



Horizon Power
124-KRT-DMP 132kV Line Upgrade Project
Flora and Fauna Survey

August 2019

Executive summary

Horizon Power is planning to replace sections of the overhead power line running from Karratha to Dampier (KRT – DMP 132 kv Line (the Line)), located in the Pilbara Region of Western Australia. The sections of the line considered to be in need of replacement are those which are considered to have reached the end of their life from an asset serviceability perspective. The purpose of the works are to replace infrastructure to ensure a continuous and reliable supply.

Horizon Power commissioned GHD Pty Ltd to undertake a vegetation, flora and fauna survey of the proposed clearing area ('survey area') for the proposed Karratha to Dampier Line re-build. The purpose of the assessment is to delineate key flora, vegetation and fauna values and potential impact to areas of sensitivity. The outcomes of the assessment will be used to inform the project design and provide information to support a native vegetation clearing permit application under Part V of the *Environmental Protection Act 1986*.

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.6 and the assumptions and qualifications contained throughout this report.

Key findings

- Nine vegetation types were identified and described for the survey area, as well as cleared and/or highly degraded areas. The survey area is predominantly located along an existing power line corridor and adjacent access tracks. The vegetation condition throughout the survey area was generally consistent, with the majority of the survey area determined to be in Very Good to Good condition
- Vegetation type VT_5 is considered representative of riparian vegetation
- No vegetation communities identified within the survey area are representative of a Threatened Ecological Community (TEC). The presence of two Priority Ecological Communities (PECs) were identified within the survey area:
 - Burrup Peninsula rock pile communities (Priority 1). Vegetation type 6 (VT_6) is considered to be representative of this PEC. There is approximately 0.53 ha of this PEC occurring within the survey area of which all is in Very Good condition.
 - Horseflat land system of the Roebourne Plains (Priority 3). Vegetation type 9 (VT_09) is considered to be representative of this PEC. There is approximately 1.72 ha of this PEC occurring within the survey area which ranged from Poor to Good condition.
- The survey recorded a total of 133 flora taxa (including subspecies and varieties) representing 35 families and 81 genera within the survey area
- No threatened flora species listed under the EPBC Act and/or BC Act was recorded within the survey area. One Priority species listed by the DBCA, *Rhynchosia bungarensis* (Priority 4), was recorded within the survey area along the bases of rockpiles on the Burrup Peninsula. A total of 48 plants from 14 locations were recorded in the survey area
- Six broad fauna habitat types have been identified within the survey area including rocky plains and low rises, minor drainage lines, rock piles, saline flats, sandy loam plains and gilgai grasslands
- A total of 77 fauna species, including 50 birds, 13 mammals and 14 reptiles were recorded during the survey
- No Threatened or priority fauna species or evidence of their presence was recorded in the survey area during the field assessment.

- An assessment of the proposed native vegetation clearing within the survey area against the Ten Clearing Principles was undertaken. This assessment concluded the proposed clearing associated with the survey area may be at variance to Principles (g) and (j).

Table of Contents

Table of Contents	iii
1. Introduction.....	1
1.1 Background.....	1
1.2 Purpose of this report	1
1.3 Location.....	1
1.4 Scope of works	1
1.5 Relevant legislation and background information.....	2
1.6 Limitations and assumptions.....	2
2. Methodology	4
2.1 Desktop assessment	4
2.2 Field survey.....	4
2.3 Limitations	6
3. Desktop assessment	9
3.1 Physical environment.....	9
3.2 Land use.....	10
3.3 Hydrology	10
3.4 Vegetation and flora	11
3.5 Fauna.....	16
4. Field survey results	17
4.1 Vegetation	17
4.2 Flora	24
4.3 Fauna.....	25
5. Assessment of vegetation clearing.....	31
6. References	39

Table index

Table 1	Key environmental legislation relevant to the project.....	2
Table 2	Information sources.....	4
Table 3	Flora and fauna survey limitations.....	7
Table 4	Land systems within the project area.....	9
Table 5	Hydrology aspects within the project area	11
Table 6	Extent of pre-European vegetation associations mapped within the project area (Beard 1975, GoWA 2019b).....	13
Table 7	Threatened and Priority Ecological Communities identified in the desktop searches.....	14
Table 8	Vegetation types recorded within the survey area.....	18

Table 9	Extent of vegetation condition mapped within the survey area.....	24
Table 10	Habitat types within the survey area.....	26
Table 11	Conservation significant fauna likely to occur in the survey area.....	29
Table 12	Assessment of survey area against the ten clearing principles	32

Figure index

Figure 1	Project locality.....	42
Figure 2	Land use constraints.....	42
Figure 3	Hydrology constraints.....	42
Figure 4	Biological constraints	42
Figure 5	Survey Area location.....	42
Figure 6	Survey Sampling Effort.....	42
Figure 7	Vegetation Types and Condition	42
Figure 8	Priority Ecological Community Mapping	42
Figure 9	Conservation Significant Flora Records.....	42

Appendices

Appendix A – Figures

Appendix B – Relevant legislation and background information

Appendix C – Desktop searches

Appendix D – Flora data

Appendix E – Fauna data

1. Introduction

1.1 Background

Horizon Power is planning to replace sections of the overhead power line running from Karratha to Dampier (KRT – DMP 132 kv Line (the Line)), located in the Pilbara Region of Western Australia. The sections of the line considered to be in need of replacement are those which are considered to have reached the end of their life from an asset serviceability perspective. The purpose of the works are to replace infrastructure to ensure a continuous and reliable supply.

1.2 Purpose of this report

GHD Pty Ltd (GHD) was commissioned by Horizon Power to complete a desktop assessment of the preferred new line route. The purpose of the assessment was to identify environmental values and constraints to inform the design and provide information to support future biological surveys. Subsequent to the desktop assessment, GHD was commissioned by Horizon Power to undertake a vegetation, flora and fauna survey for the preferred new line route. The purpose of the assessment was to delineate key flora, vegetation and fauna values and potential impact to areas of sensitivity. The outcomes of the biological survey will be used to inform the project design and provide information to support a native vegetation clearing permit application under Part V of the *Environmental Protection Act 1986* (EP Act).

1.3 Location

The proposed line route extends from Karratha to Dampier and mostly follows the existing Line with deviations in the northern and southern parts. For the purpose of the desktop assessment a project area was defined which includes the existing and proposed line route as well as adequate access areas for construction purposes. The project area (as shown in Figure 1, Appendix A) is approximately 18 kilometres (km) long and covers 210.93 hectares (ha).

A desktop study area was defined for the desktop based searches of the assessment and includes a 20 km buffer of the project area.

The project area was further refined for the purposes of the biological survey and to minimise project impacts on the environment. The 'survey area' is approximately 18 km long and 30 metres (m) wide and covers a total of 39.36 ha. The clearing footprint will be wholly contained within the survey area. The survey area is mapped in Figure 5, Appendix A.

1.4 Scope of works

GHD understands the scope of works includes the following:

- Undertake a flora and vegetation survey to broadly map vegetation units, condition and identify conservation significant flora and ecological communities within the disturbance footprint
- Undertake a fauna survey broadly map fauna habitat types and identify potential habitat for conservation significant fauna
- Update the existing desktop assessment to include the field survey findings
- Prepare a technical report (this report) that documents the methods and results, and includes an assessment of the project area against the ten clearing principles
- Provide spatial data suitable to support the submission of a native vegetation clearing permit application to the Department of Water, Environment and Regulation (DWER).

1.5 Relevant legislation and background information

Key Commonwealth and WA environmental legislation that may be relevant to the project is outlined in Table 1. An overview of key legislation and guidelines, conservation codes and background information relevant to this project is provided in Appendix B.

Table 1 Key environmental legislation relevant to the project

Legislation	Responsible agency	Aspect
Commonwealth legislation		
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Department of the Environment and Energy (DEE)	Matters of National Environmental Significance including threatened flora and fauna
WA legislation		
<i>Biodiversity Conservation Act 2016</i>	Department of Biodiversity, Conservation and Attractions (DBCA)	Conservation and protection of biodiversity and biodiversity components in WA
<i>Biosecurity and Agricultural Management Act 2007</i>	Department of Primary Industries and Regional Development (DPIRD)	Weeds and feral animals
<i>Conservation and Land Management Act 1984</i>	DBCA	Use, protection and management of public lands and waters and its flora and fauna
<i>Environmental Protection Act 1986</i>	Environmental Protection Authority (EPA) (Part IV) DWER (Part V)	Environmental impact assessment and management
<i>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</i>	DWER	Clearing of native vegetation
<i>Rights in Water and Irrigation Act 1914</i>	DWER	Access to and use of water resources; protection and management of river flows and drainage
<i>Soil and Land Conservation Act 1945</i>	DPIRD	Protection of soil and prevention/management of soil erosion

1.6 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 the 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 assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Horizon Power and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

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

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of access tracks, operational works, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions may change after the date of the field survey. 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 the flora and fauna within the survey area (Figure 5, Appendix A). Should the survey area change or be refined, further assessment may be required.

2. Methodology

2.1 Desktop assessment

A desktop assessment of the project area to identify environmental values and constraints was undertaken by viewing GIS spatial files largely sourced from Government of Western Australia (GoWA) (2019a) and reviewing publically available, government managed databases. The information sources utilised in this assessment are presented in Table 2.

Table 2 Information sources

Aspect	Information source
Climate	Bureau of Meteorology (BoM) Climate Data Online (2019)
Geology, landforms and soil	1:500 000 State linear structures layer (DMIRS-015) Soil Landscape Mapping – Systems (DPIRD-064)
Acid Sulphate Soils (ASS)	Acid Sulfate Soil Risk Map, Pilbara Coastline (DWER-053)
Environmentally Sensitive Areas (ESAs)	Clearing Regulations - Environmentally Sensitive Areas (DWER-046)
Conservation reserves and areas	DBCA – Legislated Lands and Waters (DBCA-011) DBCA – Lands of Interest (DBCA-012)
Hydrology	Public Drinking Water Source Areas (DWER-033) 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) Water Information Reporting System (DWER 2019) City of Karratha Water Management Strategy (Essential Environmental 2016)
Vegetation	Pre-European Vegetation (DPIRD-006) Native Vegetation Extent (DPIRD-005) Statewide Vegetation Statistics (GoWA 2019b)
Threatened and Priority Ecological Communities (TECs and PECs)	DBCA Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) spatial dataset Priority Ecological Communities for Western Australia Version 28 (DBCA 2019)
Conservation significant flora and fauna	DBCA NatureMap database (DBCA 2007–) DBCA Threatened and Priority Flora database (TPFL) Western Australian Herbarium database (WAHERB)
Matters of National Environmental Significance	EPBC Act Protected Matters Search Tool (PMST) (DEE 2019a)

2.2 Field survey

2.2.1 Flora and vegetation

The detailed flora and vegetation field survey was carried out by GHD botanist Joel Collins (flora licence no. SL012542) and ecologist Erin Lynch (flora licence no. SL012374) over five days from the 10 to 14 June 2019. This is the preferred survey timing from an ecological perspective.

The flora and vegetation survey methodology and reporting has been conducted with reference to the Environmental Protection Authority (EPA) Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016a).

The field survey included the following:

- GHD placed 15 non-permanent quadrats across the survey area to adequately characterise the vegetation. In addition to quadrat sampling, the project area was traversed in representative vegetation types to allow opportunistic collection of flora species. GHD have compiled an inventory of flora species (native and exotic) by vegetation type.
- Collected quadrat data included physical features (e.g. landform, soil types, litter cover), a list of dominant flora from each structural layer and a list of all species (native and introduced) within the quadrat including average height and cover (using the National Vegetation Information System). A photograph of each quadrat, and other representative vegetation types and conditions were taken.
- Vegetation units have been delineated using a combination of aerial photography, topographical features and field data. Vegetation mapping has been conducted in the field with boundaries drawn over aerial photography using handheld GPS equipment (Samsung tablet). Vegetation units were described based on structure, dominant taxa and cover characteristics as defined by quadrat and relevé data and field observations. Vegetation unit descriptions follow the National Vegetation Information System (NVIS) and are consistent with NVIS Level V (Association). At Level V up to three taxa per stratum are used to describe the association (NVIS Technical Working Group 2017).
- The vegetation condition was assessed and mapped in accordance with the vegetation condition rating scale for the Eremaean and Northern Botanical Provinces of Western Australia (IBRA) (devised by Keighery (1994) and adapted by EPA (2016a)). The scale recognises the intactness of vegetation and consists of six rating levels. The vegetation condition rating scale is located in Appendix B.
- Based on results of the desktop assessment, GHD identified areas within the project area that have the potential to contain conservation significant vegetation and flora. During the field survey GHD undertook non-systematic targeted searches for conservation significant flora and vegetation within these areas. Where conservation significant flora taxa or vegetation were identified in the field, the locations of boundaries and/or individuals were recorded using a GPS.
- Flora species that are well known to GHD ecologists were identified in the field. Where field identification of plant taxa was not possible, specimens were collected in a systematic manner and identified at the WA Herbarium by comparison with the reference collection and/or use of identification keys.

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 DEE (2019b). Nomenclature used in this report follows that used by the WA Herbarium as reported on *FloraBase*.

2.2.2 Fauna

GHD ecologist Erin Lynch undertook a level 1 fauna survey (reconnaissance survey) in conjunction with the flora and vegetation survey. The survey methodology employed by GHD was undertaken in accordance with the EPA Technical Guidance – Sampling methods for terrestrial vertebrate fauna (EPA 2016b) and Technical Guidance – Terrestrial Fauna Surveys (EPA 2016c).

The field survey included the following:

- Opportunistic fauna searches were conducted across the survey area
- Identification and mapping of faunal habitat types including habitat types suitable for conservation significant species. Representative fauna habitats were photographed. Where appropriate the fauna habitat types were aligned with the vegetation types. An inventory was made of the vertebrate fauna species (native and feral) within the survey area through opportunistic recording of species.
- Areas identified as potential habitat for conservation significant fauna were traversed to identify key distinguishing features/descriptions (including tracks, diggings, scats, bones, mounds, refuge types). The active searches (where relevant) assisted with targeting conservation significant species such as the Pilbara Olive Python.
- Avifauna surveys were undertaken selectively throughout the survey area, but included areas of known species resources such as water points, riparian areas and foraging areas. Avifauna survey were used to assist with targeting migratory birds.
- Deployment of remote camera traps to target cryptic species such as the Northern Quoll and other small mammals. These were deployed for four nights with a focus on areas where the Northern Quoll may be present, such as rocky screes and breakaways. Reconyx Hyperfire 550 remote camera locations were recorded via GPS.
- Deployment of a Songmeter SM4Bat+FS, Acoustic SM4 recorder to assess for bats (such as Ghost Bat and Orange-leaf nose Bat). The detector was deployed between sunset and sunrise across the project area.

