat types present
– A flora likelihood of occurrence assessment (Appendix D).

2.1.2 Basic and targeted fauna

The fauna desktop assessment included a review of:

– DAWE PMST database to identify fauna species listed under the EPBC Act potentially occurring within the desktop study area (DAWE 2021a) (Appendix C)
– The DBCA Threatened and Priority Fauna database for the study area (DBCA 2021c)
– The DBCA NatureMap (DBCA 2007–) database for fauna species previously recorded within the study area (Appendix C). This database comprises the following composite datasets:

Atlas of Australian birds

Bird data -Birdlife Australia

Fauna Survey Returns Database (New)

WA Museum (WAM) databases (mammals, birds, reptiles)

– Aerial photography, geology/soils, land systems and hydrology information to provide background information on the variability of the environment and likely habitat types present
– A fauna likelihood of occurrence assessment. For the purpose of this study, exclusively marine animals (fish, whales, turtles etc.) were excluded from the likelihood of occurrence assessment as they are not expected to interact with the project areas (Appendix E).

2.2 Field survey

2.2.1 Survey timing and personnel

The post-wet season single season detailed and targeted flora and vegetation survey and basic and targeted fauna survey was undertaken on 21 to 24 June 2021 by GHD senior botanist/ecologist Joel Collins (flora licence no. FB62000200-2) and GHD senior zoologist Robert Browne-Cooper.

2.2.2 Guiding documents

The survey methodology and data collection that GHD employed was consistent with:

– Environmental Protection Authority (EPA) Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016)
– EPA Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020)
– DAWE (2011a) Survey Guidelines for Australia's Threatened Mammals
– DAWE (2011b) Survey Guidelines for Australia's Threatened Reptiles
– DBCA Guidelines for surveys to detect the presence of bilbies, and assess the importance of habitat in Western Australia (DBCA 2017)
– Verifying Bilby presence and the systematic sampling of wild populations using sign based protocols – with notes on aerial and ground based techniques and asserting absence (Southgate et al 2018).

2.2.3 Data collection and storage

Field data collection for the flora, vegetation and fauna survey was undertaken using Global Positioning System (GPS) enabled Samsung tablets using electronic forms in Collector and tailored to IBSA spatial data requirements. Data was synced to the cloud at the conclusion of each field day. Field photographs were stored and where applicable have been provided as part of the Project deliverables.

2.2.4 Detailed and targeted flora and vegetation

The field survey was undertaken to identify and describe the broad dominant vegetation types, assess vegetation condition, and conduct high intensity sampling of vascular flora taxa present at the time of survey. Searches for significant ecological communities and flora species were also undertaken during the field survey.

Field survey methods involved a combination of high intensity quadrat sampling and traversing the survey area by foot. Quadrats were conducted within the survey area to describe the broad-scale vegetation and physical features. Eight quadrats were sampled throughout the survey area with the location of each quadrat presented in Figure 4, Appendix A.

Field data at each quadrat was recorded on a pro-forma data sheet and included the parameters detailed in Table 2. Survey and quadrat data are provided in Appendix D. A flora inventory was compiled from taxa listed in the quadrats and from opportunistic floristic records throughout the survey area.

Table 2 Data collected during the field survey

Aspect	Measurement
Collection attributes	Site code, personnel/recorder, date, photograph of the site.
Physical features	Landform, slope, aspect, soil attributes, ground surface cover
Location	Coordinates recorded in GDA94 datum using a hand-held GPS tool to accuracy approximately ± 5 m.
Vegetation condition	Broad-scale vegetation condition using the condition rating scale adapted by EPA (2016) for the Eremaean and Northern Botanical Provinces.
Disturbance	Level and nature of disturbances (e.g. weed presence, fire and time since last fire, impacts from grazing, infrastructure development activities).
Flora	List of dominant flora from each structural layer, list of all species at each quadrat including stratum, average height and cover using National Vegetation Information System (NVIS 2017).

Vegetation types

Vegetation types were identified and boundaries delineated using a combination of aerial photography, topographical features and field data/observations.

Vegetation types were described based on structure, dominant taxa and cover characteristics as defined by quadrat data and field observations. Vegetation type descriptions follow the NVIS and are consistent with NVIS Level V (Association) and are grouped within NVIS Level III (Broad Floristic Formation). At Level V up to three taxa per stratum are used to describe the association (NVIS 2017).

Vegetation condition

The vegetation condition was assessed and mapped in accordance with the vegetation condition rating scale for the Eremaean and Northern Botanical Provinces devised by Trudgen (1988) and adapted by EPA (2016). The scale recognises the intactness of vegetation and consists of six rating levels. The vegetation condition rating scale is outlined in Appendix B.

Flora inventory, identification and nomenclature

A flora inventory was compiled from taxa listed in described quadrats and from opportunistic floristic records throughout the survey area.

Species well known to the survey botanist were identified in the field; all other species were collected and assigned a unique collection number to facilitate tracking. All specimens collected during the field assessment were dried and processed in accordance with the requirements of the WA Herbarium. Species were identified by the use of taxonomic literature, electronic keys and online electronic databases with reference to specimens at the WA Herbarium. Relevant taxonomic experts were also consulted where required.

The conservation status of all recorded flora was compared against the current lists available on *FloraBase* (WA Herbarium 1998–) and the EPBC Act Threatened species database provided by DAWE (2021a).

Nomenclature used in this report follows that used by the WA Herbarium as reported on *FloraBase* (WA Herbarium 1998–).

Targeted flora searches

The results of the desktop assessment were reviewed, and a target list of significant flora taxa compiled. Ecological information (e.g. habitat, associated flora taxa and phenology) was sourced from *FloraBase* (WA Herbarium 1998–) and other relevant publications where available.

The targeted flora survey was completed con-currently with the vegetation and flora assessment, with timing occurring in late June 2021 to coincide with the flowering period of the majority of the target taxa for the bioregion. Appropriate habitat for significant flora taxa in the survey area was traversed on foot. Locations within the survey area with differing hydrology, fire or disturbance history to the surrounding areas were also searched where identified. Where significant flora taxa were identified the locations and number of plants present were recorded using handheld GPS units. A representative collection was also made for confirmation by the WA Herbarium.

2.2.5 Basic and targeted fauna

The post-wet season single phase basic and targeted assessment including a targeted Bilby assessment of the survey area was completed in association with the vegetation and flora survey. The survey area was traversed by foot to identify and describe the dominant fauna habitat types present and their condition, assess habitat for conservation listed species, undertake targeted Bilby assessment, and identify and record fauna species within the survey area. An assessment of the likelihood of significant fauna and their habitats occurring within the survey area was also undertaken.

Habitat assessment

A fauna habitat assessment was undertaken to document the type, value and extent of habitats within the survey area. The following information was recorded:

– Habitat structure (e.g. vegetation type, presence/absence of structural layers such as ground cover and mid storey)
– Presence/absence of refuge including density of ground covers, fallen timber (coarse woody debris), hollow-bearing trees and stags and rocks/boulder piles, and the type and extent of each refuge
– Presence/absence of waterways including type, extent and habitat quality within waterway
– Location of the habitat within the survey area in comparison to the habitat within the surrounding landscape
– Habitat connectivity and identification of wildlife corridors within and immediately adjacent to the survey area
– Current land use and disturbance history
– Evaluation of key habitat features and types identified during the desktop assessment relevant to fauna of significance
– Evaluation of the likelihood of occurrence of significant fauna within the habitat (based on presence of suitable habitat)
– A representative photograph of each habitat type.

Opportunistic fauna searches

Opportunistic fauna searches were also conducted across the survey area and involved:

– Searching the survey area for tracks, scats, bones, diggings and feeding areas for both native and feral species
– Searching through microhabitats including turning over logs or rocks, turning over leaf litter and examining tree hollows and hollow logs
– Visual and aural surveys, which accounted for many bird species potentially utilising the survey area
– Recording GPS locations of any significant fauna species.

Targeted Bilby searches

The sampling technique endorsed by the DAWE and DBCA guidelines (DBCA 2017), reference the Southgate et al (2005) method of Greater Bilby Plot Assessments) which involves an assessment of two ha plots as a method of sampling a proportion of a survey area. Due to the small size of the survey area, the approach for was to extend the plot assessment method throughout the project area to detect Greater Bilby activity and specifically to detect burrows of resident animals if present. By extending the plot assessment method to cover the entire project area, the target survey provided complete coverage.

The survey area was traversed on foot for evidence of Greater Bilby activity indicating recent presence. Searching was carried out by GHD senior zoologist Robert Browne-Cooper and senior botanist/ecologist Joel Collins. Personnel walked in a line spaced approximately 20 m - 30 m apart providing adequate on-ground coverage to target Greater Bilby. During the traverses, if present, evidence of the species was recorded including burrows, foot prints, foraging signs, and scats. GPS devices were used during traversing to log search track to inform on site coverage (Figure 4).

Fauna species identification

Identification of fauna species was made in the field using available field guides and electronic guides (e.g. Morcombe 2004).

Nomenclature used in this report follows WAM as reported on *NatureMap* (DBCA 2007–2021). This nomenclature is considered the most up-to-date species information for WA groups: reptiles, amphibians, invertebrates and mammals (including bats). All bird nomenclature follows Christidis and Boles (2008) and Australian Faunal Directory (EPA 2020). Other reference materials used are presented in Table 3.

Table 3 Fauna references

Fauna Group	Field Guide
Mammals	Menkhorst and Knight (2010), Van Dyck and Strahan (2008)
Birds	Christidis and Boles (2008), Morcombe (2004)
Reptiles	Wilson and Swan (2017)
Amphibians	Tyler and Doughty (2009)

2.3 Limitations

2.3.1 Desktop limitations

The EPBC Act PMST is based on bioclimatic modelling for the potential presence of species. As such, this does not represent actual records of the species within the project area. The records from the DBCA searches of Threatened and Priority flora and fauna provide more accurate information for the general area and local occurrence, however, some collections, sighting or trapping records cannot be dated and may misrepresent the current range of Threatened and Priority species.

2.3.2 Field survey limitations

The EPA (2016, 2020) Technical Guides states that flora and fauna survey reports for environmental impact assessment in WA should contain a section describing the limitations of the survey methods used. The limitations and constraints associated with this field survey are discussed in Table 4. Based on this assessment, the survey effort has not been subject to any constraints, which affect the thoroughness of the assessment and the conclusions were formed.

Table 4 Field survey limitations

Aspect	Constraint	Comment
Sources of information and availability of contextual information.	Nil	Adequate information is available for the survey area, this includes broadscale (1:1,000,000) mapping by Beard (1977) and digitised by Shepherd et al. (2002) and database searches (DBCA and *NatureMap*).
Scope (what life forms were sampled etc.)	Nil	Vascular flora and terrestrial vertebrate fauna were sampled during the survey. Non-vascular flora, invertebrate and aquatic fauna were not surveyed.
Proportion of flora and fauna collected and identified (based on sampling, timing and intensity)	Nil	The basic vegetation and flora survey was undertaken between 21 - 24 June, which is within the recommended timing for flora surveys in the Eremaean Botanical Province. The recommended timing is 6-8 weeks post wet season (March-June) (EPA 2016). The flora recorded from the field is detailed in Section 4 and a full flora species list is provided in Appendix D. The portion of flora collected and identified was considered representative for the survey area. The targeted fauna survey was also undertaken 21 - 24 June 2021. The fauna assessment targeted conservation significant species, including the Bilby (*Macrotis lagotis*). Recorded evidence included identifying individuals and / or any activity (footprints, foraging digs, burrows, and scats). Opportunistic sightings were also recorded, sampling those species that can be easily seen, heard or have distinctive signs, such as tracks, scats, diggings etc. Many cryptic species would not have been identified during a targeted survey and seasonal variation within species often requires targeted surveys at a particular time of the year. Of the fauna species recorded during the survey, all were identified to species level. The fauna assessment was aimed at identifying habitat types and terrestrial vertebrate fauna utilising the survey area. No sampling for invertebrates or aquatic species occurred. The information available on the identification, distribution and conservation status of invertebrates is generally less extensive than vertebrate species.
Flora determination	Nil	Flora determination was undertaken by the survey botanist in the field. Species that could not be identified in the field were collected and identified at the WA Herbarium by experienced taxonomic botanist Pali Jayasekara (GHD). Four taxa were uncertain at a species level due to lack of flowering/fruiting material. These collections are not similar to known conservation significant flora (as identified in the desktop searches). The taxonomy and conservation status of the WA flora is dynamic. This report was prepared with reliance on taxonomy and conservation status current at the time report development, but it should be noted this may change in response to ongoing research and review of International Union for Conservation Nature criteria.
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed)	Nil	The entire survey area was accessed on foot. The survey area was adequately surveyed during the field survey in line with the scope. Adequate number of floristic sampling was done for a detailed flora survey. Where possible three quadrats were sampled per vegetation type, however, one quadrat was deemed appropriate for VT02 and two quadrats sampled for VT03 and VT04 due to the smaller area mapped for these VTs. Additional opportunistic sampling was undertaken through all the survey area to develop a comprehensive species inventory.

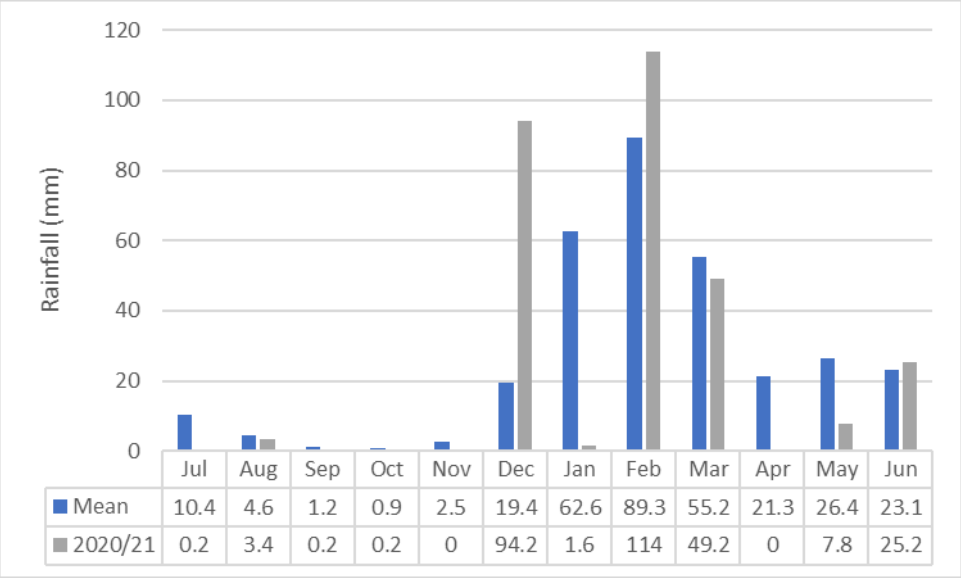
Aspect	Constraint	Comment
Mapping reliability	Nil	The vegetation and fauna habitats were mapped using high-resolution ESRI aerial imagery obtained from Landgate, topographical features, previous broad scale mapping (Beard 1977) and field data. Data was recorded in the field using hand-held GPS tools. Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. The Garmin GPS units and GPS enabled tablets used for this survey are accurate to within ± five metres on average.
Timing/weather/ season/cycle	Nil	The field survey was conducted during winter (21 - 24 June 2021 for flora and vegetation survey and for the fauna survey). In the three months prior to the survey (March-May), the Port Headland Airport Station (No. 004032) (BoM 2021) recorded a total of 57 mm of rainfall. This is below the recorded long-term average for the same period (March-May; 102.9 mm) (BoM 2021). While the rainfall was below average the flora species were mostly able to be identified through flowering/fruiting material. The weather conditions recorded during the survey were generally dry, warm, with light winds. A summary of the average climatic conditions are provided: – Daily maximum temperature 21.2 °C – Daily minimum temperature 10.8 °C – Rainfall: 21st: 3.2mm, 22nd: 17 mm, 23-24th 0 mm. The weather conditions recorded during the survey period are considered unlikely to have impacted upon the flora, vegetation and fauna survey. The survey timing was considered appropriate for the flora, vegetation and fauna field survey.
Disturbances (e.g. fire, flood, accidental human intervention)	Nil	Some of the survey area has been subjected to historical disturbance events (e.g. clearing, weeds); however, these disturbances did not affect the survey.
Intensity (in retrospect, was the intensity adequate)	Nil	The vascular flora of the survey area was sampled in accordance with EPA (2016) and terrestrial fauna sampled in accordance with EPA (2020). The survey area was sufficiently covered by the field botanist and zoologist during the survey (Figure 4, Appendix A).
Resources	Nil	Adequate resources were employed during the field survey. Eight person days were spent undertaking the survey using one botanist and one zoologist.
Access restrictions	Nil	The survey area was accessed on foot. There were no access restrictions.
Experience levels	Nil	The botanist and zoologist who executed the survey are practitioners suitably qualified and experienced in their respective fields. The field team lead, Joel Collins (flora licence no. FB62000081-2) is a senior botanist with more than 17 years' experience leading and conducting vegetation and flora surveys (detailed, basic and targeted) in the Pilbara bioregion. Senior Zoologist Robert Browne-Cooper has over 17 years' experience undertaking fauna surveys (detailed, basic and targeted) within the northern bioregion of WA, including undertaking numerous surveys in the Pilbara bioregion including targeted surveys for Bilby.

3. Desktop assessment

3.1 Climate

The Pilbara region of WA experiences a semi-arid climate and is characterised by warm to hot temperatures year round, with typically low rainfall, falling mostly in the late summer months due to the influence of tropical cyclones and monsoon. The closest BoM weather station with sufficient historical data is Port Hedland Airport Station (No. 004032), located approximately 100 km east of the survey area. Climatic data from this site indicates that the mean maximum temperature of the area ranges from 40.8ºC in December to 30.2ºC in July, and the mean minimum temperature ranges from 33.7ºC in December to 24.1ºC in July. The mean annual rainfall is 316.9 mm (BoM 2021).

Port Headland Airport Station recorded 57 mm of rainfall in the three months (March to May) preceding the survey, which is below the long term average of 102.9 mm (BoM 2021).



	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Mean	10.4	4.6	1.2	0.9	2.5	19.4	62.6	89.3	55.2	21.3	26.4	23.1
2020/21	0.2	3.4	0.2	0.2	0	94.2	1.6	114	49.2	0	7.8	25.2

Plate 1 Port Headland Airport Station (No. 004032) Rainfall (BoM 2021)

3.2 Regional biogeography

The project area is located along the borders of the Pilbara and Great Sandy Desert bioregions and lies within both the Chichester (PIL01) and McLarty (GSD01) sub-regions as described by the Interim Biogeographic Regionalisation for Australia (IBRA).

The Pilbara bioregion is characterised by vast coastal plains and inland mountain ranges with cliffs and deep gorges. Vegetation is predominantly mulga low woodlands or snappy gum over bunch and hummock grasses. Tenure comprises Aboriginal land, leasehold (for grazing cattle) and conservation reserves. The bioregion provides the majority of Western Australia (WA)'s exports in petroleum, natural gas and iron ore. Major population centres are Karratha, Port Hedland, Newman and Tom Price (DEE 2016).

The Chichester sub-region is part of the northern section of the Pilbara Craton and is characterised by undulating Archaen granite and basalt plains supporting shrub steppe. Vegetation is predominately *Acacia pyrifolia* over *Trioda pungens* hummock grasslands with Snappy Gum tree steppes occurring on ranges. Climatic conditions are described as semi-desert-tropical (300 mm), with drainage to the north via multiple rivers including De Grey River (Tille 2006).

The Great Sandy Desert bioregion is characterised by expansive red sand plains, dunefields and remnant rocky outcrops. Vegetation is predominantly spinifex grasslands, low woodlands and mixed shrubs. Tenure comprises Aboriginal land, unallocated crown land, conservation reserves and pastoral leases along the far western and eastern edges. The main industries of the bioregion include tourism, mining and mineral exploration (DEE 2016).

The McLarty sub-region is characterised by red-brown dunefields with finer texture than those further south, and includes gravelly surfaces of Anketell Ridge along the northern margin and the Madora Paleoriver System. Vegetation is characterised by *Owenia reticulata* savannas and mafer grasses. Monsoonal influence is apparent, with morning fogs common in the dry season and a sub-humid component evident in flora and fauna (Tille 2006).

3.3 Soil landscapes

Department of Primary Industries and Regional Development (previously Department of Agriculture and Food, WA (DAFWA)) and others have surveyed the Pilbara region for the purposes of land classification, mapping and resource evaluation. 102 land systems have been described for the region, which are distinguished on the basis of topography, geology, soils and vegetation (Van Vreeswyk et al. 2004). Two land systems occur within the survey area as shown in Table 5.

Table 5 Soil units occurring within the survey area (DAFWA 2007)

Land system	Description	Geology	Geomorphology
Nita	Sandplains supporting shrubby spinifex grasslands with occasional trees	Quaternary eolian sand	Depositional surfaces; level eolian sandplains and occasional linear dunes, isolated low hills and occasional stony or gravelly rises; no organised drainage features. Relief up to 15 m.
Capricorn	Rugged sandstone hills, ridges, stony footslopes and interfluves supporting low acacia shrublands or hard spinifex grasslands with scattered shrubs	Lower Proterozoic sandstone, greywacke, dolomite and shale	Erosional surfaces, ranges and hills with steep rocky upper slopes, more gently sloping stony footslopes, restricted stony lower plains and valleys; moderately spaced tributary drainage patterns. Relief up to 180 m.

3.4 Hydrology

The GoWA (2021a) data layers identified the water resource aspects present in the survey area. These are detailed below in Table 6.

Table 6 Department of Water and Environment Regulation geographic data atlas queries for the survey area

Aspect	Details	Results
Groundwater Areas	Groundwater areas proclaimed under the RIWI Act	Canning-Kimberley
Surface Water Areas	Surface water areas proclaimed under the RIWI Act	None present
Irrigation District	Irrigation Districts proclaimed under the RIWI Act	None present
Rivers	Rivers proclaimed under the Rights in RIWI Act	None present
PDWSA	PDWSA is a collective term used for the description of Water Reserves, Catchment Areas and Underground Pollution Control Areas declared (gazetted) under the provisions of the *Country Area Water Supply Act 1947*	None present
Waterways Management Areas	Areas proclaimed under the Waterway Conservation Act 1976	None present

3.4.1 Wetlands

One nationally important wetland, De Grey River, is located within approximately 11 km of the survey area. No Internationally (Ramsar) important wetlands are located within 20 km of the survey area.

3.5 Land use

3.5.1 DBCA managed lands

No DBCA managed areas are located within the survey area or desktop study area.

3.5.2 Environmentally sensitive areas

One environmentally sensitive area, ESA no. 7214 (De Grey River) is located within the desktop study area.

3.6 Flora and vegetation

3.6.1 Broad vegetation mapping and extents

Broad scale (1:1,000,000) pre-European vegetation mapping of the area was completed by Beard (1977) at an association level. The mapping indicates that three vegetation associations are present within the survey area.

– Hummock grassland with scattered shrubs or mallee *Triodia* spp., *Acacia* spp., *Grevillea* spp., *Eucalyptus* spp. (association 101)
– Hummock grassland *Triodia* spp. (association 117)
– Hummock grassland with scattered shrubs or mallee *Triodia* spp., *Acacia* spp., *Grevillea* spp., *Eucalyptus* spp. (association 93).

The pre-European mapping has been adapted and digitised by Shepherd et al. (2002). The extent of vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by DBCA (latest update March 2019 – GoWA 2021b). As shown in Table 7. The current extent remaining of vegetation associations 93 and 101 are greater than 98 % of their calculated pre European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and LGA).

Table 7 Extent of pre European vegetation associations mapped within the survey area (Beard 1977 GoWA 2021b)

Vegetation	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	% current extent in all DBCA managed land (proportion of current extent)
101	State: Western Australia	1,191,083.92	1,191,038.16	100	1.67
	IBRA bioregion: Pilbara	340.55	340.55	100	
	IBRA sub-region: Chichester	284.82	284.82	100	
	IBRA bioregion: Great Sandy Desert	961,169.80	961,124.04	100	2.07
	IBRA sub-region: McLarty	625,007.06	624,961.30	99.99	3.18
	LGA: Shire of East Pilbara	612,919.86	612,904.35	100	3.25
117	State: Western Australia	919,517.05	886,005.79	96.36	14.79
	IBRA bioregion: Pilbara	82,705.78	78,096.64	94.43	22.54
	IBRA sub-region: Chichester	31,742.84	31,195.06	98.27	

Vegetation	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	% current extent in all DBCA managed land (proportion of current extent)
	IBRA bioregion: Great Sandy Desert	467,578.77	467,121.73	99.90	0.19
	IBRA sub-region: McLarty	247,330.69	246,922.93	99.84	
	LGA: Shire of East Pilbara	655,721.38	654,571.35	99.82	16.04
93	State: Western Australia	3,044,309.52	3,040,640.98	99.88	1.96
	IBRA bioregion: Pilbara	3,042,114.27	3,038,471.67	99.88	1.96
	IBRA sub-region: Chichester	2,940,348.04	2,936,731.54	99.88	2.03
	IBRA bioregion: Great Sandy Desert	1,107.30	1,095.89	98.97	
	IBRA sub-region: McLarty	1,107.30	1,095.89	98.97	
	LGA: Shire of East Pilbara	1,709,522.24	1,706,780.57	99.84	2.70

3.6.2 Significant ecological communities

The DBCA TEC and PEC database identified no TEC or State-listed PEC within the survey area or desktop study area.

3.6.3 Flora diversity

The *NatureMap* database identified 75 flora taxa, representing 26 families and 47 genera previously recorded within the desktop study area. This total comprised all native taxa and no naturalised (introduced) taxa. Dominant families recorded included Fabaceae (23 taxa), Poaceae (11 taxa), Myrtaceae (4 taxa), Convolvulaceae (4 taxa) and Proteaceae (4 taxa). The *NatureMap* database search is provided in Appendix C.

3.6.4 Significant flora

The EPBC Act PMST, *NatureMap* database and DBCA TPFL and WAHERB databases identified the presence/potential presence of 11 significant flora taxa within the study area. The desktop searches recorded:

– One taxon listed as Threatened (Critically Endangered / Endangered under the BC Act and EPBC Act respectively).
– One taxon listed as Priority 1
– One taxon listed as Priority 2
– Six taxa listed as Priority 3
– Two taxa listed as Priority 4

The locations of significant flora registered on the DBCA databases are mapped in Figure 2, Appendix A.

3.7 Fauna

3.7.1 Fauna diversity

The *NatureMap* database (DBCA 2007-) identified 715 terrestrial vertebrate fauna species previously recorded within the desktop study area. Of the 91 fauna species previously recorded, 714 were native species and only one record of a naturalised (introduced) species. Dominant families recorded included Scincidae (19 taxa), Scolopacidae (18 taxa) and Accipitridae (13 taxa). The *NatureMap* database search is provided in Appendix C.

3.7.2 Significant fauna

The EPBC Act PMST (DAWE2021a), *NatureMap* database (DBCA 2007-) and DBCA Threatened and Priority fauna database (DBCA 2021c) identified the presence/potential presence of 54 significant fauna within the study area. This total does not include those species that are exclusively marine-based (pelagic), as no marine habitat is present within the survey area or indirectly impacted by the project. One invertebrate, Pilbara Dragonfly (*Antipodgomphus hodgkini*) was excluded.

The species list included:

– Six species listed as Vulnerable under the EPBC Act and / or BC Act
– Six species listed as Endangered under the EPBC Act and / or BC Act
– Five species listed as Critically Endangered under the EPBC Act and / or BC Act
– 33 species listed as Migratory only under the EPBC Act and / or BC Act
– Six species listed as Priority 4
– One species listed as Specially Protected under the BC Act

The locations of conservation significant fauna registered on the DBCA databases are mapped in Figure 2, Appendix A.

4. Field survey results

4.1 Flora and vegetation

4.1.1 Vegetation types

Four vegetation types aligning with broad landforms were identified and described in the survey area, not including cleared areas for tracks:

- VT01 – *Corymbia flavescens* and *Corymbia zygophylla* isolated trees over *Acacia tumida* var. *pilbarensis, Acacia ancistrocarpa* and *Grevillea wickhamii* subsp. *hispidula* open shrubland to sparse shrubland on red brown sandplain
- VT02 – *Eucalyptus odontocarpa* isolated mallee over *Acacia tumida* var. *pilbarensis, Acacia ancistrocarpa* and *Grevillea wickhamii* subsp. *hispidula* open shrubland to sparse shrubland on red brown sandplain to low rise between low rocky hills
- VT03 – *Corymbia opaca* scattered trees and *Eucalyptus odontocarpa* scattered mallee over *Acacia tumida* var. *pilbarensis, Acacia pruinosa* and *Acacia orthocarpa* open shrubland to sparse shrubland on red brown sandy loam on granite and quartz rocky low hills and slopes. Scattered *Melaleuca glomerata* are present through vegetation type.
- VT04 – *Eucalyptus victrix, Corymbia opaca* and *Corymbia zygophylla* scattered trees over *Acacia tumida* var. *pilbarensis* and *Grevillea wickhamii* subsp. *hispidula* open shrubland on red brown sandy loam on water gaining area on upper part of drainage flats. Scattered *Melaleuca glomerata* are present through vegetation type.

The vegetation types are described in further detail in Table 8 and mapped in Figure 5, Appendix A.

4.1.2 Significant vegetation communities

No TECs listed under the EPBC Act or BC Act or PECs listed by DBCA were identified within the survey area during the field survey.

4.1.3 Vegetation condition

The condition of the vegetation within the survey area ranged from Excellent to Very Good. Native vegetation covered 135.23 ha and cleared areas 0.15 ha. The extents of the vegetation condition within the survey area are detailed in Table 9 and mapped in Figure 5, Appendix A. The vegetation structure was intact with limited signs of cattle activity and a low number of introduced flora were recorded. Areas on the western end of the survey area had previous disturbance through cattle grazing and higher cover of introduced species *(*Cenchrus ciliaris*). There were limited number of tracks that dissected the survey area.

Table 8 *Recorded vegetation types*

Vegetation type	Vegetation Type Description	Extent (ha)	Sampling sites	Photograph
VT01	*Corymbia flavescens* and *Corymbia zygophylla* isolated trees over *Acacia tumida* var. *pilbarensis, Acacia ancistrocarpa* and *Grevillea wickhamii* subsp. *hispidula* open shrubland to sparse shrubland over *Acacia stellaticeps* and *Jacksonia acicularis* open shrubland over *Triodia schinzii* and *Triodia ?pungens* open hummock grassland over *Eriachne lanata, Eriachne ?obtusa* and *Eragrostis desertorum* open tussock grassland over *Bonamia erecta, Ptilotus astrolasius* and *Centipeda* sp.sparse forbland on red brown sandplain.	123.04	Bore_01, Bore_02, Bore_03	
VT02	*Eucalyptus odontocarpa* isolated mallee over *Acacia tumida* var. *pilbarensis, Acacia ancistrocarpa* and *Grevillea wickhamii* subsp. *hispidula* open shrubland to sparse shrubland over *Corchorus sidoides, Dodonaea coriacea* and *Jacksonia acicularis* open shrubland over *Triodia schinzii* and *Triodia ?pungens* open hummock grassland over *Eriachne ?obtusa* open tussock grassland over *Bonamia erecta, Ptilotus astrolasius* and *Centipeda* sp.sparse forbland on red brown sandplain to low rise between low rocky hills.	2.35	Bore_04	

Vegetation type	Vegetation Type Description	Extent (ha)	Sampling sites	Photograph
VT03	*Corymbia opaca* scattered trees and *Eucalyptus odontocarpa* scattered mallee over *Acacia tumida* var. *pilbarensis, Acacia pruinosa* and *Acacia orthocarpa* open shrubland to sparse shrubland over *Acacia spondylophylla* and *Corchorus incanus* open shrubland over *Triodia ?pungens* open hummock grassland over *Aristida holathera* var. *holathera* and *Eriachne ?obtusa* open tussock grassland over *Trigastrotheca molluginea, Trianthema pilosum* and *Bonamia erecta.* sparse forbland on red brown sandy loam on granite and quartz rocky low hills and slopes.	2.37	Bore_05, Bore_08	
VT04	*Eucalyptus victrix, Corymbia opaca* and *Corymbia zygophylla* scattered trees over *Acacia tumida* var. *pilbarensis* and *Grevillea wickhamii* subsp. *hispidula* open shrubland over *Corchorus sidoides, Tephrosia* sp. Bungaroo Creek (M.E. Trudgen 11601) and *Jacksonia acicularis* open shrubland over *Triodia schinzii* and *Triodia ?pungens* open hummock grassland over *Aristida holathera* var. *holathera* and *Eragrostis desertorum* open tussock grassland over *Ptilotus astrolasius, Tephrosia* sp. D Kimberley Flora (R.D. Royce 1848) and *Bonamia erecta.* sparse forbland on red brown sandy loam on water gaining area on upper part of drainage flats. Scattered *Melaleuca glomerata* are present through vegetation type.	7.46	Bore_06, Bore_07	

Vegetation type	Vegetation Type Description	Extent (ha)	Sampling sites	Photograph
Cleared	Cleared areas devoid of native vegetation	0.15	-	-

Table 9 Vegetation condition

Vegetation condition	Extent in survey area (ha)	%
Excellent	123.11	90.97
Very Good	12.12	8.95
Good	-	-
Poor	-	-
Degraded	-	-
Completely Degraded	-	-
Total	**135.23**	

4.1.4 Flora diversity

Seventy-seven flora taxa (including subspecies and varieties) representing 22 families and 45 genera were recorded from the survey area during the field survey. This total comprised 76 native species and one introduced flora taxa.

Dominant families recorded from the survey area included:

– Fabaceae (16 taxa)
– Poaceae (11 taxa)
– Malvaceae (eight taxa)

The complete list of flora identified within the survey compiled by site and species list by family is provided in Appendix D.

4.1.5 Introduced flora

One introduced flora taxon was recorded in the survey area:

– **Cenchrus ciliaris*.

This introduced/naturalised flora taxon identified during the survey is not listed as a Declared Pest under the *Biosecurity and Management (BAM) Act 2007* or a Weed of National Significance (WoNS). **Cenchrus ciliaris* has previously been recorded from the Pilbara and Great Sandy Desert bioregions (DBCA 2007-).

4.1.6 Significant flora

No EPBC Act or BC Act listed flora or priority flora listed by the DBCA were recorded from the survey area.

Likelihood of occurrence assessment

A likelihood of occurrence assessment was conducted for all significant flora species identified in the desktop assessment (Appendix D). This assessment took into account previous records and habitat requirements through desktop assessment and vegetation observed in the field.

The likelihood of occurrence assessment concluded that *Euphorbia clementii* (P3) may possibly occur based on nearest record within one km of the survey area and suitable habitat present (stony hills and slopes). While adequate search effort did not record the species future disturbance events, such as fire, may allow the species to recruit from soil seed bank. All other conservation listed taxa are unlikely to occur within the survey area due to a lack of suitable habitat and/or adequate search effort.

4.1.7 Flora of interest

No collections were made of species considered to be flora of interest from the project areas, such as significant range extensions or collections of taxonomic interest representing potential new species.

4.2 Fauna

4.2.1 Fauna habitats

Four broad fauna habitat types were described and mapped during the field survey as described in Table 10 and shown in Figure 6, Appendix A. These comprised of:

Low *Acacia stelliceps* shrubland over *Triodia* hummock and tussock grassland on red sandy loam soil on flat plain

Eucalyptus mallee over *Acacia* sp and *Melaleuca* sp open shrubland over hummock grassland on red sandy loam soil on plain to low rise between low rocky hills

Acacia and *Grevillea* over hummock grassland on rocky low hills and slopes

Eucalyptus victrix scattered trees over *Acacia* open shrubland over hummock grassland on red brown sandy loam on water gaining area on upper part of drainage flats.

These fauna habitats align with the mapped vegetation types. Fauna habitats covered 135.23 ha and cleared areas 0.15 ha.

The survey area is part of a larger continuous area sandplain and flat drainage system that extends throughout the surrounding area. The habitats within the survey area have a high degree of habitat connectivity with surrounding vegetation having similar or better condition vegetation.