Identification of fauna species was made in the field using available field guides and electronic guides. Where identification was not possible, photographs of specimens were collected to be later identified.

Nomenclature used in this report follows that used by the Western Australian Museum and the NatureMap database (DBCA 2007–) with the exception of birds, where Christidis and Boles (2008) was used.

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 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 often misrepresent the current range of Threatened and Priority species.

2.3.2 Field survey limitations

The EPA (2016a, b) 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 3.

Table 3 Flora and fauna survey limitations

Aspect	Constraint	Comment
Sources of information and availability of contextual information.	Nil	Adequate information is available for the survey area. Broad scale (1:250,000) mapping by Beard (1975) and digitised by Shepherd et al. (2002) Regional biogeography (Van Vreeswyk et al. 2004).
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 collected and identified (based on sampling, timing and intensity) Proportion of fauna identified, recorded and/or collected	Nil	The survey sampling and intensity was considered adequate, and seasonal conditions were considered satisfactory. All taxonomic groups were considered to be represented. The portion of flora collected and identified was considered moderate; and it is likely the survey under-recorded some grass species (Poaceae), annuals and herbs due to lower than average rainfall and consequently poor flowering material. However, based on the likelihood assessment it is unlikely these species would be conservation significant. The fauna assessment sampled 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 reconnaissance 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.
Flora determination	Minor	Flora determination was undertaken by GHD botanist/ecologist in the field and at the WA Herbarium. Two taxa could be identified to genus level only, and three taxa could be tentatively identified to species level, due to lack of flowering and/or fruiting material required for identification. None of these species were considered to be potential conservation significant flora. 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 of report development, but it should be noted this may change in response to ongoing research and review of the International Union for Conservation Nature criteria.
Completeness and further work which might be needed (e.g. was the relevant area fully surveyed)	Minor	The entire survey area was accessible and was accessed by foot and vehicle. Adequate time was available to complete the biological survey to the required standard.

Aspect	Constraint	Comment
Mapping reliability	Nil	The vegetation was mapped using high-resolution ESRI aerial imagery obtained from Landgate, topographical features, previous broad scale mapping (Beard 1975) and field data. Data was recorded in the field using hand-held GPS tools (e.g. Samsung tablet and Garmin GPS). Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. The Garmin GPS units used for this survey are accurate to within ± 5 metres on average. Therefore the data points consisting of coordinates recorded from the GPS may contain inaccuracies.
Timing/weather/season/cycle	Minor	The field survey was conducted in June 2019. In the three months prior to the flora survey (March to May 2019), the Karratha weather station recorded a total of 77.4 mm of rainfall. This rainfall total is lower than the long term average for the same period (March-May; 92 mm) (BoM 2019). The weather conditions recorded during the survey were considered unlikely to have impacted the survey results. The survey timings were considered appropriate for the flora and fauna field survey.
Disturbances (e.g. fire, flood, accidental human intervention)	Minor	Some of the survey area had been subjected to previous disturbances includes clearing for vehicle tracks, salt ponds and construction of the existing power lines. These disturbances did not limit the biological survey.
Resources	Nil	Adequate resources were employed during the field survey. The person days were spent undertaking the survey using a dedicated botanist and ecologist.
Access restrictions	Nil	No access problems were encountered during the survey.
Experience levels	Nil	The ecologists who executed the survey were practitioners suitably qualified in their respective fields. Joel Collins and Erin Lynch are botanists/ecologists with over 12 years' experience in undertaking ecological surveys in Western Australia.

3. Desktop assessment

3.1 Physical environment

3.1.1 Climate

The project is located in the Pilbara region of Western Australia and experiences a semi-arid climate. Temperatures are warm to hot year round, rainfall is generally low and mostly falls in the late summer months due to the influence of tropical cyclones and monsoon. The closest meteorological recording station is located at Karratha (No. 004083) approximately 1.4 km from the project area. Climatic data from this station indicates the mean maximum temperature ranges from 36.2 °C in January to March to 26.3 °C in July. The mean minimum temperature ranges from 26.8 °C in January to 13.8 °C in July. The mean annual rainfall is 296.7 mm with an average of 19.7 rain days per year (BoM 2019).

3.1.2 Geology, landforms and soils

The project is located in the Karratha Coast Zone of the Pilbara Province. The Pilbara Province lies over the Pilbara Craton, which consists of two different tectonic components. The two broad geologic sequences are the ancient Archaean granite-greenstone terrain and the younger volcano-sedimentary sequence of the Hamersley Basin (Tille 2006).

The Karratha Coast Zone is characterised by coastal mudflats with sandy coastal plains and some hills on marine deposits and some sedimentary and volcanic rocks of the Pilbara Craton. Soils include tidal soils with some calcareous loamy earths, salt lake soils and red/brown non-cracking clays (Tille 2006).

3.1.3 Land systems

The Pilbara region has been surveyed for the purposes of land classification, mapping and resource evaluation. A total of 102 land systems which are grouped into 20 broad land types have been described for the region, which are distinguished on the basis of topography, geology, soils and vegetation (Van Vreeswyk et al. 2004). The project area intersects five land systems; details of these land systems are presented in Table 4.

Table 4 Land systems within the project area

Land system	Description	Location
Granitic	Rugged granitic hills supporting shrubby hard and soft spinifex grasslands. <u>Geology</u> : Archaean and Proterozoic granite, gneiss, granodiorite and porphyry. <u>Geomorphology</u> : Erosional surfaces; hill tracts and domes on granitic rocks with rough crests, associated rocky hill slopes, restricted lower stony plains; narrow, widely spaced tributary drainage floors and channels.	Intersects the northern part of the project area
Cheerawarra	Sandy coastal plains and saline clay plains supporting soft and hard spinifex grasslands and minor tussock grasslands. <u>Geology</u> : Quaternary eolian sand and alluvium. <u>Geomorphology</u> : Depositional surfaces; gently undulating, sandy surfaced coastal plains and level plains with saline clay soils and bare saline scalds with wind hummocks; very rare distributary drainage lines.	Intersects the northern and central parts of the project area

Land system	Description	Location
Littoral	Bare coastal mudflats with mangroves on seaward fringes, samphire flats, sandy islands, coastal dunes and beaches. <u>Geology</u> : Quaternary mudflat deposits, clay, salt and sand; eolian sand. <u>Geomorphology</u> : Depositional surfaces; saline coastal flats; estuarine and littoral surfaces with extensive bare saline tidal flats subject to infrequent tidal inundation, slightly higher samphire flats and alluvial plains, mangrove seaward fringes with dense branching patterns of shallow tidal creeks, minor coastal dunes, limestone ridges, sandy plains and beaches.	Intersects the central part of the project area
Horseflat	Gilgaied clay plains supporting tussock grasslands and minor grassy snakewood shrublands. <u>Geology</u> : Quaternary alluvium. <u>Geomorphology</u> : Depositional surfaces; gilgaied and non-gilgaied clay plains, stony plains, narrow linear drainage depressions and dissected slopes marginal to the River land system; mostly internally drained, some through going trunk drainage channels.	Intersects the central part of the project area
Ruth	Hills and ridges of volcanic and other rocks supporting hard spinifex (occasionally soft spinifex) grasslands. <u>Geology</u> : Archaean and Proterozoic intermediate and basic volcanic rocks; also quartz, minor chert, jaspilite, shale and siltstone. <u>Geomorphology</u> : Erosional surfaces; rounded hills and ridges with restricted lower slopes and stony interfluves, moderately to widely spaced drainage patterns.	Intersects the southern part of the project area

3.1.4 Acid sulphate soils

A review of the ASS risk mapping indicates the soil under the project area has a 'high to moderate' and 'moderate to low' risk of containing ASS. The 'high to moderate' risk rating indicates the risk of ASS occurring within 3 m of the natural soil surface. The 'moderate to low' risk rating indicates the risk of ASS occurring within 3 m of natural soil surface however this rating indicates a high to moderate risk of ASS beyond 3 m of natural soil surface.

3.2 Land use

3.2.1 Conservation reserves and areas

No DBCA managed lands intersect the project area. Six conservation areas are located within the study area, with the closest Murujuga National Park located approximately 250 m east of the project area on the Burrup Peninsula (Figure 6, Appendix A).

3.2.2 Environmentally sensitive areas

No ESAs intersect the project area. One ESA occurs within the study area; this ESA is approximately 7.6 km north west of the project area and covers the Dampier Archipelago which is a National Heritage Place (Figure 6, Appendix A).

3.3 Hydrology

Desktop searches of the GoWA data layers identified the water resource aspects present in the project area. These are detailed below in Table 5.

Table 5 Hydrology aspects within the project area

Aspect	Details	Results
Groundwater Areas	Groundwater areas proclaimed under the RIWI Act	Pilbara Groundwater Area
Surface Water Areas	Surface water areas proclaimed under the RIWI Act	Pilbara Surface Water Area
Irrigation District	Irrigation Districts proclaimed under the RIWI Act	None present
Rivers	Rivers proclaimed under the Rights in RIWI Act	None present
Public Drinking Water Source Areas (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 <i>Metropolitan Water Supply, Sewage and Drainage Act 1909</i> or the <i>Country Area Water Supply Act 1947</i> .	None present
Waterways Management Areas	Areas proclaimed under <i>the Waterway Conservation Act 1976</i>	None present

3.3.1 Groundwater

The project area lies within the proclaimed Pilbara Groundwater Area (Figure 7, Appendix A). A search of the Water Information Reporting (DWER 2019) system found 94 registered groundwater bores within the study area. This does not include unregistered bores. Groundwater levels recorded from available bore data indicate that groundwater beneath the project area lies at approximately 12-13 m below ground level. The groundwater levels beneath the project area are expected to vary seasonally and be influenced by tidal processes. The northern part of the project area is adjacent to evaporation ponds, the groundwater is expected to sit much closer to the surface in this area.

3.3.2 Surface water and drainage

The project area is located within the proclaimed Pilbara Surface Water Area (Figure 7, Appendix A) and is in close proximity to the ocean. Surface water in broader area is largely reliant on weather and surface water in waterways is generally only present or flowing for parts of the year, often in response to larger cyclonic, rainfall events. The City of Karratha Water Management Strategy (Essential Environment 2016) indicate that drainage issues arise from the high erosion tendencies of the red soils and the large volumes of stormwater that flow in the wet season.

3.3.3 Wetlands

No Internationally (Ramsar) or nationally important wetlands are located within 20 km of the project area.

3.4 Vegetation and flora

3.4.1 Regional biogeography

The project area is located in the Pilbara bioregion and Roebourne sub-region as described by Interim Biogeographic Regionalisation of Australia (IBRA).

The Roebourne sub-region is characterised by Quaternary alluvial and older colluvial coastal and subcoastal plains with a grass savannah of mixed bunch and hummock grasses, and dwarf

shrub steppe of *Acacia stellaticeps* or *A. pyrifolia* and *A. inaequilatera*. Uplands are dominated by *Triodia* hummock grasslands. Ephemeral drainage lines support *Eucalyptus victrix* or *Corymbia hamersleyana* woodlands. Samphire, *Sporobolus* and mangal occur on marine alluvial flats and river deltas. Resistant linear ranges of basalts occur across the coastal plains, with minor exposures of granite. Islands are either Quaternary sand accumulations, or composed of basalt or limestone, or combinations of any of these three (Kendrick and Stanley 2001).

3.4.2 Broad vegetation mapping and extent

Broad scale (1:250,000) pre-European vegetation mapping of the area was completed by Beard (1975) at an association level. The mapping indicates that four vegetation associations are present within the project area:

- Hummock grasslands, grass steppe; soft spinifex (association 117)
- Bare areas; mudflats (association 127)
- Mosaic: Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex (association 589)
- Hummock grasslands, grass steppe; hard spinifex, *Triodia wiseana* (association 157).

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 2019b). As shown in Table 6, the current extents remaining of all vegetation associations are greater than 77% of their calculated pre European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and Local Government Area (LGA)).

The Native Vegetation Extent data layer indicates that approximately 10 % of the project area has been cleared. The clearing is largely associated with the central part of the project area that is adjacent to the Dampier salt ponds.

3.4.3 Conservation significant ecological communities

Searches of the EPBC Act PMST did not identify any TECs within the project area. Searches of the DBCA TEC/PEC database identified four PECs within 20 km of the project area, two of which intersect the project area boundary (Figure 2, Appendix A). Details of these communities are provided in Table 7.

Table 6 Extent of pre-European vegetation associations mapped within the project area (Beard 1975, GoWA 2019b)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	%current extent in all DBCA managed land (proportion of current extent)
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: Roebourne	50,962.94	46,901.57	92.03	37.53
	LGA: City of Karratha	41,173.74	31,921.58	77.53	58.03
127	State: Western Australia	737,724.05	697,871.38	94.60	10.03
	IBRA bioregion: Pilbara	177,749.75	159,595.04	89.79	2.32
	IBRA sub-region: Roebourne	177,178.87	159,024.16	89.75	2.33
	LGA: City of Karratha	96,204.40	83,703.29	87.01	4.37
589	State: Western Australia	807,698.58	802,713.40	99.93	1.91
	IBRA bioregion: Pilbara	728,768.20	724,695.82	99.44	2.11
	IBRA sub-region: Roebourne	675,391.80	671,327.48	99.40	2.14
	LGA: City of Karratha	312,813.63	310,512.32	99.26	0.78
157	State: Western Australia	502,728.56	499,311.84	99.32	18.24
	IBRA bioregion: Pilbara	199,832.17	198,409.23	99.29	5.84
	IBRA sub-region: Roebourne	14,972.09	14,451.45	96.52	1.56
	LGA: City of Karratha	73,039.72	71,600.83	98.03	0.31

Table 7 Threatened and Priority Ecological Communities identified in the desktop searches

Community type	EPBC Act	DBCA	Description (DBCA 2019)
Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays (Roebourne Plains gilgai grasslands)	-	Priority 1	The Roebourne Plains coastal grasslands with gilgai micro-relief occur on deep cracking clays that are self-mulching and emerge on depositional surfaces. The Roebourne Plains gilgai grasslands occur on microrelief of deep cracking clays, surrounded by clay plains/flats and sandy coastal and alluvial plains. The gilgai depressions supports ephemeral and perennial tussock grasslands dominated by <i>Sorghum</i> sp. and <i>Eragrostis xerophila</i> along with other native species including <i>Astrelba pectinata</i> , <i>Eriachne benthamii</i> , <i>Chrysopogon fallax</i> and <i>Panicum decompositum</i> . Restricted to the Karratha area, this community differs from the surrounding clay flats of the Horseflat land system which are dominated by <i>Eragrostis xerophila</i> and other perennial tussock grass species (<i>Eragrostis</i> mostly). Buffer area intersects the project area.
Horseflat land system of the Roebourne Plains	-	Priority 3	The Horseflat Land System of the Roebourne Plains are extensive, weakly gilgaied clay plains dominated by tussock grasslands on mostly alluvial non-gilgaied, red clay loams or heavy clay loams. Perennial tussock grasses include <i>Eragrostis xerophila</i> and other <i>Eragrostis</i> spp., <i>Eriachne</i> spp. and <i>Dichanthium</i> spp. The community also supports a suite of annual grasses including <i>Sorghum</i> spp. and rare <i>Astrebela</i> spp. The community extends from Cape Preston to Balla Balla surrounding the towns of Karratha and Roebourne. This community does not include priority ecological communities 'Roebourne Plains gilgai grasslands' and the 'Chenopod association of the Roebourne Plains area'. Buffer area intersects the project area.
Coastal dune native tussock grassland dominated by <i>Whiteochloa airoides</i>	-	Priority 3	Tussock grassland of <i>Whiteochloa airoides</i> occurs on the landward side of foredunes, hind dunes or remnant dunes with white or pinkish white medium sands with marine fragments. There may be occasional <i>Spinifex longifolius</i> tussock or <i>Triodia epactia</i> hummock grasses and scattered low shrubs of <i>Olearia dampieri</i> subsp. <i>dampieri</i> , <i>Scaevola spinescens</i> , <i>S. cunninghamii</i> , <i>Trianthema turgidifolia</i> and <i>Corchorus</i> species (<i>C. walcottii</i> , <i>C. laniflorus</i>). Occurs on Barrow Island, Tent Island and possibly some unaffected littoral areas in West Pilbara. Closest known occurrence is approximately 5.5 km north east of the southern half of the project area.
Burrup Peninsula rock pile communities	-	Priority 1	Pockets of vegetation in rock piles, rock pockets and outcrops. Comprise a mixture of Pilbara and Kimberley species, communities are different from those of the Hamersley and Chichester Ranges. Short-range endemics land snails.