Table 10 Fauna habitat types within the survey area

Habitat type	Photograph	Extent in the survey area (ha)
Low *Acacia stelliceps* shrubland over *Triodia* hummock and tussock grassland on red sandy loam soil on flat plain This habitat type generally corresponds with vegetation type VT01. Habitat condition excellent to very good with some minor tracks. Limited disturbance includes small isolated occurrences of weeds, minor cattle grazing and recent fire (0-2 years) particularly on the eastern half of the survey area. Soils are moderately well drained sandy clay. It is foraging habitat for a diverse range of regionally widespread and common bird species such as Australian Bustard, Brown Falcon, Red-browed Pardalote, and Variegated Fairy-wren. Budgerigar. Several low termite mounds within the survey area, however, many broken into smaller pieces from foraging reptiles. **Significant fauna** Foraging and breeding habitat for Greater Bilby (*Macrotis lagotis*). Foraging habitat for Peregrine Falcon (*Falco peregrinus*), Grey Falcon (*Falco hypoleucos*), Rainbow Bee-eater (*Merops ornatus*), Brush-tailed Mulgara (*Dasycercus blythi)*, Spectacled Hare Wallaby (*Lagorchestes conspicillatus leichardti)* and Lakeland Downs Mouse (*Leggadina lakedownensis)*. **Habitat value** High value habitat for Greater Bilby and Grey Falcon		123.04

Habitat type	Photograph	Extent in the survey area (ha)
Eucalyptus mallee over *Acacia* sp and *Melaleuca* sp open shrubland over hummock grassland on red sandy loam soil on plain to low rise between low rocky hills This habitat type generally corresponds with vegetation type VT02. Habitat condition excellent to very good with some minor tracks. Limited disturbance includes small isolated occurrences of weeds and minor cattle grazing. Soils are moderately well drained sandy clay. It is foraging habitat for a diverse range of regionally widespread and common bird species such as Australian Bustard, Brown Falcon, Red-browed Pardalote, and Variegated Fairy-wren. Budgerigar, Several low termite mounds within the survey area, however, many broken into smaller pieces from foraging reptiles. **Significant fauna** Foraging and breeding habitat for Greater Bilby (*Macrotis lagotis*). Foraging habitat for Peregrine Falcon (*Falco peregrinus*), Grey Falcon (*Falco hypoleucos*), Rainbow Bee-eater (*Merops ornatus*), Brush-tailed Mulgara (*Dasycercus blythi)*, Spectacled Hare Wallaby (*Lagorchestes conspicillatus leichardti)* and Lakeland Downs Mouse (*Leggadina lakedownensis)*. **Habitat value** High value habitat for Greater Bilby and Grey Falcon		2.35

Habitat type	Photograph	Extent in the survey area (ha)
Acacia and *Grevillea* over hummock grassland on rocky low hills and slopes This habitat type generally corresponds with vegetation type VT03. Habitat condition excellent to very good with some minor tracks. Limited disturbance with nearby track present. Soils are well drained sandy loam with granite and quartz rocks. It is foraging habitat for a diverse range of regionally widespread and common bird species such as Australian Bustard, Brown Falcon, Red-browed Pardalote, and Variegated Fairy-wren. Budgerigar, **Significant fauna** Habitat for Greater Bilby (*Macrotis lagotis*). Foraging habitat for Peregrine Falcon (*Falco peregrinus*), Grey Falcon (*Falco hypoleucos*), Spectacled Hare Wallaby (*Lagorchestes conspicillatus leichardti)* and Rainbow Bee-eater (*Merops ornatus*). **Habitat value** High value habitat for Grey Falcon		2.37
Eucalyptus victrix scattered trees over *Acacia* open shrubland over hummock grassland on red brown sandy loam on water gaining area on upper part of drainage flats This habitat type generally corresponds with vegetation type VT04. Habitat condition excellent to very good with some minor tracks. Limited disturbance includes small isolated occurrences of weeds and minor cattle grazing. Soils are moderately well drained sandy clay. It is foraging habitat for a diverse range of regionally widespread and common bird species such as Australian Bustard, Brown Falcon, Red-browed Pardalote, and Variegated Fairy-wren. Budgerigar, Several low termite mounds within the survey area, however, many broken into smaller pieces from foraging reptiles. **Significant fauna** Foraging and breeding habitat for Greater Bilby (*Macrotis lagotis*). Foraging habitat for Peregrine Falcon (*Falco peregrinus*), Grey Falcon (*Falco hypoleucos*), Rainbow Bee-eater (*Merops ornatus*), Brush-tailed Mulgara (*Dasycercus blythi)*, Spectacled Hare Wallaby (*Lagorchestes conspicillatus leichardti)* and Lakeland Downs Mouse (*Leggadina lakedownensis)*.		7.46

Habitat type	Photograph	Extent in the survey area (ha)
Habitat value High value habitat for Greater Bilby and Grey Falcon		
Cleared	Cleared areas devoid of native vegetation	0.15

4.2.2 Fauna diversity

A total of 55 fauna species were recorded within the survey area, including 35 birds, eight mammals, and 12 reptiles. Most species recorded were opportunistic observations of active fauna or bird calls identified while traversing the survey area during targeted fauna search and active searches. All fauna species recorded are generally widespread and abundant within habitat of the local area and wider region. Four introduced fauna species were recorded including Camel (*Camelus dromedarius*) Cattle (*Bos taurus*), Dog (*Canus domesticus*), and Feral Cat (*Felis catus*). A list of fauna species identified during the field survey is provided in Appendix E.

4.2.3 Significant fauna

Two significant fauna species were recorded during the survey:

– Grey Falcon (*Falco hypoleucos*) listed as Vulnerable under the EPBC Act and BC Act.
– Greater Bilby (*Macrotis lagotis*) (secondary evidence) listed as Vulnerable under the BC Act and EPBC Act.

The Grey Falcon was recorded at three locations, most likely the same two individuals (adult and juvenile).

The location of the conservation significant fauna in the survey are is shown in Figure 6, Appendix A. No other conservation listed fauna species listed under the EPBC Act and / or BC Act were recorded within the survey area.

Targeted survey for Greater Bilby (Macrotis lagotis)

Secondary recent evidence of the Greater Bilby (VU) activity (foraging holes, burrows, scat) was recorded within the survey area (Plate 2). The targeted Greater Bilby survey assessed eight plots. The results of the data collected is presented in Appendix E as a composite summary. The method allows for assessment of each transect/plots trackability of Greater Bilby as well as plot Other Determining Signs (ODS) . For plot trackability the mean score was 3.37. This equates to a moderate high degree of difficulty in the detectability of the Greater Bilby within the plots and transects.

The likelihood of occurrence post-survey concluded that the Greater Bilby is likely to occur in the survey area. The nearest record is a cluster of records approximately 0.43 km northwest of the survey area, from 2012. The second nearest record from 2012 is another cluster of records approximately 0.70 km south of the survey area. A more recent record from 2014 is approximately 1.05 km north west of the survey area (DBCA 2021c). Greater Bilby have been well-recorded in the area and suitable habitat is present in Low *Acacia stelliceps* shrubland over *Triodia* hummock and tussock grassland, *Eucalyptus* mallee over *Acacia* sp and *Melaleuca* sp open shrubland over hummock grassland and *Eucalyptus victrix* scattered trees over *Acacia* open shrubland over hummock grassland. As the Bilby is a mobile species and may occupy various areas overtime (based on previous records) it its considered likely that the species may occur, particularly in areas immediately west and further east of Shay Gap Road.

Plate 2: Greater Bilby (VU) burrowing activity evidence

Likelihood of occurrence

A likelihood of occurrence assessment was conducted for significant fauna species identified in the desktop assessment. This assessment was based on species biology, habitat requirements, the likely quality and availability of suitable habitat (based on vegetation types present within the survey area) and records of the species in the vicinity. No assumptions were made on the transient potential of these species. The complete likelihood assessment is provided in Appendix E. This assessment took into account previous records, species biology and habitat requirements through desktop assessment.

Of the identified conservation listed fauna species for the survey area:

Two were recorded during the current survey, Grey Falcon and Greater Bilby (secondary evidence).

Six other species are considered likely to occur due to local occurrence and habitat availability, these include:

– Brush-tailed Mulgara (Vulnerable)
– Peregrine Falcon (Specially protected fauna)
– Yellow Wagtail (Migratory)
– Spectacled Hare Wallaby (Priority 4)
– Lakeland Downs Mouse (Priority 4)
– Black-eared Cuckoo (Marine)

Of the remaining conservation listed fauna species:

– 13 were considered unlikely to occur
– 38 were considered high unlikely to occur.

5. Discussion

The survey area consists of a linear corridor up to 50 m wide across native vegetation.

The recorded vegetation types do not represent any EPBC Act or BC Act listed TECs or DBCA listed PECs or other vegetation types of significance as defined in EPA (2016). The condition of the vegetation within the survey area ranged from Excellent to Very Good with limited signs of disturbance within the survey area.

The vegetation adjacent to the survey area is continuous and considered to represent vegetation in excellent condition.

No EPBC Act or BC Act listed flora or priority flora listed by the DBCA were recorded from the survey area. The likelihood of occurrence assessment concluded that *Euphorbia clementii* (P3) may possibly occur based on nearest record within 1 km of the survey area and suitable habitat present (stony hills and slopes). While adequate search effort did not record the species, future disturbance events, such as fire, may allow the species to recruit from soil seed bank. All other conservation listed taxa are unlikely to occur within the survey area based on lack of suitable habitat and/or adequate search effort.

The proposed powerline development is considered not to have a significant impact on the flora and vegetation values at a local and regional scale due to the high representation and continuation of vegetation in the region outside of the survey area.

Four broad fauna habitat types were described and mapped during the field survey. The habitats within the survey area have a high degree of habitat connectivity with surrounding vegetation being in similar or better condition.

Two conservation significant fauna were recorded during the survey:

– Grey Falcon listed as Vulnerable under the EPBC Act and BC Act
– Greater Bilby (secondary evidence) listed as Vulnerable under the BC Act and EPBC Act.

The Grey Falcon was recorded at two locations, most likely the same two individuals (adult and juvenile).

Secondary recent evidence of the Greater Bilby (VU) activity (foraging holes, burrows, scat) was recorded within the survey area. Greater Bilby have been well-recorded in the area and suitable habitat is present present in Low *Acacia stelliceps* shrubland over *Triodia* hummock and tussock grassland, *Eucalyptus* mallee over *Acacia* sp and *Melaleuca* sp open shrubland over hummock grassland and *Eucalyptus victrix* scattered trees over *Acacia* open shrubland over hummock grassland. As the Greater Bilby is a mobile species and may occupy various areas overtime (based on previous records) it its considered likely that the species may occur, particularly in areas immediately west and further east of Shay Gap Road.

Six other species are considered likely to occur due to local occurrence and habitat availability, these include:

– Brush-tailed Mulgara (Vulnerable)
– Peregrine Falcon (Specially protected fauna)
– Yellow Wagtail (Migratory)
– Spectacled Hare Wallaby (Priority 4)
– Lakeland Downs Mouse (Priority 4)
– Black-eared Cuckoo (Marine)

The proposed powerline development is considered not to have a significant impact on likely to occur conservation listed fauna species at a local and regional scale due to the high representation and continuation of available habitat in the region outside of the survey area. Future vegetation clearing should consider a fauna clearance survey to detect potentially new Bilby burrows that may have been established during the project environmental approvals timeframe.

6. References

Atlas of Living. 2021, Website https://www.ala.org.au, accessed July 2021.

Beard, J.S 1977, Vegetation Survey of Western Australia: Kimberley, map and explanatory memoir, 1:1,000,000 series, Nedlands, University of Western Australia Press.

Biologic 2012, *Ctenotus angusticeps* Targeted Survey: Onslow to Broome. Prepared for BHP Billiton Iron Ore.

Birdlife Australia. 2019. Website https://birdlife.org.au/projects/bittern-project, accessed July 2021.

Boles, WE, Longmore NW and Thompson, MC 1994, *A recent specimen of the Night Parrot, Geopsittacus occidentalis*, Emu, vol 94, pp 37-40.

Bureau of Meteorology (BoM) 2021, Climate Data Online, retrieved July 2021, from http://www.bom.gov.au/climate/data/

Christidis & Boles (2008). Systematics and Taxonomy of Australian Birds. CSIRO Publishing

Collins, P, Boyle, A, Minton, C and Jessop, R 2001, *The importance of inland claypans for waders in Roebuck Bay, Broome, NW Australia*, Stilt, vol 38, pp 4-8.

Cramp, S 1985. *The birds of the Western Palearctic*. Vol. IV. Oxford University Press, Oxford.

Department of Agriculture and Food WA (DAFWA) 2007, *Soil-landscape mapping in South-WA*, Perth, Department of Agriculture and Food.

Department of Agriculture, Water and the Environment (DAWE) 2011a. Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth of Australia.

Department of Agriculture, Water and the Environment (DAWE) 2021a, *Environmental Protection and Biodiversity Conservation Act 1999* Protected Matters Search Tool Results, retrieved July 2021, from http://www.environment.gov.au/epbc/pmst/index.html

Department of Agriculture, Water and the Environment (DAWE) 2011b. Survey guidelines for Australia's threatened reptiles. Guidelines for detecting reptiles listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth of Australia.

Department of Agriculture, Water and the Environment (DAWE) 2021b, Species Profile and Threats Database (SPRAT), retrieved July 2021, from http://www.environment.gov.au/cgi-bin/sprat/public/.

Department of Biodiversity, Conservation and Attractions (DBCA) 2007–, *NatureMap*: Mapping Western Australia's Biodiversity, retrieved February 2021, from https://naturemap.dpaw.wa.gov.au/default.aspx

Department of Biodiversity, Conservation and Attractions (DBCA) 2017. Guidelines for surveys to detect the presence of bilbies and assess the importance of habitat in Western Australia.

Department of Biodiversity, Conservation and Attractions (DBCA) 2021a, Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) database search.

Department of Biodiversity, Conservation and Attractions (DBCA) 2021b, DBCA Threatened (Declared Rare) and Priority Flora (TPFL) database and the WA Herbarium database searches.

Department of Biodiversity, Conservation and Attractions (DBCA) 2021c, DBCA Threatened and Priority Fauna database search.

Department of the Environment and Energy (DEE) 2016, *Interim Biogeographic Regionalisation of Australia*, Version 7, retrieved June 2021, from http://www.environment.gov.au/land/nrs/science/ibra/australias-bioregions-maps.

Environmental Protection Authority (EPA) 2016, Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment, Perth, Environmental Protection Authority.

Environmental Protection Authority (EPA) 2020, Technical Guidance – Sampling methods for terrestrial vertebrate fauna, Perth, Environmental Protection Authority.

Garnett, S and Crowley, M, 2000, *The action plan for Australian birds. Canberra*, Australia, Environment Australia.

Geering, A., L. Agnew & S. Harding, 2007, eds. *Shorebirds of Australia.* Page(s) 75-196. Melbourne: CSIRO Publishing.

Government of Western Australia (GoWA) 2021a, data.wa.gov.au, accessed July 2021, from https://data.wa.gov.au/.

Government of Western Australia (GoWA) 2021b, 2019 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full report), Current as of March 2019, Perth, Australia, Department of Biodiversity, Conservation and Attractions, retrieved July 2021, from https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics.

Higgins, P J and Davies, S J J F (eds.) 1996, Handbook of Australian, New Zealand & Antarctic birds, Volume 3: Snipe to Pigeons, South Melbourne, Australia, Oxford University Press.

Jarman, H, 1978. An inland record of the Whimbrel. Australian Bird Watcher. 7:170.

Johnston, R E, and Storr, G M, 2004, *Handbook of Birds of Western Australia, Volume II – Passerines*. Perth, Western Australia: Western Australian Museum.

Lloyd, R L and Lloyd, H J (1991). An Oriental Pratincole at the Dry Creek Saltfields, South Australian Ornithologist. 31: 74.

Marchant, S and Higgins, PJ (eds) 1993, *Handbook of Australian, New Zealand and Antarctic Birds*, *Volume 2: Raptors to Lapwings*, Melbourne, Australia, Oxford University Press.

Masters, P, Dickman, C R, and Crowther, M, 2003*, Effects of cover reduction on mulgara Dasycercus cristicauda (Marsupialia: Dasyuridae), rodent and invertebrate populations in central Australia: implications for land management*, Austral Ecology vol 28, pp. 658-665.

Menkhorst, P., and Knight, F. 2010. A field Guide to the Mammals or Australia. Oxford University Press.

Morcombe, M 2004, *Field Guide to Australian Birds*, Archer Field, Australia, Steve Parish Publishing.

Nevill, S 2013, *Birds of Western Australia*, Perth, Australia, Simon Nevill Publications.

NVIS Technical Working Group 2017, Australian Vegetation Attribute Manual: National Vegetation Information System, Version 7.0, Department of the Environment and Energy, Canberra.

Parker, S A 1980, *Birds and conservation parks in the north-east of South Australia*. South Australian Parks and Conservation. 3:11-18.

Pavey, C, 2006, National Recovery Plan for the Greater Bilby Macrotis lagotis. Northern Territory Department of Natural Resources, Environment and the Arts.

Pearson, D J, 1993. 'Distribution, status and conservation of pythons in Western Australia', In: Lunney, D & Ayers, D (Eds) *Herpetology in Australia: a Diverse Discipline*, pp. 383-395, Royal Zoological Society of NSW, Sydney.

Pearson, D J, 2006, *Giant Pythons of the Pilbara*, Landscope, vol 19, pp. 32-39.

Pringle, J.D. 1987. *The Shorebirds of Australia.* Sydney, NSW: Angus & Robertson.

Sadlier, R A 1993, A range extension for the scincid lizard Ctenotus angusticeps of north-western Australia, Herpetofauna, vol 23(1), pp 7-8.

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

Southgate, R., Paltridge, R. Masters, P, Nano, T. 2005. An evaluation of transect, plot and aerial survey techniques to monitor the spatial pattern and status of the bilby (Macrotis lagotis) in the Tanami Desert. Wildlife Research 32(1).

Southgate, R., Dziminski, M., Paltridge, R., Schubert, A., & Gaikhorst, G. (2018). Verifying bilby presence and the systematic sampling of wild populations using sign-based protocols – with notes on aerial and ground survey techniques and asserting absence. Journal of the Australian Mammal Society

Storr, G.M. 1980. Birds of the Kimberley Division, Western Australia. Special Publications of the Western Australian Museum, No. 11. 11:1-117. Perth, Western Australia: Western Australian Museum.

Storr, G.M, 1988. A new Ctenotus (Lacertilia: Scincidae) from Western Australia. Records of the Western Australian Museum, No. 14(1):139-140.

Tille, P J. 2006 *Soil-landscapes of Western Australia's rangelands and arid interior*. Department of Agriculture and Food, Western Australia, Perth. Report 313.

Trudgen, M.E, 1988, A report on the Flora and Vegetation of the Port Kennedy Area, unpublished report prepared for Bowman Bishaw and Associates, West Perth.

Tulp, L and deGoeij, P, 1994, *Evaluating Wader Habitats in Roebuck Bay (North-western Australia) as a Springboard for Northbound Migration in Waders, with a focus on Great Knots*, Emu, vol 94(2), pp 78-95.

Tyler & Doughty. 2009. Field Guide to Frogs of Western Australia. WA Museum.

Van Dyck, S. and R. Strahan (2008) The Mammals of Australia. New Holland. Sydney, NSW.

Van Vreeswyk, A M, Leighton, K A, Payne A L, and Hennig, P. 2004, *An inventory and condition survey of the Pilbara region*, Western Australia. Department of Agriculture and Food, Western Australia, Perth. Technical Bulletin 92.

Watkins, D, 1993, A National Plan for Shorebird Conservation in Australia. Report to World Wide Fund for Nature, Prepared by the Australasian Wader Studies Group.

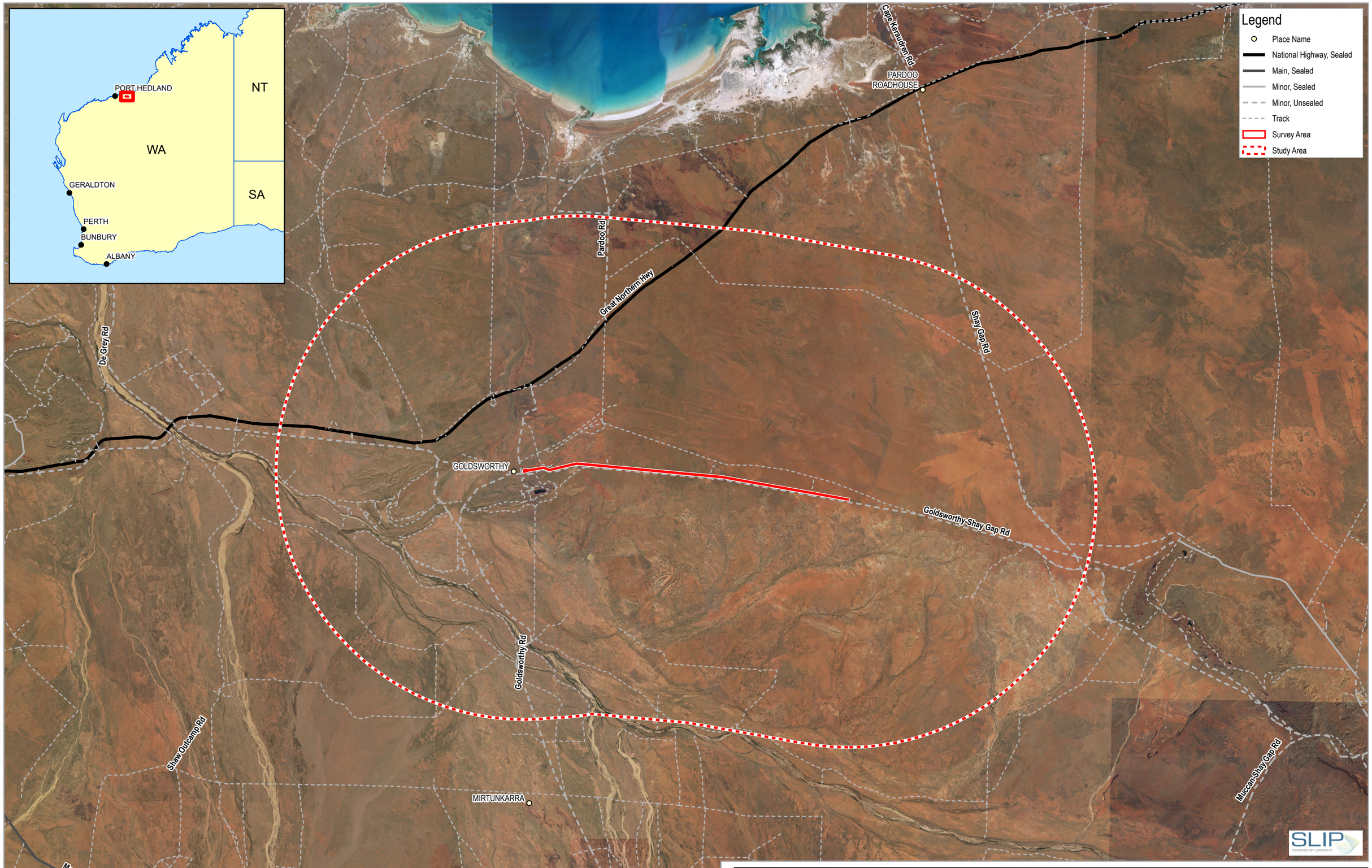
Wilson, S and Swan, G 2013, *A Complete Guide to Reptiles of Australia*, fourth edition, New South Wales, Australia, New Holland Publishers.

Wilson et al 2017 A complete guide to reptiles of Australia Fifth Edition, New Holland Publishing, Sydney Australia

Appendices

Appendix A

Figures



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GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Study and Survey Area Boundary

Project No. **12543431**
Revision No. **0**
Date **2/07/2021**

FIGURE 1

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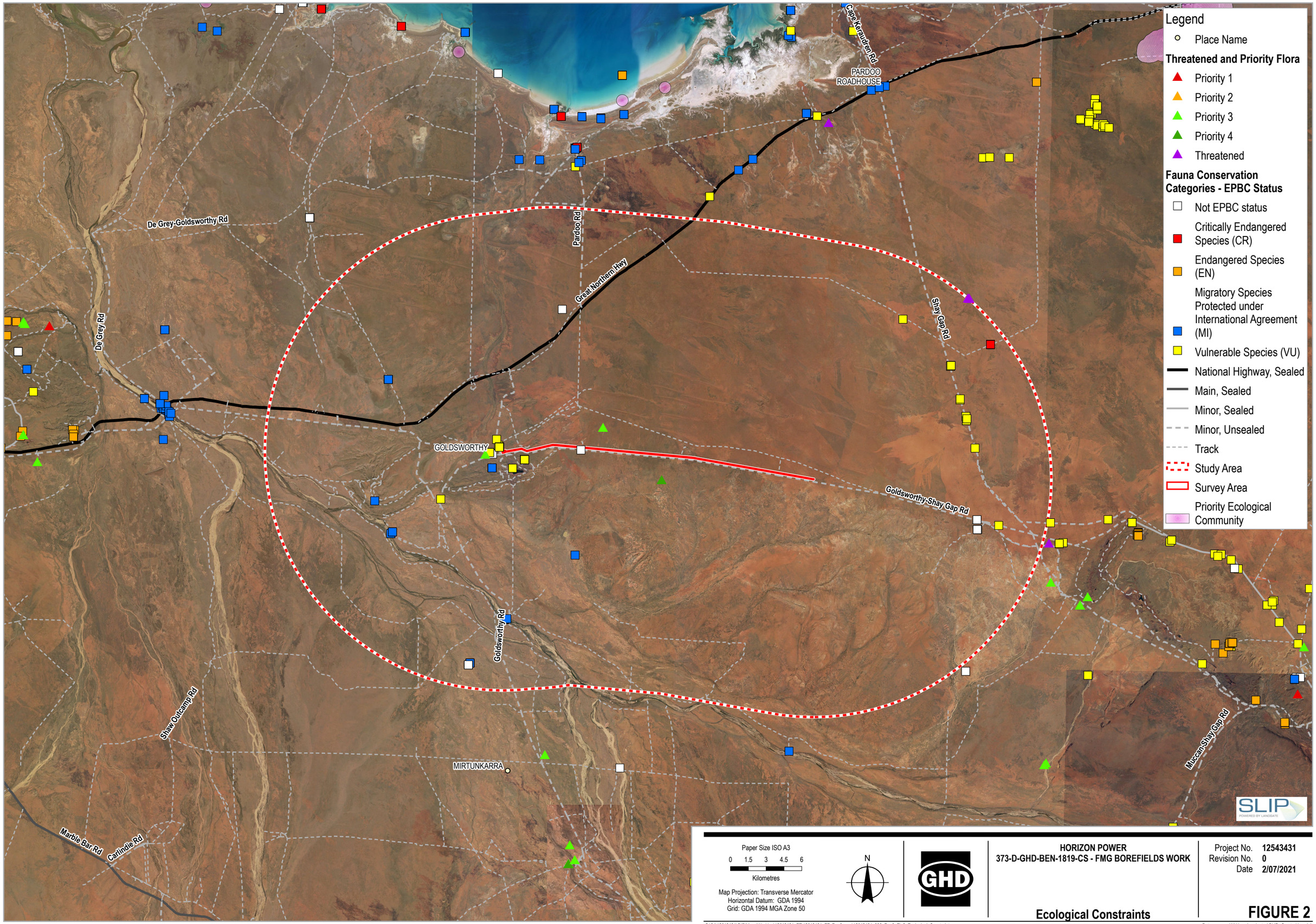

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HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Ecological Constraints

Project No. **12543431**
Revision No. **0**
Date **2/07/2021**

FIGURE 2

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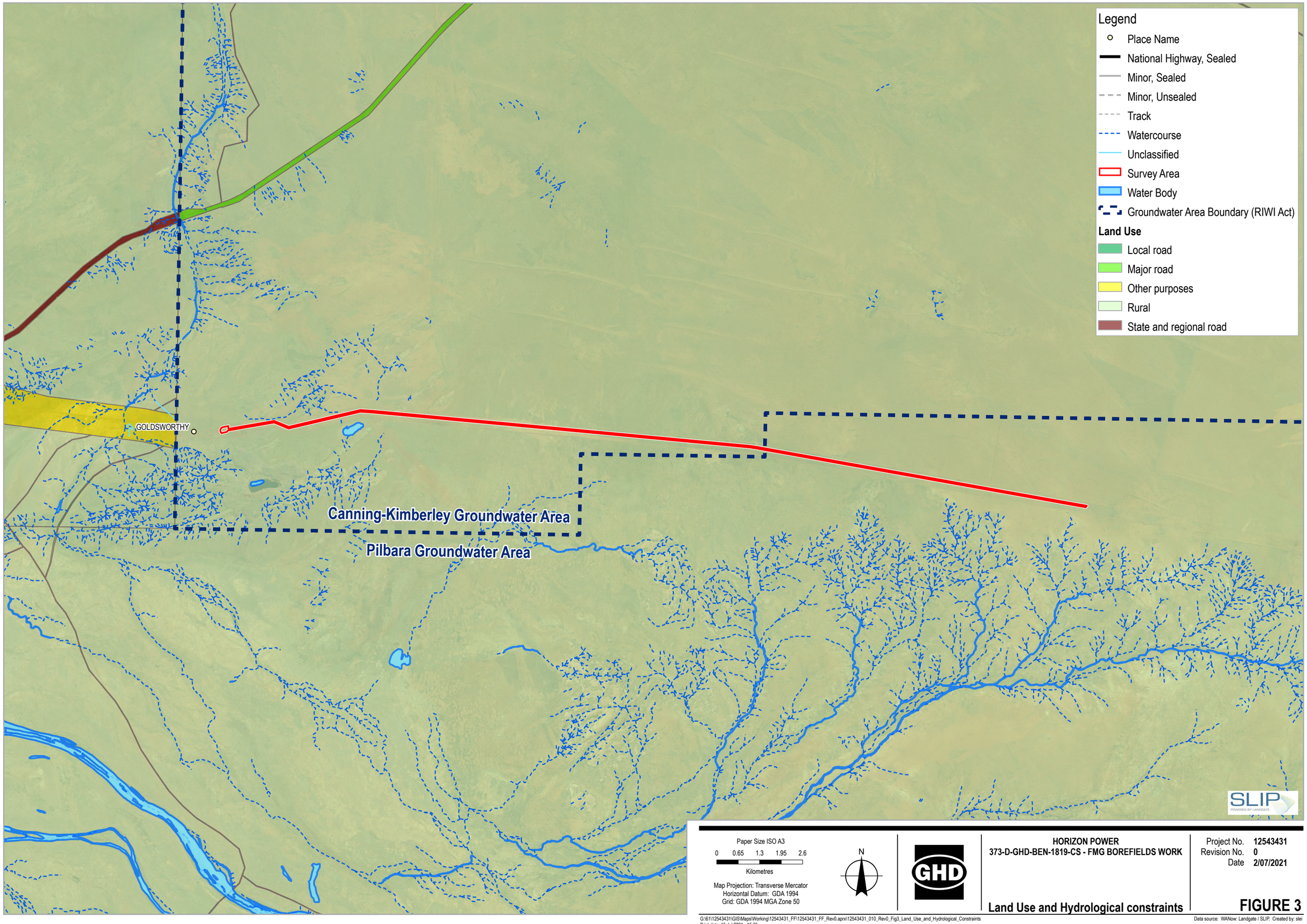

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Kilometres

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HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Project No. **12543431**
Revision No. **0**
Date **2/07/2021**

Land Use and Hydrological constraints

FIGURE 3

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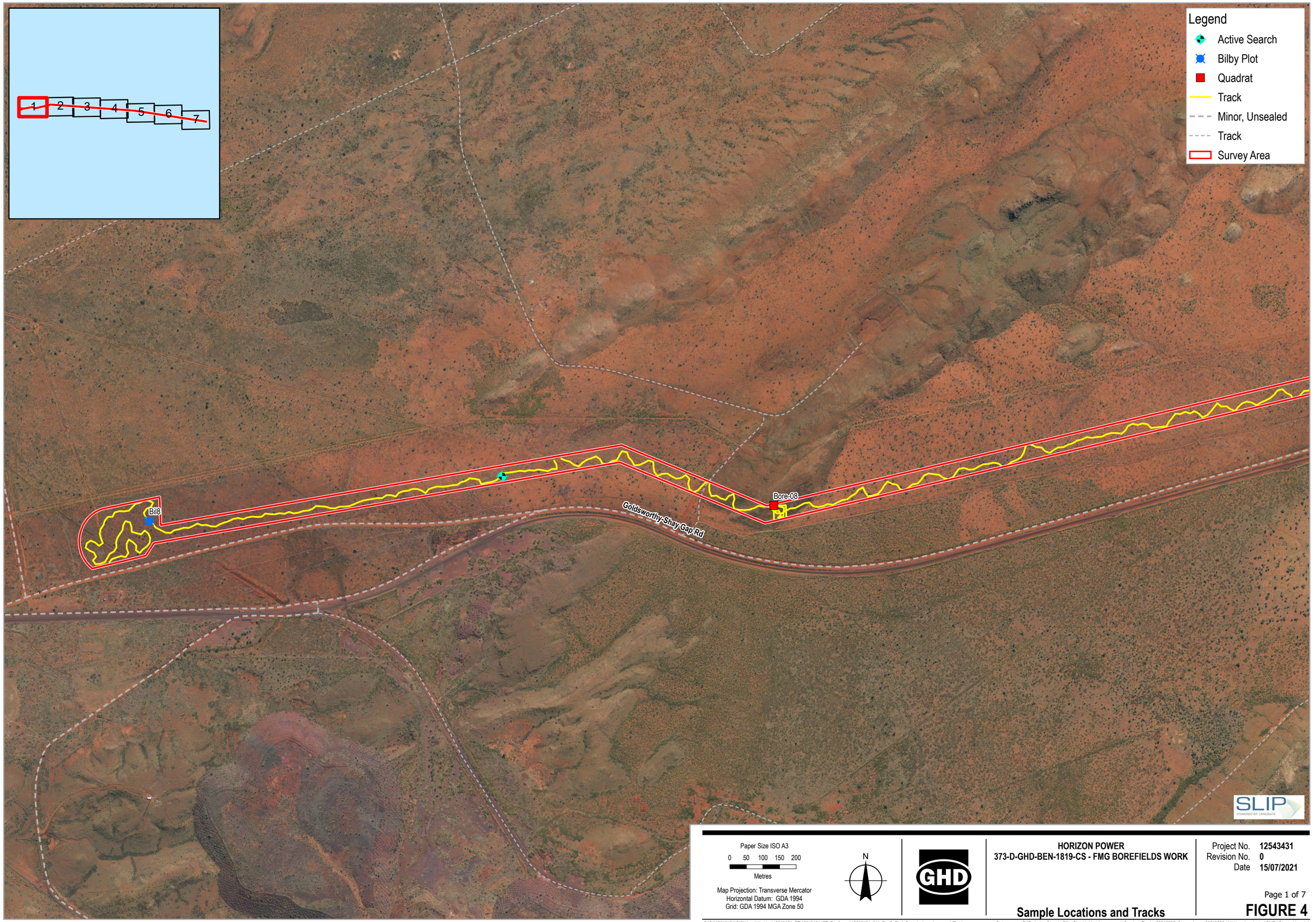

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Metres

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N

GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Sample Locations and Tracks

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

FIGURE 4

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Metres

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GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Sample Locations and Tracks

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

FIGURE 4

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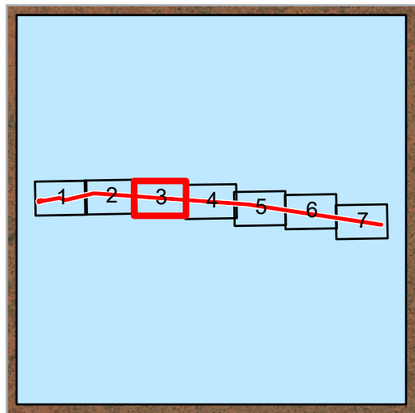

Legend
- Track
- Minor, Unsealed
- Survey Area

Goldsworthy-Shay Gap Rd

SLIP POWERED BY LANDGATE

Paper Size ISO A3

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

Sample Locations and Tracks

FIGURE 4

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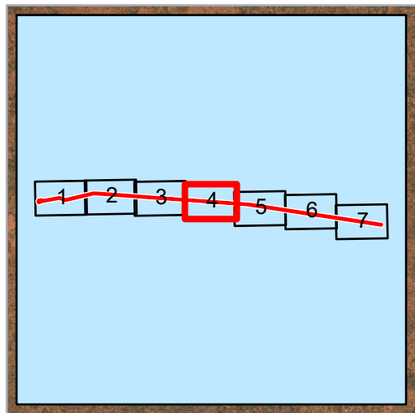