Community type	EPBC Act	DBCAs	Description (DBCAs 2019)
			Known occurrences located approximately 5.3 km north east of the project area on the Burrup Peninsula.

3.4.4 Flora diversity

A search of the *NatureMap* database identified 606 taxa previously recorded within the study area (Appendix C). This total comprised 569 native taxa and 37 naturalised (introduced) taxa. The most commonly recorded families were Fabaceae, Poaceae, Malvaceae and Chenopodiaceae.

3.4.5 Conservation significant flora

Searches of the EPBC Act PMST and *NatureMap* database identified the presence/potential presence of 12 conservation significant flora within the study area. The desktop search recorded:

- One Priority 2 taxon
- Ten Priority 3 taxa
- One Priority 4 taxon.

3.5 Fauna

3.5.1 Fauna diversity

A search of the *NatureMap* database identified 694 fauna species previously recorded within the study area (Appendix C). This total comprised 207 birds, four amphibians, 104 reptiles, 212 invertebrates, 42 mammals and 125 fish. Of the 694 fauna species previously recorded 694 were native species and 12 were naturalised (introduced) species.

3.5.2 Conservation significant fauna

Searches of the EPBC Act PMST and *NatureMap* database identified the presence/potential presence of 52 conservation significance fauna within the study area. This total does not include those species that are exclusively marine as no marine habitat is present within the project area. The desktop searches recorded:

- Eighteen species listed as Threatened under the EPBC Act and/or the BC Act
- One species listed as Threatened under the EPBC Act and as Priority 3 by DBCA
- Twenty seven species listed as migratory under the EPBC Act and/or the BC Act
- One species listed as Specially protected species (Other specially protected fauna) under the BC Act
- Five species listed as Priority by DBCA.

4. Field survey results

4.1 Vegetation

4.1.1 Vegetation types


Nine vegetation types were identified and described for the survey area, as well as cleared and/or highly degraded areas (total cleared 14.81 ha). The survey area is predominantly located along an existing power line corridor and adjacent access tracks.



The vegetation within the survey area primarily consists of hummock grasslands of *Triodia epactia* and *T. wiseana* with scattered to open shrublands dominated by *Acacia*, *Hakea*, *Grevillea* and *Senna* species on rocky sandy loam plains and low undulating rocky rises and slopes. Minor drainage lines which dissect the plain and rocky slopes are lined by *Corymbia hamersleyana* with the occasional *Eucalyptus camaldulensis*. The clay flats associated with the salt flats adjacent to Burrup Road are dominated by an open hummock grasslands of *Triodia angusta* and scattered chenopod shrubs.



Vegetation type VT_5 is considered representative of riparian vegetation.



A description of the vegetation types mapped across the survey area is provided in Table 8 and mapped in Figure 7, Appendix A.



Table 8 Vegetation types recorded within the survey area

Vegetation type code	Vegetation type description	Sample locations and extent (ha)	Photograph
VT_1	<p><i>Acacia inaequilatera</i>, <i>Acacia bivenosa</i> and <i>Hakea lorea</i> subsp. <i>lorea</i> open shrubland over <i>Eremophila longifolia</i>, <i>Senna glutinosa</i> subsp. <i>pruinosa</i> and <i>Solanum lasiophyllum</i> sparse shrubland over <i>Cymbopogon ambiguus</i> open tussock grassland over <i>Triodia wiseana</i> and <i>Triodia epactia</i> hummock grassland over <i>Fimbristylis ?dichotoma</i> and <i>Bulbostylis barbata</i> scattered forbs on low undulating rocky rises and slopes. Other associated species include <i>Acacia stellaticeps</i>.</p>	<p>KAR_01, KAR_02, KAR_03, KAR_05, KAR_06</p> <p>Area: 5.91 ha</p>	

Vegetation type code	Vegetation type description	Sample locations and extent (ha)	Photograph
VT_2	<p><i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Acacia bivenosa</i> open shrubland over <i>Acacia arida</i>, <i>Senna glutinosa</i> subsp. <i>pruinosa</i> and <i>Indigofera monophylla</i> sparse shrubland over <i>Triodia wiseana</i> hummock grassland on rocky hill and slopes. Other associated species include <i>Acacia stellaticeps</i>, <i>Scaevola spinescens</i>, <i>Acacia maitlandii</i> and <i>Triumfetta clementii</i>.</p>	<p>KAR_07, KAR_08, KAR_21</p> <p>Area: 2.95 ha</p>	
VT_3	<p><i>Acacia xiphophylla</i> open shrubland over <i>Rhagodia preissii</i>, <i>Hibiscus sturtii</i> var. <i>?platyklamys</i> and <i>Gossypium australe</i> sparse shrubland over <i>Triodia wiseana</i> and <i>Triodia epactia</i> open hummock grassland and <i>*Cenchrus ciliaris</i> sparse tussock grassland.</p>	<p>KAR_04</p> <p>Area: 0.55 ha</p>	

Vegetation type code	Vegetation type description	Sample locations and extent (ha)	Photograph
VT_4	<p><i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>, <i>Hakea lorea</i> subsp. <i>lorea</i>, <i>Acacia inaequilatera</i> and <i>Ehretia saligna</i> var. <i>saligna</i> open shrubland over <i>Solanum lasiophyllum</i>, <i>Diplopeltis eriocarpa</i> and <i>Solanum lasiophyllum</i> scattered shrubs over <i>Triodia epactia</i> sparse hummock grassland on flat rocky sandy loam plains near rock piles. Associated species include <i>Indigofera monophylla</i>, <i>Triumfetta propinqua</i>, <i>Acacia orthocarpa</i>, <i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i> and <i>Acacia amplexiceps</i>.</p>	<p>KAR_09, KAR_14, KAR_23 Area: 9.01 ha</p>	
VT_5	<p><i>Eucalyptus camaldulensis</i> and <i>Corymbia hamersleyana</i> open woodland over <i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>, <i>Acacia sericophylla</i>, <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> open shrubland over <i>Triodia epactia</i> and <i>Triodia wiseana</i> hummock grassland and *<i>Cenchrus ciliaris</i> tussock grassland on minor drainage lines.</p>	<p>KAR_24 Area: 0.26 ha</p>	

Vegetation type code	Vegetation type description	Sample locations and extent (ha)	Photograph
VT_6	<p><i>Terminalia circumalata</i> and <i>Brachychiton acuminatus</i> scattered low trees over <i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>, <i>Flueggea virosa</i> subsp. <i>melanthesoides</i> and <i>Senna artemisioides</i> scattered shrubs over <i>Triodia epactia</i> open hummock grassland over <i>Cymbopogon ambiguus</i> and *<i>Cenchrus ciliaris</i> open tussock grassland and <i>Tinospora smilacina</i> and <i>Ipomoea costata</i> open vineland on rock piles. Associated species include <i>Rhynchosia bungarensis</i> (P4).</p> <p>Priority 1 PEC Burrup Peninsula rock pile communities.</p>	<p>KAR_11, KAR_12, KAR_13, KAR_15, KAR_16</p> <p>Area: 0.53 ha</p>	
VT_7	<p><i>Triodia angusta</i> open hummock grassland and *<i>Cenchrus ciliaris</i> open tussock grassland over <i>Tecticornia ?indica</i> subsp. <i>leiostachya</i>, <i>Tecticornia ?pterygosperma</i> and <i>Sclerolaena diacantha</i> open chenopod shrubland on saline flats with some rock outcrop.</p>	<p>KAR_22</p> <p>Area: 0.53 ha</p>	

Vegetation type code	Vegetation type description	Sample locations and extent (ha)	Photograph
VT_8	<p><i>Acacia bivenosa</i>, <i>Acacia synchronicia</i> and <i>Acacia ancistrocarpa</i> open shrubland over <i>Triodia wiseana</i> open hummock grassland and *<i>Cenchrus ciliaris</i> sparse tussock grasses on disturbed sandy loam plains.</p>	<p>KAR_18, KAR_19</p> <p>Area: 3.08 ha</p>	
VT_9	<p><i>Acacia pyrifolia</i> var. <i>pyrifolia</i> scattered shrubs over <i>Eragrostis xerophila</i>, <i>Chrysopogon fallax</i> and <i>Eriachne benthamii</i> open tussock grassland and <i>Triodia epactia</i> isolated hummock grassland on deep cracking gilgai clay plains. Associated species include <i>Dactyloctenium radulans</i>, *<i>Cenchrus setiger</i>, <i>Corchorus incanus</i> subsp. <i>incanus</i>, <i>Operculina aequisejala</i> and <i>Phyllanthus maderaspatensis</i>.</p> <p>Priority 3 Horseflat land systems of the Roebourne Plains</p>	<p>KAR_20</p> <p>Area: 1.72 ha</p>	

4.1.2 Conservation significant ecological communities

There are no TECs present within the survey area. The field assessment did identify the presence of two PECs within the survey area:

- Burrup Peninsula rock pile communities (Priority 1)
- Horseflat land system of the Roebourne Plains (Priority 3).

PEC Community mapping is provided in Figure 8, Appendix A.

The 'Burrup Peninsula rock pile communities' are pockets of vegetation in the rock piles and outcrops. The rock piles are important for providing fire and revolutionary refuge for flora (Kendrick and Stanley 2001). The rock pocket communities vary from open *Cymbopogon ambiguus* assemblages with *Ptilotus obovatus* and few small forbs and grasses on otherwise bare calcrete, through to *Triodia* sub shrub communities, to dense shrub/tree communities with *Flueggea virosa* subsp. *melanthesoides*, *Phyllanthus ciccoides*, small spreading trees of *Ficus brachypoda*, *Brachychiton acuminatus*, *Pittosporum phylliraeoides* and *Terminalia supranitifolia* often as large trees and sometimes in numbers (DEC 2009).

Vegetation type 6 (VT_6) is considered to be representative of the Burrup Peninsula rock pile communities PEC. This vegetation type includes scattered low trees of *Brachychiton acuminatus*, *Terminalia circumalata*, *Ficus aculeata* var. *indecora* and *Flueggea virosa* subsp. *melanthesoides*, scattered patches of *Cymbopogon ambiguus* tussock grasses and *Tinospora smilacina* and *Ipomoea costata* vines on rock piles. There is approximately 0.53 ha of this PEC occurring within the survey area of which all is in Very Good condition.

The Horseflat Land System of the Roebourne Plains are extensive, weakly gilgaied clay plains dominated by tussock grasslands on mostly alluvial non-gilgaied, red clay loams or heavy clay loams. Perennial tussock grasses include *Eragrostis xerophila* and other *Eragrostis* spp., *Eriachne* spp. and *Dichanthium* spp. The community also supports a suite of annual grasses including Sorghum spp. and rare *Astrelba* spp (DBCA 2019).

Vegetation type 9 (VT_09) is considered to be representative of the Horseflat land system of the Roebourne Plains PEC. Vegetation type 9 is situated on the Horseflat land system and is dominated by an *Eragrostis xerophila*, *Chrysopogon fallax* and *Eriachne benthamii* open tussock grassland on deep cracking gilgai clay plains. Associated species include *Dactyloctenium radulans*, **Cenchrus setiger*, *Corchorus incanus* subsp. *incanus*, *Operculina aequisejala* and *Phyllanthus maderaspatensis*. There is approximately 1.72 ha of this PEC occurring within the survey area which ranged from Poor to Good condition.

4.1.3 Vegetation condition

The vegetation condition throughout the survey area was generally consistent, with the majority of the survey area determined to be in Very Good to Good condition. The exceptions were areas which had been previously cleared or disturbed such as roads and access tracks, roadsides, and along the existing pipelines and power lines, where the weed species **Cenchrus ciliaris* (Buffel grass) and **Aerva javanica* (Kapok bush) were more common. Fire has also had an impact on the structure and condition of the vegetation throughout the survey area.

The extent of the vegetation condition mapped within the survey area is provided in Table 9 and mapped in Figure 7, Appendix A.

Table 9 Extent of vegetation condition mapped within the survey area

Vegetation Condition (EPA 2016a)	Extent mapped (ha)
Very Good	10.30 ha
Good	7.31 ha
Poor	4.55 ha
Degraded	1.14 ha
Completely Degraded	1.23 ha
Cleared	14.81 ha

4.2 Flora

4.2.1 Flora diversity

The survey recorded a total of 133 flora taxa (including subspecies and varieties) representing 35 families and 81 genera within the survey area. This total comprised of 130 native taxa and three introduced taxa, **Cenchrus ciliaris* (Buffel grass), **Aerva javanica* (Kapok), and **Vachellia farnesiana* (Mimosa bush).

Buffel grass and Kapok have been rated as having 'high' potential ecological impact under the invasive plant prioritisation process. Buffel grass significantly alters environmental conditions when invading new habitats as it reduces soil fertility, increases soil erosion (which increases surface run-off) and creates unstable watersheds with degraded water quality. It also exudes chemicals that are toxic to other plants (DEC 2013). Buffel grass is most common in disturbed areas such as vehicle tracks, roadsides and other previously cleared areas. Mimosa bush was present in the northern section of the survey area along the existing pipeline on the rocky slopes and drainage areas.