Legend
- Active Search
- Bilby Plot
- Quadrat
- Track
- Minor, Unsealed
- Track
- Survey Area

Bil3

Bore-03

Goldsworthy-Shay Gap Rd

SLIP
POWERED BY LANDGATE

Paper Size ISO A3

0 50 100 150 200

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

Sample Locations and Tracks

FIGURE 4

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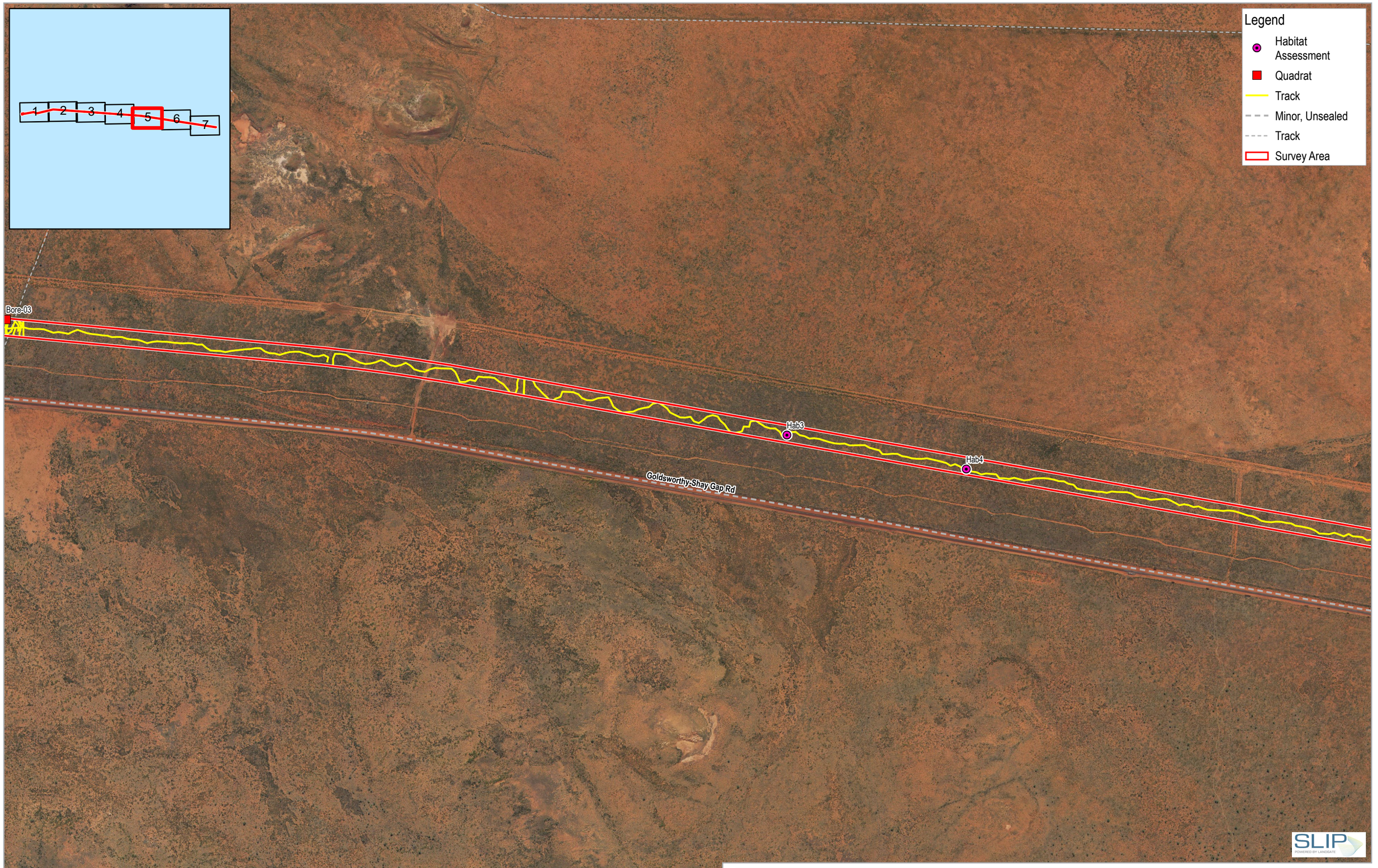

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HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Project No. **12543431**
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Sample Locations and Tracks

FIGURE 4

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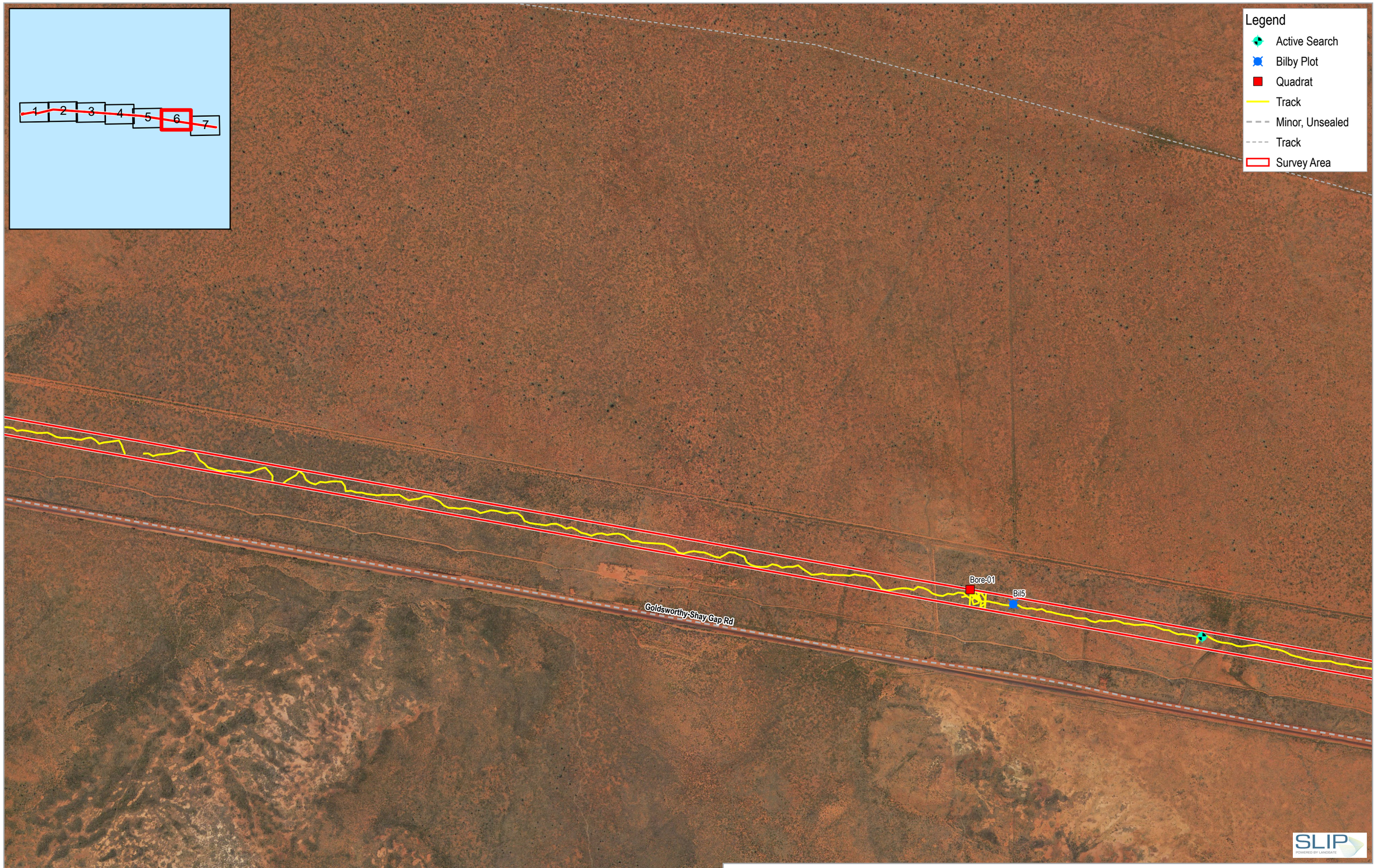

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HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

Sample Locations and Tracks

FIGURE 4

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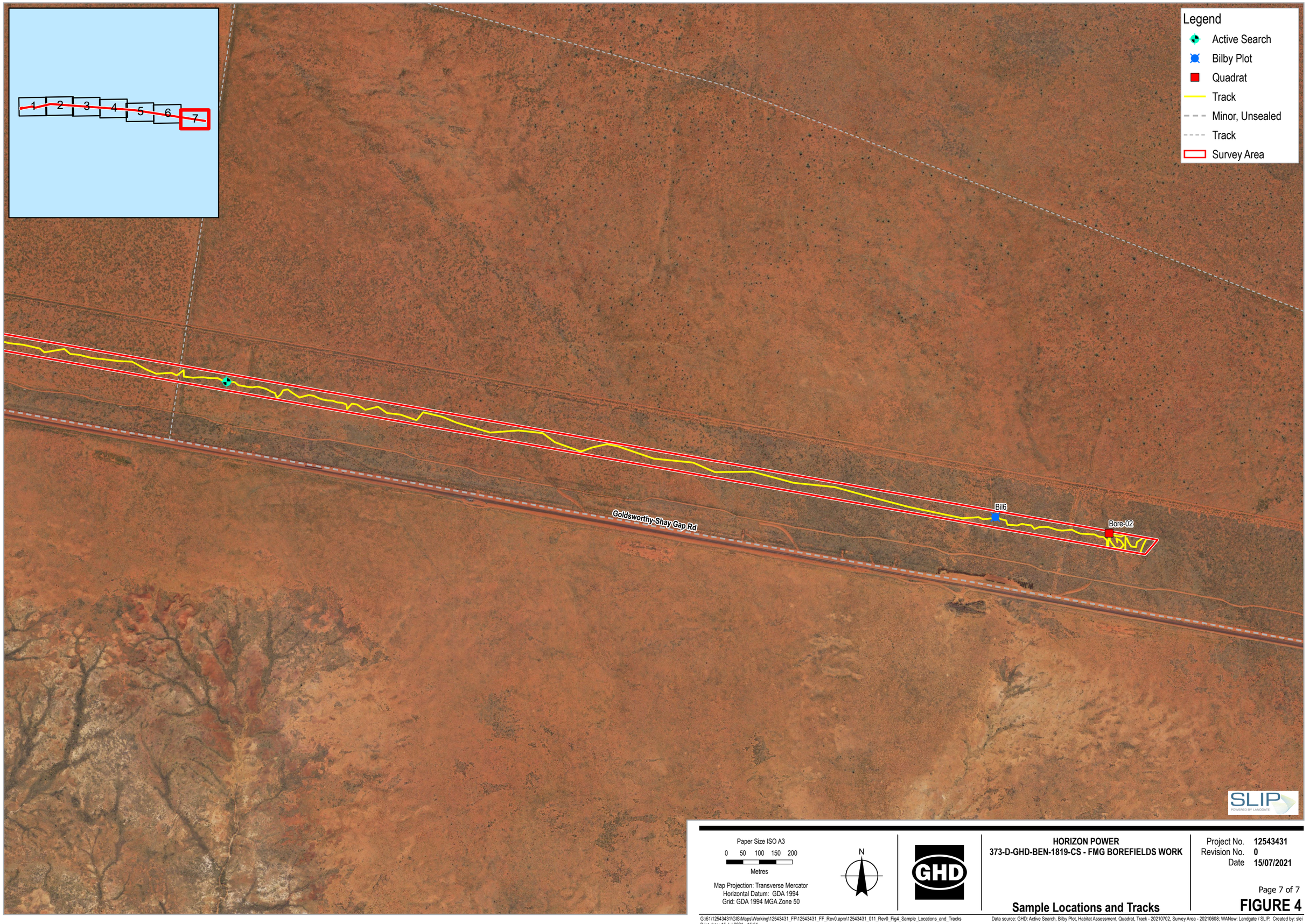

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GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

Sample Locations and Tracks

FIGURE 4

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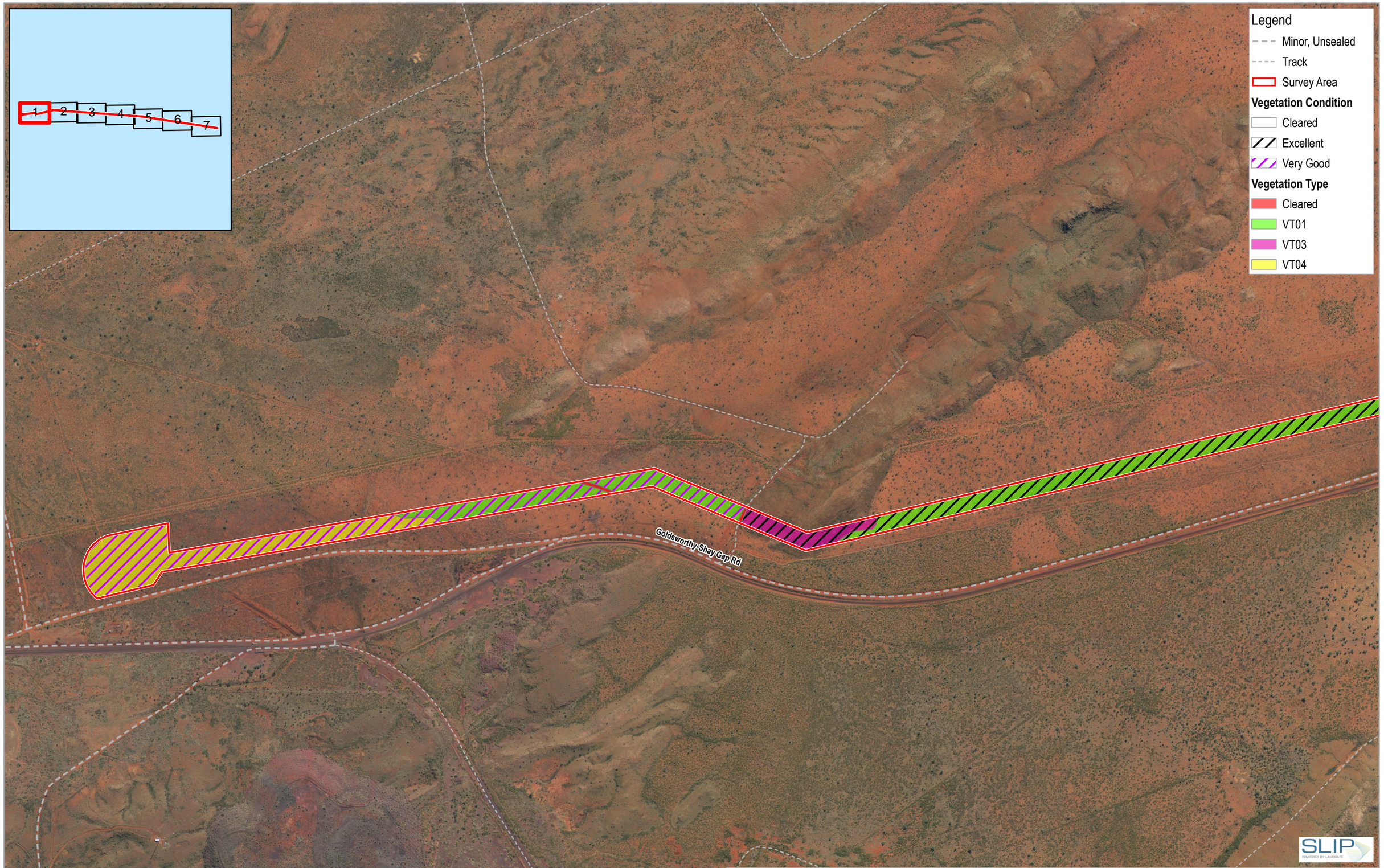

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GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Vegetation Types and Condition

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

FIGURE 5

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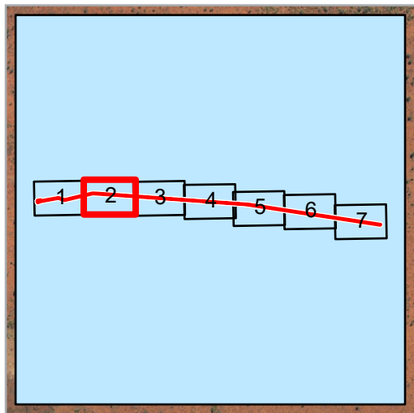

Legend

- Minor, Unsealed
- Track
- Survey Area

Vegetation Condition

- Excellent

Vegetation Type

- VT01
- VT02
- VT03

Goldsworthy-Shay Gap Rd

SLIP POWERED BY LANDGATE

Paper Size ISO A3

0 50 100 150 200

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

Vegetation Types and Condition

FIGURE 5

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Paper Size ISO A3

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Vegetation Types and Condition

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

FIGURE 5

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

Vegetation Types and Condition

FIGURE 5

G:\61\12543431\GIS\Maps\Working\12543431_FF\12543431_FF_Rev0.aprx\12543431_012_Rev0_Fig5_Vegetation_types_condition
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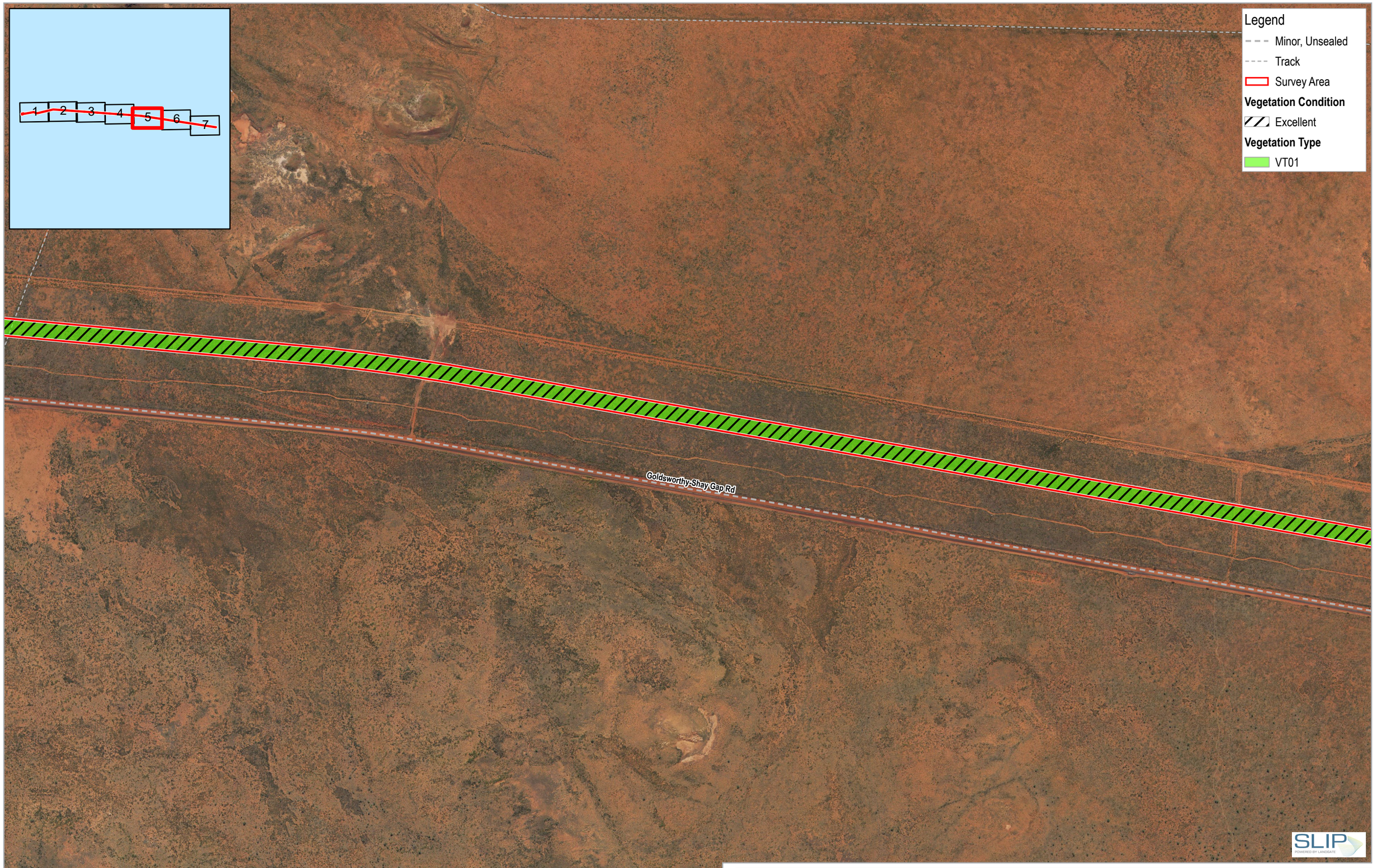

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GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Vegetation Types and Condition

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

FIGURE 5

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Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

Vegetation Types and Condition

FIGURE 5

G:\61\12543431\GIS\Maps\Working\12543431_FF\12543431_FF_Rev0.aprx\12543431_012_Rev0_Fig5_Vegetation_types_condition
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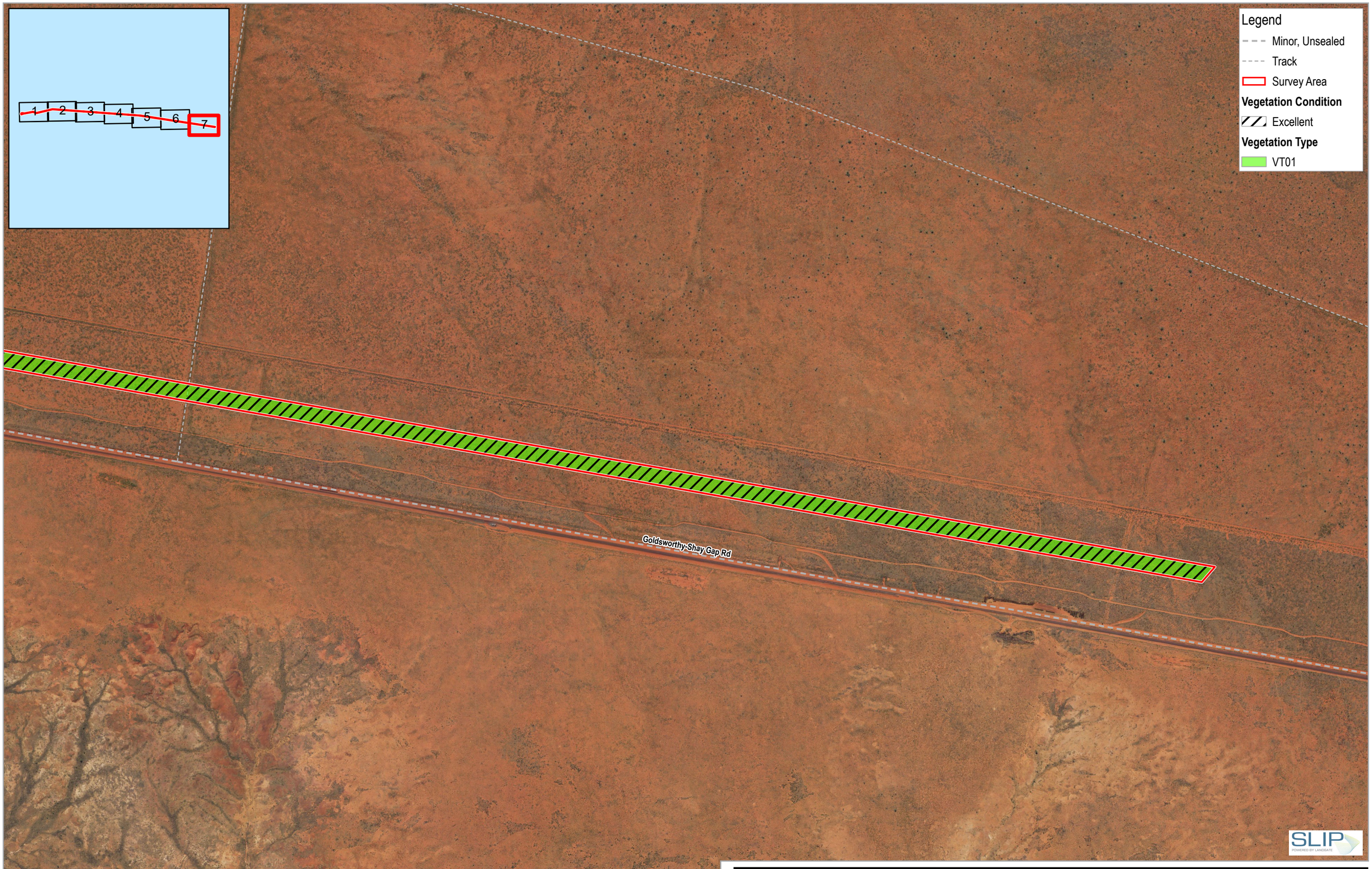

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Grid: GDA 1994 MGA Zone 50

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HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Vegetation Types and Condition

Project No. **12543431**
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FIGURE 5

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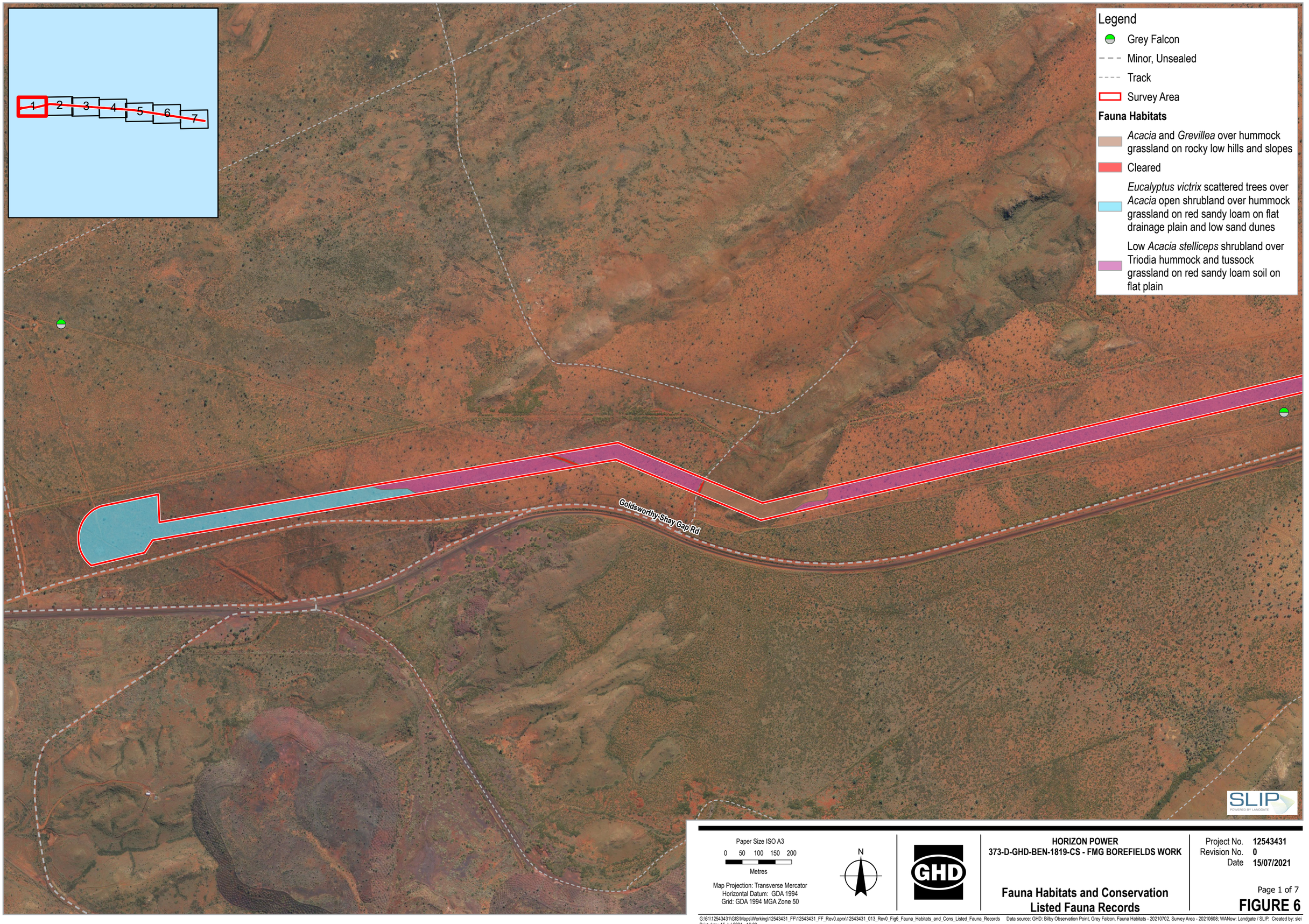

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HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Fauna Habitats and Conservation Listed Fauna Records

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

FIGURE 6

G:\61\12543431\GIS\Maps\Working\12543431_FF\12543431_FF_Rev0.aprx\12543431_013_Rev0_Fig6_Fauna_Habitats_and_Cons_Listed_Fauna_Records Data source: GHD: Bilby Observation Point, Grey Falcon, Fauna Habitats - 20210702, Survey Area - 20210608; WANow: Landgate / SLIP. Created by: slei
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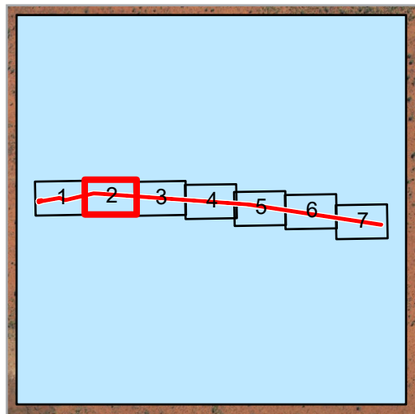

Legend

- Bilby Burrow
- Bilby Diggings
- Bilby Scat
- Grey Falcon
- Minor, Unsealed
- Track
- Survey Area

Fauna Habitats

- *Acacia* and *Grevillea* over hummock grassland on rocky low hills and slopes
- <ita>Eucalyptus mallee</ita> over <ita>Acacia<</ita> sp and Melaleuca sp open shrubland over hummock grassland on red sandy loam soil on plain
- Low *Acacia stelliceps* shrubland over Triodia hummock and tussock grassland on red sandy loam soil on flat plain

Goldsworthy-Shay Gap Rd

SLIP POWERED BY LANDGATE

Paper Size ISO A3

0 50 100 150 200

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Fauna Habitats and Conservation Listed Fauna Records

Project No. **12543431**
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Date **15/07/2021**

FIGURE 6

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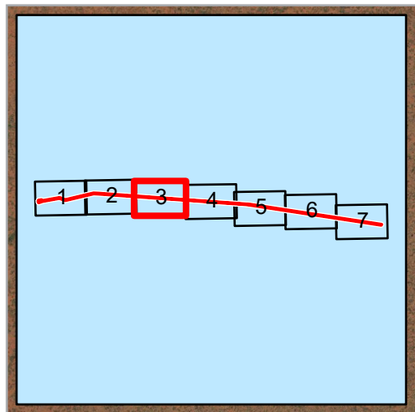

Legend

- Bilby Diggings
- Minor, Unsealed
- Survey Area

Fauna Habitats

- Low *Acacia stelliceps* shrubland over Triodia hummock and tussock grassland on red sandy loam soil on flat plain

Goldsworthy-Shay Gap Rd

SLIP POWERED BY LANDGATE

Paper Size ISO A3

0 50 100 150 200

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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GHD

HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Fauna Habitats and Conservation Listed Fauna Records

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

FIGURE 6

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Grid: GDA 1994 MGA Zone 50

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HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Fauna Habitats and Conservation Listed Fauna Records

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

FIGURE 6

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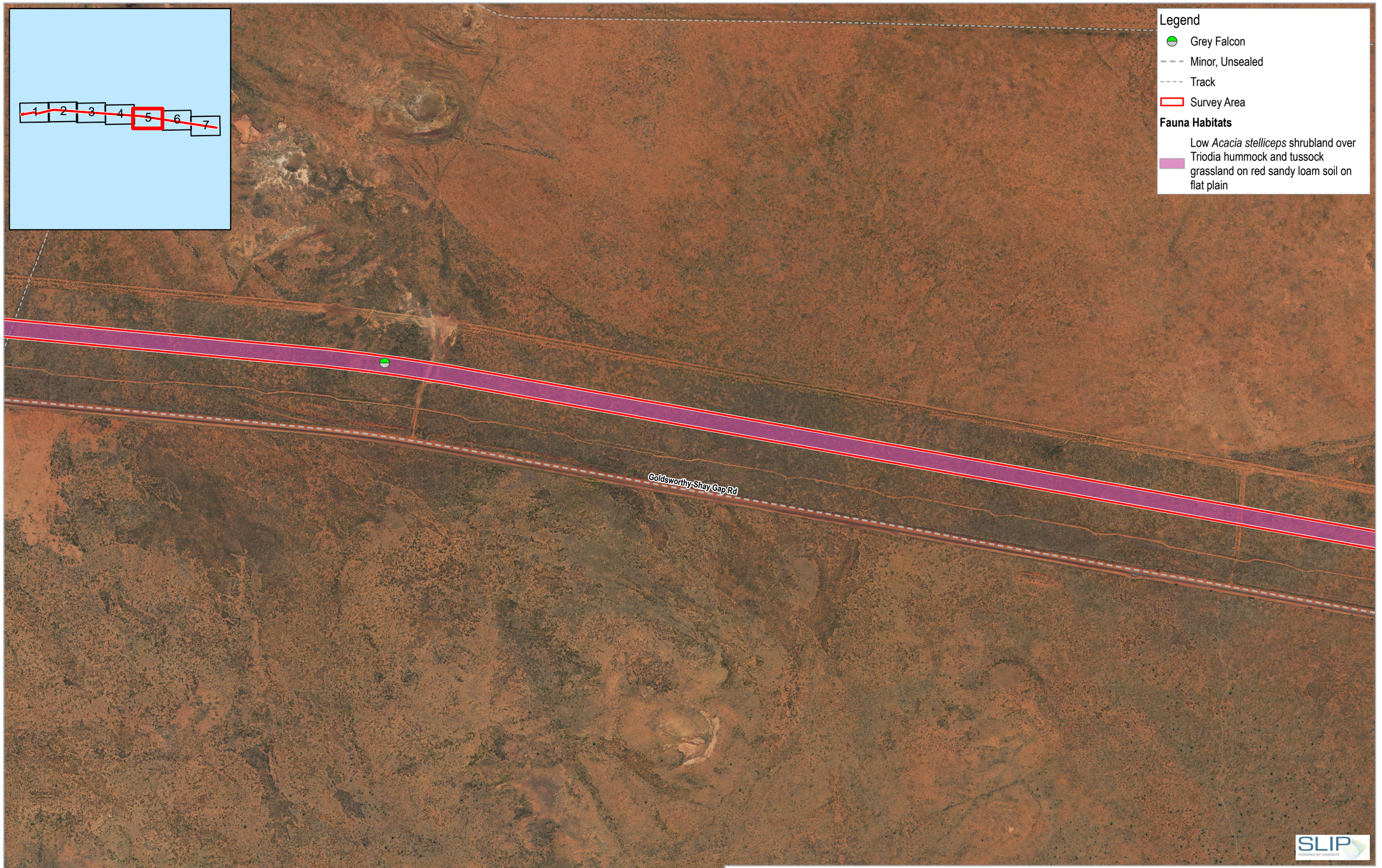

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HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Fauna Habitats and Conservation Listed Fauna Records

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

FIGURE 6

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HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Fauna Habitats and Conservation Listed Fauna Records

Project No. **12543431**
Revision No. **0**
Date **15/07/2021**

FIGURE 6

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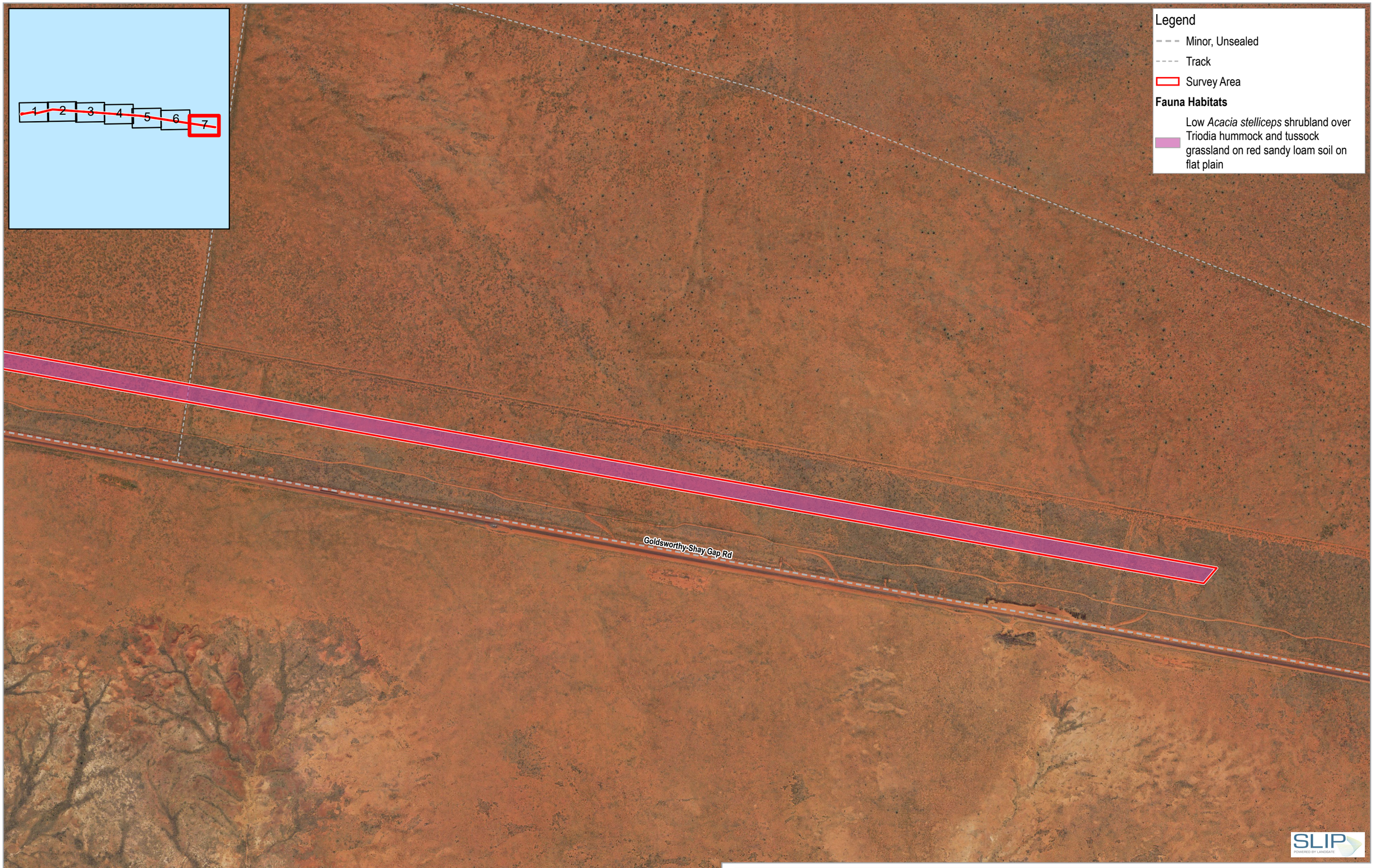

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HORIZON POWER
373-D-GHD-BEN-1819-CS - FMG BOREFIELDS WORK

Fauna Habitats and Conservation Listed Fauna Records

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Revision No. **0**
Date **15/07/2021**

FIGURE 6

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Appendix B

Relevant legislation, background information and conservation code

Relevant legislation

Federal *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Federal Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora and ecological communities and heritage places, which are defined in the EPBC Act as Matters of National Environmental Significance (MNES).

The biological aspects listed as MNES include:

– Nationally threatened flora species and ecological communities
– Migratory species

A person must not undertake an action that has, will have, or is likely to have a significant impact (direct or indirect) on MNES, without approval from the Federal Minister for the Environment.

The EPBC Act is administered by the Department of Agriculture, Water and the Environment (DAWE).

State *Environmental Protection Act 1986*

The *Environmental Protection Act 1986* (EP Act) is the primary legislative Act dealing with the protection of the environment in Western Australia. The Act allows the Environmental Protection Authority (EPA), to prevent, control and abate pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing. Part IV of the EP Act is administered by the EPA and makes provisions for the EPA to undertake environmental impact assessment of significant proposals, strategic proposals and land use planning schemes.

The Department of Water and Environment Regulation (DWER) is responsible for administering the clearing provisions of the EP Act (Part V). Clearing of native vegetation in Western Australia requires a permit from the DWER, unless exemptions apply. Applications for clearing permits are assessed by the Department and decisions are made to grant or refuse the application in accordance with the Act. When making a decision the assessment considers clearing against the ten clearing principles as specified in Schedule 5 of the EP Act:

1. Native vegetation should not be cleared if it comprises a high level of biodiversity.
2. Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significance habitat for fauna indigenous to Western Australia.
3. Native vegetation should not be cleared if it includes, or is necessary, for the continued existence of rare flora.
4. Native vegetation should not be cleared if it comprises the whole or part of native vegetation in an area that has been extensively cleared.
5. Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.
6. Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
7. Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.
8. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.
9. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

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

Exemptions for clearing include clearing that is a requirement of a written law or authorised under certain statutory processes (listed in Schedule 6 of the EP Act) and exemptions for prescribed low impact day-to-day activities (prescribed in the Environmental Protection (Clearing of Native Vegetation) Regulations 2004); these exemptions do not apply in environmentally sensitive areas (ESAs).

State *Biodiversity and Conservation Act 2016*

The *Biodiversity Conservation Act 2016* (BC Act) provides for the conservation and protection of biodiversity and biodiversity components, as well as the promotion of the ecologically sustainable use of biodiversity components in Western Australia. The BC Act replaces both the repealed *Wildlife Conservation Act 1950* (WC Act) and the *Sandalwood Act 1929* (Sandalwood Act), as well as their associated regulations. To attain the objectives of the BC Act, principles of ecological sustainable development have been established:

– Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations
– If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
– The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
– The conservation of biodiversity and ecological integrity should be a fundamental consideration indecision-making
– Improved valuation, pricing and incentive mechanisms should be promoted.

The BC Act is administered by the Department of Biodiversity Conservation and Attractions (DBCA).

State *Biosecurity and Agriculture Management Act 2007*

The *Biosecurity and Agriculture Management Act 2007* (BAM Act) and associated regulations are administered by the Department of Primary Industries and Regional Development (DPIRD) and replace the repealed *Agriculture and Related Resources Protection Act 1976.* The main purposes of the BAM Act and its regulations are to:

– Prevent new animal and plant pests (vermin and weeds) and diseases from entering WA
– Manage the impact and spread of those pests already present in the state
– Safely manage the use of agricultural and veterinary chemicals
– Increased control over the sale of agricultural products that contain violative chemical residues.

The Western Australian Organism List (WAOL) provides the status of organisms which have been categorised under the BAM Act. A Declared Pest is a prohibited organism or an organism for which a declaration under Section 22(2) of the Act is in force. Declared Pests may be assigned a control category including: C1 (exclusion), C2 (eradication) and C3 (management). The category may apply to the whole of the State, LGAs, districts, individual properties or even paddocks, and all landholders are obliged to comply with the specific category of control. Categories of control are defined below.

DPIRD Categories for Declared Pests under the BAM Act

Control class code	Description
C1 (Exclusion)	Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 (Eradication)	Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 (Management)	Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

Background information

Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are declared by the Minister for Environment under Section 51B of the EP Act. The Table below outlines the aspects of areas declared as ESA in the Environmental Protection (Environmentally Sensitive Areas) Notice 2005.

Aspects of ESAs

Aspects of Environmentally Sensitive Areas
A declared World Heritage property as defined in Section 12 of the EPBC Act.
An area that is included on the Register of the National Estate (RNE), because of its natural values, under the *Australian Heritage Commission Act 1975* of the Commonwealth (the RNE was closed in 2007 and is no longer a statutory list – all references to the RNE were removed from the EPBC Act on 19 February 2012).
A defined wetland and the area within 50 m of the wetland. Defined wetlands include Ramsar wetlands, conservation category wetlands and nationally important wetlands.
The area covered by vegetation within 50 m of rare flora, to the extent to which the vegetation is continuous with the vegetation in which the rare flora is located.
The area covered by a Threatened Ecological Community.
A Bush Forever Site listed in "Bush Forever" Volumes 1 and 2 (2000), published by the Western Australia Planning Commission, except to the extent to which the site is approved to be developed by the Western Australia Planning Commission.
The areas covered by the Environmental Protection (Gnangara Mound Crown Land) Policy 1992.
The areas covered by the Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002.
The areas covered by the lakes to which the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* (EPP Lakes) applies.
Protected wetlands as defined in the Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998.

Reserves and conservation areas

Department of Biodiversity, Conservation and Attractions managed lands and waters

DBCA manages lands and waters throughout Western Australia to conserve ecosystems and species, and to provide for recreation and appreciation of the natural environment. DBCA managed lands and waters include national parks, conservation parks and reserves, marine parks and reserves, regional parks, nature reserves, State forest and timber reserves. Access to, or through, some areas of DBCA managed lands may require a permit or could be restricted due to management activities. Proposed land use changes and development proposals that abut DBCA managed lands will generally be referred to DBCA throughout the assessment process.

Wetlands

Wetlands include not only lakes with open water, but areas of seasonally, intermittently or permanently waterlogged soil.

Ramsar Wetlands (Wetlands of International Importance)

The Convention of Wetlands of International Importance was signed in 1971 at the Iranian town of Ramsar. The Convention has since been referred to as the Ramsar Convention. Ramsar Listed wetlands are "sites containing

representative, rare or unique wetlands, or wetlands that are important for conserving biological diversity … because of their ecological, botanical, zoological, limnological or hydrological importance" (DAWE 2020b). Once a Ramsar Listed Wetland is designated, the country agrees to manage its conservation and ensure its wise use. Under the Convention, wise use is broadly defined as "maintaining the ecological character of a wetland" (DAWE 2020b).

Nationally important wetlands

Wetlands of national significance are listed under the Directory of Important Wetlands in Australia. Nationally important wetlands are wetlands which meet at least one of the following criteria (DAWE 2020a):

- It is a good example of a wetland type occurring within a biogeographic region in Australia
- It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex
- It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail
- The wetland supports one percent or more of the national populations of any native plant or animal taxa
- The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level
- The wetland is of outstanding historical or cultural significance.

Vegetation extent and status

The National Objectives and Targets for Biodiversity Conservation 2001–2005 (Commonwealth of Australia 2001) recognise that the retention of 30 percent or more of the pre-clearing extent of each ecological community is necessary if Australia's biological diversity is to be protected. This is the threshold level below which species loss appears to accelerate exponentially and loss below this level should not be permitted. This level of recognition is in keeping with the targets recommended in the review of the National Strategy for the Conservation of Australia's Biological Diversity (ANZECC 2000).

The extent of remnant native vegetation in WA has been assessed by Shepherd et al. (2002) and the GoWA (2019), based on broadscale vegetation association mapping by Beard (various publications). The GoWA produces Statewide Vegetation Statistics Reports that are used for a number of purposes including conservation planning, land use planning and when assessing development applications. The reports are updated every 2-3 years.

Vegetation condition

The vegetation condition can be assessed in accordance with the vegetation condition rating scale for the South West and Interzone Botanical Provinces (EPA 2016a). The scale recognises the intactness of vegetation and consists of six rating levels as outlined below.

Vegetation condition rating scale for the Eremaean and Northern Botanical Provinces

Condition	Eremaean and Northern Botanical Provinces description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as at caused by low levels of grazing or slightly aggressive weed.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.

Condition	Eremaean and Northern Botanical Provinces description
Degraded	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Conservation codes

Species of significant flora and communities are protected under both Federal and State Acts. The Federal EPBC Act provides a legal framework to protect and manage nationally important flora and communities. The State BC Act is the primary wildlife conservation legislation in Western Australia. Information on the conservation codes is summarised in the following sections.

Ecological communities

Significant communities

Ecological communities are defined as naturally occurring biological assemblages that occur in a particular type of habitat (English and Blyth 1997). Federally listed Threatened Ecological Communities (TECs) are protected under the EPBC Act. The BC Act provides for the Minister to list an ecological community as a TEC (section 27), or as a collapsed ecological community (section 31) statutory listing of State TECs by the Minister. The legislation also describes statutory processes for preparing recovery plans for TECs, the registration of their critical habitat, and penalties for unauthorised modification of TECs.

Possible TECs that do not meet survey criteria are added to the DBCA Priority Ecological Community (PEC) List under Priorities 1, 2 and 3. These are ecological communities that are adequately known; are rare but not threatened, or meet criteria for Near Threatened. PECs that have been recently removed from the threatened list are placed in Priority 4. These ecological communities require regular monitoring. Conservation dependent ecological communities are placed in Priority 5. PECs are not listed under any formal Federal or State legislation, however, may be listed as TECs under the EPBC Act.

Codes and definitions for TECs listed under the EPBC Act and/or BC Act

Categories	Definition
Federal Government Conservation Categories (EPBC Act)	
Critically Endangered (CR)	An ecological community if, at that time, is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000).
Endangered (EN)	An ecological community if, at that time: – is not critically endangered; and – is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000).
Vulnerable (VU)	An ecological community if, at that time: – is not critically endangered or endangered; and – is facing a high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000).
Western Australia Conservation Categories (BC Act)	
Threatened Ecological Communities	
Critically Endangered (CR)	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.
Endangered (EN)	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.

Categories	Definition
Vulnerable (VU)	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.

Collapsed ecological communities

An ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time –

– there is no reasonable doubt that the last occurrence of the ecological community has collapsed); or

– the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover –

- its species composition or structure; or
- its species composition and structure.

Section 33 of the BC Act provides for a collapsed ecological community to be regarded as a threatened ecological community if it is discovered in a state that no longer makes it eligible for listing as a collapsed ecological community.

Categories and definitions for PECs as listed by the DBCA

Category	Descriptions
Priority 1	Poorly known ecological communities. Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤100 ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
Priority 2	Poorly known ecological communities. Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200 ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
Priority 3	Poorly known ecological communities. – 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: – Communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; – 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. 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.
Priority 4	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. – Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands. – 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.

Category	Descriptions
	– Ecological communities that have been removed from the list of threatened communities during the past five years.
Priority 5	Conservation Dependent ecological communities. 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.

Other significant vegetation

Vegetation may be significant for a range of reasons other than a statutory listing. The EPA (2016a, b) states that significant vegetation may include vegetation that includes the following:

- Restricted distribution
- Degree of historical impact from threatening processes
- A role as a refuge
- Providing an important function required to maintain ecological integrity of a significant ecosystem
- Local endemism in restricted habitats
- Novel combinations of taxa
- A role as a key habitat for Threatened species or large population representing a significant proportion of the local to regional total population of a species
- Being representative of a vegetation unit in 'pristine' condition in a highly cleared landscape, recently discovered range extensions, or isolated outliers of the main range.

This may apply at a number of levels, so the unit may be significant when considered at the fine-scale (intra-locality), intermediate-scale (locality or inter-locality) or broad-scale (local to region).

Flora

Significant flora

Species of significant flora are protected under both Federal and State legislation. Any activities that are deemed to have a significant impact on species that are recognised by the EPBC Act, and/or the BC Act can warrant referral to DAWE and/or the EPA.

The Federal conservation level of flora species and their significance status is assessed under the EPBC Act. The significance levels for flora used in the EPBC Act align with the International Union for Conservation of Nature (IUCN) Red List criteria, which are internationally recognised as providing best practice for assigning the conservation status of species.

The State conservation level of flora species and their significance status also follows the IUCN Red List criteria. Under the BC Act flora can be listed as Threatened, Extinct and as Specially Protected species.

Threatened species are those are species which have been adequately searched for and are deemed to be, in the wild, either rare, under identifiable threat of extinction, or otherwise in need of special protection, and have been gazetted as such. The assessment of the conservation status of Threatened species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria. Specially protected species meet one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection. Species that are listed as Threatened or Extinct species under the BC Act cannot also be listed as Specially Protected species.

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

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species, are placed in Priority 4. These species require regular monitoring.

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

For the purposes of this assessment, all species listed under the EPBC Act, BC Act and DBCA Priority species are considered significant.

Categories and definitions for EPBC Act and BC Act listed flora species

Conservation category	Definition
Threatened species	
Critically Endangered (CR)	Threatened species Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.
Endangered (EN)	Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines.
Vulnerable (VU)	Threatened species considered to be "facing a high risk of extinction in the wild in the medium term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines.
Extinct species	
Extinct (EX)	Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).
Extinct in the Wild (EW)	Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Codes for DBCA listed Priority flora

Priority category	Definition
Priority 1	Poorly-known taxa Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
Priority 2	Poorly-known taxa Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
Priority 3	Poorly-known taxa Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
Priority 4	Rare, Near Threatened and other taxa in need of monitoring

Priority category	Definition
	– Rare: Taxa 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 taxa are usually represented on conservation lands. – Near Threatened. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. – Taxa that have been removed from the list of threatened taxa during the past five years for reasons other than taxonomy.

Other significant flora

Flora species, subspecies, varieties, hybrids and ecotypes may be significant for a range of reasons, other than a statutory listing. The EPA (2016a, b) states that significant flora may include taxa that have/are:

– A keystone role in a particular habitat for Threatened or Priority flora species, or large populations representing a considerable proportion of the local or regional total population of a species
– Relictual status, being representation of taxonomic or physiognomic groups that no longer occur widely in the broader landscape
– New species or anomalous features that indicate a potential new species
– Being representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
– Unusual species, including restricted subspecies, varieties, or naturally occurring hybrids
– Local endemism (a restricted distribution) or association with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems).

Introduced plants (weeds)

Declared Pests

Information on species considered to be Declared Pests is provided under *State Biosecurity and Agriculture Management Act 2007.*

Weeds of National Significance

The spread of weeds across a range of land uses or ecosystems is important in the context of socio-economic and environmental values. The assessment of Weeds of National Significance (WoNS) is based on four major criteria:

– Invasiveness
– Impacts
– Potential for spread
– Socio-economic and environmental values.

Australian state and territory governments have identified thirty-two Weeds of National Significance (WoNS); a list of 20 WoNS was endorsed in 1999 and a further 12 were added in 2012.

References

ANZECC 2000, Core Environmental Indicators for Reporting on the State of Environment, ANZECC State of the Environment Reporting Task Force.

Commonwealth of Australia 2001, National Targets and Objectives for Biodiversity Conservation 2001–2005, Canberra, AGPS.

DAWE 2020a, *Criteria for determining nationally important wetlands*, retrieved 2020, from http://www.environment.gov.au/topics/water/water-our-environment/wetlands/australian-wetlands-database/directory-important.

DAWE 2020b, *The Ramsar Convention on Wetlands*, retrieved 2020, from http://www.environment.gov.au/topics/water/water-our-environment/wetlands/ramsar-convention-wetlands.

English, V and Blyth, J 1997, Identifying and Conserving Threatened Ecological Communities in the South West Botanical Province, Perth, Department of Conservation and Land Management.

EPA 2016a, Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment, EPA, Perth, WA.

EPA 2016b, Environmental Factor Guideline - Flora and Vegetation, EPA, Perth, WA.

GoWA 2019, *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full report)*, Current as of March 2019, Perth Western Australia, Department of Environment and Conservation, from https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics.

Shepherd, DP, Beeston, GR & Hopkins, AJM 2002, Native Vegetation in Western Australia – Extent, Type and Status, Resource Management Technical Report 249, Perth, Department of Agriculture

Appendix C

Desktop searches

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 09/07/2021

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 119° 26' 37" E,20° 12' 36" S
Buffer 30km
Group By Family

Family	Species	Records
Acanthizidae	3	8
Accipitridae	13	253
Aegothelidae	1	13
Aeolosomatidae	1	1
Aeshnidae	2	4
Agamidae	9	70
Alaudidae	1	57
Ameiridae	2	4
Anatidae	7	165
Ancylidae	1	1
Anhingidae	1	24
Araneidae	1	1
Arcellidae	2	2
Ardeidae	9	146
Ariidae	1	1
Artamidae	7	132
Asplanchnidae	1	1
Atherinidae	1	2
Aturidae	2	2
Baetidae	3	14
Bdelloidea	1	3
Belostomatidae	2	2
Boidae	3	4
Bolboceratidae	2	2
Brachionidae	9	17
Burhinidae	1	9
Buthidae	1	3
Cacatuidae	1	50
Caenidae	2	12
Campephagidae	2	110
Candonidae	3	3
Caprimulgidae	1	8
Carabidae	11	29
Carphodactylidae	1	2
Casuariidae	1	6
Centropagidae	2	3
Centropodidae	1	20
Ceratopogonidae	8	13
Chaoboridae	1	1
Charadriidae	7	101
Chironomidae	28	90
Chydoridae	12	16
Ciconiidae	1	20
Clupeidae	1	1
Coenagrionidae	8	36
Columbidae	7	237
Conchostraca	1	2
Conochilidae	1	1
Corbiculidae	1	7
Corduliidae	2	4
Corixidae	7	23
Corvidae	2	90
Cracticidae	3	42
Cuculidae	3	24
Culicidae	6	16
Cyclopidae	9	15
Cypridae	10	18
Cyzicidae	1	3
Daphniidae	1	4
Darwinulidae	1	1
Dasyuridae	4	57
Diaptomidae	1	3
Diatom Family	66	101
Dicaeidae	1	1
Dicranophoridae	1	2
Dicruridae	4	188
Difflugiidae	1	2
Diplodactylidae	6	44
Dolichopodidae	2	2
Dugongidae	1	1
Dytiscidae	22	52
Ecnomidae	3	17
Elapidae	9	27
Eleotridae	2	2
Enchytraeidae	1	1

Epistylididae	1	1
Ergasilidae	1	1
Estrilidae	4	140
Euchlanidae	3	7
Euglyphidae	1	4
Eylaidae	1	2
Falconidae	5	121
Flosculariidae	1	1
Gekkonidae	3	25
Gerridae	2	2
Glareolidae	2	8
Gomphidae	3	11
Gruidae	1	11
Gyrinidae	1	2
Hadziidae	1	1
Haematopodidae	2	14
Halcyonidae	3	150
Haliplidae	1	1
Hexarthridae	1	2
Hirundinidae	6	97
Hydrachnidae	2	2
Hydraenidae	5	11
Hydridae	1	2
Hydrochidae	3	6
Hydrophilidae	18	36
Hydropsychidae	2	2
Hydroptilidae	1	1
Hygrobatidae	2	3
Hylidae	1	3
Ilyocryptidae	1	3
Ilyocyprididae	3	4
Isostictidae	1	8
Lamponidae	2	3
Laridae	5	41
Lecanidae	8	11
Lepadellidae	3	3
Lepidoptera	2	2
Leptoceridae	7	24
Lesquereusidae	1	1
Libellulidae	9	30
Limnesiidae	1	2
Limnichidae	1	1
Limnocharidae	1	3
Limnocytheridae	2	2
Limnodynastidae	1	22
Lycosidae	1	2
Lyncaeidae	1	1
Macropodidae	2	4
Macrotrichidae	3	3
Maluridae	5	46
Megalopidae	1	1
Melanotaeniidae	1	5
Meliphagidae	9	188
Melitidae	1	1
Meropidae	1	104
Mesoveliidae	3	3
Mideopsidae	1	2
Moinidae	2	3
Molossidae	1	1
Motacillidae	1	13
Mugilidae	1	1
Muridae	6	46
Muscidae	2	4
Myobatrachidae	3	37
Mytilinidae	1	2
NO FAMILY	1	14
Naididae	6	21
Nematoda	3	4
Nemesiidae	1	1
Neosittidae	1	1
Neotrichidae	1	2
Notommatidae	3	3
Notonectidae	7	13
Ostracoda	1	3
Otididae	1	14
Oxidae	1	1
Pachycephalidae	5	34
Palaemonidae	1	1
Paramelitidae	2	3
Pardalotidae	2	59
Pelecanidae	1	51
Petroicidae	2	5
Phalacrocoracidae	5	47
Phasianidae	3	27
Phreodrilidae	1	2
Planorbidae	4	19
Pleidae	1	1
Plotosidae	1	1
Podargidae	1	3
Podicipedidae	2	11
Polycentropodidae	1	1
Pomatostomidae	1	57
Pristinidae	1	3
Prodidomidae	1	1
Psittacidae	7	205
Pteropodidae	1	4
Ptilonorhynchidae	1	12
Pygopodidae	5	14
Pyralidae	3	10
Rallidae	6	18
Recurvirostridae	3	18
Rotifera	1	1
Saldidae	1	1
Salticidae	2	3
Sarcoptiformes	1	1

Scarabaeidae	5	8
Scaridiidae	1	1
Scincidae	19	260
Scirtidae	1	3
Scolopacidae	18	86
Scolopendridae	1	1
Sididae	3	3
Simuliidae	2	2
Sparassidae	1	1
Spongillidae	1	1
Staphylinidae	1	4
Stratiomyidae	1	4
Strigidae	1	18
Sturnidae	1	10
Sylviidae	1	1
Synchaetidae	1	3
Tabanidae	1	5
Terapontidae	1	3
Testudinellidae	1	4
Thamnocephalidae	1	1
Thiaridae	2	15
Threskiornithidae	4	58
Thylacomyidae	1	28
Tipulidae	1	1
Trichocercidae	1	3
Trichotriidae	1	2
Trombidiformes	1	2
Turnicidae	2	29
Tytonidae	1	1
Unionicolidae	7	9
Urodacidae	3	3
Varanidae	3	22
Veliidae	1	2
Vespertilionidae	1	1
Zodariidae	2	6
Zosteropidae	1	9
TOTAL	**715**	**5043**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Acanthizidae					
1.	25530	*Gerygone fusca (Western Gerygone)*			
2.	24276	*Gerygone tenebrosa (Dusky Gerygone)*			
3.	30948	*Smicrornis brevirostris (Weebill)*			
Accipitridae					
4.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
5.	25536	*Accipiter fasciatus (Brown Goshawk)*			
6.	24285	*Aquila audax (Wedge-tailed Eagle)*			
7.	24288	*Circus approximans (Swamp Harrier)*			
8.	24289	*Circus assimilis (Spotted Harrier)*			
9.		*Elanus axillaris*			
10.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*			
11.	25541	*Haliastur indus (Brahminy Kite)*			
12.	24295	*Haliastur sphenurus (Whistling Kite)*			
13.	24297	*Hamirostra melanosternon (Black-breasted Buzzard)*			
14.	47965	*Hieraaetus morphnoides (Little Eagle)*			
15.	25542	*Milvus migrans (Black Kite)*			
16.	48591	*Pandion cristatus (Osprey, Eastern Osprey)*		IA	
Aegothelidae					
17.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
Aeolosomatidae					
18.		*Aeolosoma sp. 1 (PSS)*			
Aeshnidae					
19.		*Adversaeschna brevistyla*			
20.		*Anax papuensis*			
Agamidae					
21.	30833	*Amphibolurus longirostris (Long-nosed Dragon)*			
22.	24865	*Ctenophorus caudicinctus subsp. caudicinctus (Ring-tailed Dragon)*			
23.	25459	*Ctenophorus isolepis (Crested Dragon, Military Dragon)*			
24.	24876	*Ctenophorus isolepis subsp. isolepis (Crested Dragon, Military Dragon)*			
25.	24882	*Ctenophorus nuchalis (Central Netted Dragon)*			
26.	24896	*Diporiphora pindan (Pindan Dragon)*			
27.	25510	*Pogona minor (Dwarf Bearded Dragon)*			
28.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
29.	24908	*Pogona minor subsp. mitchelli (Dwarf Bearded Dragon)*			
Alaudidae					
30.	25545	*Mirafra javanica (Horsfield's Bushlark, Singing Bushlark)*			
Ameiridae					
31.		*Stygonitocrella trispinosa*			
32.		*Stygonitocrella unispinosa*			
Anatidae					
33.	24312	*Anas gracilis (Grey Teal)*			
34.	24316	*Anas superciliosa (Pacific Black Duck)*			
35.	24318	*Aythya australis (Hardhead)*			
36.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
37.	24322	*Cygnus atratus (Black Swan)*			
38.	24325	*Dendrocygna eytoni (Plumed Whistling Duck)*			
39.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
Ancylidae					
40.		*Ancylidae sp.*			
Anhingidae					
41.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
Araneidae					
42.		*Nephila edulis*			
Arcellidae					
43.		*Arcella sp.*			
44.		*Arcella sp. P1*			
Ardeidae					
45.	24337	*Ardea garzetta subsp. nigripes (Little Egret)*			
46.	25559	*Ardea intermedia (Intermediate Egret)*			
47.	41324	*Ardea modesta (great egret, white egret)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
48.	24340	*Ardea novaehollandiae (White-faced Heron)*			
49.	24341	*Ardea pacifica (White-necked Heron)*			
50.	47897	*Butorides striata (Striated Heron, Mangrove Heron)*			
51.		*Egretta garzetta*			
52.		*Egretta novaehollandiae*			
53.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
Ariidae					
54.		*Neoarius graeffei*			
Artamidae					
55.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
56.		*Artamus leucogaster*			
57.	25567	*Artamus leucorynchus (White-breasted Woodswallow)*			
58.	24354	*Artamus leucorynchus subsp. leucopygialis (White-breasted Woodswallow)*			
59.	24355	*Artamus minor (Little Woodswallow)*			
60.	24356	*Artamus personatus (Masked Woodswallow)*			
61.	24357	*Artamus superciliosus (White-browed Woodswallow)*			
Asplanchnidae					
62.		*Asplanchna sp.*			
Atherinidae					
63.		*Craterocephalus cuneiceps*			
Aturidae					
64.		*Albia sp.*			
65.		*Austraturus sp. P3 (PRP)*			Y
Baetidae					
66.		*Baetidae sp.*			
67.		*Cloeon sp.*			
68.		*Pseudocloeon hypodelum (ex Baetid genus3 WA sp. 2) (PSW)*			
Bdelloidea					
69.		*Bdelloidea sp. 2:2*			
Belostomatidae					
70.		*Diplonychus eques*			
71.		*Lethocerus distinctifemur*			
Boidae					
72.	25318	*Antaresia perthensis (Pygmy Python)*			
73.	25320	*Aspidites melanocephalus (Black-headed Python)*			
74.	25236	*Aspidites ramsayi (Woma)*			
Bolboceratidae					
75.		*Bolbobaineus planiceps*			
76.		*Bolboleaus truncatus*			
Brachionidae					
77.		*Brachionus angularis*			
78.		*Brachionus calyciflorus*			
79.		*Brachionus cf. forficula*			Y
80.		*Brachionus dichotomus*			
81.		*Brachionus quadridentatus*			
82.		*Keratella procurva*			
83.		*Keratella tropica*			
84.		*Plationus patulus*			
85.		*Platyias quadricornis*			
Burhinidae					
86.	24359	*Burhinus grallarius (Bush Stone-curlew)*			
Buthidae					
87.		*Lychas sp. 2*			
Cacatuidae					
88.		*Eolophus roseicapillus*			
Caenidae					
89.		*Caenidae sp.*			
90.		*Tasmanocoenis arcuata*			
Campephagidae					
91.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
92.	24367	*Lalage tricolor (White-winged Triller)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Candonidae					
93.		*'Leicacandona' 'gyralea' (PSS)*			Y
94.		*Areacandona 'fortescueiensis' (PSS)*			
95.		*Candonopsis kimberleyi*			Y
Caprimulgidae					
96.	24368	*Eurostopodus argus (Spotted Nightjar)*			
Carabidae					
97.		*Calosoma schayeri*			
98.		*Catadromus lacordairei*			
99.		*Chlaenius australis*			
100.		*Euryscaphus waterhousei*			
101.		*Geoscaptus laevissimus*			
102.		*Gnathaphanus melbournensis*			
103.		*Loxandrus laevigatus*			
104.		*Loxandrus micantior*			
105.		*Phorticosomus gularis*			
106.		*Platycoelus melliei*			
107.		*Trichocarenum cylindricum*			
Carphodactylidae					
108.	24969	*Nephrurus levis subsp. pilbarensis*			
Casuariidae					
109.	24470	*Dromaius novaehollandiae (Emu)*			
Centropagidae					
110.		*Boeckella triarticulata*			
111.		*Calamoecia baylyi (Cue form) (ex nr lucasi CB)*			
Centropodidae					
112.	25600	*Centropus phasianinus (Pheasant Coucal)*			
Ceratopogonidae					
113.		*Alluaudomyia sp.*			
114.		*Bezzia sp. P3 (PSW)*			Y
115.		*Ceratopogonidae sp.*			
116.		*Culicoides sp. P2 (PSW)*			
117.		*Dasyheleinae sp. P1 (PSW)*			
118.		*Dasyheleinae sp. P2 (PSW)*			
119.		*Nilobezzia sp. P2 (PSW)*			
120.		*Stilobezzia sp P1 (PSW)*			
Chaoboridae					
121.		*Chaoborus punctilliger*			
Charadriidae					
122.	25575	*Charadrius leschenaultii (Greater Sand Plover)*		T	
123.	25576	*Charadrius mongolus (Lesser Sand Plover)*		T	
124.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
125.	24378	*Charadrius veredus (Oriental Plover)*		IA	
126.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
127.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
128.	25577	*Vanellus miles (Masked Lapwing)*			
Chironomidae					
129.		*Chironominae sp.*			
130.		*Chironomus aff. alternans (V24) (CB)*			
131.		*Clinotanypus crux*			
132.		*Coelopynia pruinosa*			
133.		*Cryptochironomus griseidorsum*			
134.		*Dicrotendipes jobetus*			
135.		*Larsia albiceps*			
136.		*Microchironomus 'K1' (PSW)*			
137.		*Paracladopelma sp. P1 (nr M1) (PSW)*			
138.		*Paracladopelma sp. P2 (nr M2) (PSW)*			
139.		*Paratanytarsus sp. P1 (PSW)*			
140.		*Pentaneurini sp. P3 (PSW)*			
141.		*Pentaneurini sp. P6 (PSW)*			
142.		*Polypedilum griseoguttatum*			Y
143.		*Polypedilum leei*			
144.		*Polypedilum nr vespertinus (M2) (SAP)*			
145.		*Polypedilum nubifer*			
146.		*Polypedilum watsoni*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
147.		*Procladius paludicola*			
148.		*Rheocricotopus sp. P1 (PSW)*			
149.		*Rheotanytarsus christinae*			
150.		*Rheotanytarsus trivittatus*			
151.		*Skusella nr "V12 ex-WA" (Cranston)*			
152.		*Tanypodinae sp.*			
153.		*Tanytarsus fuscithorax/semibarbitarsus*			
154.		*Tanytarsus sp. P4 (PSW)*			
155.		*Thienemanniella sp. P1 (PSW)*			
156.		*Xenochironomus sp P3 (PSW)*			
Chydoridae					
157.		*Alona 'davidi vermiculata'*			
158.		*Alona cf. verrucosa*			
159.		*Alona rigidicaudis*			
160.		*Armatalona macrocopa*			
161.		*Chydorus eurynotus*			
162.		*Dunhevedia crassa*			
163.		*Ephemeroporus barroisi s.l.*			
164.		*Kurzia longirostris*			
165.		*Leberis cf. diaphanus (striate) (PSW)*			
166.		*Leydigia australis*			
167.		*Miralona victoriensis*			
168.		*Ovatalona cf. cambouei*			
Ciconiidae					
169.	25578	*Ephippiorhynchus asiaticus (Black-necked Stork)*			
Clupeidae					
170.		*Nematalosa erebi*			
Coenagrionidae					
171.		*Argiocnemis rubescens*			
172.		*Austroagrion pindrina/Ischnura heterosticta*			
173.		*Coenagrionidae sp.*			
174.		*Ischnura aurora aurora*			
175.		*Ischnura heterosticta heterosticta*			
176.		*Pseudagrion aureofrons*			
177.		*Pseudagrion microcephalum*			
178.		*Xanthagrion erythroneurum*			
Columbidae					
179.	24401	*Geopelia cuneata (Diamond Dove)*			
180.	24402	*Geopelia humeralis (Bar-shouldered Dove)*			
181.	25585	*Geopelia striata (Zebra Dove)*			
182.	24403	*Geopelia striata subsp. placida (Peaceful Dove)*			
183.	24404	*Geophaps plumifera (Spinifex Pigeon)*			
184.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
185.	24411	*Phaps histrionica (Flock Bronzewing, Flock Pigeon)*			
Conchostraca					
186.		*Conchostraca (unident.)*			
Conochilidae					
187.		*Conochilus dossuarius*			
Corbiculidae					
188.		*Corbicula sp.*			
Corduliidae					
189.		*Hemicordulia tau*			
190.		*Procordulia affinis*			
Corixidae					
191.		*Agraptocorixa parvipunctata*			
192.		*Corixidae sp.*			
193.		*Micronecta adelaidae (ex P4)*			
194.		*Micronecta gracilis*			
195.		*Micronecta micra*			
196.		*Micronecta n. sp. P3 (PSW)*			
197.		*Micronecta robusta*			
Corvidae					
198.	24416	*Corvus bennetti (Little Crow)*			
199.	25593	*Corvus orru (Torresian Crow)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Cracticidae					
200.	24420	*Cracticus nigrogularis (Pied Butcherbird)*			
201.	25595	*Cracticus tibicen (Australian Magpie)*			
202.	25596	*Cracticus torquatus (Grey Butcherbird)*			
Cuculidae					
203.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
204.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			
205.	24434	*Chrysococcyx osculans (Black-eared Cuckoo)*			
Culicidae					
206.		*Anopheles annulipes s.l.*			
207.		*Culex (Culex) annulirostris*			
208.		*Culex crinicauda*			
209.		*Culex nr. crinicauda (PSW)*			
210.		*Culex sp.*			
211.		*Culicidae sp.*			
Cyclopidae					
212.		*Diacyclops cockingi*			
213.		*Diacyclops humphreysi humphreysi*			
214.		*Diacyclops sp.*			
215.		*Eucyclops australiensis*			
216.		*Halicyclops (Rochacyclops) calm*			
217.		*Mesocyclops brooksi*			
218.		*Mesocyclops darwini*			
219.		*Microcyclops varicans*			
220.		*Paracyclops chiltoni*			
Cypridídae					
221.		*Bennelongia australis lineage*			
222.		*Bennelongia barangaroo lineage*			
223.		*Bennelongia nimala*			
224.		*Cypretta baylyi*			
225.		*Cypretta sp PSW074*			
226.		*Cypricercus sp. 422 (CB)*			
227.		*Cyprinotis 'maximus' n. sp.*			
228.		*Cyprinotus cingalensis (ex kimberleyensis)*			
229.		*Ilyodromus sp. PB*			
230.		*Isocypris williamsi (ex Ilyodromus sp. 413)*			
Cyzicidae					
231.		*Ozestheria packardi*			
Daphniidae					
232.		*Ceriodaphnia cornuta*			
Darwinulidae					
233.		*Darwinula stevensoni*			
Dasyuridae					
234.	24091	*Dasykaluta rosamondae (Little Red Kaluta)*			
235.	24095	*Ningaui timealeyi (Pilbara Ningaui)*			
236.	24116	*Sminthopsis macroura (Stripe-faced Dunnart)*			
237.	24120	*Sminthopsis youngsoni (Lesser Hairy-footed Dunnart)*			
Diaptomidae					
238.		*Eodiaptomus lumholtzi*			
Diatom Family					
239.		*Achnanthes exigua Grun.*			
240.		*Achnanthes exilis Kütz.*			
241.		*Achnanthidium minutissima (Kütz.) Czarnecki*			
242.		*Amphora coffeaeformis (Ag.) Kütz.*			
243.		*Amphora veneta Kütz.*			
244.		*Anomoeoneis brachysira (Bréb.) Grun.*			
245.		*Anomoeoneis vitrea*			
246.		*Aulacoseira ambigua*			
247.		*Caloneis silicula (Ehr.) Cl.*			
248.		*Campylodiscus clypeus Ehr.*			
249.		*Cocconeis placentula var. euglypta ehr.*			
250.		*Cylotella stelligera Cl. & Grun.*			
251.		*Cymbella affinis Kütz.*			
252.		*Cymbella cymbiformis Ag.*			
253.		*Cymbella delicatula Kütz.*			