The list of flora recorded within the survey area is provided in Appendix D.

4.2.2 Conservation significant flora

No threatened flora species listed under the EPBC Act and/or BC Act was recorded within the survey area. One Priority species listed by the DBCA was recorded within the survey area, *Rhynchosia bungarensis* (Priority 4).

The location of priority flora recorded within the survey area is provided in Appendix D and mapped on Figure 9, Appendix A.

Rhynchosia bungarensis

Rhynchosia bungarensis (Plate 1) is listed Priority 4 and is a compact, prostrate shrub, to 0.5 m high with yellow flowers. It is known to occur on pebbly, shingly coarse sand amongst boulders and banks of flow line in the mouth of a gully wall (Western Australian Herbarium 1998–). According to *NatureMap* there are 110 records of this species, with a large number of records concentrated on the Burrup Peninsula.

A total of 48 plants from 14 locations were recorded in the survey area. This species was typically recorded along the bases of rockpiles on the Burrup Peninsula.



Plate 1 *Rhynchosia bungarensis*

Likelihood of occurrence

A likelihood of occurrence assessment was conducted post-field survey for all conservation significant flora taxa identified in the desktop assessment based on the desktop searches (provided in Appendix C). This assessment took into account previous records, habitat requirements, efficacy of the survey, intensity of the survey, flowering times and the cryptic nature of the species (Appendix D).

The likelihood of occurrence assessment post-field survey concluded that one species was present (*Rhynchosia bungarensis*) and the remaining priority flora are considered unlikely to occur within the survey area.



4.3 Fauna

4.3.1 Fauna habitat

Six broad fauna habitat types have been identified within the survey area. These habitat types closely align with the vegetation types described in section 4.1.1. The topography of the survey area is generally flat plains to low undulating rises with some rocky outcropping in the southern section of the survey area. The habitat types of the northern section of the survey area ranges from gilgai grasslands and mixed *Acacia* shrublands on sandy loam plains on the mainland, saline flats which extend between the mainland and the Burrup Peninsula and low undulating rocky hills, rock piles and drainage areas on the Burrup Peninsula.

The habitat types recorded in the survey area are described in Table 10.

Table 10 Habitat types within the survey area

Fauna habitat	Representative photograph
<p>Rocky plains and low rises</p> <p>This habitat type is associated with stony/rocky plains and low undulating rises and consists of scattered shrubs of <i>Acacia</i>, <i>Grevillea</i>, <i>Hakea</i> and <i>Senna</i> species over a <i>Triodia</i> hummock grassland.</p> <p>The hummock grasslands provides refuge for reptiles (such as snakes, skinks, goannas and dragons) and small mammals and ground dwelling birds. The open shrublands provide refuge and a food source for native birds. Rocky outcrops contain small crevices which provide refuge for reptile species and small mammals. The majority of the habitat was well connected with some minor clearing as a result of access tracks and existing powerlines.</p> <p>This habitat type aligns with VT_1, VT_2, VT_3, VT_4</p>	
<p>Minor drainage lines</p> <p>The minor drainage lines are dominated by open woodlands of <i>Corymbia hamersleyana</i> and the occasional <i>Eucalyptus camaldulensis</i>. Mixed <i>Acacia</i> shrublands dominated the mid layer over an open hummock and tussock grassland of <i>Triodia</i> species and *<i>Cenchrus ciliaris</i>. The drainage areas within the survey area on the Burrup Peninsula are very broad and not well defined.</p> <p>Creeklines are considered to be important ecological corridors to other broader habitats within the local area and provide a source of water during periods of heavy rainfall. Trees and shrubs provide shelter and food resources to a number of native fauna species, in particular birds.</p> <p>This habitat type aligns with VT_5</p>	

Fauna habitat

Rock piles

The rock pile habitat is found on hill tops on the Burrup Peninsula. The rock crevices and over hangs provide shelter for fauna species in particular the Pilbara olive python (Vulnerable), Northern Quoll (Endangered) and rock-wallabies. The scattered trees (*Brachychiton* and *Terminalia* species) provide food resources and refuge for a number of fauna species, particularly birds.

This habitat type aligns with VT_6

Representative photograph



Saline flats

The saline flats consists of the salt pans and the adjacent low chenopod shrubland/low open hummock grassland on sandy clay flats. The vegetation is low and sparse with large bare areas of sandy clay and rocky outcrops. This habitat type may provide suitable foraging habitat for a range of migratory waders. The causeway and adjacent salt works link the mainland to the Burrup Peninsula. The salt ponds along the causeway are man-made and do not support native vegetation

This habitat type aligns with VT_7



Fauna habitat

Sandy loam plains

This habitat type occurs on the mainland adjacent to Dampier Highway. The vegetation is dominated by open shrublands of *Acacia* species over a sparse hummock and tussock grassland of *Triodia wiseana* and **Cenchrus ciliaris*. This habitat type has been disturbed and generally in poor condition as a result of adjacent land uses and previous clearing. The ground cover is generally sparse and provides limited habitat for reptiles and small mammals. The *Acacia* shrublands provide suitable habitat for a number of bird species.

This habitat type aligns with VT_8

Representative photograph



Gilgai grassland

The gilgai grassland habitat type consists of a low open tussock grassland of *Eragrostis xerophila* grassland with isolated patches of *Triodia epactia* on deep cracking gilgai clay plains. The area has been subject to varying degrees of degradation from historical clearing in adjacent areas and weed invasion.

The gilgai grassland provides suitable habitat for the Short-tailed mouse (Priority 4) who favours cracking clay and adjacent habitats.

This habitat type aligns with VT_9



4.3.2 Habitat corridors and linkages

The habitat types within the survey area is well connected and part of a largely contiguous landscape. The fauna habitats of the survey area are part of a much larger area of similar habitats within the local area and surrounding region. The vegetation within the northern section of the survey area is connected to the Murujuga National Park (located on the Burrup Peninsula). Main roads, including Madigan Road and the Dampier Highway, the man-made salt pans between the mainland and the peninsula as well as industrial and urban development around Karratha are existing barriers to fauna moving east-west and north-south through the landscape, particularly for mammal and reptiles species.

4.3.3 Diversity

A total of 77 fauna species, including 50 birds, 13 mammals and 14 reptiles were recorded during the survey. Of these three species are introduced: black rat, dog and feral cat. All fauna species recorded during the survey are generally common and are known to occur in the area.

A full list of fauna recorded during the survey is provided in Appendix E.

4.3.4 Conservation significant fauna

No Threatened or priority fauna species or evidence of their presence was recorded in the survey area during the field assessment.

Likelihood of occurrence

A likelihood of occurrence assessment was conducted post-field survey for conservation significant fauna identified in the desktop assessment. This assessment was based on species biology, habitat requirements, the quality and availability of suitable habitat, and local occurrence (Appendix E).

The likelihood of occurrence assessment concluded six species are likely to occur and the remaining species are considered unlikely or highly unlikely to occur within the survey area. Species identified as likely to occur are listed in Table 11.

Table 11 Conservation significant fauna likely to occur in the survey area

Species	EPBC Act	BC Act/ DBCA	Likelihood of occurrence
Peregrine Falcon (<i>Falco peregrinus</i>)		OS	Likely –The habitats present within the survey area represents suitable foraging habitat, however lacks suitable breeding habitat. Therefore likely to occur at least on an occasional basis.
Osprey (<i>Pandion haliaetus</i>)	Mi	Mi	Likely –The survey area is situated near the coastline. This species is likely to fly over, and opportunistically utilise portions of the habitat.
Northern Quoll (<i>Dasyurus hallucatus</i>)	En	En	Likely – Known to occur locally. The rocky areas provide suitable habitat however no evidence of their presence was observed during the survey.
Water-rat (<i>Hydromys chrysogaster</i>)		P4	Likely – Known to occur on the Burrup Peninsula however not on the mainland. The habitat within the survey area is considered marginally suitable.
Pilbara Olive Python (<i>Liasis olivaceus</i> subsp. <i>barroni</i>)	Vu	Vu	Likely - Species known to occur locally and rocky habitat within survey area is considered suitable habitat however there are no permanent pools within the survey area.

Species	EPBC Act	BC Act/ DBCA	Likelihood of occurrence
Lined soil-crevice skink (Dampier) (<i>Notoscincus butleri</i>)		P4	Likely – Species known to occur locally (West Intercourse Island and less than 2 km south of Karratha). The rocky habitat within the survey area is considered suitable habitat however there are no major creeks or rivers within the survey area.

The likelihood of occurrence assessment identified other fauna species of conservation significance could occasionally occur within the habitats of the survey area (e.g. species deemed unlikely). However, it is considered unlikely the survey area provides important habitat (e.g. breeding habitat or key foraging habitat) for any of these species and that these other species may occasional use the habitats of the survey area for temporary refuge and dispersal between other areas of habitat.

No species of conservation significance are likely to be solely dependent on the habitats present within the survey area.

5. **Assessment of vegetation clearing**

The clearing of vegetation in Western Australia is regulated by DWER and requires a permit under Part V of the EP Act, except when a project is assessed under Schedule 6 of the Act or is prescribed by regulation in the *Environmental Protection (Clearing Native Vegetation) Regulations 2004* and not in an ESA.

When preparing a native vegetation clearing application, an assessment of the proposed project clearing against the Ten Clearing Principles should be undertaken to inform this process. The Ten Clearing Principles aim to ensure potential impacts resulting from removal of native vegetation can be assessed in an integrated way.

An assessment of the proposed native vegetation clearing within the survey area against the Ten Clearing Principles was undertaken (Table 12). This assessment concluded the proposed clearing associated with the survey area may be at variance to Principles (g) and (j).

Table 12 Assessment of survey area against the ten clearing principles

Principle	Assessment	Outcome	Reference
<p>(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.</p>	<p>The survey area is situated within the Pilbara IBRA bioregion and the Roebourne subregion. The flora of the Roebourne subregion is diverse with 992 native vascular flora taxa recorded.</p> <p>A search of the NatureMap database identified 606 flora taxa, representing 66 families and 223 genera previously recorded within 20 km of the project area. This total comprised 569 native flora taxa and 37 naturalised (introduced) flora taxa. The flora survey recorded a total of 133 flora taxa (including three introduced species) representing 35 families and 81 genera within the survey area.</p> <p>Searches of the EPBC Act PMST, <i>NatureMap</i> database and DBCA TPFL and WAHERB databases identified the presence/potential presence of 12 conservation significance flora taxa within a 20 km buffer of the survey area. No threatened flora species listed under the EPBC Act and/or BC Act was recorded within the survey area. One priority 4 species, <i>Rhynchosia bungarensis</i>, was recorded along the base of rock piles on the Burrup Peninsula. A total of 48 plants from 14 locations were recorded. <i>Rhynchosia bungarensis</i> is well represented on a local scale on the Burrup Peninsula however is less represented elsewhere in the Pilbara region. A likelihood of occurrence assessment was conducted post-field survey for all conservation significant flora taxa identified in the desktop assessment. The assessment concluded that no further threatened or priority flora are considered likely to occur within the survey area.</p> <p>The survey area intersects native vegetation which provides fauna habitat. The habitat types present within the survey area are well represented in the local and regional area. A search of the <i>NatureMap</i> database identified 694 fauna species (including 12 naturalised/ introduced species) previously recorded within 20 km of the survey area. This total comprised 207 birds, four amphibians, 104 reptiles, 212 invertebrates, 42 mammals and 125 fish. The fauna survey</p>	<p>The proposed clearing is unlikely to be at variance to this principle.</p>	<p>Beard (1975) DBCA (2007–) DBCA TPFL and WAHerb databases DEE (2019a) GHD field survey GoWA (2019a)</p>

Principle	Assessment	Outcome	Reference
	<p>identified a total of 77 fauna species, including 50 birds, 13 mammals and 14 reptiles from the survey area.</p> <p>Searches of the EPBC Act PMST and <i>NatureMap</i> database identified the presence/potential presence of 52 conservation significant fauna within a 20 km buffer of the survey area. This total does not include those species that are exclusively marine as no suitable marine habitat is present within the survey area. No Threatened or priority fauna species or evidence of their presence was recorded during the fauna assessment. A likelihood of occurrence assessment was conducted post-field survey for all conservation significant fauna species identified in the desktop assessment which concluded six species are likely to occur within the survey area.</p> <p>The presence of two PECs were identified within the survey area. Vegetation type 6 (VT_6) is considered to be representative of the Burrup Peninsula rock pile communities PEC (Priority 1). There is approximately 0.53 ha of this PEC occurring within the survey area of which all is in Very Good condition. Vegetation type 9 (VT_09) is considered to be representative of the Horseflat land system of the Roebourne Plains PEC (Priority 3). There is approximately 1.72 ha of this PEC occurring within the survey area which ranged from Poor to Good condition.</p> <p>The project will result in vegetation and habitat loss through direct clearing of native vegetation. Clearing will largely occur along an existing transmission line. Whilst the project will further fragment fauna habitat, it is unlikely to have a significant impact on local and regional linkages given its location to existing infrastructure and the extent of native vegetation in local and regional areas. The proposed clearing for linear infrastructure is unlikely to impact on the conservation status of conservation significant flora and fauna. The project footprint is unlikely to comprise greater biological diversity than the surrounding areas.</p>		

Principle	Assessment	Outcome	Reference
<p>(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.</p>	<p>Six broad fauna habitat types have been identified within the survey area including rocky plains and low rises, minor drainage lines, rock piles, saline flats, sandy loam plains and gilgai grasslands.</p> <p>Searches of the EPBC Act PMST and NatureMap database identified the presence/potential presence of 52 conservation significant fauna within a 20 km buffer of the survey area. This total does not include those species that are exclusively marine as no marine habitat is present within the survey area. The results identified:</p> <ul style="list-style-type: none"> • 18 species listed as Threatened under the EPBC Act and/or BC Act • One species listed as Threatened under the EPBC Act and as Priority 3 by DBCA • 27 species listed as Migratory under the EPBC Act and/or BC Act, • Five species listed as Priority by the DBCA • One species listed as Specially protected species under the BC Act. <p>The fauna assessment identified a total of 77 fauna species, including 50 birds, 13 mammals and 14 reptiles within the survey area. No Threatened or priority fauna species or evidence of their presence was recorded in the survey area during the field assessment. A likelihood of occurrence assessment was conducted post-field survey for all conservation significant fauna species identified in the desktop assessment which concluded six species are likely to occur within the survey area. Suitable habitat for these species is present within the survey area however no evidence of their presence was observed during the survey.</p> <p>The project area is unlikely to support fauna habitat that is in better condition than the surrounding available habitat. Furthermore, the project footprint is not likely to comprise of significant habitat for indigenous fauna.</p>	<p>The proposed clearing is unlikely to be at variance to this principle.</p>	<p>DBCA (2007–) DEE (2019a) GHD field survey GoWA (2019a)</p>