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254.		*Encyonema gracile Rabh.*			
255.		*Eolimna subminiscula (Grun.) Lange-Bertalot*			
256.		*Epithemia adnata (Kütz.) Bréb.*			
257.		*Epithemia smithii Carruthers*			
258.		*Eunotia pectinatus (Dillw.) Rabh.*			
259.		*Fragilaria nitzschoides*			
260.		*Fragilaria ulna (Nitz.) Lange Bertalot*			
261.		*Gomphonema parvulum (Kütz.) Kütz.*			
262.		*Hantzschia amphioxys (Ehr.) Grun.*			
263.		*Hantzschia virgata*			
264.		*Karayevia clevei cf.*			Y
265.		*Luticola goeppertiana (Bleisch) Mann*			
266.		*Mastogloia elliptica (Ag.) Cl.*			
267.		*Mastogloia elliptica var. danseii (thwaites) grun.*			
268.		*Mastogloia smithii Thwaites*			
269.		*Mayamaea atomus*			
270.		*Navicula absoluta*			
271.		*Navicula bryophila Petersen*			
272.		*Navicula cryptocephala Kütz.*			
273.		*Navicula cryptonella Lange-Bertalot*			
274.		*Navicula elginensis (Greg.) Ralfs.*			
275.		*Navicula molestiformis Hust.*			
276.		*Navicula muraliformis*			Y
277.		*Navicula rhynchocephala Kütz.*			
278.		*Navicula similis Krasske*			
279.		*Navicula subrhynchocephala Hust.*			
280.		*Navicula tenelloides Hust.*			
281.		*Navicula veneta Kütz.*			
282.		*Nitzschia amphibia Grun.*			
283.		*Nitzschia capitellata*			
284.		*Nitzschia compressa (Bailey) Boyer*			
285.		*Nitzschia constricta (Greg.) Grun.*			
286.		*Nitzschia dissipata (Kütz.) Grun.*			
287.		*Nitzschia filiformis (W. Sm.) Van Heurck*			
288.		*Nitzschia frustulum (Kütz.) Grun.*			
289.		*Nitzschia intermedia Hantz.*			
290.		*Nitzschia levidensis var. victoriae (grun.) cholnoky*			
		> cholnoky			
		nitzschia levidensis v. victo			
291.		*Nitzschia microcephala Grun.*			
292.		*Nitzschia palea (Kütz.) W. Sm.*			
293.		*Nitzschia sigma (Kütz.) W. Sm.*			
294.		*Nitzschia sublinearis Hust.*			Y
295.		*Nitzschia umbonata (Ehr.) Lange-Bertalot*			
296.		*Pinnularia gibba Ehr.*			
297.		*Pinnularia obscura*			
298.		*Pleurosigma delicatulum W. Sm.*			
299.		*Rhopalodia gibba (Ehr.) O. Mull.)*			
300.		*Sellephora pupula (Kütz) Mereschkowsky*			
301.		*Stauroneis anceps Ehr.*			
302.		*Stauroneis phoenicenteron (Nitz.) Ehr.*			
303.		*Staurosira construens Ehr.*			
304.		*Surirella ovalis Bréb.*			Y
Dicaeidae					
305.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
Dicranophoridae					
306.		*Dicranophorus halbachi*			
Dicruridae					
307.	24443	*Grallina cyanoleuca (Magpie-lark)*			
308.	48096	*Rhipidura albiscapa (Grey Fantail)*			
309.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
310.	24457	*Rhipidura phasiana (Mangrove Grey Fantail)*			
Difflugiidae					
311.		*Difflugia sp. P1*			
Diplodactylidae					
312.	24926	*Diplodactylus conspicillatus (Fat-tailed Gecko)*			
313.	30933	*Lucasium stenodactylum*			
314.	24982	*Rhynchoedura ornata (Western Beaked Gecko)*			

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315.	25517	*Strophurus ciliaris*			
316.	24924	*Strophurus ciliaris subsp. aberrans*			
317.	24932	*Strophurus jeanae*			
Dolichopodidae					
318.		*Dolichopodidae sp.*			
319.		*Dolichopodidae sp. A (SAP)*			
Dugongidae					
320.	24084	*Dugong dugon (Dugong)*		S	
Dytiscidae					
321.		*Allodessus bistrigatus*			
322.		*Batrachomatus wingi*			
323.		*Bidessodes denticulatus*			
324.		*Copelatus nigrolineatus*			
325.		*Cybister tripunctatus*			
326.		*Dytiscidae sp.*			
327.		*Eretes australis*			
328.		*Hydroglyphus basalis*			
329.		*Hydroglyphus grammopterus (=trilineatus)*			
330.		*Hydroglyphus leai*			
331.		*Hydroglyphus orthogrammus*			
332.		*Hydrovatus rufoniger*			
333.		*Hydrovatus weiri*			
334.		*Hyphydrus lyratus*			
335.		*Hyphydrus sp.*			
336.		*Laccophilus sharpi*			
337.		*Limbodessus compactus*			
338.		*Megaporus ruficeps*			
339.		*Sternopriscus multimaculatus*			
340.		*Sternopriscus pilbarensis*			
341.		*Sternopriscus sp.*			
342.		*Tiporus tambreyi*			
Ecnomidae					
343.		*Ecnomidae sp.*			
344.		*Ecnomus pilbarensis*			
345.		*Ecnomus sp. AV16 (PSW)*			
Elapidae					
346.	25243	*Acanthophis pyrrhus (Desert Death Adder)*			
347.	25331	*Brachyurophis approximans (North-western Shovel-nosed Snake)*			
348.	25362	*Ephalophis greyae*			
349.	25301	*Furina ornata (Moon Snake)*			
350.	25261	*Pseudechis australis (Mulga Snake)*			
351.	42416	*Pseudonaja mengdeni (Western Brown Snake)*			
352.	25263	*Pseudonaja modesta (Ringed Brown Snake)*			
353.	25305	*Simoselaps anomalus (Desert Banded Snake)*			
354.	25307	*Suta punctata (Spotted Snake)*			
Eleotridae					
355.		*Hypseleotris compressa*			
356.		*Hypseleotris compressa?*			Y
Enchytraeidae					
357.		*Enchytraeidae sp.*			
Epistylididae					
358.		*Epistylis sp*			
Ergasilidae					
359.		*Ergasilidae sp.*			
Estrilidae					
360.	24631	*Emblema pictum (Painted Finch)*			
361.	24633	*Heteromunia pectoralis (Pictorella Mannikin)*			
362.	25685	*Neochmia ruficauda (Star Finch)*			
363.	30870	*Taeniopygia guttata (Zebra Finch)*			
Euchlanidae					
364.		*Euchlanis dilatata*			
365.		*Euchlanis incisa*			
366.		*Euchlanis oropha*			
Euglyphidae					

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367.		*Euglypha sp.*			
Eylaidae					
368.		*Eylais sp.*			
Falconidae					
369.	25621	*Falco berigora (Brown Falcon)*			
370.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
371.	24473	*Falco hypoleucos (Grey Falcon)*		T	
372.	25623	*Falco longipennis (Australian Hobby)*			
373.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
Flosculariidae					
374.		*Ptygura sp.*			
Gekkonidae					
375.	24956	*Gehyra pilbara*			
376.	24959	*Gehyra variegata*			
377.	24961	*Heteronotia binoei (Bynoe's Gecko)*			
Gerridae					
378.		*Gerridae sp.*			
379.		*Rhagadotarsus anomalus*			
Glareolidae					
380.	24481	*Glareola maldivarum (Oriental Pratincole)*		IA	
381.	24482	*Stiltia isabella (Australian Pratincole)*			
Gomphidae					
382.	33970	*Antipodogomphus hodgkini (Pilbara dragonfly)*		P3	
383.		*Austroepigomphus (Xerogomphus) gordoni*			
384.		*Austrogomphus mjobergi*			
Gruidae					
385.	24484	*Grus rubicunda (Brolga)*			
Gyrinidae					
386.		*Dineutus australis*			
Hadziidae					
387.		*Nedsia sp.*			
Haematopodidae					
388.	25627	*Haematopus fuliginosus (Sooty Oystercatcher)*			
389.	24487	*Haematopus longirostris (Pied Oystercatcher)*			
Halcyonidae					
390.	25547	*Dacelo leachii (Blue-winged Kookaburra)*			
391.	42351	*Todiramphus pyrrhopygius (Red-backed Kingfisher)*			
392.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
Haliplidae					
393.		*Haliplus halsei*			
Hexarthridae					
394.		*Hexarthra cf brandorffi (PSW)*			
Hirundinidae					
395.	47909	*Cheramoeca leucosterna (White-backed Swallow)*			
396.	24491	*Hirundo neoxena (Welcome Swallow)*			
397.	25630	*Hirundo rustica (Barn Swallow)*		IA	
398.	24493	*Hirundo rustica subsp. gutturalis (Barn Swallow)*		IA	Y
399.	48060	*Petrochelidon ariel (Fairy Martin)*			
400.	48061	*Petrochelidon nigricans (Tree Martin)*			
Hydrachnidae					
401.		*Hydrachna sp.*			
402.		*Hydrachna sp. 4/5 (PSW)*			
Hydraenidae					
403.		*Hydraena barbipes*			
404.		*Hydraena cf. rudallensis (PSW)*			
405.		*Limnebius sp.*			
406.		*Ochthebius sp. P1 (PSW)*			
407.		*Ochthebius sp. P2 (PSW)*			
Hydridae					
408.		*Hydra sp.*			

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Hydrochidae					
409.		*Hydrochus group 3 "black" (PSW)*			
410.		*Hydrochus sp. P1 (PSW)*			
411.		*Hydrochus sp. P5*			Y
Hydrophilidae					
412.		*Berosus josephenae*			
413.		*Berosus nr josephenae (was Pilbara sp 3) (PSW)*			
414.		*Berosus pulchellus*			
415.		*Berosus sp.*			
416.		*Enochrus deserticola*			
417.		*Enochrus elongatulus*			
418.		*Enochrus sp.*			
419.		*Helochares/E mastersi larvae*			
420.		*Hydrochus burdekinensis*			
421.		*Hydrochus interioris*			
422.		*Hydrochus macroaquilonius*			
423.		*Hydrophilidae sp.*			
424.		*Laccobius matthewsi*			
425.		*Paracymus pygmaeus*			
426.		*Paracymus spenceri*			
427.		*Paranacaena sp. P1*			Y
428.		*Regimbartia attenuata*			
429.		*Spercheus platycephalus*			
Hydropsychidae					
430.		*Cheumatopsyche dostinei*			
431.		*Cheumatopsyche wellsae*			
Hydroptilidae					
432.		*Hellyethira sp.*			
Hygrobatidae					
433.		*Australiobates queenslandensis*			
434.		*Australiobates sp. P3 (nr crassisetus) (PSW)*			
Hylidae					
435.	25371	*Cyclorana australis (Giant Frog)*			
Ilyocryptidae					
436.		*Ilyocryptus raridentatus*			
Ilyocyprididae					
437.		*Ilyocypris 'spiculata' (ms name) (SAP)*			
438.		*Ilyocypris australiensis*			
439.		*Ilyocypris perigundi*			
Isostictidae					
440.		*Eurysticta coolawanyah*			
Lamponidae					
441.		*Lampona ampeinna*			
442.		*Lamponata daviesae*			
Laridae					
443.		*Chroicocephalus novaehollandiae*			
444.	48587	*Hydroprogne caspia (Caspian Tern)*		IA	
445.	25643	*Sterna hybrida (Whiskered Tern)*			
446.	48593	*Sternula albifrons (Little Tern)*		IA	
447.	48597	*Thalasseus bergii (Crested Tern)*		IA	
Lecanidae					
448.		*Lecane bulla*			
449.		*Lecane crepida*			
450.		*Lecane decipiens*			Y
451.		*Lecane hornemanni*			
452.		*Lecane luna*			
453.		*Lecane obtusa*			
454.		*Lecane papuana*			
455.		*Lecane ungulata*			
Lepadellidae					
456.		*Lepadella amphitropis*			
457.		*Lepadella ovalis*			
458.		*Lepadella patella*			

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Lepidoptera					
459.		*Lepidoptera (non-pyralid) Pilbara sp. 3 not hairy (PSW)*			
460.		*Lepidoptera sp.*			
Leptoceridae					
461.		*Leptoceridae sp.*			
462.		*Oecetis sp. Pilbara 4 (PSW)*			
463.		*Oecetis sp. Pilbara 5 (PSW)*			
464.		*Oecetis sp. Pilbara 6 (PSW)*			
465.		*Oecetis sp. Pilbara 8 (PSW)*			
466.		*Triaenodes sp. P1=P2 (PSW)*			
467.		*Triplectides australis*			
Lesquereusidae					
468.		*Lesquereusia spiralis*			
Libellulidae					
469.		*Crocothemis nigrifrons*			
470.		*Diplacodes bipunctata*			
471.		*Diplacodes haematodes*			
472.		*Libellulidae sp.*			
473.		*Macrodiplax cora*			
474.		*Orthetrum caledonicum*			
475.		*Pantala flavescens*			
476.		*Tramea stenoloba*			
477.		*Zyxomma elgneri*			
Limnesiidae					
478.		*Limnesia sp. 4 (PSW)*			
Limnichidae					
479.		*Limnichidae sp.*			
Limnocharidae					
480.		*Limnochares australica*			
Limnocytheridae					
481.		*Limnocythere dorsosicula*			
482.		*Limnocythere sp BOS068*			
Limnodynastidae					
483.	25430	*Notaden nichollsi (Desert Spadefoot)*			
Lycosidae					
484.		*Knoelle clara*			
Lyncaeidae					
485.		*Lynceus argillaphilus*			
Macropodidae					
486.	24135	*Macropus robustus subsp. erubescens (Euro, Biggada)*			
487.	24136	*Macropus rufus (Red Kangaroo, Marlu)*			
Macrotrichidae					
488.		*Macrothrix capensis*			
489.		*Macrothrix indistincta*			
490.		*Macrothrix sp.*			
Maluridae					
491.	25647	*Amytornis striatus (Striated Grasswren)*			
492.	25651	*Malurus lamberti (Variegated Fairy-wren)*			
493.	24544	*Malurus lamberti subsp. assimilis (Variegated Fairy-wren)*			
494.	25652	*Malurus leucopterus (White-winged Fairy-wren)*			
495.	24549	*Malurus leucopterus subsp. leuconotus (White-winged Fairy-wren)*			
Megalopidae					
496.		*Megalops cyprinoides*			
Melanotaeniidae					
497.		*Melanotaenia australis*			
Meliphagidae					
498.	24559	*Acanthagenys rufogularis (Spiny-cheeked Honeyeater)*			
499.	24564	*Certhionyx variegatus (Pied Honeyeater)*			
500.	24568	*Epthianura aurifrons (Orange Chat)*			
501.	24570	*Epthianura tricolor (Crimson Chat)*			
502.	42314	*Gavicalis virescens (Singing Honeyeater)*			
503.	25661	*Lichmera indistincta (Brown Honeyeater)*			

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504.	24583	*Manorina flavigula (Yellow-throated Miner)*			
505.	25665	*Melithreptus gularis (Black-chinned Honeyeater)*			
506.	25668	*Philemon citreogularis (Little Friarbird)*			
Melitidae					
507.		*Melitidae sp. 1 (PSS)*			
Meropidae					
508.	24598	*Merops ornatus (Rainbow Bee-eater)*			
Mesoveliidae					
509.		*Mesovelia horvathi*			
510.		*Mesovelia hungerfordi*			
511.		*Mesovelia vittigera*			
Mideopsidae					
512.		*Gretacarus nsp. P1 (PSW)*			
Moinidae					
513.		*Moina aff weismanni*			
514.		*Moina micrura s.l.*			
Molossidae					
515.	24183	*Mormopterus loriae (Little Northern Freetail-bat)*			
Motacillidae					
516.	25670	*Anthus australis (Australian Pipit)*			
Mugilidae					
517.		*Mugil cephalus*			
Muridae					
518.	24217	*Leggadina lakedownensis (Northern Short-tailed Mouse, Lakeland Downs Mouse, Kerakenga)*		P4	
519.	24223	*Mus musculus (House Mouse)*	Y		
520.	24233	*Pseudomys chapmani (Western Pebble-mound Mouse, Ngadji)*		P4	
521.	24235	*Pseudomys desertor (Desert Mouse)*			
522.	24237	*Pseudomys hermannsburgensis (Sandy Inland Mouse)*			
523.	24248	*Zyzomys argurus (Common Rock-rat)*			
Muscidae					
524.		*Muscidae sp. A (SAP)*			
525.		*Muscidae sp. N*			Y
Myobatrachidae					
526.	25439	*Uperoleia glandulosa (Glandular Toadlet)*			
527.	25442	*Uperoleia micromeles (Tanami Toadlet)*			
528.	25446	*Uperoleia talpa (Ratcheting Toadlet)*			
Mytilinidae					
529.		*Mytilina ventralis macracantha*			
NO FAMILY					
530.		*No invertebrates*			
Naididae					
531.		*Allonais pectinata*			
532.		*Aulodrilus pigueti*			
533.		*Dero furcata*			
534.		*Dero nivea*			
535.		*Monopylephorus n. sp. WA29 (ex Pristina WA3) (PSS)*			
536.		*Naididae (ex Tubificidae)*			
Nematoda					
537.		*Nematoda sp.*			
538.		*Nematoda sp. P6 (PSW)*			
539.		*Nematoda sp. P8 (PSW)*			
Nemesiidae					
540.		*Aname ellenae*			
Neosittidae					
541.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
Neotrichidae					
542.		*Neothrix superarmata*			
Notommatidae					
543.		*Cephalodella gibba*			
544.		*Cephalodella sp. P1 (very long toes)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
					Y
545.		*Enteroplea cf. lacustris (PSW)*			
Notonectidae					
546.		*Anisops canaliculatus*			
547.		*Anisops gratus*			
548.		*Anisops nasutus*			
549.		*Anisops sp.*			
550.		*Anisops stali*			
551.		*Anisops thienemanni*			
552.		*Notonectidae sp.*			
Ostracoda					
553.		*Ostracoda (unident.)*			
Otididae					
554.	24610	*Ardeotis australis (Australian Bustard)*			
Oxidae					
555.		*Oxus orientalis*			
Pachycephalidae					
556.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
557.	24618	*Oreoica gutturalis (Crested Bellbird)*			
558.	24620	*Pachycephala lanioides (White-breasted Whistler)*			
559.	24621	*Pachycephala melanura subsp. melanura (Mangrove Golden Whistler)*			
560.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
Palaemonidae					
561.		*Macrobrachium sp. P1*			Y
Paramelitidae					
562.		*Paramelitidae cf. sp. 2 (PSS)*			
563.		*Paramelitidae sp.*			
Pardalotidae					
564.	24627	*Pardalotus rubricatus (Red-browed Pardalote)*			
565.	25682	*Pardalotus striatus (Striated Pardalote)*			
Pelecanidae					
566.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
Petroicidae					
567.	47997	*Melanodryas cucullata (Hooded Robin)*			
568.	24659	*Petroica goodenovii (Red-capped Robin)*			
Phalacrocoracidae					
569.		*Microcarbo melanoleucos*			
570.	25697	*Phalacrocorax carbo (Great Cormorant)*			
571.	25698	*Phalacrocorax melanoleucos (Little Pied Cormorant)*			
572.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
573.	25699	*Phalacrocorax varius (Pied Cormorant)*			
Phasianidae					
574.	24671	*Coturnix pectoralis (Stubble Quail)*			
575.	25701	*Coturnix ypsilophora (Brown Quail)*			
576.	24673	*Coturnix ypsilophora subsp. australis (Brown Quail)*			
Phreodrilidae					
577.		*Phreodrilid with dissimilar ventral chaetae*			
Planorbidae					
578.		*Ameriana sp. P1 (PSW)*			
579.		*Gyraulus hesperus*			
580.		*Isidorella egraria*			
581.		*Planorbidae sp.*			
Pleidae					
582.		*Pleidae sp.*			
Plotosidae					
583.		*Neosilurus hyrtlii*			
Podargidae					
584.	25703	*Podargus strigoides (Tawny Frogmouth)*			
Podicipedidae					
585.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
586.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Polycentropodidae					
587.		*Paranyctiophylax sp AV5 (KIM-UWA)*			
Pomatostomidae					
588.	25706	*Pomatostomus temporalis (Grey-crowned Babbler)*			
Pristinidae					
589.		*Pristina longiseta*			
Prodidomidae					
590.		*Wesmaldra hirsti*			
Psittacidae					
591.		*Barnardius zonarius*			
592.	25715	*Cacatua roseicapilla (Galah)*			
593.	24725	*Cacatua roseicapilla subsp. assimilis (Galah)*			
594.	25716	*Cacatua sanguinea (Little Corella)*			
595.	24736	*Melopsittacus undulatus (Budgerigar)*			
596.	24742	*Nymphicus hollandicus (Cockatiel)*			
597.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
Pteropodidae					
598.	24173	*Pteropus scapulatus (Little Red Flying-fox)*			
Ptilonorhynchidae					
599.		*Ptilonorhynchus guttatus*			
Pygopodidae					
600.	25001	*Delma nasuta*			
601.	25002	*Delma pax*			
602.	25004	*Delma tincta*			
603.	25005	*Lialis burtonis*			
604.	25009	*Pygopus nigriceps*			
Pyralidae					
605.		*Pyralidae Pilbara sp 2 (PSW)*			
606.		*Pyralidae nr. sp. 39/40 of JHH (SAP)*			
607.		*Pyralidae sp.*			
Rallidae					
608.	25727	*Fulica atra (Eurasian Coot)*			
609.	24761	*Fulica atra subsp. australis (Eurasian Coot)*			
610.	25730	*Gallirallus philippensis (Buff-banded Rail)*			
611.	24765	*Gallirallus philippensis subsp. mellori (Buff-banded Rail)*			
612.	24769	*Porzana fluminea (Australian Spotted Crake)*			
613.	24771	*Porzana tabuensis (Spotless Crake)*			
Recurvirostridae					
614.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
615.	25734	*Himantopus himantopus (Black-winged Stilt)*			
616.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
Rotifera					
617.		*Rotifera sp.*			
Saldidae					
618.		*Saldidae sp.*			
Salticidae					
619.		*Zebraplatys keyserlingi*			
620.		*Zenodorus orbiculatus*			
Sarcoptiformes					
621.		*Oribatida group 1 (PSS)*			
Scarabaeidae					
622.		*Heteronyx parvulus*			
623.		*Onthophagus margaretensis*			
624.		*Onthophagus mjobergi*			
625.		*Tesserodon granulatum*			
626.		*Tesserodon novaehollandiae*			
Scaridiidae					
627.		*Scaridium bostjani*			
Scincidae					
628.	25017	*Carlia triacantha (Desert Rainbow Skink)*			
629.	25020	*Cryptoblepharus plagiocephalus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
630.	25036	*Ctenotus duricola*			
631.	25462	*Ctenotus grandis*			
632.	25045	*Ctenotus helenae*			
633.	25463	*Ctenotus pantherinus (Leopard Ctenotus)*			
634.	25064	*Ctenotus pantherinus subsp. ocellifer (Leopard Ctenotus)*			
635.	25062	*Ctenotus piankai*			
636.	25073	*Ctenotus saxatilis (Rock Ctenotus)*			
637.	25077	*Ctenotus serventyi*			
638.	41409	*Eremiascincus musivus (Mosaic Desert Skink)*			
639.	43381	*Eremiascincus pallidus (Western Narrow-banded Skink, Narrow-banded Sand Swimmer)*			
640.	25125	*Lerista bipes*			
641.	30928	*Lerista clara*			
642.	30929	*Lerista jacksoni*			
643.	25155	*Lerista muelleri*			
644.	25184	*Menetia greyii*			
645.	25495	*Morethia ruficauda*			
646.	25194	*Morethia ruficauda subsp. ruficauda*			
Scirtidae					
647.		*Scirtidae sp.*			
Scolopacidae					
648.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
649.	25736	*Arenaria interpres (Ruddy Turnstone)*		IA	
650.	24779	*Calidris acuminata (Sharp-tailed Sandpiper)*		IA	
651.	25738	*Calidris canutus (Red Knot, knot)*		IA	
652.	24783	*Calidris canutus subsp. rogersi (Red Knot (north-eastern Siberia))*		T	
653.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
654.	24790	*Calidris tenuirostris (Great Knot)*		T	
655.	24792	*Gallinago megala (Swinhoe's Snipe)*		IA	
656.	30932	*Limosa lapponica (Bar-tailed Godwit)*		IA	
657.	25741	*Limosa limosa (Black-tailed Godwit)*		IA	
658.	24798	*Numenius madagascariensis (Eastern Curlew)*		T	
659.	24799	*Numenius minutus (Little Curlew, Little Whimbrel)*		IA	
660.	25742	*Numenius phaeopus (Whimbrel)*		IA	
661.	24803	*Tringa brevipes (Grey-tailed Tattler)*		P4	
662.	24806	*Tringa glareola (Wood Sandpiper)*		IA	
663.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
664.	24809	*Tringa stagnatilis (Marsh Sandpiper, little greenshank)*		IA	
665.	41351	*Xenus cinereus (Terek Sandpiper)*		IA	
Scolopendridae					
666.		*Ethmostigmus rubripes*			
Sididae					
667.		*Diaphanosoma unguiculatum*			
668.		*Latonopsis australis*			
669.		*Latonopsis brehmi*			
Simuliidae					
670.		*Cnephia nr aurantiacum*			
671.		*Cnephia tonnoiri*			
Sparassidae					
672.		*Holconia neglecta*			
Spongillidae					
673.		*Spongillidae sp.*			
Staphylinidae					
674.		*Staphylinidae sp.*			
Stratiomyidae					
675.		*Stratiomyidae sp.*			
Strigidae					
676.	25747	*Ninox connivens (Barking Owl)*			
Sturnidae					
677.	47954	*Gelochelidon nilotica (Gull-billed Tern)*		IA	
Sylviidae					
678.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
Synchaetidae					
679.		*Polyarthra dolichoptera*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Tabanidae					
680.		*Tabanidae sp.*			
Terapontidae					
681.		*Leiopotherapon unicolor*			
Testudinellidae					
682.		*Testudinella patina*			
Thamnocephalidae					
683.		*Branchinella mcraei*			
Thiaridae					
684.		*Plotiopsis australis*			
685.		*Thiaridae sp.*			
Threskiornithidae					
686.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
687.	24842	*Platalea regia (Royal Spoonbill)*			
688.	24843	*Plegadis falcinellus (Glossy Ibis)*		IA	
689.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
Thylacomyidae					
690.	24168	*Macrotis lagotis (Bilby, Dalgyte, Ninu)*		T	
Tipulidae					
691.		*Tipulidae sp.*			
Trichocercidae					
692.		*Trichocerca similis*			
Trichotriidae					
693.		*Macrochaetus altamirai*			
Trombidiformes					
694.		*Acariformes sp.*			
Turnicidae					
695.	24848	*Turnix pyrrhothorax (Red-chested Button-quail)*			
696.	24851	*Turnix velox (Little Button-quail)*			
Tytonidae					
697.	25762	*Tyto alba (Barn Owl)*			
Unionicolidae					
698.		*Encentridophorus sarasini*			
699.		*Recifella sp.*			
700.		*Unionicola crassipalpis*			
701.		*Unionicola nr minutissima (PSW)*			
702.		*Unionicola nr vidrinei (PSW)*			
703.		*Unionicola sp P1 (PSW)*			Y
704.		*Unionicola vidrinei*			
Urodacidae					
705.		*Urodacus hoplurus*			
706.		*Urodacus varians*			
707.		*Urodacus yaschenkoi*			
Varanidae					
708.	25209	*Varanus acanthurus (Spiny-tailed Monitor)*			
709.	25210	*Varanus brevicauda (Short-tailed Pygmy Monitor)*			
710.	25212	*Varanus eremius (Pygmy Desert Monitor)*			
Veliidae					
711.		*Microvelia (Pacificovelia) oceanica*			
Vespertilionidae					
712.		*Nyctophilus geoffroyi subsp. pallescens*			
Zodariidae					
713.		*Masasteron tealei*			
714.		*Minasteron minusculum*			
Zosteropidae					
715.	24857	*Zosterops luteus (Yellow White-eye)*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement

Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area

S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 09/07/2021

Kingdom Plantae
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 119° 26' 37" E,20° 12' 36" S
Buffer 30km
Group By Family

Family	Species	Records
Acanthaceae	1	2
Aizoaceae	5	12
Amaranthaceae	20	51
Apocynaceae	1	2
Araliaceae	1	1
Asteraceae	12	30
Boraginaceae	11	13
Byblidaceae	1	2
Campanulaceae	2	2
Caryophyllaceae	2	4
Chenopodiaceae	12	23
Cleomaceae	2	7
Combretaceae	1	1
Convolvulaceae	12	25
Cucurbitaceae	4	5
Cyperaceae	17	38
Droseraceae	2	2
Elatinaceae	5	7
Eriocaulaceae	1	2
Euphorbiaceae	11	23
Fabaceae	81	236
Frankeniaceae	1	1
Gentianaceae	1	3
Goodeniaceae	9	24
Gyrostemonaceae	2	3
Hemerocallidaceae	1	1
Hydrocharitaceae	1	4
Lamiaceae	2	6
Lauraceae	1	3
Loranthaceae	2	3
Lythraceae	3	10
Malvaceae	29	52
Marsileaceae	2	5
Meliaceae	1	1
Menyanthaceae	1	4
Molluginaceae	3	15
Montiaceae	4	10
Moraceae	3	4
Moringaceae	1	1
Myrtaceae	11	35
Nyctaginaceae	2	3
Onagraceae	1	3
Orobanchaceae	1	2
Papaveraceae	2	3
Passifloraceae	1	1
Pedaliaceae	1	1
Phrymaceae	4	10
Phyllanthaceae	2	7
Plantaginaceae	3	5
Plumbaginaceae	1	1
Poaceae	66	206
Polygalaceae	1	1
Portulacaceae	1	7
Potamogetonaceae	2	5
Primulaceae	1	2
Proteaceae	9	17
Rhizophoraceae	1	1
Rubiaceae	3	3
Sapindaceae	3	6
Solanaceae	10	16
Stylidiaceae	1	1
Surianaceae	1	2
Thymelaeaceae	1	2
Violaceae	1	1
Zygophyllaceae	3	6
TOTAL	**404**	**985**

Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Acanthaceae					
1.	12088	*Rostellularia adscendens var. clementii*			
Aizoaceae					
2.	44240	*Trianthema cusackianum*			
3.	44305	*Trianthema pilosum*			
4.	44362	*Trianthema triquetrum*			
5.	44360	*Trianthema turgidifolium*			
6.	29095	*Zaleya galericulata subsp. galericulata*			
Amaranthaceae					
7.	2645	*Achyranthes aspera (Chaff Flower)*			
8.	2646	*Aerva javanica (Kapok Bush)*	Y		
9.	2647	*Alternanthera angustifolia*			
10.	2648	*Alternanthera denticulata (Lesser Joyweed)*			
11.	2651	*Alternanthera nana (Hairy Joyweed)*			
12.	2652	*Alternanthera nodiflora (Common Joyweed)*			
13.	18361	*Gomphrena affinis subsp. pilbarensis*			
14.	2676	*Gomphrena canescens (Batchelors Buttons)*			
15.	18363	*Gomphrena canescens subsp. canescens*			
16.	2680	*Gomphrena cunninghamii*			
17.	2695	*Ptilotus arthrolasius*			
18.	2696	*Ptilotus astrolasius*			
19.	2699	*Ptilotus axillaris (Mat Mulla Mulla)*			
20.	2704	*Ptilotus calostachyus (Weeping Mulla Mulla)*			
21.	2725	*Ptilotus fusiformis*			
22.	2728	*Ptilotus gomphrenoides*			
23.	2734	*Ptilotus incanus*			
24.	2745	*Ptilotus murrayi*			
25.	2747	*Ptilotus obovatus (Cotton Bush)*			
26.	43203	*Surreya diandra*			
Apocynaceae					
27.	6567	*Carissa lanceolata (Conkerberry, Marnuwiji)*			
Araliaceae					
28.	19043	*Trachymene oleracea subsp. oleracea*			
Asteraceae					
29.	7866	*Blumea tenella*			
30.	7906	*Calotis plumulifera*			
31.	7919	*Centipeda minima (Spreading Sneezewood, Kanjirralaa, Inteng-inteng, Karengkal, Kata-palkalpa, Munyu-parnti-parnti)*			
32.	19762	*Centipeda minima subsp. macrocephala*			
33.	19757	*Centipeda minima subsp. minima*			
34.	17816	*Pluchea ferdinandi-muelleri*			
35.	8168	*Pluchea rubelliflora*			
36.	8170	*Pluchea tetranthera*			
37.	8192	*Pterocaulon sphacelatum (Apple Bush, Fruit Salad Plant)*			
38.	8235	*Streptoglossa bubakii*			
39.	8237	*Streptoglossa decurrens*			
40.	8241	*Streptoglossa tenuiflora*			
Boraginaceae					
41.	6697	*Halgania solanacea*			
42.	17494	*Halgania solanacea var. solanacea*			
43.	17299	*Heliotropium ammophilum*			
44.	17301	*Heliotropium chrysocarpum*			
45.	6705	*Heliotropium crispatum*			
46.	6707	*Heliotropium curassavicum (Smooth Heliotrope)*			
47.	6710	*Heliotropium europaeum (Common Heliotrope)*	Y		
48.	6713	*Heliotropium ovalifolium*			
49.	17309	*Heliotropium pachyphyllum*			
50.	17031	*Heliotropium transforme*			
51.	6727	*Trichodesma zeylanicum (Camel Bush, Kumbalin)*			
Byblidaceae					
52.	3179	*Byblis liniflora (Northern Byblis)*			
Campanulaceae					
53.	7390	*Wahlenbergia queenslandica*			
54.	7393	*Wahlenbergia tumidifructa*			
Caryophyllaceae					
55.	12075	*Polycarpaea corymbosa var. corymbosa*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
56.	2903	*Polycarpaea longiflora*			
Chenopodiaceae					
57.	2485	*Chenopodium auricomum (Queensland Bluebush)*			
58.	11890	*Dysphania rhadinostachya subsp. rhadinostachya*			
59.	11662	*Maireana tomentosa subsp. tomentosa*			
60.	2571	*Maireana villosa*			
61.	2597	*Sclerolaena bicornis (Goathead Burr)*			
62.	11650	*Sclerolaena bicornis var. bicornis (Goathead Burr)*			
63.	2617	*Sclerolaena hostilis*			
64.	2633	*Sclerolaena uniflora (Two-spined Saltbush)*			
65.	31616	*Tecticornia auriculata*			
66.	33356	*Tecticornia indica subsp. indica*			
67.	33318	*Tecticornia indica subsp. leiostachya (Samphire)*			
68.	2644	*Threlkeldia diffusa (Coast Bonefruit)*			
Cleomaceae					
69.	2987	*Cleome uncifera*			
70.	2988	*Cleome viscosa (Tickweed, Tjinduwadhu)*			
Combretaceae					
71.	45698	*Terminalia circumalata*			
Convolvulaceae					
72.	6603	*Bonamia alatisemina*			
73.	11167	*Bonamia erecta*			
74.	6606	*Bonamia media*			
75.	6608	*Bonamia pannosa*			
76.	19565	*Cressa australis*			
77.	6617	*Evolvulus alsinoides (Tropical Speedwell)*			
78.	11416	*Evolvulus alsinoides var. decumbens*			
79.	11200	*Evolvulus alsinoides var. villosicalyx*			
80.	6623	*Ipomoea coptica*			
81.	6625	*Ipomoea diamantinensis*			
82.	6633	*Ipomoea muelleri (Poison Morning Glory, Yumbu)*			
83.	6637	*Ipomoea polymorpha*			
Cucurbitaceae					
84.	48838	*Citrullus amarus*	Y		
85.	7371	*Cucumis melo (Ulcardo Melon)*			
86.	41721	*Cucumis variabilis*			
87.	25825	*Cucurbita pepo*	Y		
Cyperaceae					
88.	750	*Bulbostylis barbata*			
89.	751	*Bulbostylis burbidgeae*		P4	
90.	774	*Cyperus bifax (Downs Nutgrass)*			
91.	777	*Cyperus bulbosus (Bush Onion, Tjanmata)*			
92.	789	*Cyperus difformis (Rice Sedge)*			
93.	798	*Cyperus iria*			
94.	802	*Cyperus macrostachyos*			
95.	807	*Cyperus pulchellus*			
96.	814	*Cyperus squarrosus*			
97.	818	*Cyperus vaginatus (Stiffleaf Sedge)*			
98.	823	*Eleocharis atropurpurea*			
99.	851	*Fimbristylis dichotoma (Eight Day Grass)*			
100.	853	*Fimbristylis elegans*			
101.	859	*Fimbristylis littoralis*			
102.	862	*Fimbristylis microcarya*			
103.	878	*Fimbristylis rara*			
104.	952	*Lipocarpha microcephala*			
Droseraceae					
105.	43544	*Drosera finlaysoniana*			
106.	3103	*Drosera indica (Indian Sundew)*			
Elatinaceae					
107.	5183	*Bergia ammannioides*			
108.	5185	*Bergia perennis*			
109.	11642	*Bergia perennis subsp. obtusifolia*			
110.	11912	*Bergia perennis subsp. perennis*			
111.	5186	*Bergia trimera*			
Eriocaulaceae					
112.	1154	*Eriocaulon cinereum*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Euphorbiaceae					
113.	17422	*Adriana tomentosa var. tomentosa*			
114.	4617	*Euphorbia australis (Namana)*			
115.	35307	*Euphorbia australis var. australis*			
116.	9048	*Euphorbia careyi*			
117.	4622	*Euphorbia clementii*		P3	
118.	4623	*Euphorbia coghlanii (Namana)*			
119.	42870	*Euphorbia psilosperma*			
120.	12097	*Euphorbia tannensis subsp. eremophila (Desert Spurge)*			
121.	42879	*Euphorbia trigonosperma*			
122.	42876	*Euphorbia vaccaria var. vaccaria*			
123.	4705	*Ricinus communis (Castor Oil Plant)*	Y		
Fabaceae					
124.	3198	*Acacia acradenia*			
125.	11215	*Acacia adoxa var. adoxa*			
126.	16160	*Acacia adoxa var. subglabra*			
127.	3209	*Acacia ampliceps*			
128.	3214	*Acacia ancistrocarpa (Fitzroy Wattle)*			
129.	17013	*Acacia colei var. colei*			
130.	3300	*Acacia dictyophleba (Sandhill Wattle, Ngarkalya)*			
131.	3326	*Acacia eriopoda (Broome Pindan Wattle)*			
132.	12673	*Acacia glaucocaesia*			
133.	3370	*Acacia hilliana*			
134.	44583	*Acacia hilliana x stellaticeps*			
135.	3377	*Acacia inaequilatera (Baderi)*			
136.	3447	*Acacia monticola (Gawar, Lilwardi)*			
137.	3501	*Acacia ptychophylla*			
138.	15203	*Acacia sabulosa*			
139.	13078	*Acacia sclerosperma subsp. sclerosperma*			
140.	3551	*Acacia sphaerostachya*			
141.	19456	*Acacia stellaticeps*			
142.	3579	*Acacia trachycarpa (Minni Ritchi, Balgali)*			
143.	23521	*Acacia trudgeniana*			
144.	20319	*Acacia tumida var. pilbarensis*			
145.	19641	*Acacia tumida var. tumida*			
146.	3680	*Aeschynomene indica (Budda Pea)*			
147.	17147	*Alysicarpus muelleri*			
148.	12757	*Bauhinia cunninghamii*			
149.	11055	*Cajanus cinereus*			
150.	10972	*Cajanus marmoratus*			
151.	3774	*Crotalaria cunninghamii (Green Birdflower, Bilbun)*			
152.	20179	*Crotalaria medicaginea var. neglecta*			
153.	19398	*Crotalaria ramosissima*			
154.	17117	*Cullen cinereum*			
155.	17439	*Cullen lachnostachys*			
156.	17116	*Cullen martinii*			
157.	3853	*Desmodium filiforme*			
158.	3856	*Desmodium muelleri*			
159.	3612	*Dichrostachys spicata (Pied Piper Bush)*			
160.	3938	*Glycine canescens (Silky Glycine)*			
161.	3971	*Indigofera boviperda*			
162.	3973	*Indigofera colutea (Sticky Indigo)*			
163.	3980	*Indigofera linifolia*			
164.	3981	*Indigofera linnaei (Birdsville Indigo)*			
165.	3982	*Indigofera monophylla*			
166.	16061	*Indigofera oblongifolia*	Y		
167.	3985	*Indigofera rugosa*			
168.	3987	*Indigofera trita*			
169.	3989	*Isotropis atropurpurea (Poison Sage)*			
170.	3996	*Jacksonia aculeata*			
171.	4054	*Leptosema anomalum*			
172.	4061	*Lotus cruentus (Redflower Lotus)*			
173.	3614	*Neptunia dimorphantha (Sensitive Plant)*			
174.	3617	*Neptunia monosperma*			
175.	3675	*Petalostylis labicheoides (Slender Petalostylis)*			
176.	3620	*Prosopis pallida (Mesquite, Algaroba)*	Y		
177.	4191	*Rhynchosia minima (Rhynchosia)*			
178.	12279	*Senna artemisioides subsp. helmsii*			
179.	12280	*Senna artemisioides subsp. oligophylla*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
180.	12303	*Senna costata*			
181.	12152	*Senna curvistyla*			
182.	12312	*Senna notabilis*			
183.	18450	*Senna symonii*			
184.	4196	*Sesbania cannabina (Sesbania Pea)*			
185.	4198	*Sesbania formosa (White Dragon Tree)*			
186.	12353	*Stylosanthes hamata (Verano Stylo)*	Y		
187.	4232	*Swainsona laciniata*			
188.	4242	*Swainsona pterostylis*			
189.	13587	*Swainsona tanamiensis*			
190.	4263	*Tephrosia clementii*			
191.	4272	*Tephrosia leptoclada*			
192.	4280	*Tephrosia rosea (Flinders River Poison, Bungoo'dah)*			
193.	19531	*Tephrosia rosea var. clementii*			
194.	19529	*Tephrosia rosea var. rosea*			
195.	15947	*Tephrosia sp. B Kimberley Flora (C.A. Gardner 7300)*			
196.	17768	*Tephrosia sp. Bungaroo Creek (M.E. Trudgen 11601)*			
197.	15949	*Tephrosia sp. D Kimberley Flora (R.D. Royce 1848)*			
198.	4285	*Tephrosia supina*			
199.	4287	*Tephrosia virens*			
200.	4316	*Trigonella suavissima (Sweet Fenugreek)*			
201.	4323	*Vigna lanceolata (Maloga Vigna, Wega)*			
202.	11576	*Vigna lanceolata var. lanceolata*			
203.	31391	*Vigna sp. Hamersley Clay (A.A. Mitchell PRP 113)*			
204.	12679	*Zornia muelleriana subsp. congesta*			
Frankeniaceae					
205.	5188	*Frankenia ambita*			
Gentianaceae					
206.	41646	*Schenkia clementii*			
Goodeniaceae					
207.	7424	*Dampiera candicans*			
208.	20523	*Goodenia azurea subsp. hesperia*			
209.	7509	*Goodenia forrestii*			
210.	7521	*Goodenia lamprosperma*			
211.	7526	*Goodenia microptera*			
212.	12552	*Goodenia muelleriana*			
213.	7545	*Goodenia scaevolina (Ngurubi)*			
214.	10982	*Goodenia stobbsiana*			
215.	13178	*Scaevola amblyanthera var. centralis*			
Gyrostemonaceae					
216.	2778	*Codonocarpus cotinifolius (Native Poplar, Kundurangu)*			
217.	2789	*Gyrostemon tepperi*			
Hemerocallidaceae					
218.	1286	*Corynotheca pungens*			
Hydrocharitaceae					
219.	17868	*Vallisneria nana*			
Lamiaceae					
220.	6830	*Basilicum polystachyon*			
221.	6789	*Newcastelia cladotricha (Lambs Tail)*			
Lauraceae					
222.	2949	*Cassytha capillaris*			
Loranthaceae					
223.	2383	*Amyema preissii (Wireleaf Mistletoe)*			
224.	29080	*Amyema sanguinea var. pulchra*			
Lythraceae					
225.	5277	*Ammannia baccifera*			
226.	5278	*Ammannia multiflora*			
227.	5285	*Rotala diandra*			
Malvaceae					
228.	4886	*Abutilon amplum*			
229.	4891	*Abutilon fraseri (Lantern Bush)*			
230.	11325	*Abutilon indicum var. australiense*			
231.	4901	*Abutilon otocarpum (Desert Chinese Lantern)*			
232.	14113	*Abutilon sp. Pilbara (W.R. Barker 2025)*			
233.	25847	*Corchorus incanus subsp. incanus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
234.	17405	*Corchorus lasiocarpus*			
235.	4862	*Corchorus parviflorus*			
236.	4864	*Corchorus sidoides (Flannel Weed)*			
237.	4865	*Corchorus tridens*			
238.	4867	*Corchorus walcottii (Woolly Corchorus)*			
239.	4910	*Gossypium australe (Native Cotton)*			
240.	4918	*Gossypium robinsonii (Wild Cotton)*			
241.	29317	*Hibiscus austrinus var. austrinus*			
242.	4924	*Hibiscus burtonii*			
243.	4933	*Hibiscus leptocladus*			
244.	4962	*Malvastrum americanum (Spiked Malvastrum)*	Y		
245.	5051	*Melhania oblongifolia*			
246.	5053	*Melochia pyramidata*	Y		
247.	46821	*Seringia nephrosperma (Free carpel fire-bush)*			
248.	4966	*Sida arenicola*			
249.	4971	*Sida cardiophylla*			
250.	4988	*Sida rohlenae*			
251.	18149	*Sida rohlenae subsp. rohlenae*			
252.	33698	*Sida sp. Pilbara (A.A. Mitchell PRP 1543)*			
253.	45274	*Sida sp. Pindan (B.G. Thomson 3398)*			
254.	4989	*Sida spinosa (Spiny Sida)*			
255.	16306	*Triumfetta deserticola*			
256.	13481	*Triumfetta ramosa*			
Marsileaceae					
257.	75	*Marsilea exarata*			
258.	76	*Marsilea hirsuta (Nardoo)*			
Meliaceae					
259.	4518	*Owenia reticulata (Native Walnut, Bandal)*			
Menyanthaceae					
260.	6549	*Nymphoides indica (Marshwort)*			
Molluginaceae					
261.	2835	*Glinus lotoides (Hairy Carpet Weed)*			
262.	2836	*Glinus oppositifolius*			
263.	48201	*Trigastrotheca molluginea*			
Montiaceae					
264.	40825	*Calandrinia pentavalvis*			
265.	2865	*Calandrinia pumila*			
266.	2870	*Calandrinia stagnensis*			
267.	2872	*Calandrinia tepperiana*			
Moraceae					
268.	31578	*Ficus aculeata var. indecora (Ranji)*			
269.	19648	*Ficus brachypoda*			
270.	19642	*Ficus cerasicarpa*			
Moringaceae					
271.	19717	*Moringa oleifera*	Y		
Myrtaceae					
272.	5446	*Calytrix carinata*			
273.	16781	*Corymbia candida subsp. lautifolia*			
274.	14650	*Corymbia flavescens*			
275.	17093	*Corymbia hamersleyana*			
276.	17084	*Corymbia zygophylla*			
277.	35345	*Eucalyptus camaldulensis subsp. obtusa (Blunt-budded River Red Gum)*			
278.	35343	*Eucalyptus camaldulensis subsp. refulgens*			
279.	5724	*Eucalyptus odontocarpa (Sturt Creek Mallee)*			
280.	14548	*Eucalyptus victrix*			
281.	5875	*Melaleuca argentea (Silver Cadjeput, Bandaran)*			
282.	5923	*Melaleuca lasiandra*			
Nyctaginaceae					
283.	2769	*Boerhavia burbidgeana*			
284.	2770	*Boerhavia coccinea (Tar Vine, Wituka)*			
Onagraceae					
285.	6136	*Ludwigia perennis*			
Orobanchaceae					
286.	12492	*Striga squamigera*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Papaveraceae					
287.	2961	*Argemone ochroleuca (Mexican Poppy)*	Y		
288.	17797	*Argemone ochroleuca subsp. ochroleuca*	Y		
Passifloraceae					
289.	14096	*Passiflora foetida var. hispida*	Y		
Pedaliaceae					
290.	7118	*Josephinia eugeniae (Josephinia Burr)*			
Phrymaceae					
291.	7057	*Elacholoma hornii*			
292.	7060	*Glossostigma diandrum*			
293.	7082	*Mimulus gracilis*			
294.	7092	*Peplidium muelleri*			
Phyllanthaceae					
295.	4680	*Phyllanthus maderaspatensis*			
296.	4687	*Phyllanthus virgatus*			
Plantaginaceae					
297.	7098	*Stemodia grossa (Marsh Stemodia, Mindjaara)*			
298.	7099	*Stemodia kingii*			
299.	7102	*Stemodia viscosa (Pagurda)*			
Plumbaginaceae					
300.	6490	*Muellerolimon salicorniaceum*			
Poaceae					
301.	19835	*Amphipogon sericeus*			
302.	207	*Aristida contorta (Bunched Kerosene Grass)*			
303.	210	*Aristida holathera*			
304.	12063	*Aristida holathera var. holathera*			
305.	212	*Aristida inaequiglumis (Feathertop Threeawn)*			
306.	215	*Aristida latifolia (Feathertop Wiregrass)*			
307.	229	*Astrebla pectinata (Barley Mitchell Grass)*			
308.	258	*Cenchrus ciliaris (Buffel Grass)*	Y		
309.	29721	*Cenchrus setiger (Birdwood Grass)*	Y		
310.	270	*Chloris pumilio*			
311.	273	*Chrysopogon fallax (Golden Beard Grass)*			
312.	279	*Cymbopogon ambiguus (Scentgrass)*			
313.	281	*Cymbopogon obtectus (Silkyheads)*			
314.	46558	*Cynodon convergens*			
315.	283	*Cynodon dactylon (Couch)*	Y		
316.	290	*Dactyloctenium radulans (Button Grass)*			
317.	303	*Dichanthium fecundum (Curly Bluegrass)*			
318.	13741	*Dichanthium sericeum subsp. humilius*			
319.	13740	*Dichanthium sericeum subsp. polystachyum*			
320.	313	*Digitaria ctenantha (Comb Finger Grass)*			
321.	48378	*Diplachne fusca subsp. fusca*			
322.	328	*Echinochloa colona (Awnless Barnyard Grass)*	Y		
323.	355	*Elytrophorus spicatus (Spikegrass)*			
324.	357	*Enneapogon caerulescens (Limestone Grass)*			
325.	365	*Enneapogon polyphyllus (Leafy Nineawn)*			
326.	20377	*Enneapogon robustissimus*			
327.	368	*Enteropogon ramosus (Windmill Grass, Curly Windmill Grass)*			
328.	375	*Eragrostis cumingii (Cuming's Love Grass)*			
329.	378	*Eragrostis dielsii (Mallee Lovegrass)*			
330.	380	*Eragrostis eriopoda (Woollybutt Grass, Wangurnu)*			
331.	395	*Eragrostis speciosa (Handsome Lovegrass)*			
332.	398	*Eragrostis tenellula (Delicate Lovegrass)*			
333.	399	*Eragrostis xerophila (Knotty-butt Neverfail)*			
334.	400	*Eriachne aristidea*			
335.	403	*Eriachne benthamii (Swamp Wanderrie)*			
336.	408	*Eriachne flaccida (Claypan Grass)*			
337.	12055	*Eriachne glauca var. glauca*			
338.	13660	*Eriachne lanata*			
339.	414	*Eriachne obtusa (Northern Wandarrie Grass)*			
340.	425	*Eriochloa procera (Cupgrass)*			
341.	426	*Eriochloa pseudoacrotricha (Perennial Cupgrass)*			
342.	11011	*Eulalia aurea*			
343.	458	*Iseilema dolichotrichum*			
344.	459	*Iseilema eremaeum*			
345.	464	*Iseilema membranaceum (Small Flinders Grass)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
346.	465	*Iseilema vaginiflorum (Red Flinders Grass)*			
347.	471	*Leptochloa digitata (Whorled Cane Grass)*			
348.	503	*Panicum decompositum (Native Millet, Kaltu-kaltu)*			
349.	515	*Paraneurachne muelleri (Northern Mulga Grass)*			
350.	522	*Paspalidium jubiflorum (Warrego Grass)*			
351.	523	*Paspalidium rarum (Rare Paspalidium)*			
352.	546	*Perotis rara (Comet Grass)*			
353.	606	*Setaria dielsii (Diels' Pigeon Grass)*			
354.	608	*Setaria italica (Italian Millet)*	Y		
355.	619	*Sorghum plumosum (Plume Canegrass)*			
356.	633	*Sporobolus mitchellii (Ratstail Couch)*			
357.	673	*Themeda triandra*			
358.	13131	*Triodia epactia*			
359.	690	*Triodia longiceps (Giant Grey Spinifex)*			
360.	17873	*Triodia schinzii*			
361.	706	*Triraphis mollis (Needle Grass)*			
362.	29269	*Urochloa occidentalis var. occidentalis*			
363.	717	*Urochloa piligera*			
364.	728	*Whiteochloa cymbiformis*			
365.	729	*Xerochloa barbata (Rice Grass)*			
366.	732	*Yakirra australiensis*			
Polygalaceae					
367.	41363	*Polygala galeocephala*			
Portulacaceae					
368.	2884	*Portulaca oleracea (Purslane, Wakati)*			
Potamogetonaceae					
369.	113	*Potamogeton tricarinatus (Floating Pondweed)*			
370.	44492	*Stuckenia pectinata*			
Primulaceae					
371.	6484	*Samolus repens (Creeping Brookweed)*			
Proteaceae					
372.	2001	*Grevillea eriostachya (Flame Grevillea, Kaliny-kalinypa)*			
373.	2079	*Grevillea pyramidalis (Caustic Bush, Tjungu)*			
374.	2121	*Grevillea wickhamii (Wickham's Grevillea)*			
375.	13440	*Grevillea wickhamii subsp. aprica*			
376.	19478	*Grevillea wickhamii subsp. hispidula*			
377.	19074	*Grevillea wickhamii subsp. macrodonta*			
378.	2177	*Hakea lorea (Witinti)*			
379.	19137	*Hakea lorea subsp. lorea*			
380.	2178	*Hakea macrocarpa (Dyaridany, Jaradinty)*			
Rhizophoraceae					
381.	39680	*Ceriops australis*			
Rubiaceae					
382.	7318	*Dentella minutissima*			
383.	7339	*Oldenlandia galioides*			
384.		*Spermacoce sp.*			
Sapindaceae					
385.	4740	*Atalaya hemiglauca (Whitewood)*			
386.	4745	*Diplopeltis eriocarpa (Hairy Pepperflower)*			
387.	4759	*Dodonaea coriacea*			
Solanaceae					
388.	6966	*Duboisia hopwoodii (Pituri, Kundugu)*			
389.	11331	*Nicotiana occidentalis subsp. obliqua*			
390.	11734	*Nicotiana rosulata subsp. rosulata*			
391.	20652	*Physalis angulata*	Y		
392.	6998	*Solanum cleistogamum*			
393.	7001	*Solanum dioicum (Gilu)*			
394.	7002	*Solanum diversiflorum*			
395.	7014	*Solanum horridum*			
396.	7018	*Solanum lasiophyllum (Flannel Bush, Mindjulu)*			
397.	7022	*Solanum nigrum (Black Berry Nightshade)*	Y		
Stylidiaceae					
398.	7711	*Stylidium desertorum*			
Surianaceae					
399.	3182	*Stylobasium spathulatum (Pebble Bush)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Thymelaeaceae					
400.	5230	*Pimelea ammocharis*			
Violaceae					
401.	5215	*Hybanthus aurantiacus*			
Zygophyllaceae					
402.	4368	*Tribulopis angustifolia*			
403.	4377	*Tribulus hirsutus*			
404.	18066	*Tribulus sp. long-styled eichlerianus (A.S. George 10666)*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Australian Government

Department of Agriculture, Water and the Environment

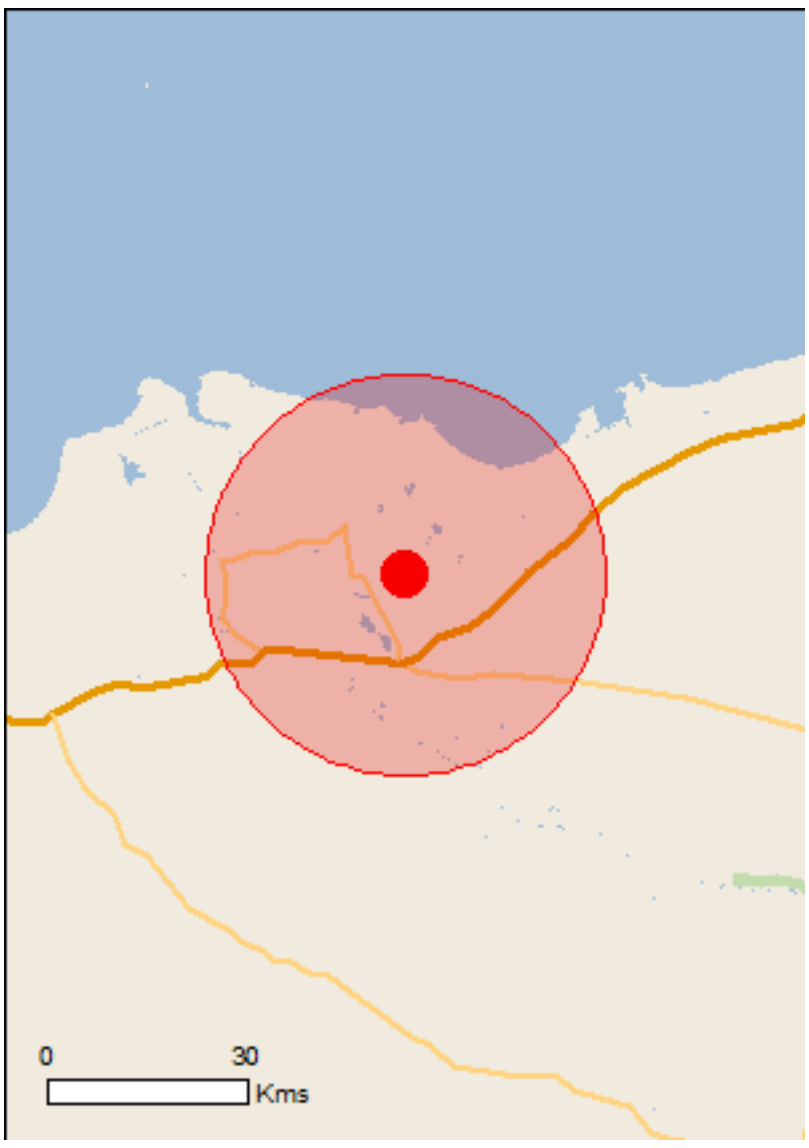
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 09/07/21 12:51:54



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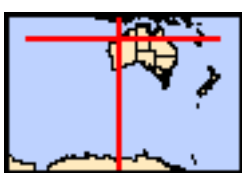

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	27
Listed Migratory Species:	43

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	75
Whales and Other Cetaceans:	11
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	1

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	11
Nationally Important Wetlands:	2
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside the Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

Name
EEZ and Territorial Sea

Marine Regions [Resource Information]

If you are planning to undertake action in an area in or close to the Commonwealth Marine Area, and a marine bioregional plan has been prepared for the Commonwealth Marine Area in that area, the marine bioregional plan may inform your decision as to whether to refer your proposed action under the EPBC Act.

Name
North-west

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Critically Endangered	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
[Dasyurus hallucatus](#) Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
[Macroderma gigas](#) Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
[Macrotis lagotis](#) Greater Bilby [282]	Vulnerable	Species or species habitat known to occur within area
[Megaptera novaeangliae](#) Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
[Rhinonicteris aurantia (Pilbara form)](#) Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
[Aipysurus apraefrontalis](#) Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area
[Aipysurus foliosquama](#) Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Liasis olivaceus barroni](#) Olive Python (Pilbara subspecies) [66699]	Vulnerable	Species or species habitat known to occur within area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Sharks		
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
[Pristis clavata](#) Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area
[Pristis pristis](#) Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area
[Pristis zijsron](#) Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding likely to occur within area
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]		
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Breeding likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area
Sula leucogaster Brown Booby [1022]		Breeding known to occur within area
Migratory Marine Species		
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Dugong dugon Dugong [28]		Species or species habitat likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta		Species or species habitat known to occur

Name	Threatened	Type of Presence
Ray [84994]		within area
Manta birostris		
Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Orcinus orca		
Killer Whale, Orca [46]		Species or species habitat may occur within area
Pristis clavata		
Dwarf Sawfish, Queensland Sawfish [68447]	Vulnerable	Species or species habitat known to occur within area
Pristis pristis		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat known to occur within area
Pristis zijsron		
Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding likely to occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis		
Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Tursiops aduncus (Arafura/Timor Sea populations)		
Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundo rustica		
Barn Swallow [662]		Species or species habitat known to occur within area
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Breeding likely to occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Sula leucogaster Brown Booby [1022]		Breeding known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Fish		
Bulbonaricus brauni Braun's Pughead Pipefish, Pug-headed Pipefish		Species or species

Name	Threatened	Type of Presence
[66189]		habitat may occur within area
Campichthys tricarinatus Three-keel Pipefish [66192]		Species or species habitat may occur within area
Choeroichthys brachysoma Pacific Short-bodied Pipefish, Short-bodied Pipefish [66194]		Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Doryrhamphus janssi Cleaner Pipefish, Janss' Pipefish [66212]		Species or species habitat may occur within area
Doryrhamphus negrosensis Flagtail Pipefish, Masthead Island Pipefish [66213]		Species or species habitat may occur within area
Festucalex scalaris Ladder Pipefish [66216]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Halicampus nitidus Glittering Pipefish [66224]		Species or species habitat may occur within area
Halicampus spinirostris Spiny-snout Pipefish [66225]		Species or species habitat may occur within area
Haliichthys taeniophorus Ribboned Pipehorse, Ribboned Seadragon [66226]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus histrix Spiny Seahorse, Thorny Seahorse [66236]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Micrognathus micronotopterus Tidepool Pipefish [66255]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Trachyrhamphus longirostris Straightstick Pipefish, Long-nosed Pipefish, Straight Stick Pipefish [66281]		Species or species habitat may occur within area
Mammals		
Dugong dugon Dugong [28]		Species or species habitat likely to occur within area
Reptiles		
Acalyptophis peronii Horned Seasnake [1114]		Species or species habitat may occur within area
Aipysurus apraefrontalis Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area
Aipysurus duboisii Dubois' Seasnake [1116]		Species or species habitat may occur within area
Aipysurus eydouxii Spine-tailed Seasnake [1117]		Species or species habitat may occur within area
Aipysurus foliosquama Leaf-scaled Seasnake [1118]	Critically Endangered	Species or species habitat known to occur within area
Aipysurus laevis Olive Seasnake [1120]		Species or species habitat may occur within area
Aipysurus tenuis Brown-lined Seasnake [1121]		Species or species habitat may occur within area
Astrotia stokesii Stokes' Seasnake [1122]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or

Name	Threatened	Type of Presence
		related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area
Disteira major Olive-headed Seasnake [1124]		Species or species habitat may occur within area
Emydocephalus annulatus Turtle-headed Seasnake [1125]		Species or species habitat may occur within area
Ephalophis greyi North-western Mangrove Seasnake [1127]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Hydrelaps darwiniensis Black-ringed Seasnake [1100]		Species or species habitat may occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Hydrophis mcdowelli null [25926]		Species or species habitat may occur within area
Hydrophis ornatus Spotted Seasnake, Ornate Reef Seasnake [1111]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Australian Marine Parks	[Resource Information]
Name	Label
Eighty Mile Beach	Multiple Use Zone (IUCN VI)

Extra Information

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Mammals		
Camelus dromedarius Dromedary, Camel [7]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Reptiles		
Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area

Nationally Important Wetlands [Resource Information]

Name	State
De Grey River	WA
Eighty Mile Beach System	WA

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-20.20752 119.44696

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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Appendix D

Flora data

Flora species list
Flora matrix
Raw site data
Quadrat data
Flora likelihood of occurrence guidelines
Flora likelihood of occurrence assessment

Flora species list

Family	Taxon	Status
Aizoaceae	*Trianthema pilosum*	
Amaranthaceae	*Ptilotus astrolasius*	
Amaranthaceae	*Ptilotus axillaris*	
Amaranthaceae	*Ptilotus calostachyus*	
Amaranthaceae	*Ptilotus gaudichaudii*	
Apocynaceae	*Carissa lanceolata*	
Asteraceae	*Centipeda* sp.	
Asteraceae	*Pluchea dentex*	
Boraginaceae	*Halgania solanacea* var. *solanacea*	
Boraginaceae	*Halgania* sp.	
Boraginaceae	*Heliotropium chrysocarpum*	
Boraginaceae	*Heliotropium vestitum*	
Cleomaceae	*Arivela uncifera*	
Cleomaceae	*Arivela viscosa*	
Convolvulaceae	*Bonamia erecta*	
Convolvulaceae	*Bonamia media*	
Fabaceae	*Acacia acradenia*	
Fabaceae	*Acacia ancistrocarpa*	
Fabaceae	*Acacia colei*	
Fabaceae	*Acacia coriacea* subsp. *pendens*	
Fabaceae	*Acacia orthocarpa*	
Fabaceae	*Acacia pruinosa*	
Fabaceae	*Acacia spondylophylla*	
Fabaceae	*Acacia stellaticeps*	
Fabaceae	*Acacia tumida* var. *pilbarensis*	
Fabaceae	*Crotalaria ramosissima*	
Fabaceae	*Indigofera monophylla*	
Fabaceae	*Jacksonia acicularis*	
Fabaceae	*Senna nobilis*	
Fabaceae	*Tephrosia* sp. Bungaroo Creek (M.E. Trudgen 11601)	
Fabaceae	*Tephrosia* sp. D Kimberley Flora (R.D. Royce 1848)	
Gyrostemonaceae	*Codonocarpus cotinifolius*	
Gyrostemonaceae	*Gyrostemon tepperi*	
Lauraceae	*Cassytha filiformis*	
Lamiaceae	*Newcastelia cladotricha*	
Malvaceae	*Corchorus incanus*	
Malvaceae	*Corchorus sidoides*	

Family	Taxon	Status
Malvaceae	*Gossypium australe*	
Malvaceae	*Seringia sp.*	
Malvaceae	*Sida arenicola*	
Malvaceae	*Sida clementii*	
Malvaceae	*Sida* sp. Pilbara (A.A. Mitchell PRP 1543)	
Malvaceae	*Triumfetta ramosa*	
Meliaceae	*Owenia reticulata*	
Molluginaceae	*Trigastrotheca molluginea*	
Myrtaceae	*Calytrix carinata*	
Myrtaceae	*Corymbia flavescens*	
Myrtaceae	*Corymbia opaca*	
Myrtaceae	*Corymbia zygophylla*	
Myrtaceae	*Eucalyptus odontocarpa*	
Myrtaceae	*Eucalyptus victrix*	
Myrtaceae	*Melaleuca glomerata*	
Phyllanthaceae	*Phyllanthus exilis*	
Plantaginaceae	*Stemodia kingii*	
Poaceae	*Aristida holathera* var. *holathera*	
Poaceae	*Cenchrus ciliaris*	*
Poaceae	*Chrysopogon fallax*	
Poaceae	*Eragrostis desertorum*	
Poaceae	*Eriachne lanata*	
Poaceae	*Eriachne ?obtusa*	
Poaceae	*Eriachne pulchella subsp. pulchella*	
Poaceae	*Eriachne* sp.	
Poaceae	*Triodia ?pungens*	
Poaceae	*Triodia schinzii*	
Poaceae	*Yakirra australiensis* var. *australiensis*	
Proteaceae	*Grevillea eriostachya*	
Proteaceae	*Grevillea wickhamii* subsp. *hispidula*	
Proteaceae	*Hakea lorea*	
Sapindaceae	*Dodonaea coriacea*	
Violaceae	*Afrohybanthus* sp.	
Zygophyllaceae	*Tribulus hirsutus*	