Principle	Assessment	Outcome	Reference
(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	<p>No EPBC Act and/or BC Act listed flora have been identified within 20 km of the project area.</p> <p>The survey area is not likely to include or be necessary for the continued existence of rare/threatened flora.</p>	The proposed clearing is unlikely to be at variance to this principle.	<p>DBCA TPFL and WAHERB databases</p> <p>DBCA (2007–)</p> <p>DEE (2019a)</p> <p>GHD field survey</p>
(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.	<p>Searches of the EPBC Act PMST and the DBCA TEC databases identified no TECs within 20 km of the survey area. No TECs were identified during the flora and vegetation survey.</p>	The proposed clearing is unlikely to be at variance to this principle.	<p>DBCA TEC/PEC database</p> <p>DEE (2019a)</p> <p>GHD field survey</p>
(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	<p>The survey area is located within the Pilbara bioregion and Roebourne subregion as described by the IBRA. Broad scale (1:250,000) pre-European vegetation mapping of the area was completed by Beard (1975) at an association level. The mapping indicates that four vegetation associations are present within the survey area:</p> <ul style="list-style-type: none"> • Hummock grasslands, grass steppe; soft spinifex (association 117) • Bare areas; mudflats (association 127) • Mosaic: Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex (association 589) • Hummock grasslands, grass steppe; hard spinifex, <i>Triodia wiseana</i> (association 157) <p>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</p>	The proposed clearing is unlikely to be at variance to this principle.	<p>Beard (1975)</p> <p>Shepherd et al. (2002)</p> <p>GoWA (2019a, b)</p>

Principle	Assessment	Outcome	Reference
	<p>2019b). The current extents remaining of all vegetation associations are greater than 77 % of their calculated pre European extents at all scales (e.g. State, IBRA bioregion, IBRA subregion and Local Government Area (LGA) levels).</p> <p>Given the vegetation extents remaining, the survey area is not located within an area that has been extensively cleared.</p>		
(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	<p>The survey area does not intersect any significant drainage lines or wetlands. The survey area does intersect a couple of minor/broad ephemeral drainage lines, however, these are associated with infrequent surface water caused by sporadic weather events like seasonal cyclones.</p> <p>The northern part of the survey area is adjacent to evaporation ponds. These ponds are man-made and do not support native vegetation. The project area is unlikely to support vegetation that grows in association with a watercourse or wetlands.</p>	The proposed clearing is unlikely to be at variance to this principle.	GHD field survey GoWA (2019a)
(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	<p>The soils of the survey area comprise tidal soils with some calcareous loamy earths, salt lake soils and red/brown non-cracking clays. Land system mapping indicates the Granitic and Ruth Systems, and tidal flat areas of the Littorial Systems are not susceptible to erosion, however, the Cheerawarra and Horseflat Systems are moderately to highly susceptible to erosion.</p> <p>The City of Karratha Water Management Plan (Essential Environmental 2016) indicates that the City has issues with erosion from seasonal floors removing the red dirt. The removal of vegetation may increase the risk of wind and water erosion, particularly during the wet season.</p> <p>A review of the ASS risk mapping indicates that the survey area is located within an area that has a high to moderate, and moderate to low probability of occurrence of ASS. Undisturbed ASS do not pose a risk, and only become an issue where excavation occurs. Measures</p>	The proposed clearing may be at variance to this principle.	GoWA (2019a)

Principle	Assessment	Outcome	Reference
	may need to be implemented to ensure that ASS is not exposed during construction.		
(h) 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.	<p>The survey area does not intersect any conservation areas. The closest conservation area is Murujuga National Park which is located approximately 250 m east of the survey area, on the Burrup Peninsula.</p> <p>The project will not directly impact on any conservation areas. It is anticipated that standard management practices will be implemented during construction to mitigate aspects that have the potential to cause indirect impacts on nearby conservation areas, such as contamination through hydrocarbon spills and weed spread.</p>	The proposed clearing is unlikely to be at variance to this principle.	DEE (2019) GoWA (2019a)
(i) 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.	<p>The survey area does not intersect any significant drainage lines. The survey area intersects a couple of minor/broad ephemeral drainage lines, however, these are likely to be associated with infrequent surface water caused by sporadic weather events like seasonal cyclones. No Internationally (Ramsar) or Nationally Important Wetlands intersect the survey area.</p> <p>The survey area is located within the proclaimed Pilbara Groundwater Area and Pilbara Surface Water Area. It is considered unlikely that any clearing will significantly disturb or interrupt any natural drainage and surface run-off patterns. However, during heavy localised rainfall events erosion may occur in cleared areas leading to temporary soil erosion and/or sedimentation. These impacts are expected to be minimal and short-term. Furthermore, given the depth to groundwater it is considered unlikely that clearing will impact groundwater.</p> <p>It is anticipated that the surface water hydrology can be maintained in its current regime with appropriate drainage design.</p> <p>Given appropriate management measures are undertaken during the project, the proposed clearing is unlikely to cause deterioration in the quality of surface or underground water.</p>	The proposed clearing is unlikely to be at variance to this principle.	DEE (2019) GoWA (2019a)
(j) Native vegetation should not be cleared if the clearing of the vegetation is likely to	The survey area comprises tidal soils with some calcareous loamy earths, salt lake soils and red/brown non-cracking clays. Removal of vegetation in areas with clay soils may exacerbate the incidence or intensity of flooding or localised waterlogging.	The proposed clearing may be at variance to this principle.	BoM (2019)

Principle	Assessment	Outcome	Reference
cause, or exacerbate, the incidence or intensity of flooding.			Essential Environmental (2016)

6. References

Beard, JS 1975, *Vegetation Survey of Western Australia: Pilbara, map and explanatory memoir* 1:1,000,000 series, Nedlands, University of Western Australia Press.

Bureau of Meteorology (BoM) 2019, *Climate Data Online*, retrieved February and June 2019, from <http://www.bom.gov.au/climate/data/>

Christidis, L and Boles, WE 2008, *Systematics and Taxonomy of Australian Birds*, Melbourne, Australia, CSIRO Publishing.

Department of Biodiversity, Conservation and Attractions (DBCA) 2007–, *NatureMap: Mapping Western Australia's Biodiversity*, retrieved February 2019, from <http://naturemap.dpaw.wa.gov.au/default.aspx/>.

Department of Biodiversity, Conservation and Attractions (DBCA) 2019, *Priority Ecological Communities for Western Australia Version 28*. Species and Communities Program, DBCA, 17 January 2019.

Department of Environment and Conservation (DEC) 2013, *Murujuga National Park Management Plan 78*, Department of Environment and Conservation, Perth

Department of the Environment and Energy (DEE) 2019a, *Environmental Protection and Biodiversity Conservation Act 1999 Protected Matters Search Tool Results*, retrieved February 2019, from <http://www.environment.gov.au/epbc/pmst/index.html>.

Department of the Environment and Energy (DEE) 2019b, *Environment Protection and Biodiversity Act 1999 List of Threatened Flora*, retrieved June 2019, from <http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl?wanted=flora>.

Department of Water and Environment Regulation (DWER) 2019, *Water Information Reporting*, retrieved February 2019, from <http://wir.water.wa.gov.au/Pages/Water-Information-Reporting.aspx>.

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

Environmental Protection Authority (EPA) 2016b, *Technical Guide – Sampling for Terrestrial Vertebrate Fauna Surveys*, Perth, Environmental Protection Authority and the Department of Environment and Conservation.

Environmental Protection Authority (EPA) 2016c, *Technical Guidance, Terrestrial Fauna Surveys*, Perth, Environmental Protection Authority.

Essential Environment 2016, *City of Karratha Water Management Plan*, unpublished report prepared for the City of Karratha.

Government of Western Australia (GoWA) 2019a, *Data WA*, retrieved February and June 2019, from <https://data.wa.gov.au/>.

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

Kendrick, P & Stanley, F (2001). *Pilbara 4 (PIL4 – Roebourne synopsis), A biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002*.

Keighery, BJ 1994, *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*, Nedlands, Australia, Wildflower Society of Western Australia (Inc.).

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

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

Tille, P 2006, *Soil-landscapes of Western Australia's Rangelands and Arid Interior*, Resource Management Technical Report 313, Perth, Department of Agriculture and Food.

Van Vreeswyk, AME, Payne, AL, Leighton, KA and Hennig, P 2004, *An inventory and condition survey of the Pilbara region*, Technical Bulletin No. 92, Western Australia, South Perth, Department of Agriculture.

Western Australian (WA) Herbarium 1998–, *FloraBase—the Western Australian Flora*, Biodiversity, Conservation and Attractions, retrieved June 2019, from <http://florabase.dpaw.wa.gov.au/>.

Appendices

Appendix A – Figures

Figure 1 Project locality

Figure 2 Land use constraints

Figure 3 Hydrology constraints

Figure 4 Biological constraints

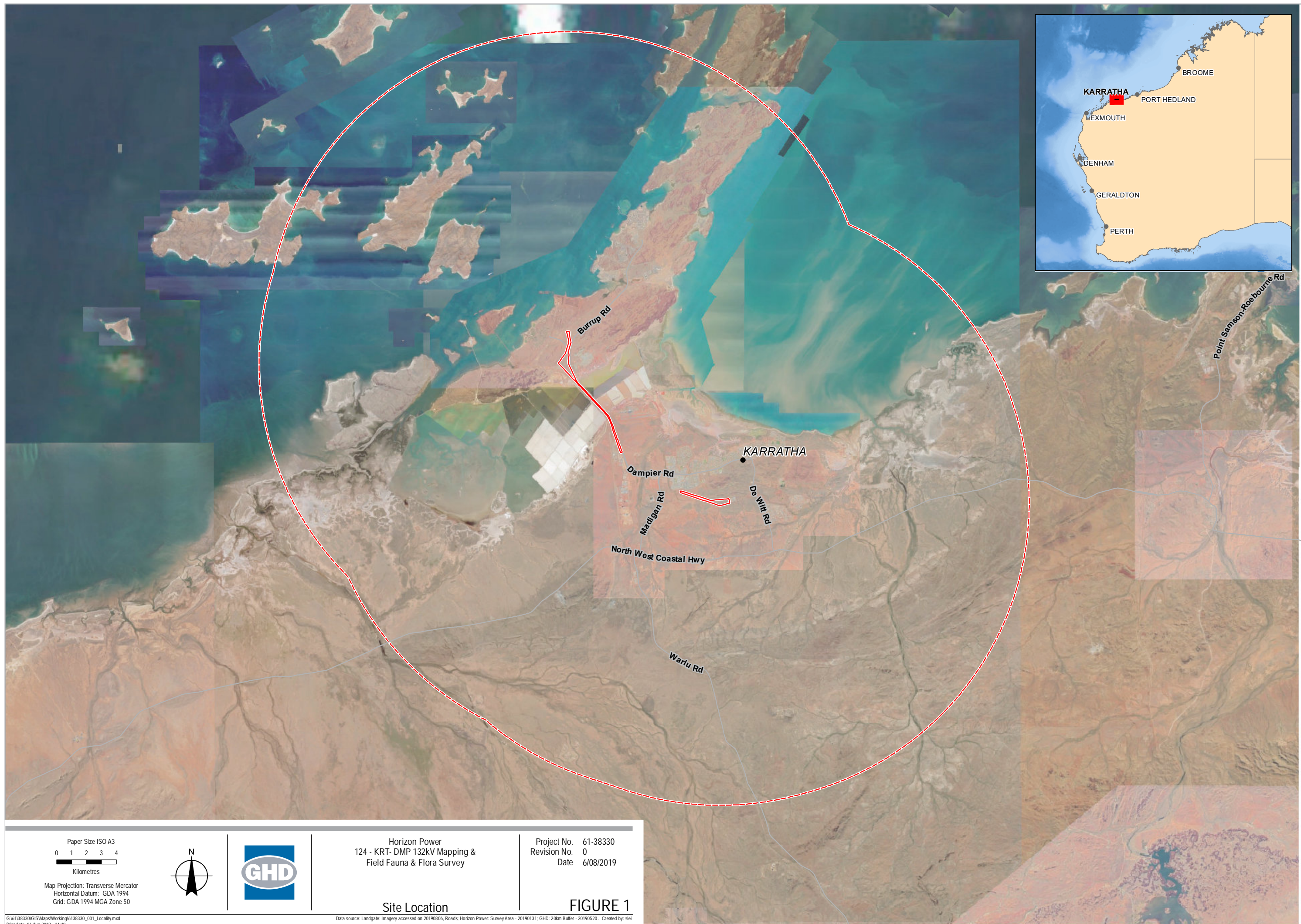
Figure 5 Survey Area location

Figure 6 Survey Sampling Effort

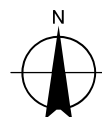
Figure 7 Vegetation Types and Condition

Figure 8 Priority Ecological Community Mapping

Figure 9 Conservation Significant Flora Records



Paper Size ISO A3
 0 1 2 3 4
 Kilometres



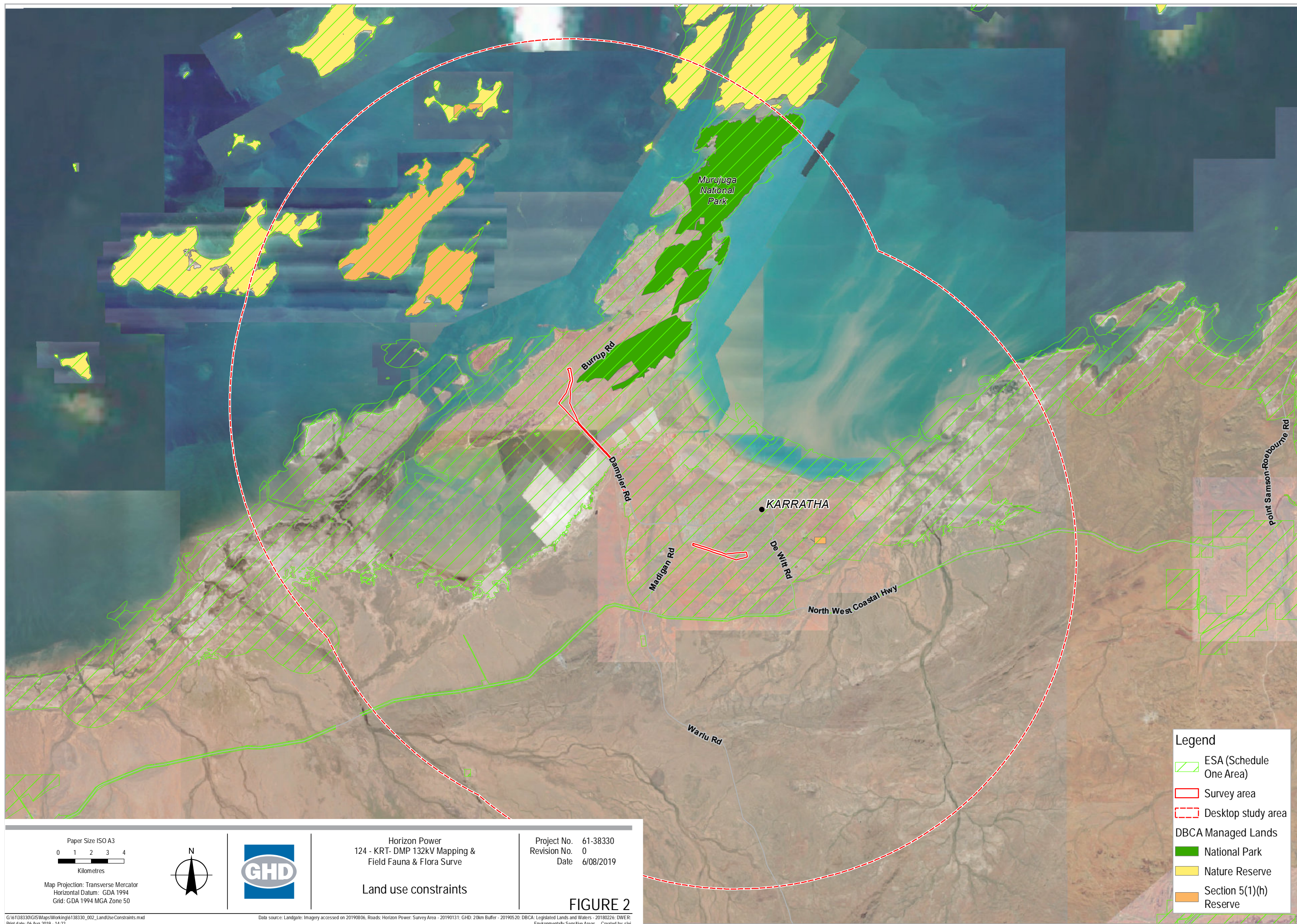
Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