Flora species by site matrix

Taxon	Bore_01	Bore_02	Bore_03	Bore_04	Bore_05	Bore_06	Bore_07	Bore_08
Acacia ancistrocarpa	1	1	1	1	1	1	1	
Acacia colei						1		
Acacia orthocarpa				1	1			
Acacia spondylophylla					1			1
Acacia stellaticeps	1	1	1					
Acacia tumida var. pilbarensis			2	2	3	1	1	
Aristida holathera var. holathera			1			1	1	1
Bonamia erecta	1	1	1	1		1	1	1
Bonamia media						1	1	
Cassytha filiformis						1	1	
Cenchrus ciliaris			1					
Centipeda sp.	1	1	1	1				1
Chrysopogon fallax						1	1	
Arivela viscosa						1	1	
Corchorus incanus								1
Corchorus sidoides			1	1		1	1	
Corymbia flavescens								
Corymbia opaca					1		1	1
Corymbia zygophylla						1	1	
Dodonaea coriacea				1	1	1		
Eragrostis desertorum				1		1	1	
Eriachne ?obtusa	1	1		1	1			
Eriachne lanata	1	1	1					
Eriachne pulchella subsp. *pulchella*								1

Taxon	Bore_01	Bore_02	Bore_03	Bore_04	Bore_05	Bore_06	Bore_07	Bore_08
Eriachne sp.						1	1	
Eucalyptus odontocarpa				1	1			
Eucalyptus victrix						1	1	
Gossypium australe						1	1	
Grevillea wickhamii subsp. hispidula	1		1	1	1	1	2	1
Halgania sp.	1	1						
Heliotropium chrysocarpum	1							
Afrohybanthus sp.			1	1	1			
Indigofera monophylla				1	1			
Jacksonia acicularis	1	1	1	1		1	1	
Pluchea dentex							1	
Ptilotus astrolasius	1	1				2	2	
Ptilotus axillaris						1	1	
Ptilotus calostachyus	1			1		1	1	1
Seringia sp.		1						
Sida arenicola			1					
Sida clementii			1			1	1	
Sida sp. Pilbara (A.A. Mitchell PRP 1543)						1	1	
Tephrosia sp. Bungaroo Creek (M.E. Trudgen 11601)						1		
Tephrosia sp. D Kimberley Flora (R.D. Royce 1848)						1	1	
Trianthema pilosum						1	1	1
Trigastrotheca molluginea								1
Triodia ?pungens	1	1	1	1	1			1
Triodia schinzii	1	1	1	1		1	1	
Triumfetta ramosa			1					
Yakirra australiensis var. *australiensis*						1	1	

Raw site data

Site number	Genus	Species	Height (m)	Cover (ind)	Cover (%)	Form / stratum
Bore_01	*Acacia*	*ancistrocarpa*	1.5	1	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_01	*Acacia*	*stellaticeps*	0.5	25	30-10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_01	*Bonamia*	*erecta*	0.25	3	<10%	Forb (G)
Bore_01	*Centipeda*	sp	0.25	1	<2% Numerous	Forb (G)
Bore_01	*Eriachne*	*lanata*	0.5	5	<10%	Tussock grass (G)
Bore_01	*Eriachne*	*? obtusa*	0.5	3	<10%	Tussock grass (G)
Bore_01	*Grevillea*	*wickhamii* subsp*. hispidula*	1.75	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_01	*Halgania*	sp	0.25	0.1	<2% Few than 10	Forb (G)
Bore_01	*Heliotropium*	*chrysocarpum*	0.1	0.1	<2% Few than 10	Forb (G)
Bore_01	*Jacksonia*	*acicularis*	0.5	1	<2% Numerous	Shrub, cycad, grass-tree, tree-fern (M)
Bore_01	*Ptilotus*	*astrolasius*	0.25	1	<2% Numerous	Forb (G)
Bore_01	*Ptilotus*	*calostachyus*	0.75	0.2	<2% Numerous	Forb (G)
Bore_01	*Triodia*	*schinzii*	0.5	30	30-10%	Hummock grass (G)
Bore_01	*Triodia*	*? pungens*	0.75	2	<2% Numerous	Hummock grass (G)
Bore_02	*Acacia*	*ancistrocarpa*	1.5	10	<10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_02	*Acacia*	*stellaticeps*	0.5	30	30-10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_02	*Bonamia*	*erecta*	0.25	3	<10%	Forb (G)
Bore_02	*Centipeda*	sp	0.25	1	<2% Numerous	Forb (G)
Bore_02	*Eriachne*	*lanata*	0.5	1	<2% Few than 10	Tussock grass (G)
Bore_02	*Eriachne*	*? obtusa*	0.5	2	<2% Numerous	Tussock grass (G)
Bore_02	*Halgania*	sp	0.25	0.1	<2% Few than 10	Forb (G)
Bore_02	*Jacksonia*	*acicularis*	0.5	1	<2% Numerous	Shrub, cycad, grass-tree, tree-fern (M)
Bore_02	*Ptilotus*	*astrolasius*	0.25	1	<2% Numerous	Forb (G)
Bore_02	*Seringia*	sp	0.5	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)

Site number	Genus	Species	Height (m)	Cover (ind)	Cover (%)	Form / stratum
Bore_02	*Triodia*	*schinzii*	0.5	40	70-30%	Hummock grass (G)
Bore_02	*Triodia*	*? pungens*	0.75	10	<10%	Hummock grass (G)
Bore_03	*Acacia*	*ancistrocarpa*	1.5	15	30-10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_03	*Acacia*	*tumida* var. *pilbarensis*	1.75	15	30-10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_03	*Acacia*	*tumida* var. *pilbarensis*	1.75	4	<10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_03	*Acacia*	*stellaticeps*	0.5	10	<10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_03	*Aristida*	*holathera* var. *holathera*	0.25	0.2	<2% Few than 10	Tussock grass (G)
Bore_03	*Bonamia*	*erecta*	0.25	0.5	<2% Numerous	Forb (G)
Bore_03	*Cenchrus*	*ciliaris*	0.25	0.1	<2% Few than 10	Tussock grass (G)
Bore_03	*Centipeda*	sp	0.25	1	<2% Numerous	Forb (G)
Bore_03	*Corchorus*	*sidoides*	0.25	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_03	*Eragrostis*	*desertorum*	0.25	0.5	<2% Numerous	Tussock grass (G)
Bore_03	*Eriachne*	*lanata*	0.5	0.1	<2% Few than 10	Tussock grass (G)
Bore_03	*Grevillea*	*wickhamii* subsp. *hispidula*	1.5	15	30-10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_03	*Hybanthus*	sp.	0.1	0.1	<2% Few than 10	Forb (G)
Bore_03	*Jacksonia*	*acicularis*	0.5	0.1	<2% Numerous	Shrub, cycad, grass-tree, tree-fern (M)
Bore_03	*Sida*	*clementii*	0.5	0.1	<2% Numerous	Forb (G)
Bore_03	*Sida*	*arenicola*	0.25	0.5	<2% Numerous	Forb (G)
Bore_03	*Triodia*	*schinzii*	0.5	5	<10%	Hummock grass (G)
Bore_03	*Triodia*	*? pungens*	0.75	35	70-30%	Hummock grass (G)
Bore_03	*Triumfetta*	*ramosa*	0.25	0.5	<2% Few than 10	Forb (G)
Bore_04	*Acacia*	*ancistrocarpa*	1.5	25	30-10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_04	*Acacia*	*tumida* var. *pilbarensis*	1.75	15	30-10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_04	*Acacia*	*tumida* var. *pilbarensis*	1.75	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_04	*Acacia*	*orthocarpa*	1.25	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)

Site number	Genus	Species	Height (m)	Cover (ind)	Cover (%)	Form / stratum
Bore_04	*Bonamia*	*erecta*	0.25	2	<2% Numerous	Forb (G)
Bore_04	*Centipeda*	*sp*	0.25	1	<2% Numerous	Forb (G)
Bore_04	*Corchorus*	*sidoides*	0.25	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_04	*Dodnaea*	*coraceae*	0.25	0.1	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_04	*Eriachne*	*? obtusa*	0.5	0.1	<2% Few than 10	Tussock grass (G)
Bore_04	*Eucalyptus*	*odontocarpa*	2.25	4	<10%	Tree mallee (U)
Bore_04	*Grevillea*	*wickhamii* subsp. *hispidula*	1.5	4	<10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_04	*Hybanthus*	sp.	0.1	1	<2% Numerous	Forb (G)
Bore_04	*Indigofera*	*monophylla*	0.25	0.3	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_04	*Jacksonia*	*acicularis*	0.5	4	<10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_04	*Ptilotus*	*calostachyus*	0.75	0.2	<2% Numerous	Forb (G)
Bore_04	*Triodia*	*schinzii*	0.5	25	30-10%	Hummock grass (G)
Bore_04	*Triodia*	*? pungens*	0.75	20	30-10%	Hummock grass (G)
Bore_05	*Acacia*	*ancistrocarpa*	1.5	20	30-10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_05	*Acacia*	*tumida* var. *pilbarensis*	1.75	15	30-10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_05	*Acacia*	*tumida* var. *pilbarensis*	1.75	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_05	*Acacia*	*tumida* var. *pilbarensis*	3	1	<2% Numerous	Shrub, cycad, grass-tree, tree-fern (M)
Bore_05	*Acacia*	*orthocarpa*	1.25	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_05	*Acacia*	*spondylophylla*	0.25	0.5	<2% Numerous	Shrub, cycad, grass-tree, tree-fern (M)
Bore_05	*Corymbia*	*opaca*	7	1	<2% Few than 10	Tree, palm (U)
Bore_05	*Dodonaea*	*coriacea*	0.25	0.1	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_05	*Eriachne*	*? obtusa*	0.5	0.1	<2% Few than 10	Tussock grass (G)
Bore_05	*Eucalyptus*	*odontocarpa*	2	2	<10%	Tree mallee (U)
Bore_05	*Grevillea*	*wickhamii* subsp. *hispidula*	1.5	6	<10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_05	*Hybanthus*	sp.	0.1	1	<2% Numerous	Forb (G)

Site number	Genus	Species	Height (m)	Cover (ind)	Cover (%)	Form / stratum
Bore_05	*Indigofera*	*monophylla*	0.25	0.3	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_05	*Triodia*	*? pungens*	0.75	50	70-30%	Hummock grass (G)
Bore_06	*Acacia*	*ancistrocarpa*	1.5	35	70-30%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_06	*Acacia*	*tumida* var. *pilbarensis*	1.75	15	30-10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_06	*Acacia*	*colei*	3	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_06	*Aristida*	*holathera* var. *holathera*	0.25	3	<10%	Tussock grass (G)
Bore_06	*Bonamia*	*erecta*	0.25	0.5	<2% Numerous	Forb (G)
Bore_06	*Bonamia*	*media*	0.1	0.1	<2% Numerous	Forb (G)
Bore_06	*Cassytha*	*filiformis*	1.75	0.1	<2% Few than 10	Vine (G)
Bore_06	*Chrysopogon*	*fallax*	0.5	2	<2% Numerous	Tussock grass (G)
Bore_06	*Cleome*	*vicosa*	0.25	0.1	<2% Few than 10	Forb (G)
Bore_06	*Corchorus*	*sidoides*	0.25	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_06	*Corymbia*	*zygophylla*	5	1	<2% Numerous	Tree, palm (U)
Bore_06	*Dodnaea*	*coraceae*	0.25	0.1	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_06	*Eragrostis*	*desertorum*	0.25	3	<10%	Tussock grass (G)
Bore_06	*Eriachne*	*sp*	0.25	0.5	<2% Numerous	Other grass (G)
Bore_06	*Eucalyptus*	*victrix*	7	1	<2% Numerous	Tree, palm (U)
Bore_06	*Gossypium*	*australe*	0.75	1	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_06	*Grevillea*	*wickhamii* subsp. *hispidula*	1.5	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_06	*Jacksonia*	*acicularis*	0.5	0.1	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_06	*Ptilotus*	*astrolasius*	0.25	0.5	<2% Numerous	Forb (G)
Bore_06	*Ptilotus*	*calostachyus*	0.75	0.2	<2% Numerous	Forb (G)
Bore_06	*Ptilotus*	*arthrolasius*	0.25	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_06	*Ptilotus*	*axillaris*	0.1	0.1	<2% Numerous	Forb (G)
Bore_06	*Sida*	*clementii*	0.25	0.1	<2% Few than 10	Forb (G)

Site number	Genus	Species	Height (m)	Cover (ind)	Cover (%)	Form / stratum
Bore_06	*Sida*	sp. Pilbara (A.A. Mitchell PRP 1543)	0.25	0.5	<2% Few than 10	Forb (G)
Bore_06	*Tephrosia*	sp. D Kimberley Flora (R.D. Royce 1848)	0.25	0.5	<2% Numerous	Forb (G)
Bore_06	*Tephrosia*	sp. Bungaroo Creek (M.E. Trudgen 11601)	0.5	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_06	*Trianthema*	*pilosum*	0.1	0.1	<2% Few than 10	Forb (G)
Bore_06	*Triodia*	*schinzii*	0.75	40	70-30%	Hummock grass (G)
Bore_06	*Yakirra*	*australiensis* var. *australiensis*	0.1	0.1	<2% Few than 10	Other grass (G)
Bore_07	*Acacia*	*ancistrocarpa*	1.5	20	70-30%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_07	*Acacia*	*tumida* var. *pilbarensis*	1.75	2	<2% Numerous	Shrub, cycad, grass-tree, tree-fern (M)
Bore_07	*Aristida*	*holathera* var. *holathera*	0.25	1	<10%	Tussock grass (G)
Bore_07	*Bonamia*	*erecta*	0.25	0.5	<2% Numerous	Forb (G)
Bore_07	*Bonamia*	*media*	0.1	0.1	<2% Numerous	Forb (G)
Bore_07	*Cassytha*	*filiformis*	1.75	0.1	<2% Few than 10	Vine (G)
Bore_07	*Chrysopogon*	*fallax*	0.5	2	<2% Numerous	Tussock grass (G)
Bore_07	*Arivela*	*vicosa*	0.25	0.1	<2% Few than 10	Forb (G)
Bore_07	*Corchorus*	*sidoides*	0.25	15	30-10%	Shrub, cycad, grass-tree, tree-fern (M)
Bore_07	*Corymbia*	*opaca*	6.75	1	<2% Few than 10	Tree, palm (U)
Bore_07	*Corymbia*	*zygophylla*	5	1	<2% Numerous	Tree, palm (U)
Bore_07	*Eragrostis*	*desertorum*	0.25	3	<10%	Tussock grass (G)
Bore_07	*Eriachne*	*sp*	0.25	0.5	<2% Numerous	Other grass (G)
Bore_07	*Eucalyptus*	*victrix*	7	1	<2% Numerous	Tree, palm (U)
Bore_07	*Gossypium*	*australe*	0.75	1	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_07	*Grevillea*	*wickhamii* subsp. *hispidula*	1.5	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_07	*Grevillea*	*wickhamii* subsp. *hispidula*	1.5	0.1	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_07	*Jacksonia*	*acicularis*	0.5	0.1	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_07	*Pluchea*	*dentex*	0.5	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)

Site number	Genus	Species	Height (m)	Cover (ind)	Cover (%)	Form / stratum
Bore_07	*Ptilotus*	*astrolasius*	0.25	0.5	<2% Numerous	Forb (G)
Bore_07	*Ptilotus*	*calostachyus*	0.75	0.2	<2% Numerous	Forb (G)
Bore_07	*Ptilotus*	*arthrolasius*	0.25	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_07	*Ptilotus*	*axillaris*	0.1	0.1	<2% Numerous	Forb (G)
Bore_07	*Sida*	*clementii*	0.25	0.1	<2% Few than 10	Forb (G)
Bore_07	*Sida*	sp. Pilbara (A.A. Mitchell PRP 1543)	0.25	0.5	<2% Few than 10	Forb (G)
Bore_07	*Tephrosia*	sp. D Kimberley Flora (R.D. Royce 1848)	0.25	0.5	<2% Numerous	Forb (G)
Bore_07	*Trianthema*	*pilosum*	0.1	0.1	<2% Few than 10	Forb (G)
Bore_07	*Triodia*	*schinzii*	0.75	5	<10%	Hummock grass (G)
Bore_07	*Yakirra*	*australiensis* var. *australiensis*	0.1	0.1	<2% Few than 10	Other grass (G)
Bore_08	*Centipeda*	sp	0.25	0.1	<2% Numerous	Forb (G)
Bore_08	*Acacia*	*spondylophylla*	0.5	0.5	<2% Numerous	Shrub, cycad, grass-tree, tree-fern (M)
Bore_08	*Aristida*	*holathera* var. *holathera*	0.25	0.2	<2% Few than 10	Tussock grass (G)
Bore_08	*Bonamia*	*erecta*	0.25	0.5	<2% Numerous	Forb (G)
Bore_08	*Corchorus*	*incanus*	0.5	0.5	<2% Few than 10	Shrub, cycad, grass-tree, tree-fern (M)
Bore_08	*Corymbia*	*opaca*	7	1	<2% Numerous	Tree, palm (U)
Bore_08	*Eriachne sp*	*pulchella* subsp. *pulchella*	0.1	0.1	<2% Numerous	Other grass (G)
Bore_08	*Grevillea*	*wickhamii* subsp. *hispidula*	1.5	2	<2% Numerous	Shrub, cycad, grass-tree, tree-fern (M)
Bore_08	*Ptilotus*	*calostachyus*	0.75	0.2	<2% Numerous	Forb (G)
Bore_08	*Trianthema*	*pilosum*	0.1	0.1	<2% Numerous	Forb (G)
Bore_08	*Trigastrotheca*	*molluginea*	0.1	0.1	<2% Numerous	Forb (G)
Bore_08	*Triodia*	*? pungens*	0.75	35	70-30%	Hummock grass (G)
Opp_coll	*Calytrix*	*carinata*				
Opp_coll	*Acacia*	*pruinosa*				
Opp_coll	*Acacia*	*coriacea* subsp. *pendens*				

Site number	Genus	Species	Height (m)	Cover (ind)	Cover (%)	Form / stratum
Opp_coll	*Acacia*	*acradenia*				
Opp_coll	*Arivela*	*uncifera*				
Opp_coll	*Carissa*	*lanceolata*				
Opp_coll	*Cenchrus*	*ciliaris*				
Opp_coll	*Chrysopogon*	*fallax*				
Opp_coll	*Codonocarpus*	*cotinifolius*				
Opp_coll	*Corymbia*	*opaca*				
Opp_coll	*Corymbia*	*flavescens*				
Opp_coll	*Crotalaria*	*ramosisima*				
Opp_coll	*Eucalyptus*	*odontocarpa*				
Opp_coll	*Grevillea*	*eriostachya*				
Opp_coll	*Gyrostemon*	*tepperi*				
Opp_coll	*Hakea*	*lorea*				
Opp_coll	*Halgania*	*solanacea* var. *solanacea*				
Opp_coll	*Heliotropium*	*vestitum*				
Opp_coll	*Indigofera*	*monophylla*				
Opp_coll	*Melaleuca*	*glomerata*				
Opp_coll	*Newcastelia*	*cladotricha*				
Opp_coll	*Newcastelia*	*cladotricha*				
Opp_coll	*Owenia*	*reticulata*				
Opp_coll	*Phyllanthus*	*exilis*				
Opp_coll	*Ptilotus*	*gaudichaudii*				
Opp_coll	*Senna*	*nobilis*				
Opp_coll	*Seringia*	sp				
Opp_coll	*Stemodia*	*kingii*				

Site number	Genus	Species	Height (m)	Cover (ind)	Cover (%)	Form / stratum
Opp_coll	*Tephrosia*	sp. Bungaroo Creek (M.E. Trudgen 11601)				
Opp_coll	*Trianthema*	*pilosum*				
Opp_coll	*Tribulus*	*hirsutus*				
Opp_coll	*Triumfetta*	*ramosa*				
Opp_coll	*Yakirra*	*australiensis* var. *australiensis*				

Quadrat data

Site ID:	Bore_01	VT: 01	
Type:	Quadrat	Size: 50 x 50 m	
Date:	23/06/2021	Described by: Joel Collins	
Landform and slope:	Sand Plain, Negligible		
Drainage:	Good		
Aspect:	West		
Soil colour & type:	Sand, brown / red		
Vegetation condition:	Excellent		
Fire age & intensity:	Recent (0 to 2 yr)		
Disturbances:	Fire, track nearby		
Leaf litter (%):	<2%		
Bare ground (%)	11-30%		

Site ID:	Bore_02	VT: 01	
Type:	Quadrat	Size: 50 x 50 m	
Date:	23/06/2021	Described by: Joel Collins	
Landform and slope:	Sand Plain, Negligible		
Drainage:	Good		
Aspect:	West		
Soil colour & type:	Sand, brown / red		
Vegetation condition:	Excellent		
Fire age & intensity:	Moderate (3 to 5 yr)		
Disturbances:	Fire, track nearby		
Leaf litter (%):	<2%		
Bare ground (%)	2-10%		

Site ID:	Bore_03	VT: 01	
Type:	Quadrat	Size: 50 x 50 m	
Date:	23/06/2021	Described by: Joel Collins	
Landform and slope:	Sand Plain, Negligible		
Drainage:	Good		
Aspect:	Flat		
Soil colour & type:	Sand, brown / red		
Vegetation condition:	Excellent		
Fire age & intensity:	Recent (0 to 2 yr)		
Disturbances:	Track nearby		
Leaf litter (%):	<2%		
Bare ground (%)	2-10%		

Site ID:	Bore_04	VT: 02	
Type:	Quadrat	Size: 50 x 50 m	
Date:	23/06/2021	Described by: Joel Collins	
Landform and slope:	Sand Plain, Gentle		
Drainage:	Good		
Aspect:	East		
Soil colour & type:	Sand, brown / red		
Vegetation condition:	Excellent		
Fire age & intensity:	Moderate (3 to 5 yr)		
Disturbances:	Track nearby, cattle		
Leaf litter (%):	<2%		
Bare ground (%)	11-30%		

Site ID:	Bore_05	VT: 03	
Type:	Quadrat	Size: 50 x 50 m	
Date:	23/06/2021	Described by: Joel Collins	
Landform and slope:	Outcrop, Moderate		
Drainage:	Good		
Aspect:	West		
Soil colour & type:	Sand, brown / red		
Vegetation condition:	Excellent		
Fire age & intensity:	Moderate (3 to 5 yr)		
Disturbances:	Track nearby		
Leaf litter (%):	<2%		
Bare ground (%)	<2%		

Site ID:	Bore_06	VT: 04	
Type:	Quadrat	Size: 50 x 50 m	
Date:	24/06/2021	Described by: Joel Collins	
Landform and slope:	Sand Plain, Negligible		
Drainage:	Good		
Aspect:	Flat		
Soil colour & type:	Sand, brown / red		
Vegetation condition:	Excellent		
Fire age & intensity:	Old (6+ yr)		
Disturbances:	Track nearby		
Leaf litter (%):	2-10%		
Bare ground (%)	11-30%		

Site ID:	Bore_07	VT: 04	
Type:	Quadrat	Size: 50 x 50 m	
Date:	24/06/2021	Described by: Joel Collins	
Landform and slope:	Sand Plain, Negligible		
Drainage:	Good		
Aspect:	Flat		
Soil colour & type:	Sand, brown / red		
Vegetation condition:	Excellent		
Fire age & intensity:	Old (6+ yr)		
Disturbances:	Track nearby		
Leaf litter (%):	2-10%		
Bare ground (%)	11-30%		

Site ID:	Bore_08	VT: 03	
Type:	Quadrat	Size: 50 x 50 m	
Date:	24/06/2021	Described by: Joel Collins	
Landform and slope:	Outcrop, Moderate		
Drainage:	Good		
Aspect:	West		
Soil colour & type:	Loam, brown / red		
Vegetation condition:	Excellent		
Fire age & intensity:	Moderate (3 to 5 yr)		
Disturbances:	Track nearby		
Leaf litter (%):	<2%		
Bare ground (%)	2-10%		

Flora likelihood of occurrence assessment guidelines

Likelihood of occurrence	Guideline
Likely	Species previously recorded within the study area and large areas of suitable habitat occur in the survey area.
Possible	Species previously recorded within the study area and areas of suitable habitat occur/may occur in the survey area.
Unlikely	Species previously recorded within the study area, but suitable habitat does not occur in the survey area or suitable habitat occurs in the survey area, however, suitable search effort did not record the species.
Highly unlikely	Species not previously recorded within the study area, suitable habitat does not occur in the survey area and/or the survey area is outside the natural distribution of the species.
Other considerations	Intensity of survey, availability of access, growth form type, recorded flowering times, cryptic nature of species

Source information - desktop searches

PMST – DAWE Protected Matters Search Tool (PMST) to identify flora listed under the EPBC Act potentially occurring within the study area

TPFL and WAHERB – records of threatened flora from TPFL and WAHERB database searches within the study area

NM – DBCA *NatureMap* (accessed July 2021)

Flora likelihood of assessment of conservation significant flora identified in the desktop assessment as potentially occurring within the study area

Family	Taxon	Status		Description (if available) (WA Herbarium 1998-, DAWE 2021)	Likelihood of occurence	Source
		BC Act / DBCA	EPBC Act			
Amaranthaceae	*Ptilotus mollis*	P4	-	Compact, perennial shrub, to 0.5 m high, soft grey foliage. Fl. white / pink, May or September. Stony hills and screes.	Unlikely, nearest record is 34 km south of the survey area. No suitable habitat present.	WA Herb
Boraginaceae	*Heliotropium murinum*	P3	-	Short-lived perennial, herb, up to 0.4 m high. Fl. May or September. Red sand plains.	Unlikely, nearest record is 25.5 km south of the survey area. While suitable habitat may be present in the survey area suitable search effort did not record the species.	WA Herb
Cyperaceae	*Bulbostylis burbidgeae*	P4	-	Tufted, erect to spreading annual, grass-like or herb (sedge), 0.03-0.25 m high, spikelets in a simple umbel or rarely solitary; stamens 3; involucral bracts long, hairy. Fl. Brown, March or June to August. Granitic soils. Granite outcrops, cliff bases.	Unlikely, nearest record is 2 km south of the survey area. While limited marginal habitat is present, search effort did not record the species.	DBCA, WA Herb, NM
Euphorbiaceae	*Euphorbia clementii*	P3	-	Erect herb, to 0.6 m high. Gravelly hillsides, stony grounds.	Possible, nearest record is 1 km west of the survey area. While suitable habitat is present, search effort did not record the species. Future disturbance events, such as fire, may allow the species to recruit from soil seed bank.	DBCA, WA Herb, NM
Euphorbiaceae	*Euphorbia inappendiculata* var. *inappendiculata*	P2	-	Distribution IBRA Regions Gascoyne and Pilbara. Claypan, red-brown sandy clay.	Unlikely, nearest record is 34 km south of the survey area. No suitable habitat present.	WA Herb
Fabaceae	*Indigofera ammobia*	P3	-	Many stemmed shrub, to 0.5 m high. Fl. Green and purple, September. Red sand, sand dunes.	Unlikely, nearest record is 30.5 km south-east of the survey area. While suitable habitat is present, search effort did not record the species.	DBCA, WA Herb
Fabaceae	*Rothia indica* subsp. *australis*	P3	-	Prostrate annual, herb, to 0.3 m high, densely covered in spreading hairs. Fl. April to August. Sandy soils, sandhills and sandy flats.	Unlikely, nearest record is 24.5 km east of the survey area. While suitable habitat is	WA Herb

Family	Taxon	Status		Description (if available) (WA Herbarium 1998-, DAWE 2021)	Likelihood of occurence	Source
		BC Act / DBCA	EPBC Act			
					present, search effort did not record the species.	
Malvaceae	*Corchorus* sp. Yarrie (J. Bull & D. Roberts CAL 01.05)	P1	-	Herb or shrub. Stems hairy. Leaves 20-35 mm long, 8-15 mm wide, not lobed; margins crenate or sinuate; indumentum present, with stellate hairs; stipules present but early deciduous (only visible on youngest leaves). Flowering time June.	Unlikely, nearest record is 34 km south of the survey area. While suitable habitat is present, search effort did not record the species.	WA Herb
Malvaceae	*Seringia exastia*. Note: this species has been taxonomically reviewed with a reduced species range to be adopted.	CR	EN	Low shrub, stems hairy. Leaves 12-30 mm long, 6-10 mm wide, not lobed; margins entire; indumentum present, with stellate hairs; stipules present but early deciduous (only visible on youngest leaves), 2-5 mm long. Flowering time April – December.	Unlikely, nearest record is 20.5 km east of the survey area. While suitable habitat is present, search effort did not record the species.	WA Herb
Poaceae	*Eragrostis crateriformis*	P3		Annual, grass-like or herb, 0.17-0.42 mm high. Fl. January to May or July. Clayey loam or clay. Creek banks, depressions.	Unlikely, nearest record is 34 km south of the survey area. No suitable habitat present.	DBCA, WA Herb
Solanaceae	*Nicotiana umbratica*	P3		Erect, short-lived annual or perennial, herb, 0.3-0.7 m high. Fl. White, April to June. Shallow soils, rocky outcrops.	Unlikely, nearest record is 21 km east of the survey area. No suitable habitat present.	WA Herb

Appendix E

Fauna data

Fauna likelihood of occurrence
Bilby plot data
Fauna species list

Parameters of fauna likelihood of occurrence assessment

Assessment outcome	Description
Present	Species recorded during the field survey or from recent, reliable records from within or close proximity to the survey area.
Likely	Species are likely to occur in the survey area where there is suitable habitat within the survey area and there are recent records of occurrence of the species in close proximity to the survey area. OR Species known distribution overlaps with the survey area and there is suitable habitat within the survey area.
Unlikely	Species assessed as unlikely include those species previously recorded within 10 km of the survey area however: There is limited (i.e. the type, quality and quantity of the habitat is generally poor or restricted) habitat in the survey area. The suitable habitat within the survey area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the survey area. OR Those species that have a known distribution overlapping with the survey area however: There is limited habitat in the survey area (i.e. the type, quality and quantity of the habitat is generally poor or restricted). The suitable habitat within the survey area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the survey area.
Highly unlikely	Species that are considered highly unlikely to occur in the survey area include: Those species that have no suitable habitat within the survey area. Those species that have become locally extinct, or are not known to have ever been present in the region of the survey area.

Fauna likelihood of occurrence assessment term definitions

Term	Description
Study area	a 20 km buffer around the survey area
Survey area	the area subject to the current survey
Locality	the area within an approximate 20 km radius of the survey area
CR	Critically endangered
EN	Endangered
VU	Vulnerable
IA	International agreement – listed as a migratory species
Mi, Ma	Migratory, Marine
CD	Conservation dependent
OS	Other specially protected fauna

Term	Description
P1 – P4	Priority 1 – Priority 4. Threatened and Priority fauna rankings
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
DBCA	Department of Biodiversity and Conservation Attractions
BC Act	Biodiversity Conservation Act 2016

Source information – desktop searches

PMST – DAWE PMST to identify fauna listed under the EPBC Act potentially occurring within the project area

DBCA – DBCA 2021. WA Government, DBCA Threatened and Priority fauna rankings

NM – DBCA *NatureMap* (accessed July 2021)

Fauna likelihood of occurrence assessment of conservation significant fauna identified in the desktop assessment as potentially occurring within the study area

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
Birds						
Actitis hypoleucos	Common Sandpiper	IA	Mi	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags (Geering et al. 2007; Higgins & Davies 1996). Generally the species forages in shallow water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots. Birds sometimes venture into grassy areas adjoining wetlands (Higgins & Davies 1996).	Highly unlikely, nearest DBCA record is approximately 11 km south-west. No suitable habitat such as shallow wetlands or tidal areas exists in the survey area.	DBCA, PMST, NM
Anous stolidus	Common Noddy	IA	Mi	The Common Noddy is found in tropical and sub-tropical seas off the west, north and east coasts of Australia, from the Abrolhos Islands in WA to the islands of the Great Barrier Reef in Qld, as well as Norfolk and Lord Howe Islands. Some are seen almost annually in NSW as far south as Sydney. It also ranges across tropical parts of the Pacific, Indian and Atlantic Oceans (DAWE 2021).	Highly Unlikely, no suitable habitat present, this species is primarily oceanic, when occurring in coastal areas it prefers to form colonies on islands.	PMST
Apus pacificus	Fork-tailed Swift	IA	Mi	In WA there are sparsely scattered records along the south coast, ranging from the Eyre Bird Observatory and west to Denmark. They breed in the northern hemisphere and migrate to Australian during the non-breeding season and are widespread in coastal and sub-coastal areas across mainland Australia and some nearshore and offshore islands. This species is almost exclusively aerial, flying less than 1 m to at least 300 m above ground. This species is considered rare in the south-west region (DAWE 2021b).	Unlikely, this species may occur aerially, feeding during flight above the site on an occasional or seasonal basis during non-breeding season.	DBCA, PMST

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
					This species breeds	
Ardea ibis	Cattle Egret	IA	Mi	The Cattle Egret is highly sociable and can be found in small groups to large flocks. It arrived in northern Australia in 1950 and is commonly found in wetlands, both marine and fresh and usually forages in shallows of open waters – swamps, billabongs, floodplain pools, mudflats, and mangrove channels (Morcombe 2004).	Unlikely, no suitable habitat such as wetlands present within survey area.	PMST
Arenaria interpres	Ruddy Turnstone	IA	Mi	In Australasia, the Ruddy Turnstone is mainly found in coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. It can, however, be found on sand, coral or shell beaches, shoals, cays and dry ridges of sand or coral. It has occasionally been sighted in estuaries, harbours, bays and coastal lagoons, among low saltmarsh or on exposed beds of seagrass, around sewage ponds and on mudflats (Higgins & Davies 1996).	Highly unlikely, nearest DBCA record is approximately 26 km north. No suitable habitat exists in the survey area.	DBCA, NM
Calidris acuminata	Sharp-tailed Sandpiper	IA	Mi	In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. They tend to occupy coastal mudflats mainly after ephemeral terrestrial wetlands have dried out, moving back during the wet season. They may be attracted to mats of algae and water weed either floating or washed up around terrestrial wetlands, and coastal areas with much beachcast seaweed. Sometimes they occur on rocky shores and rarely on exposed reefs (Higgins & Davies 1996).	Unlikely, nearest DBCA record is approximately 11 km south. No suitable habitat exists in the survey area.	DBCA, PMST, NM
Calidris ferruginea	Curlew Sandpiper	CR	CR, Mi	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms.	Highly unlikely, nearest DBCA record is approximately 18.5	DBCA, PMST

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters (Higgins & Davies 1996). Curlew Sandpipers forage on mudflats and nearby shallow water. In non-tidal wetlands, they usually wade, mostly in water 15–30 mm, but up to 60 mm, deep. They forage at the edges of shallow pools and drains of intertidal mudflats and sandy shores. At high tide, they forage among low sparse emergent vegetation, such as saltmarsh, and sometimes forage in flooded paddocks or inundated saltflats. Occasionally they forage on wet mats of algae or waterweed, or on banks of beachcast seagrass or seaweed. They rarely forage on exposed reefs (Higgins & Davies 1996). In Roebuck Bay, northern Western Australia, they are also said to feed on part of the mudflats that have been exposed for a longer period, foraging in small groups (Tulp & de Goeij 1994). Curlew Sandpipers generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh (Higgins & Davies 1996).	km north-east. No suitable habitat exists in the survey area.	
Calidris melanotos	Pectoral Sandpiper		Mi	In Western Australia (WA), the species is rarely recorded. It has been observed at the Nullarbor Plain, Reid, Stoke's Inlet, Grassmere Lake, Warden Lake, Dalyup and Yellilup Swamp, Swan River, Benger Swamp, Guraga Lake, Wittecarra, Harding River, coastal Gascoyne, the Pilbara and the Kimberley (Higgins & Davies 1996). The species is usually found in coastal or near coastal habitat but occasionally found further inland. It prefers wetlands that have open fringing mudflats and low, emergent or fringing vegetation, such as grass or samphire. The species has also been recorded in swamp overgrown with lignum. They forage in shallow water or soft mud at the edge of wetlands (Higgins & Davies 1996).	Highly unlikely, no suitable habitat present	PMST
Calidris ruficollis	Red-necked Stint	IA	Mi	In Australasia, the Red-necked Stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores.	Highly unlikely, nearest DBCA record is approximately 11	DBCA, NM

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				Occasionally they have been recorded on exposed or ocean beaches, and sometimes on stony or rocky shores, reefs or shoals. They also occur in saltworks and sewage farms; saltmarsh; ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks and pools in saltflats. They sometimes use flooded paddocks or damp grasslands. They have occasionally been recorded on dry gibber plains, with little or no perennial vegetation (Higgins & Davies 1996).	km south-west. No suitable habitat exists in the survey area.	
Calidris tenuirostris	Great Knot	CR	CR, Mi	The Great Knot has been recorded around the entirety of the Australian coast, with a few scattered records inland. It is now absent from some sites along the south coast where it used to be a regular visitor (Garnett and Crowley 2000). The greatest numbers are found in norther Australia, where the species is common on the coasts of the Pilbara and Kimberley, from the Dampier Archipelago to the Northern Territory border, and in the Northern Territory from Darwin and Melville Island, through Arnhem Land to the south-east Gulf of Carpentaria. In Australasia, the species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbors, estuaries and lagoons (DAWE 2021). A group of approximately 8610 birds have been recorded roosting at an inland claypan near Roebuck Bay in north-west Western Australia (Collins et al. 2001).	Highly unlikely, nearest DBCA record is approximately 26 km north. No suitable habitat exists in the survey area.	DBCA, NM
Charadrius leschenaultia	Great Sand Plover, Large Sand Plover	VU	VU, Mi	Australia, the Greater Sand Plover occurs in coastal areas in all states, though the greatest numbers occur in northern Australia, especially the north-west (Marchant & Higgins 1993). In northern Australia, the species is especially widespread between North West Cape and Roebuck Bay in Western Australia; there are sparsely scattered records from the largely inaccessible area between Roebuck Bay and Darwin, but it often occurs in the Top End of the Northern Territory, including on Groote Eylandt (DAWE 2021b). It prefers coastal intertidal mudflats and sandbanks of sheltered bays and estuaries (Morcombe 2004).	Highly unlikely, nearest DBCA record is approximately 26 km north. No suitable habitat exists in the survey area.	DBCA, NM
Charadrius mongolus	Lesser Sand Plover	EN	EN, Mi	Within Australia, the Lesser Sand-Plover is widespread in coastal regions and has been recorded in all states. It mainly occurs in northern and eastern Australia, in south-eastern parts of the Gulf of Carpentaria, western Cape York Peninsula and	Highly unlikely, nearest DBCA record is approximately 26	DBCA, NM

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				islands in Torres Strait, and along the entire east coast, though it occasionally also occurs inland. It is most numerous in Queensland and NSW. The species has also been recorded on Lord Howe Island, Norfolk Island and Christmas Island, Indian Ocean. In non-breeding grounds in Australia, this species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbors and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among mangroves. The species also inhabits saltworks and near-coastal saltpans, brackish swamps and sandy or silt islands in river beds (Marchant & Higgins 1993). In north-western Australia, the species appears to use the Port Hedland saltworks in preference to nearby beaches.	km north. No suitable habitat exists in the survey area.	
Charadrius veredes	Oriental Plover	IA	Mi	Immediately after arriving in non-breeding grounds in northern Australia, Oriental Plovers spend a few weeks in coastal habitats such as estuarine mudflats and sandbanks, on sandy or rocky ocean beaches or nearby reefs, or in near-coastal grasslands, before dispersing further inland. Thereafter they usually inhabit flat, open, semi-arid or arid grasslands, where the grass is short and sparse, and interspersed with hard, bare ground, such as claypans, dry paddocks, playing fields, lawns and cattle camps or open areas that have been recently burnt (Storr, 1980).	Unlikely, nearest DBCA record is approximately 14 km south. No suitable habitat exists in the survey area.	DBCA, PMST, NM
Chlidonias leucopterus	White-winged Black Tern, White-winged Tern	IA	Mi	The White-winged Black Tern is a non-breeding migrant to Australia. The species is widespread and common along south-western, northern and central-eastern coasts, with only scattered records of small numbers along the coasts elsewhere in southern Australia. In WA, the species is widespread on the southern west coast to the coasts of the Pilbara region and Kimberley. Few records are from inland regions, mainly along major river systems, such as the Ord drainage (DAWE 2021b).	Highly unlikely, nearest DBCA record is approximately 11 km north-west. No suitable habitat exists in the survey area.	DBCA
Chrysococcyx osculans	Black-eared Cuckoo		Ma	The Black-eared Cuckoo occurs across most of the Australian mainland, particularly drier habitats: open woodlands, mulga, and mallee; sparsely vegetated arid country with spinifex, grasslands or salt marsh; widely scattered trees and shrubs; lines of vegetation along watercourses. It migrates into the	Likely, known to occur locally and regionally and suitable habitat	PMST

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				southwest and southeast for the summer and present across northern Australia throughout the year (Morcombe 2004).	occurs within survey area.	
Cuculus opatus	Oriental Cuckoo	IA	Mi	The Oriental Cuckoo prefers rainforest margins, monsoon forest, vine scrubs, riverine thickets, wetter, densely canopied eucalypt forests, paperbark swamps and mangroves. It departs Australia in autumn; some remain through Australian winter (Morcombe 2004).	Highly unlikely, Not know to occur locally, no suitable habitat present	PMST
Falco hypoleucos	Grey Falcon	VU	VU	The Grey Falcon is a sleek, grey falcon of the interior plains, commonly patrolling low over groundcover below treetop level. It is usually found in lightly timbered country, particularly stony plains and lightly timbered acacia scrublands (Morcombe 2004).	Present, species was recorded during survey	DBCA, PMST
Falco peregrinus	Peregrine Falcon	OS		The Peregrine Falcon is uncommon but wide-ranging across Australia. Habitat is extremely diverse, from rainforest to arid scrub, from coastal heath to alpine. The Peregrine Falcon nests primarily on ledges of cliffs, shallow tree hollows, and ledges of building in cities (Morcombe 2004).	Likely, previous records of the species within 1km of the survey area	DBCA, NM
Fregata ariel	Lesser Frigatebird	IA	Mi	The Lesser Frigatebird is said to be the most common and widespread frigatebird in Australian seas (DAWE 2021b). It is common in tropical seas, breeding on remote islands, including Christmas Island in the Indian Ocean in recent years. These birds are most likely to be seen from the mainland prior to the onset of a tropical cyclone, and once this abates they disappear again. (DAWE 2021b).	Highly unlikely, nearest DBCA record is approximately 26 km north. No suitable habitat exists in the survey area.	DBCA, PMST
Gallinago megala	Swinhoe's Snipe	IA	Mi	The Swinhoe's Snipe has been recorded in northern Australia between the Kimberley Divide and Cape York Peninsula. In Western Australia the species has been recorded in the Pilbara, Kimberley and in the north-west regions around Mitchell Plateau (DAWE 2021b). Habitat specific to Australia includes dense clumps of grass and rushes around the edges of fresh and brackish wetlands; swamps, billabongs, river pools, small streams and sewage ponds (Higgins & Davies 1996).	Highly unlikely, nearest DBCA record is approximately 11 km south-west. No suitable habitat exists in the survey area.	DBCA, NM
Gelochelidon nilotica	Gull-billed Tern	IA	Mi	The Gull-billed Tern is nomadic or migratory species in Australia. Gull-billed Terns are found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats,	Highly unlikely, nearest DBCA record is	DBCA, NM

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				floodwaters, sewage farms, irrigated croplands and grasslands, where resources are favourable. They are only rarely found over the ocean. The Gull-billed Tern. Although essentially an inland species, outside breeding season it shows a distinct preference for saltmarshes and lagoons near the coast. Movements are not fully understood but it is common and widespread in Australia (Morcombe 2004).	approximately 11 km north-west. No suitable habitat exists in the survey area.	
Glareola maldivarum	Oriental Pratincole	IA	Mi	In non-breeding grounds in Australia, the Oriental Pratincole usually inhabits open plains, floodplains or short grassland (including farmland or airstrips), often with extensive bare areas. They often occur near terrestrial wetlands, such as billabongs, lakes or creeks, and artificial wetlands such as reservoirs, salt works and sewage farms, especially around the margins. The species also occurs along the coast, inhabiting beaches, mudflats and islands, or around coastal lagoons (Lloyd and Lloyd 1991).	Unlikely, nearest DBCA record is approximately 18 km south. No suitable habitat exists in the survey area.	DBCA, PMST, NM
Haliaeetus leucogaster	White-bellied Sea Eagle	IA	Mi	The White-bellied Sea-Eagle is common around most of the coastline and scarce near major coastal cities. It prefers coastal habitats, commonly found over islands, reefs, headlands, beaches, abys, estuaries, mangroves, seasonally flooded inland swamps, lagoons and floodplains; often far inland on large pools of major rivers (Morcombe 2004).	Highly unlikely, no suitable habitat present	PMST
Hirundo rustica	Barn Swallow	IA	Mi	In Australia, the Barn Swallow is recorded in open country in coastal lowlands, often near water, towns and cities. Birds are often sighted perched on overhead wires, and also in or over freshwater wetlands, paperbark Melaleuca woodland, mesophyll shrub thickets and tussock grassland (DAWE 2021b).	Unlikely, nearest DBCA record is approximately 26 km north. No suitable habitat exists in the survey area.	DBCA, PMST, NM
Hydroprogne caspia	Caspian Tern	IA	Mi	The Caspian Tern is mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries and river deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers and creeks. They also use artificial wetlands, including reservoirs, sewage ponds and saltworks. In offshore areas the species	Highly unlikely, nearest DBCA record is approximately 26 km north. No suitable habitat exists in the survey area.	DBCA, NM

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				prefers sheltered situations, particularly near islands, and is rarely seen beyond reefs (DAWE 2021b).		
Limosa lapponica	Bar-tailed Godwit	IA	Mi	Bar-tailed Godwits arrive in Australia each year in August from breeding grounds in the northern hemisphere. Birds are more numerous in northern Australia Bar-tailed Godwits inhabit estuarine mudflats, beaches and mangroves. They are common in coastal areas around Australia. They are social birds and are often seen in large flocks and in the company of other waders (Birdlife Australia 2019).	Highly unlikely, nearest DBCA record is approximately 26 km north. No suitable habitat exists in the survey area.	DBCA, NM
Limosa lapponica menzbieri	Northern Siberian Bar-tailed Godwit	CR	CR	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, salt lakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips, although it is commonly recorded in paddocks at some locations overseas (Marchant & Higgins 1993).	Highly unlikely, no records within 40 km of the study area. No suitable habitat present.	PMST
Limosa limosa	Black-tailed Godwit	IA	Mi	In Australia the Black-tailed Godwit has a primarily coastal habitat environment. The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit; occasionally recorded on rocky coasts or coral islets. The use of habitat often depends on the stage of the tide. It is also found in shallow and sparsely vegetated, near-coastal, wetlands; such as saltmarsh, saltflats, river pools, swamps, lagoons and floodplains. There are a few inland records, around shallow, freshwater and saline lakes, swamps, dams and bore-overflows. They also use lagoons in sewage farms and saltworks (Higgins & Davies 1996).	Highly unlikely, nearest DBCA record is approximately 28.5 km west of the survey area. No suitable habitat	DBCA, NM
Macronectes giganteus	Southern Giant Petrel	P4	EN, Mi	The Soutern Giant Petrel is the largest petrel and is widespread throughout the Southern Ocean. It breeds on six subantarctic and Antarctic islands in Australian territory; Macquarie Island, Heard Island, and McDonald Island in the Southern Ocean, and	Highly unlikely, no DBCA records within 40 km of the survey area. No	PMST

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				Giganteus Island, Hawker Island, and Frazier Island in the Australian Antarctic Territories (DAWE 2021).	suitable habitat present.	
Motacilla cinerea	Grey Wagtail	IA	Mi	The Grey Wagtail is an opportunistic migrant to Australia. The species typically migrates to Indonesia occasionally landing in Australia. Most records for the species are from Northern Australia and South Australia (Morcombe 2004). The non-breeding habitat only of the Grey Wagtail has a strong association with water, particularly rocky substrates along water courses but also lakes and marshes (DAWE 2021b). It can be found mainly in banks and rocks in fast-running freshwater habitats: rivers, creeks, streams, and around waterfalls, both in forest and open country; but occurs almost anywhere during migration (Johnstone & Storr 2004).	Highly unlikely, no records recorded within 40km of the study area. No suitable habitat exists in the survey area.	PMST
Motacilla flava	Yellow Wagtail	IA	Mi	The Yellow Wagtail occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra. In Australia, the Yellow Wagtail is a very uncommon except in the Broome region. They can often be found in northern towns wherever there are well watered grass areas (DAWE 2021b).	Likely, one recent (2014) local record from Pardoo and several records with the region. Likely to occur on at least an occasional basis.	PMST
Numenius madagascariensis	Eastern Curlew	IA	CR, Mi	The Eastern Curlew is a large non-breeding migratory shorebird, found commonly along the north coast of Western Australia, but rarely south of Shark Bay. The species is found along the coastline from Barrow Island and Dampier Archipelago, through the Kimberley in WA to the NT. It is found in estuaries, bays, harbours, inlets and coastal lagoons, saltworks and sewerage farms, areas (e.g. intertidal mudflats or sandflats fringed by mangroves) often with beds of seagrass and occasionally on ocean beaches, coral reefs, rock platforms and rocky islets. The Eastern Curlew forages on soft, sheltered, intertidal sand- or mudflats, often near mangroves, on salt flats, saltmarshes, rock pools, coastal reefs and ocean beaches near the tideline. The species roosts in large flocks, separate from other waders on sandy spits and islets, dry beach sand near the high-water mark, among coastal vegetation (including low saltmarsh and mangroves) and occasionally on reef-flats, in the	Highly unlikely, nearest DBCA record is approximately 26 km north. No suitable habitat exists in the survey area.	DBCA, PMST, NM

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				shallow water of lagoons, near-coastal wetlands, in trees and posts (Morcombe 2004).		
Numenius minutus	Little Curlew, Little Whimbrel	IA	Mi	When resting during the heat of day, the Little Curlew congregates around pools, river beds and water-filled tidal channels, and shallow water at edges of billabongs. The species prefers pools with bare dry mud (including mudbanks in shallow water) and they do not use pools if they are totally dry, flooded or heavily vegetated (Higgins & Davies 1996). Birds may also rest in grassy, open woodlands and on bare black soil plains, or on dry or recently burnt grasslands on floodplains, which may be without vegetation for hundreds of metres, and occasionally on mudflats when nearby grasslands are unburnt, or around swamps. Resting has also been recorded under partly submerged vegetation. After freshwater pools dry up, roosting may occur in the shallows of reservoirs and the sea (Higgins & Davies 1996).	Unlikely, nearest DBCA record is approximately 14 km south. No suitable habitat exists in the survey area.	DBCA, NM
Numenius phaeopus	Whimbrel	IA	Mi	The Whimbrel is often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms. It has been infrequently recorded using saline or brackish lakes near coastal areas. It also used salt flats with saltmarsh, or saline grasslands with standing water left after high spring-tides, and in similar habitats in sewage farms and salt fields (Higgins & Davies 1996). There are a small number of inland records from saline lakes and cane grass swamps (Jarman 1978).	Highly unlikely, nearest DBCA record is approximately 26 km north. No suitable habitat exists in the survey area.	DBCA, NM
Pandion cristatus	Eastern Osprey	IA	Mi	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging (Marchant & Higgins 1993). They frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes. They exhibit a preference for coastal cliffs and	Highly unlikely, nearest DBCA record is approximately 11.5 km south-west. No suitable habitat exists in the survey area such as coastal or estuarine areas.	DBCA, PMST, NM

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				elevated islands in some parts of their range, but may also occur on low sandy, muddy or rocky shores over coral cays.		
Pezoporus occidentalis	Night Parrot	CR	EN	The Night Parrot inhabits arid and semi-arid areas that are characterised by having dense, low vegetation. Based on accepted records, the habitat of the Night Parrot consists of Triodia grasslands in stony or sandy environments and of samphire and chenopod shrublands, including genera such as Atriplex, Bassia and Maireana, on floodplains and claypans, and on the margins of saltlakes, creeks or other sources of water (Parker, 1980). It has also been observed to enter dense Muehlenbecki growth when flushed from a more typical habitat (Boles et al. 1994).	Unlikely, no records recorded within 40km of the study area. Some suitable habitat exists in the survey area.	PMST
Plegadis falcinellus	Glossy Ibis	IA	Mi	The Glossy Ibis' preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons. Within Australia, the largest contiguous areas of prime habitat is inland and northern floodplains (Marchant & Higgins 1990).	Highly unlikely, nearest DBCA record is approximately 11.5 km south-west. No suitable habitat exists in the survey area.	DBCA, NM
Rostratula australis	Australian Painted Snipe	EN	EN	The Australian Painted Snipe is rarely seen as it is extremely secretive, keeping to dense vegetation of swamps, emerging only in subdued light of dawn and dusk. The preferred habitat of this species includes surrounds and shallows of wetlands that are well vegetated with dense low cover (Morcombe 2004).	Highly unlikely, no records recorded within 40km of the study area. No suitable habitat exists in the survey area.	PMST
Rostratula benghalensis (sensu lato)	Painted Snipe		EN	The Painted Snipe is extremely secretive, keeping to dense vegetation of swamps, emerging only in subdued light of dawn and dusk. It is commonly found in the surrounds and shallows of wetlands that are well vegetated with dense low cover (Morcombe 2004).	Highly unlikely, no records recorded within 40km of the study area. No suitable habitat exists in the survey area.	PMST
Sternula albifrons	Little Tern	IA	Mi	In Australia, Little Terns inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed	Highly unlikely, nearest DBCA record is	DBCA, PMST, NM

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				sandbanks or sand-spits, and also on exposed ocean beaches (DAWE 2021b).	approximately 18.5 km north-east. No suitable habitat exists in the survey area.	
Thalasseus bergii	Crested Tern	IA	Mi	Crested Terns occur singularly or in flocks in coastal areas, estuaries, inlets, islands and occasionally on large inland lakes or rivers. They are often seen perching with gulls on beaches, sand spits or jetties. Crested Terns are widespread from the south coast of Africa north to Asia, south to Australia and east to Polynesia. They also occur on many islands in the Indian and Pacific Oceans (DAWE 2021b).	Highly unlikely, nearest DBCA record is approximately 39.5 km north-west. No suitable habitat exists in the survey area.	DBCA, NM
Tringa brevipes	Grey-tailed Tattler	P4, IA	Mi	Within Australia, the Grey-tailed Tattler has a primarily northern coastal distribution and is found in most coastal regions (Higgins & Davies 1996). The Grey-tailed Tattler is often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide (DAWE 2021b).	Highly unlikely, nearest DBCA record is approximately 26 km north. No suitable habitat exists in the survey area.	DBCA, NM
Tringa glareola	Wood Sandpiper	IA	Mi	The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially Melaleuca and River Red Gums Eucalyptus camaldulensis and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. They are also found at some small wetlands only when they are drying. They are rarely found using brackish wetlands, or dry stunted saltmarsh. Typically they do not use coastal flats, but are occasionally recorded in stony wetlands. This species uses artificial wetlands, including open sewage ponds, reservoirs, large farm dams, and bore drains (Higgins & Davies 1996). In Western Australia, within wetlands, birds often	Unlikely, nearest DBCA record is approximately 9 km south. No suitable habitat exists in the survey area.	DBCA, NM

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				occur within a few metres of one another and are concentrated at a few sites in a wetland (Higgins & Davies 1996).		
Tringa nebularia	Common Greenshank, Greenshank	IA	Mi	The Common Greenshank is found in a wide variety of inland wetlands and coastal habitats of varying salinity. It occurs in sheltered coastal areas typically with large mudflats and saltmarsh, mangroves or seagrass, including embayments, harbours, river estuaries, deltas and lagoons, but less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and salt flats, and artificial wetlands. They occur around most of the coast from Cape Arid in the south to Carnarvon in the north-west (DAWE 2021b),and are moderately common here given suitable habitat. They can be found in areas including Wannamal Lake, many Perth lakes, Alfred Cove, Peel Inlet, Vasse and Harvey Estuaries, and the Albany and Esperance regions (Nevill 2013).	Highly unlikely, nearest DBCA record is approximately 11 km north-west. No suitable habitat exists in the survey area.	DBCA, PMST, NM
Tringa stagnatilis	Marsh Sandpiper	IA	Mi	The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. In north Australia they prefer intertidal mudflats (Higgins & Davies 1996), although surveys in Kakadu National Park recorded more birds around shallow freshwater lakes than in areas influenced by tide (Bamford 1988). At the Top End they often use ephemeral pools on inundated freshwater and tidal floodplains (Higgins & Davies 1996). Three of the five sites with highest recorded numbers are saltwater habitats (Hunter Estuary, NSW; Port Hedland Saltworks, Western Australia; Tullakool Evaporation Ponds, NSW) (Watkins 1993). Elsewhere they said to avoid, or rarely occur in, tidal habitats, and rarely occur on beaches. In Western Australia they prefer freshwater to marine environments. In south-east Australia they prefer inland saline lakes and coastal saltworks. They are found infrequently around mangroves (Higgins & Davies 1996).	Highly unlikely, nearest DBCA record is approximately 18.5 km north-east. No suitable habitat exists in the survey area.	DBCA, NM

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
Xenus cinereus	Terek Sandpiper	IA	Mi	In Australia, the Terek Sandpiper has a primarily coastal distribution, with occasional records inland. It is more widespread and common in northern and eastern Australia than southern Australia (DAWE 2021b). The Terek Sandpiper mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire (Halosarcia spp.). Birds are seldom near the edge of water, however, birds may wade into the water (Marchant & Higgins 1993).	Highly unlikely, nearest DBCA record is approximately 26 km north. No suitable habitat exists in the survey area.	DBCA, NM
Reptiles						
Liasis olivaceus barroni	Pilbara Olive Python	VU	VU	The Olive Python is commonly found in escarpments, gorges and water holes in the ranges of the Pilbara region (Pearson 1993; Wilson & Swan 2003). Radio-telemetry has shown that individuals are commonly in close proximity to water and rock outcrops that attract suitable sized prey species (Pearson 2006).	Unlikely, nearest DBCA record is approximately 18 km south. No suitable habitat exists in the survey area.	DBCA, PMST
Mammals						
Dasycercus blythi	Brush-tailed Mulgara	P4		The Brush-tailed Mulgara is primarily nocturnal, shelters in burrows and feeds on insects, other arthropods and small vertebrates. This species inhabits spinifex grasslands and, in central Australia, lives in burrows that it digs on the flats between low sand dunes (Van Dyck and Strahan 2008). The Mulgara is a solitary species exhibiting high site fidelity and a low propensity for dispersal once a home range has been established (Masters *et al*. 2003). Males and females maintain home ranges of 1.4 to 14 hectares (Masters *et al*. 2003) which on average, overlap by less than 20% (Masters *et al.* 2003).	Likely, nearest DBCA record is approximately 26.5 km south. Some suitable habitat exists in the survey area.	DBCA
Dasyurus hallucatus	Northern Quoll	EN	EN	The Northern Quoll once occurred across the majority of northern Australia but its range has significantly contracted. It occurs in the Pilbara region but in disjunct populations. The Northern Quoll inhabits a range of vegetation associations but is especially abundant on dissected rocky escarpment and eucalypt woodland within 200 km of the coast. It is known to den in rock crevices and rock piles and favours rocky areas.	Unlikely, nearest DBCA record is approximately 18.5 km north-east. The Triodia plain habitat that is extensive within	DBCA, PMST

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				They are predominantly nocturnal but are occasionally active during the day, particularly during the mating season and are known to have a large home range (Van Dyck and Strahan 2008).	the survey area is considered marginal habitat at best.	
Lagorchestes conspicillatus leichardti	Spectacled Hare-wallaby (mainland)	P4		This subspecies was formerly distributed on Barrow Island and on Hermite Island in the Montebello Group, Western Australia. It is now restricted to Barrow Island and Boomerang Island, which is joined to Barrow at low tide .As the species occurs only on Barrow and Boomerang Islands, the extent of occurrence can be calculated to be approximately 233 km², the size of Barrow Island (DAWE 2021b).	Likely, nearest DBCA record is approximately 14 km east. Some suitable habitat present. Likely to occur on at least an occasional basis.	DBCA
Leggadina lakedownesis	Northern Short-tailed Mouse, Lakeland Downs Mouse	P4		The Lakeland Downs Mouse is only found in the northern parts of Western Australia, Northern Territory and Queensland. It prefers dry savannah habitat, and has been recorded in East Pilbara, Ashburton surrounds and Kimberley regions (ALA 2021).	Likely, nearest DBCA record is approximately 26 km north-west of the survey area.	DBCA, NM
Macroderma gigas	Ghost Bat	VU	VU	The Ghost Bat occurs in a wide range of habitats, and requires an undisturbed cave, deep fissure or disused mine shaft in which to roost. It is patchily distributed across Australia and is sensitive to disturbance (Van Dyck and Strahan 2008).	Highly unlikely, nearest DBCA record is approximately 15 km north-east. No suitable habitat exists in the survey area.	DBCA, PMST
Macrotis lagotis	Greater Bilby	VU	VU	The Greater Bilby distribution in Western Australia is restricted to the north, including the Pilbara, Sandy and Gibson Deserts. The Greater Bilby usually spends the daytime in burrows, often built against termite mounds, spinifex hummock or shrubs (Van Dyck and Strahan 2008). Extant population of the Greater Bilby occur in a variety of habitats, usually on landforms with level to low slope topography and light to medium soils. It occupies three major vegetation types; open tussock grassland on uplands and hills, mulga woodland/shrubland growing on ridges and rises, and hummock grassland in plains and alluvial areas. Laterite and rock feature substrates are an important part of Greater Bilby habitat. These habitat support shrub species,	Present, species was recorded during survey (recent secondary evidence)	DBCA, PMST, NM

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				such as *Acacia kempeana, A. hilliana* and *A. rhodophylla*, which have root-dwelling larvae that provide a constant food source for the Greater Bilby. After dark they leave their burrows to feed and populations are known to move long distances when current habitat ranges become unsuitable. Bilbies are largely solitary, widely dispersed and found in low numbers. The current occurrence of the Greater Bilby is strongly associated with higher rainfall and temperatures, which promote areas of higher plant and food production. The Greater Bilby may also prefer these conditions as higher rainfall and temperatures are not well tolerated by foxes (Pavey 2006).		
Pseudomys chapmani	Western Pebble-mound Mouse	P4		The Western Pebble-mound Mouse is restricted to the Pilbara region where it is recognised as an endemic species. Habitat for the Western Pebble-mound Mouse can be found on stony hillsides with hummocky grasslands and little or no soil. It constructs large mounds of pebbles on stony slopes which cover an area of 0.5-9.0 square metres. 'Active' mounds are characterized by volcano-like cones capped by 'craters' that mark occluded entrances to subterranean burrow systems in which the mice live, often gregariously (Van Dyck and Strahan 2008).	Unlikely, nearest DBCA record is approximately 14 km east. No suitable habitat exists in the survey area.	DBCA, NM
Rhinonicteris aurantia (Pilbara)	Pilbara Leaf-nosed Bat	VU	VU	The Pilbara Leaf-nosed Bat roosts in deep caves or mines in the wet season and forages nearby. This species occurs in the Pilbara region where its populations are scattered and localised. There are a few known populations of this species in the western Pilbara, roosting in caves formed in gorges that dissect massive siliceous sedimentary geology. It is most often observed in flight over waterholes in gorges (Van Dyck and Strahan 2008). Optimal roosts are thought to occur in caves that form between ascending rock layers, where humidity is maintained from seeping groundwater (Van Dyck and Strahan 2008). Roosts are commonly located over pools of water, or areas deep within the mine or cave structure which provides elevated temperature and humidity. Foraging habitat includes: Triodia hummock grasslands covering low rolling hills and shallow gullies, with *Eucalyptus camaldulensis* along the creeks; over small watercourses throughout granite boulder terrain; over pools and low shrubs in ironstone gorges; and in	Highly unlikely, no records recorded within 40km of the study area. No suitable habitat exists in the survey area.	DBCA, PMST

Taxa	Common name	Status		Description and habitat requirements	Likelihood of occurrence within the survey area	Source
		BC Act/ DBCA	EPBC Act			
				and around gravelly watercourses with *Melaleuca leucadendron*.		

Bilby plot data

	Bilby					dog		fox		cat		cow		agile		echidna	coucal	bustard	Habitat									Descriptor of tracking conditions						Notes			
plot no.	trax	digs	burrow	scats	Presence/ absence score	rd	plot	rd	plot	rd	plot	rd	plot	rd	plot	rd/plot	rd/plot	rd/plot	Broad habitat	Ground_dom. Sp.	g%cov	lit%c	Shrub_dom. Sp.	s%cov	Est. time since fire	Fire notes	Small animals detected: rd&plot	plot trackability	plot ODS	wind strongest 2 days previous	rain 2 days previous	wind at sample	rain evidence at sample	notes1	date	start time	obs name
BIL 1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	open low triodia mixed open	triodia, sparse herbs	40	10	acacia	25	4yr	some old charcoal	0	3.7	10.7	0	2	0	1	recent rain has remov	21-Jun	921	RBC
BIL 2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	open low triodia mixed open	triodia, sparse herbs	40	10	acacia	30	5yr	some old charcoal	0	3.4	10.4	0	2	0	1	recent rain has remov	22-Jun	1105	RBC
BIL 3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	open low triodia mixed open	triodia	30	5	acacia	35	4yr	some old charcoal	0	3.4	10.4	0	2	0	1	recent rain has remov	22-Jun	1403	RBC
BIL 4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	open low triodia mixed low a	triodia	30	10	acacia	40	4yr	some old charcoal	0	3.8	10.8	0	1	0	1	recent rain has remov	22-Jun	1529	RBC
BIL 5	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	open low triodia mixed open	triodia	30	5	acacia	35	5yr	some old charcoal	1	2.9	8.9	0	1	0	1	some fresh tracks visit	23-Jun	936	RBC
BIL 6	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	Triodia hummock grassland v	triodia	25	5	triodia	35	5yr	no signs of fire	1	3.6	9.6	0	1	0	1	some fresh tracks visit	23-Jun	1129	RBC
BIL 7	0	1	1	1	1	0	0	0	0	0	1	0	1	0	1	0	0	0	Tall oped Acacia s/land over	triodia	20	10	acacia	25	5yr	some old charcoal	1	2.7	8.7	0	1	0	1	some fresh tracks visit	23-Jun	1500	RBC
BIL 8	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	triodia over mixed open aca	triodia	40	10	triodia	50	6yr	no signs of fire	1	3.6	9.6	0	0	0	1	fresh tracks visible for	24-Jun	915	RBC

Key

0 = None recorded

1 = Evidence present

r = Evidence on road

Small animals recorded = pigeon,quail,invertebrate,small bird, rodent, monitor

surface trackability: 1=very good … 4=very poor

plot_ODS: 4=very good … 13=very poor includes light, sun angle, continuity

Fauna detected during field survey

Family	Genus	Species	Common name	Status		Survey area	Pardoo area
				BC Act / DBCA	EPBC Act		
Birds							
Otididae	*Ardeotis*	*australis*	Australian Bustard			y	
Campephagidae	*Coracina*	*novaehollandiae*	Black-faced Cuckoo-Shrike			y	
Artamidae	*Artamus*	*cinereus*	Black-faced Woodswallow			y	
Falconidae	*Falco*	*berigora berigora*	Brown Falcon			y	
Accipitridae	*Accipiter*	*fasciatus*	Brown Goshawk				y
Meliphagidae	*Lichmera*	*indistincta indistincta*	Brown Honeyeater			y	
Cuculidae	*Chrysococcyx*	*basalis*	Horsefield's Bronze Cuckoo			y	
Psittacidae	*Melopsittacus*	*undulatus*	Budgerigar			y	
Burhinidae	*Burhinus*	*grallarius*	Bush Stone-curlew			y	
Columbidae	*Ocyphaps*	*lophotes*	Crested Pigeon			y	
Columbidae	*Geopelia*	*cuneata*	Diamond Dove			y	
Dromaiiidae	*Dromaius*	*novaehollandiae*	Emu				y
Hirundinidae	*Petrochelidon*	*ariel*	Fairy Martin			y	
Cacatuidae	*Eolophus*	*roseicapillus*	Galah			y	
Falconidae	*Falco*	*hypoleucos*	Grey Falcon		VU	y	
Pomatostomidae	*pomatostomus*	*temporalis*	Grey-crowned Babbler			y	
Turnicidae	*Turnix*	*velox*	Little Button Quail			y	
Cacatuidae	*Cacatua*	*sanguinea sanguinea*	Little Corella			y	
Accipitridae	*Aquila*	*morphnoides*	Little Eagle				y
Monarchidae	*Grallina*	*cyanoleuca*	Magpie-lark			y	
Falconidae	*Falco*	*cenchroides cenchroides*	Nankeen Kestrel			y	

Family	Genus	Species	Common name	Status		Survey area	Pardoo area
				BC Act / DBCA	EPBC Act		
Columbidae	*Geopelia*	*striata*	Peaceful Dove			y	
Artamidae	*Cracticus*	*nigrogularis*	Pied Butcherbird			y	
Meropidae	*Merops*	*ornatus*	Rainbow Bee-eater			y	
Pardalotidae	*Pardalotus*	*rubricatus*	Red-browed Pardalote			y	
Locustellidae	*Megalurus*	*mathewsi*	Rufous Songlark			y	
Alcedinidae	*Todiramphus*	*pyrrhopygius*	Red-backed Kingfisher			y	
Meliphagidae	*Lichenostomus*	*virescens*	Singing Honeyeater			y	
Columbidae	*Geophaps*	*plumifera*	Spinifex Pigeon			y	
Podargidae	*Podargus*	*strigoides*	Tawny Frogmouth				
Corvidae	*Corvus*	*orru*	Torresian Crow			y	
Maluridae	*Malurus*	*lamberti*	Variegated Fairy-wren			y	
Accipitridae	*Aquila*	*audax*	Wedge-tailed Eagle			y	
Ptilonorhynchidae	*Ptilonorhynchus*	*maculatus*	Western Bowerbird			y	
Accipitridae	*Haliastur*	*sphenurus*	Whistling Kite			y	
Maluridae	*Malurus*	*leucopterus*	White-winged Fairy-wren			y	
Rhipiduridae	*Rhipidura*	*leucophrys*	Willie Wagtail			y	
Meliphagidae	*Manorina*	*flavigula*	Yellow Throated Miner			y	
Estrildidae	*Taeniopygia*	*guttata*	Zebra Finch			y	
Mammals							
Macropodidae	*Macropus*	*agilis*	Agile Wallaby				y
Camelidae	*Camelus*	*dromedarius*	Camel	int	int	y	
Bovidae	*Bos*	*taurus*	Cow	int	int	y	
Canidae	*Canus*	*domesticus*	Dog	int	int	y	
Tachyglossidae	*Tachyglossus*	*aculeatus*	Echidna			y	

Family	Genus	Species	Common name	Status		Survey area	Pardoo area
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Felidae	*Felis*	*catus*	Feral Cat	int	int	y	
Peramelidae	*Macrotis*	*lagotis*	Greater Bilby	VU	VU	y	
Macropodidae	*Macropus*	*rufus*	Red Kangaroo			y	
Muridae	*Notomys*	*alexis*	Spinifex Hopping Mouse			y	
Reptiles							
Boidae	*Aspidites*	*melanocephalus*	Black-headed Python				y
Pygopodidae	*Lialis*	*burtonis*	Burton's Legless Lizard			y	
Gekkonidae	*Heteronotia*	*binoei*	Bynoe's Gecko			y	
Agamidae	*Ctenophorus*	*isolepis*	Central Military Dragon			y	
Scincidae	*Lerista*	*bipes*	Two-toed Slider			y	
Elapidae	*Acanthophis*	*pyrrhus*	Desert Death Adder			y	
Varanidae	*Varanus*	*gouldii*	Gould's Monitor			y	
Scincidae	*Ctenotus*	*pantherinus*	Leopard Skink			y	
Gekkonidae	*Gehyra*	*media*	Medium Dtella			y	
Varanidae	*Varanus*	*tristis tristis*	Black-tailed Monitor			y	
Diplodactylidae	*Lucasium*	*stenodactylum*	Sandplain Gecko			y	
Agamidae	*Moloch*	*horridus*	Thorny Devil			y	
Gekkonidae	*Gehyra*	*variegata*	Tree Dtella			y	

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