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

Site Location

FIGURE 1



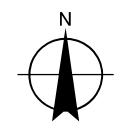
Legend

- ESA (Schedule One Area)
- Survey area
- Desktop study area

DBCAs Managed Lands

- National Park
- Nature Reserve
- Section 5(1)(h) Reserve

Paper Size ISO A3
 0 1 2 3 4
 Kilometres
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 50

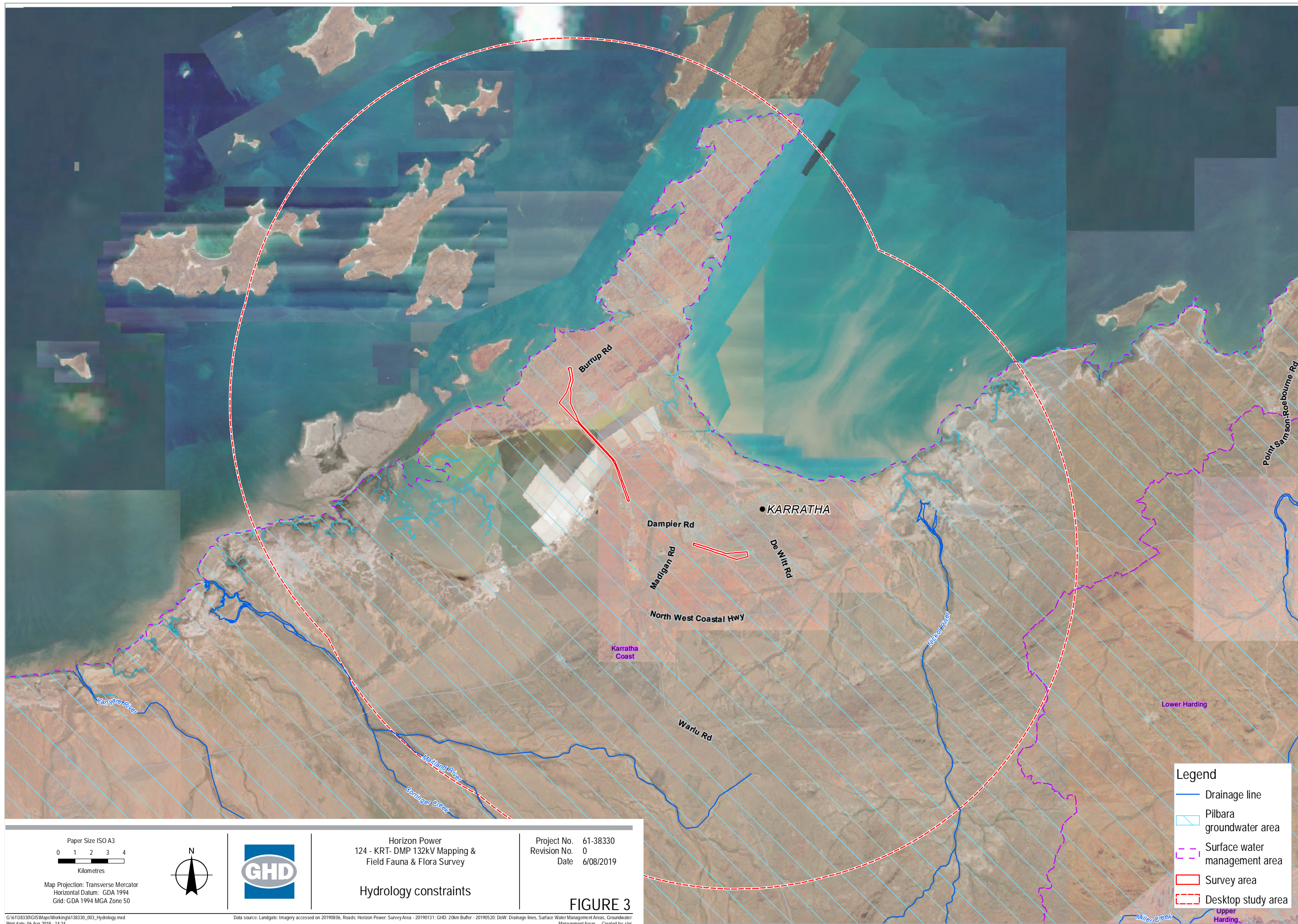


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Surve

 Land use constraints

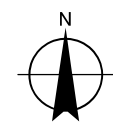
Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 2



- Legend**
- Drainage line
 - ▨ Pilbara groundwater area
 - - - Surface water management area
 - Survey area
 - - - Desktop study area

Paper Size ISO A3
 0 1 2 3 4
 Kilometres

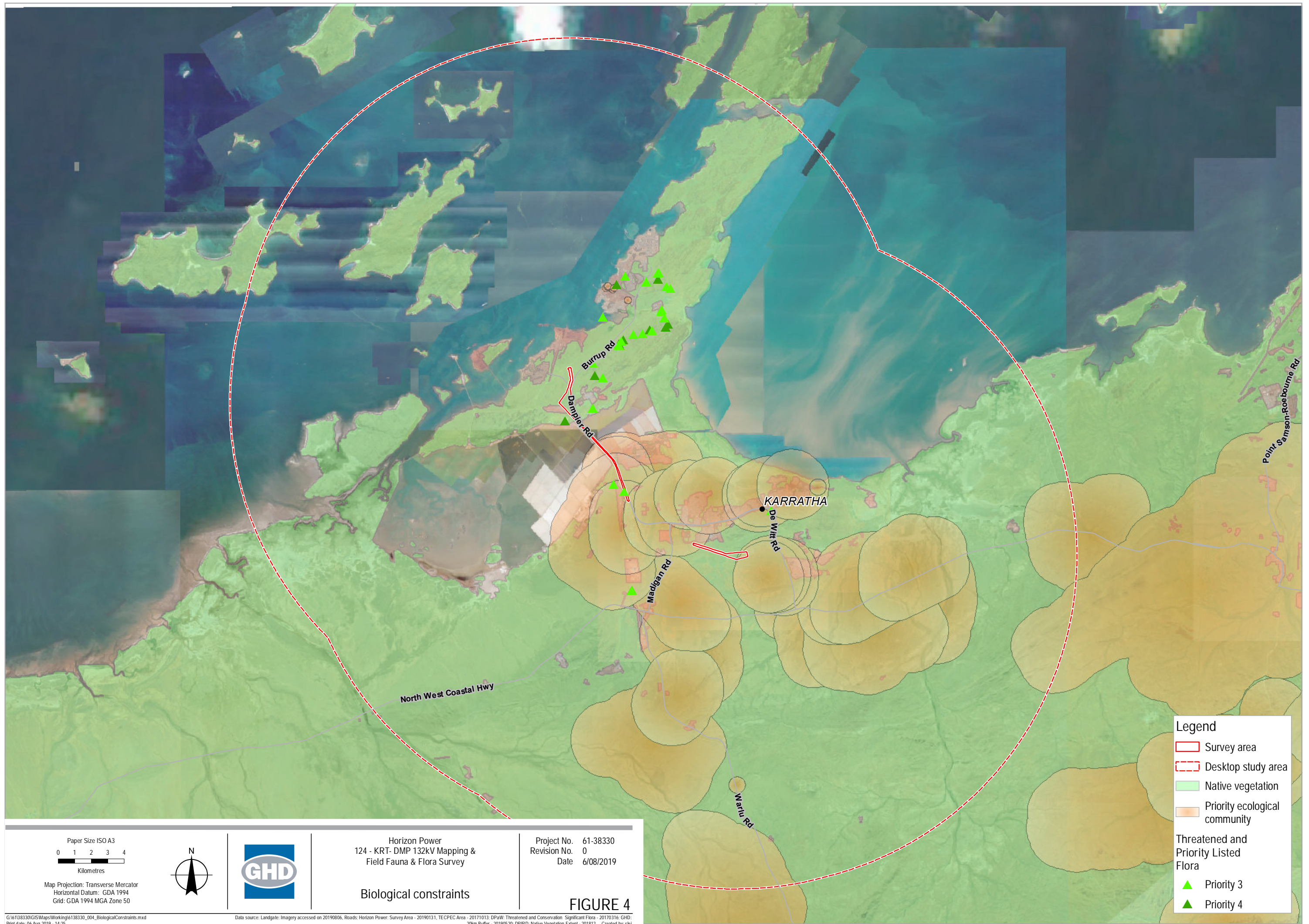


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

Hydrology constraints

FIGURE 3



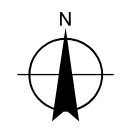
Legend

- Survey area
- Desktop study area
- Native vegetation
- Priority ecological community

Threatened and Priority Listed Flora

- ▲ Priority 3
- ▲ Priority 4

Paper Size ISO A3
 0 1 2 3 4
 Kilometres
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 50



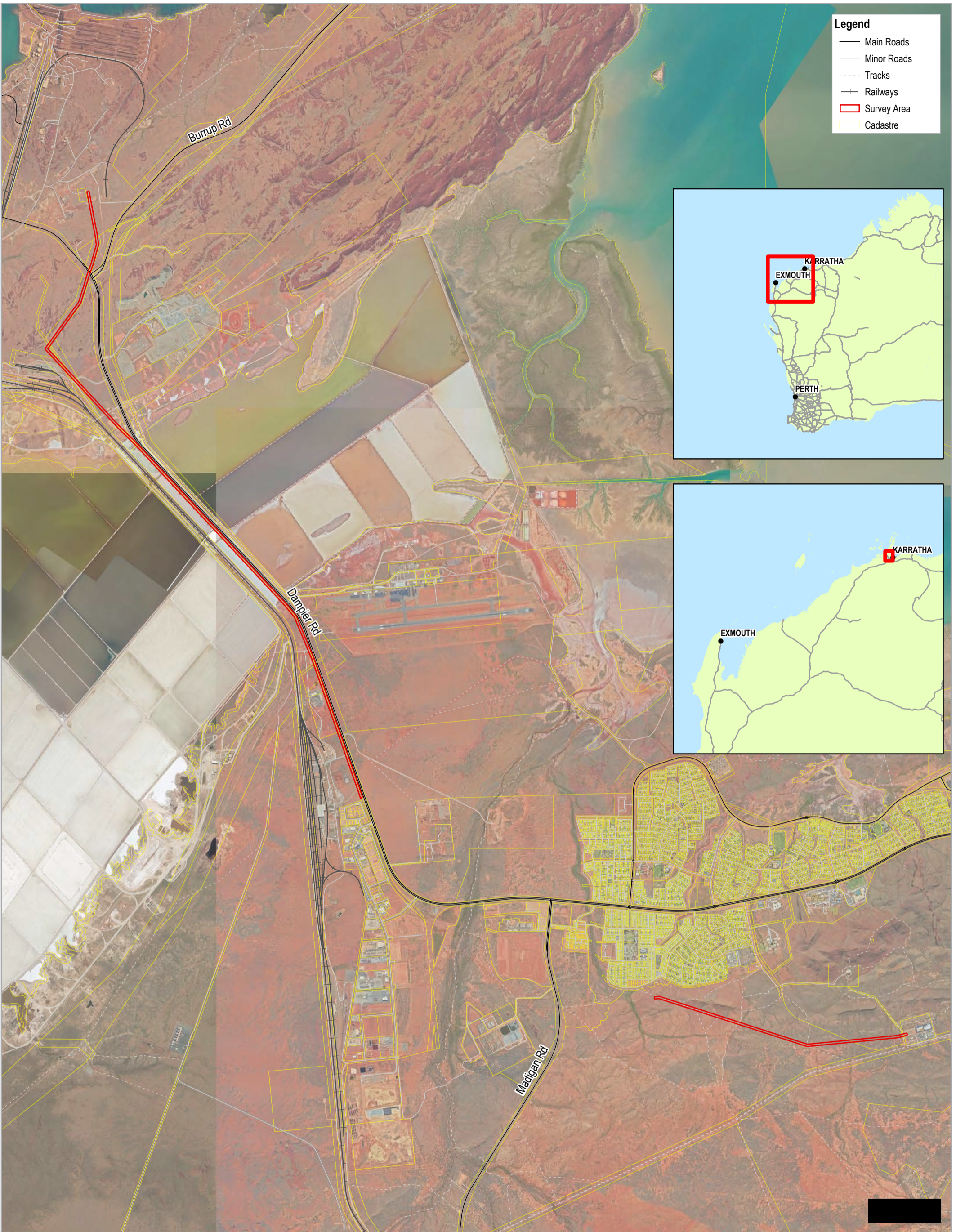
Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

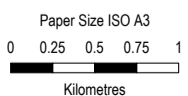
Biological constraints

FIGURE 4

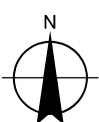
G:\6138330\GIS\Maps\Working\6138330_04_BiologicalConstraints.mxd
 Print date: 06 Aug 2019 - 14:25
 Data source: Landgate: Imagery accessed on 20190806, Roads: Horizon Power: Survey Area - 20190131, TECPEC Area - 20171013, DPaW: Threatened and Conservation: Significant Flora - 20170316, GHD: 20km Buffer - 20190520, DPRD: Native Vegetation Extent - 201812. Created by: skl



- Legend**
- Main Roads
 - Minor Roads
 - - - Tracks
 - + Railways
 - ▭ Survey Area
 - ▭ Cadastre



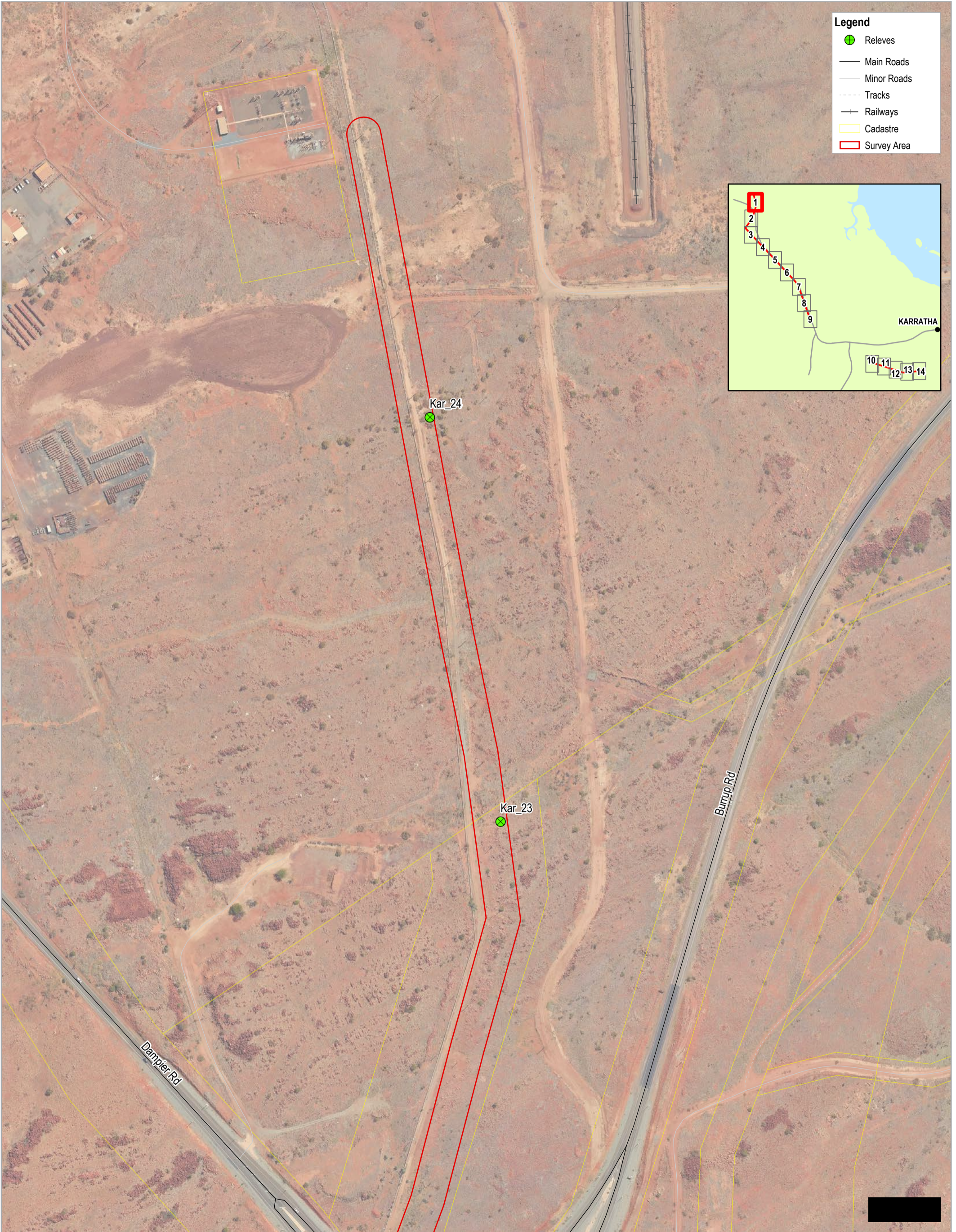
Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 50



Horizon Power
124 - KRT- DMP 132kV Mapping & Field Fauna & Flora Survey
Location of Survey Area

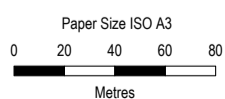
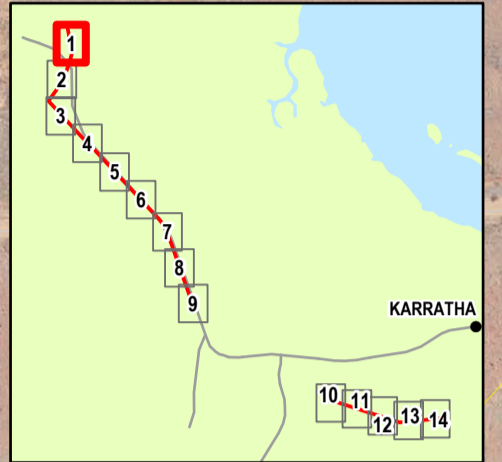
Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 5

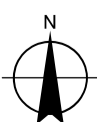


Legend

- ⊗ Releves
- Main Roads
- Minor Roads
- - - Tracks
- ⊕ Railways
- ▭ Cadastre
- ▭ Survey Area



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

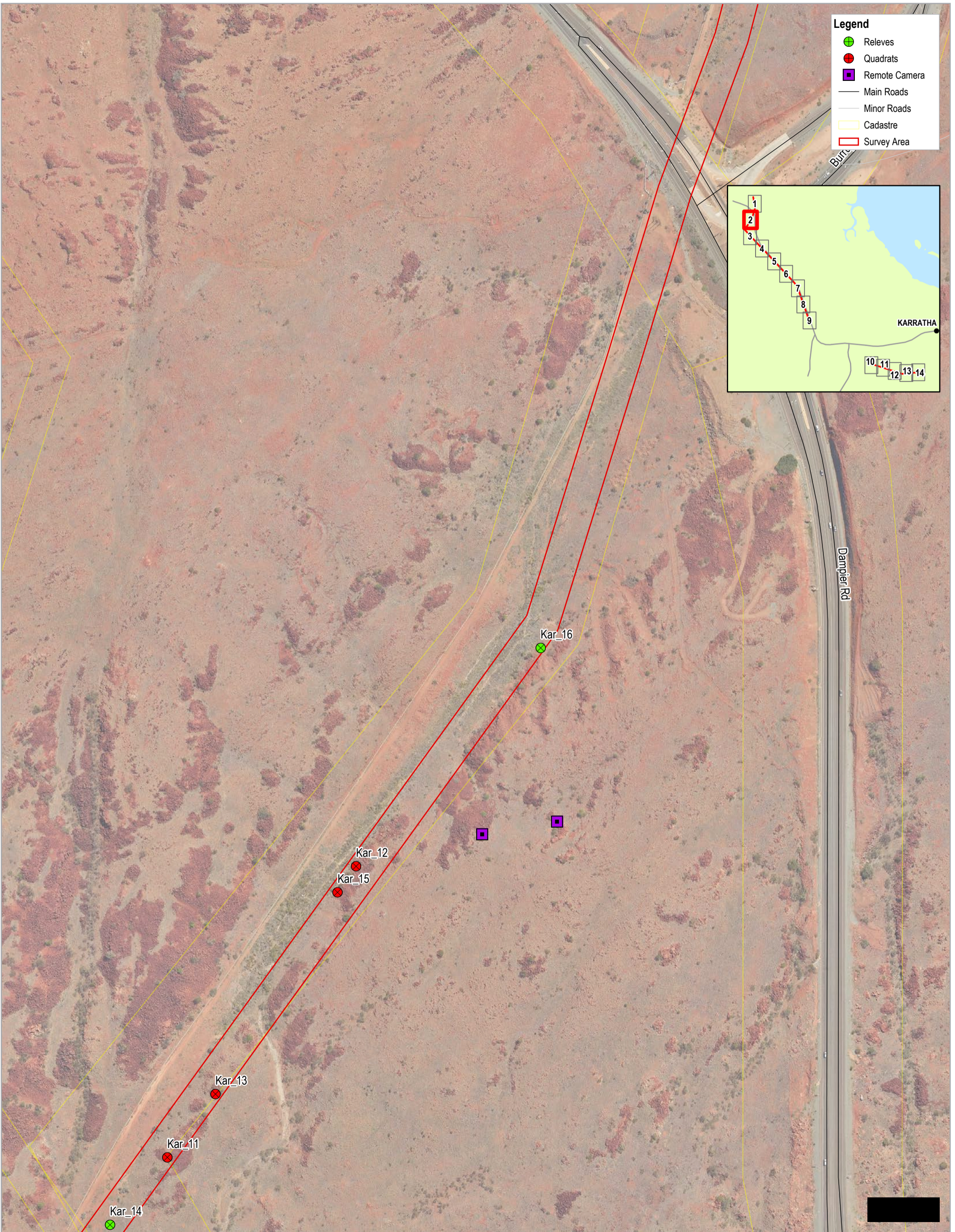


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

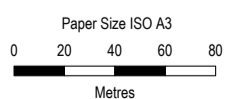
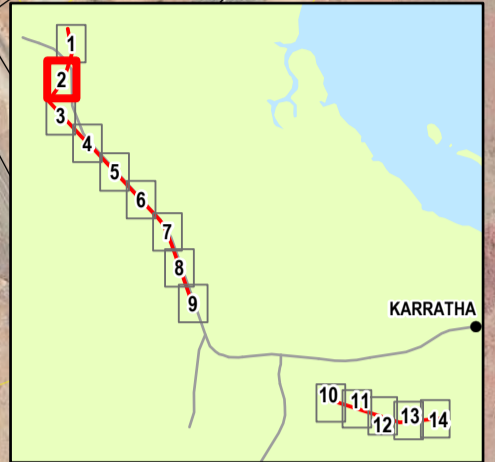
Survey Sampling Effort

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

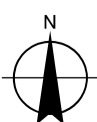
FIGURE 6
 Page 1 of 14



- Legend**
- ⊗ Releves
 - ⊗ Quadrats
 - ⊠ Remote Camera
 - Main Roads
 - Minor Roads
 - ▭ Cadastre
 - ▭ Survey Area



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

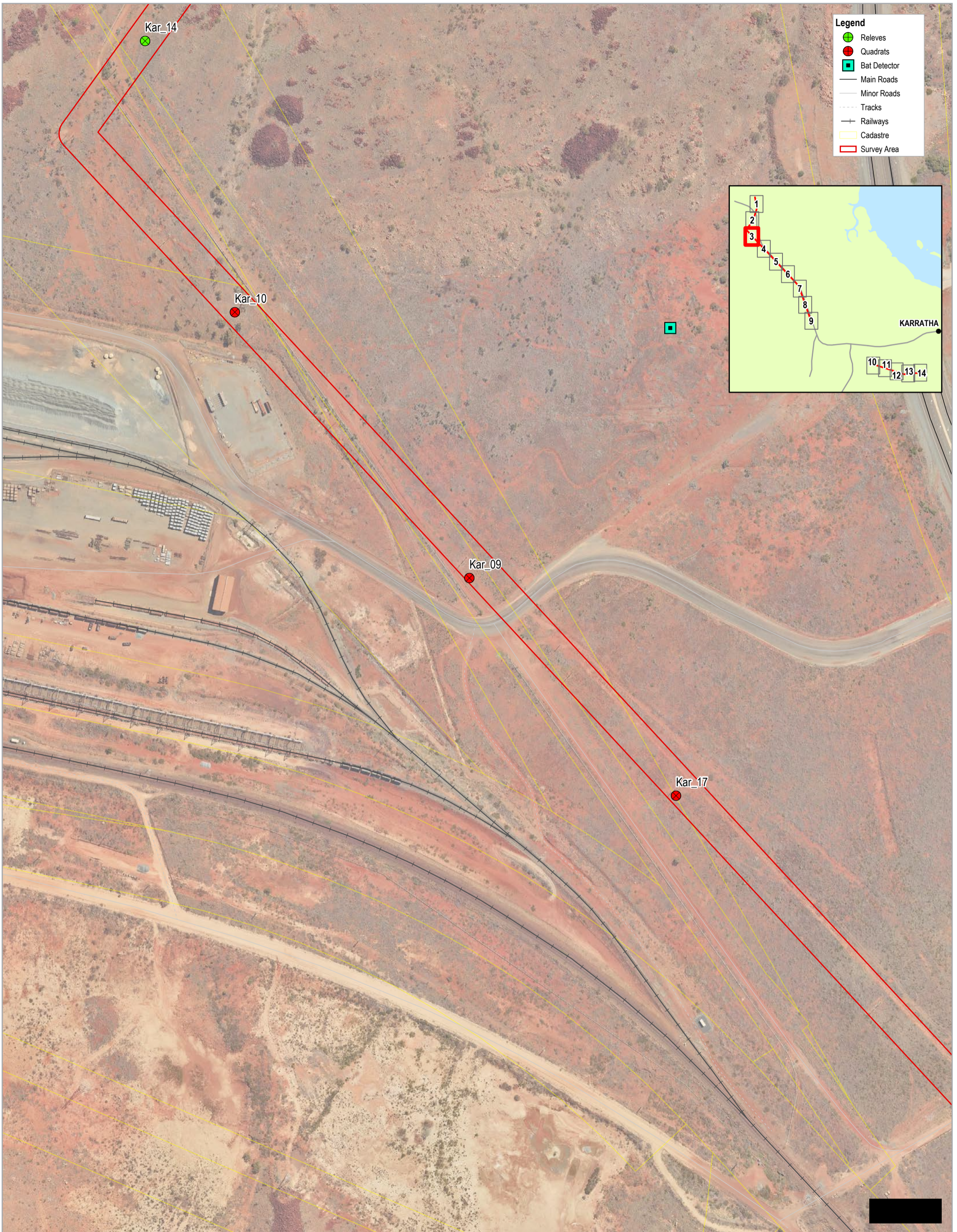


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

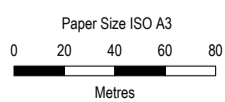
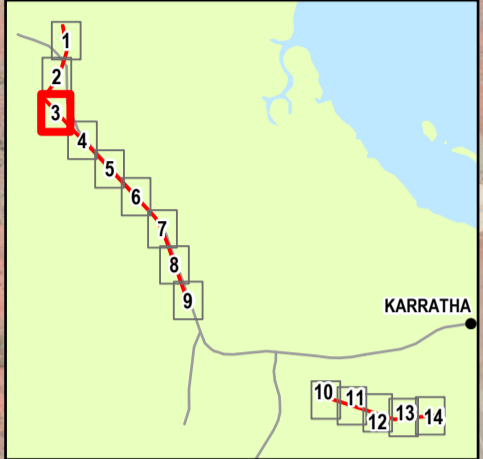
Survey Sampling Effort

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

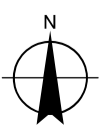
FIGURE 6
 Page 2 of 14



- Legend**
- Relevés
 - Quadrats
 - Bat Detector
 - Main Roads
 - Minor Roads
 - Tracks
 - Railways
 - Cadastre
 - Survey Area



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

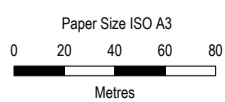
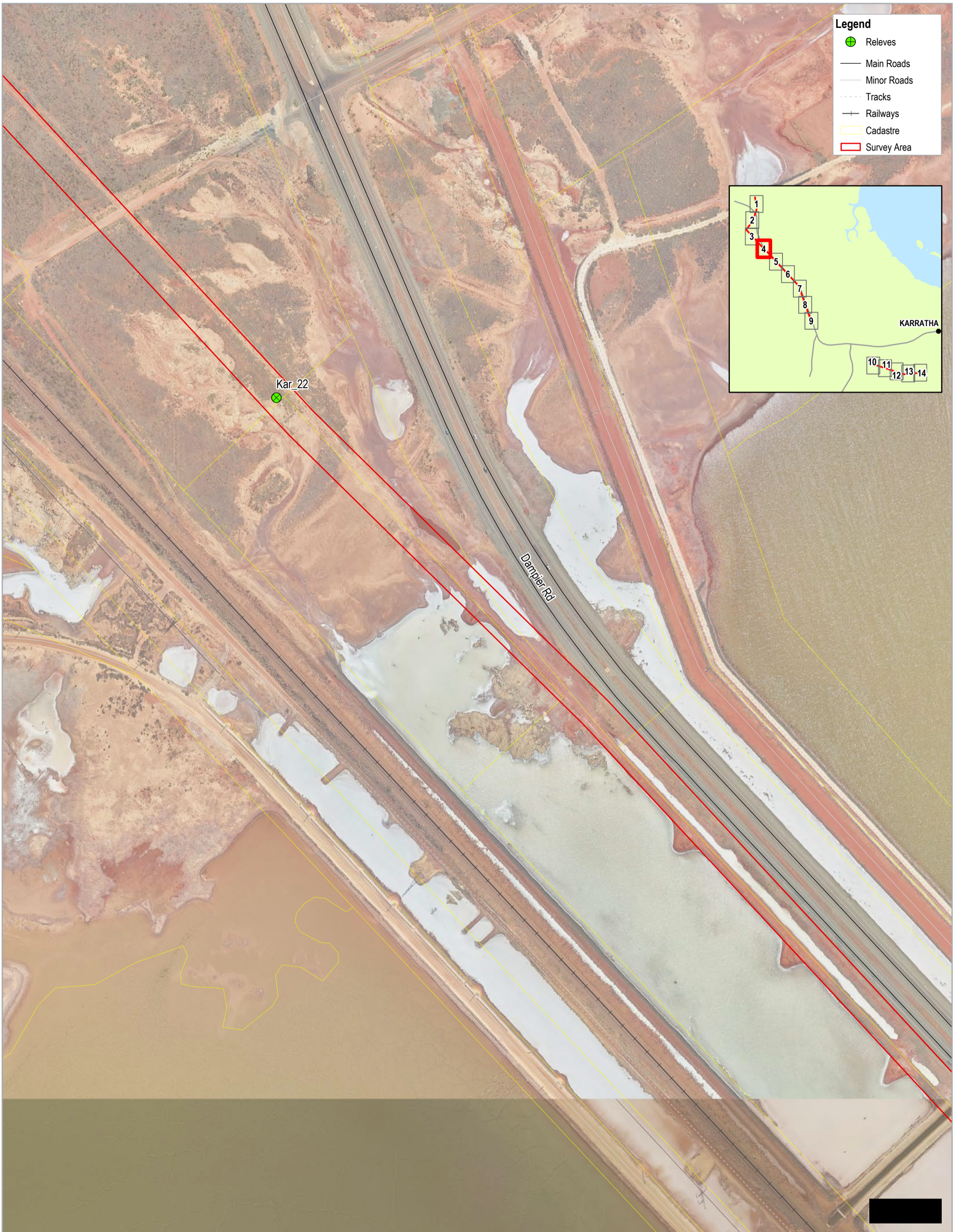


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

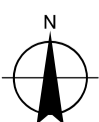
Survey Sampling Effort

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 6
 Page 3 of 14



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

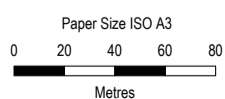
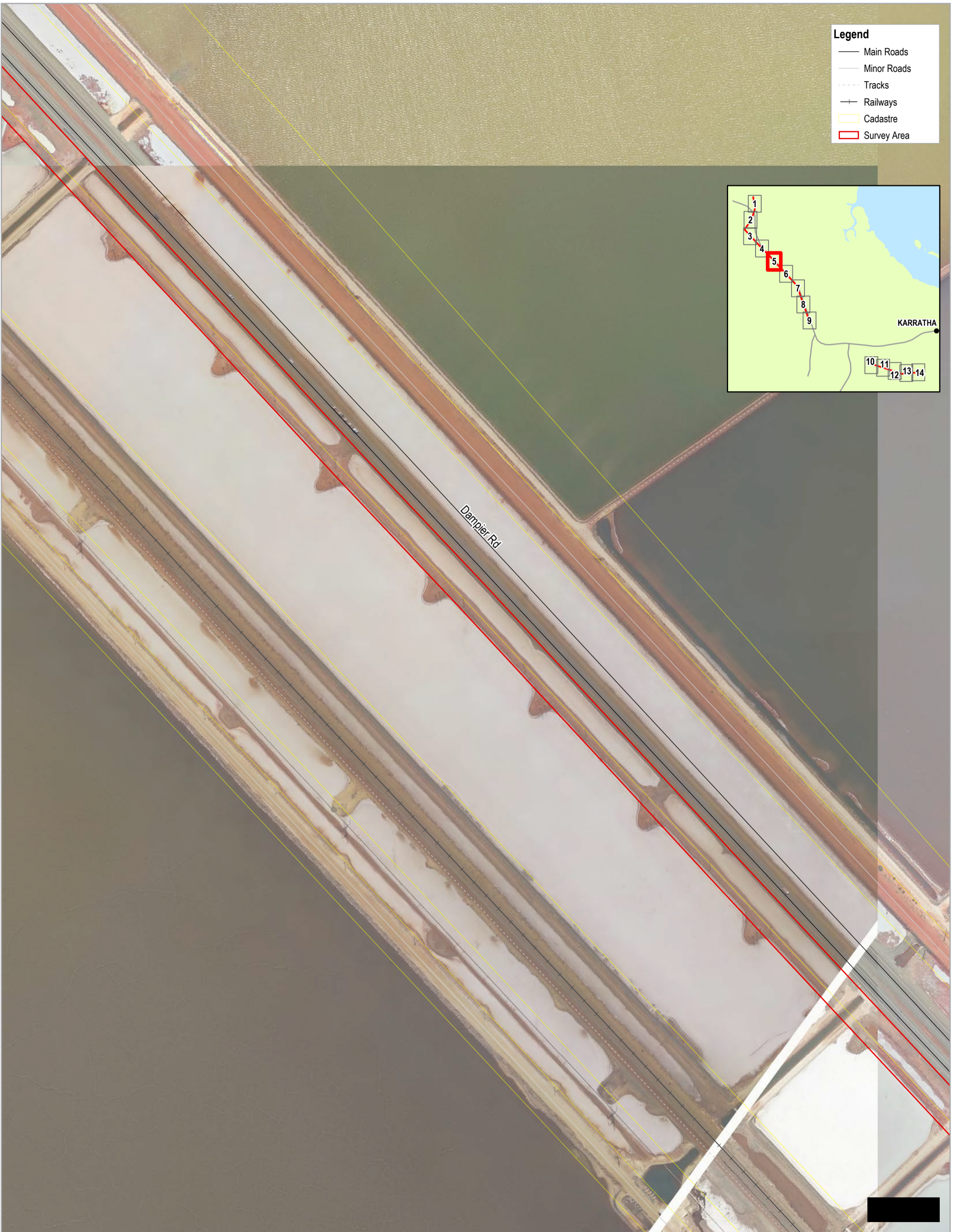


Horizon Power
124 - KRT- DMP 132kV Mapping &
Field Fauna & Flora Survey

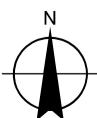
Survey Sampling Effort

Project No. 61-38330
Revision No. 0
Date 6/08/2019

FIGURE 6
Page 4 of 14



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

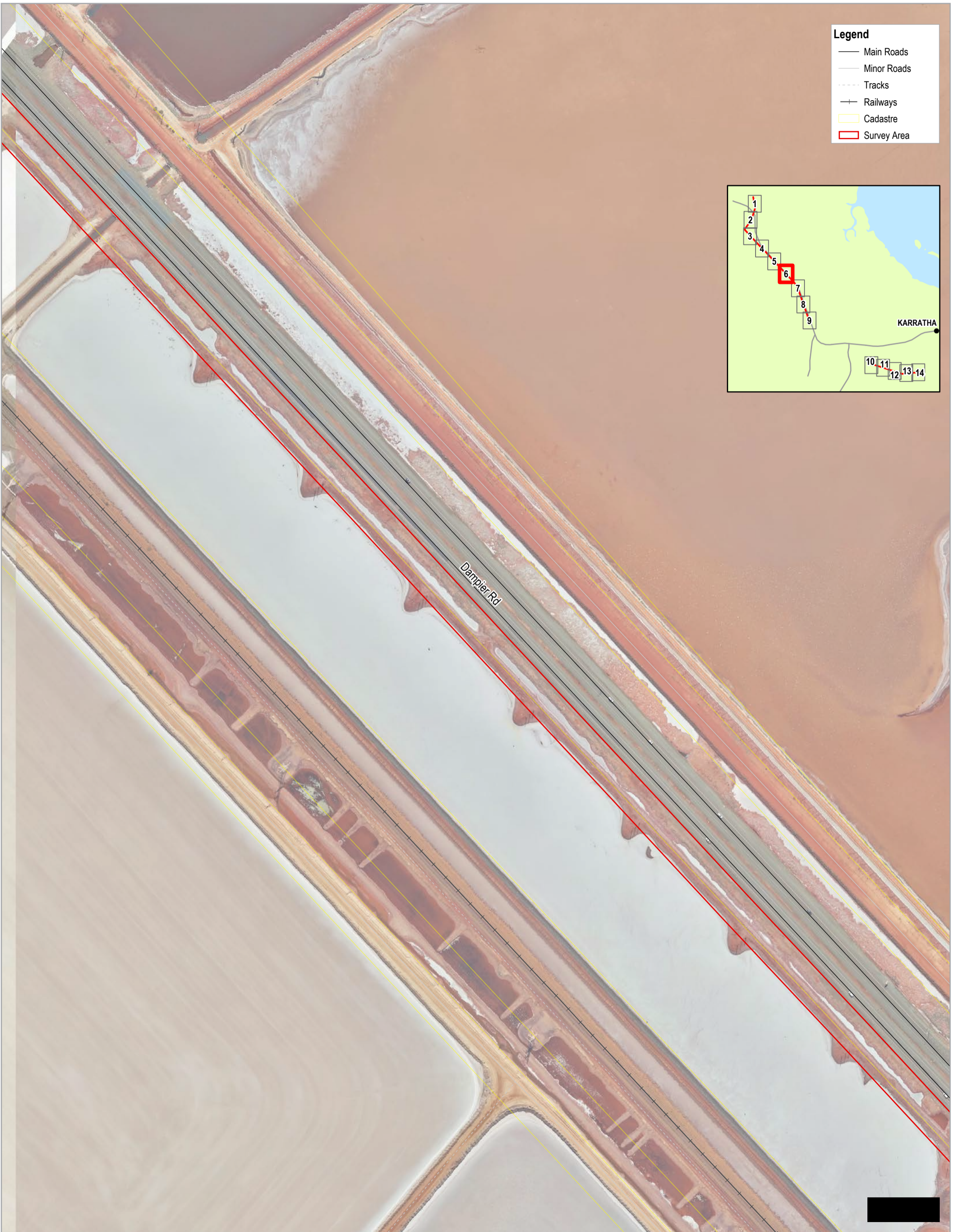


Horizon Power
124 - KRT- DMP 132kV Mapping &
Field Fauna & Flora Survey

Survey Sampling Effort

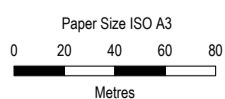
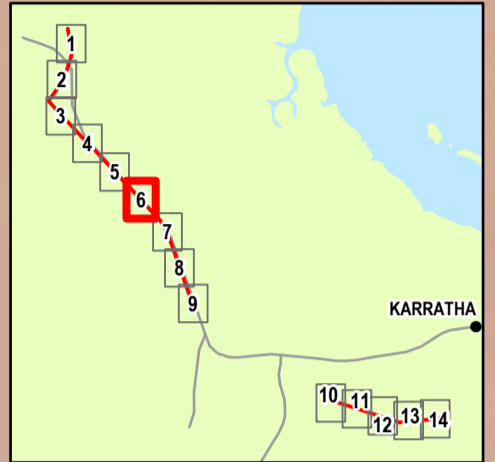
Project No. 61-38330
Revision No. 0
Date 6/08/2019

FIGURE 6
Page 5 of 14

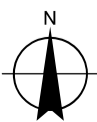


Legend

- Main Roads
- Minor Roads
- - - Tracks
- + Railways
- ▭ Cadastre
- ▭ Survey Area



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

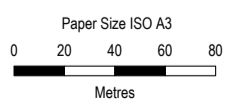


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

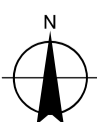
Survey Sampling Effort

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 6
Page 6 of 14



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

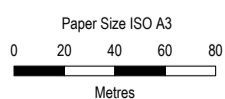


Horizon Power
124 - KRT- DMP 132kV Mapping &
Field Fauna & Flora Survey

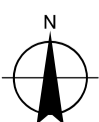
Survey Sampling Effort

Project No. 61-38330
Revision No. 0
Date 6/08/2019

FIGURE 6
Page 7 of 14



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



Horizon Power
124 - KRT- DMP 132kV Mapping &
Field Fauna & Flora Survey

Survey Sampling Effort

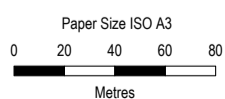
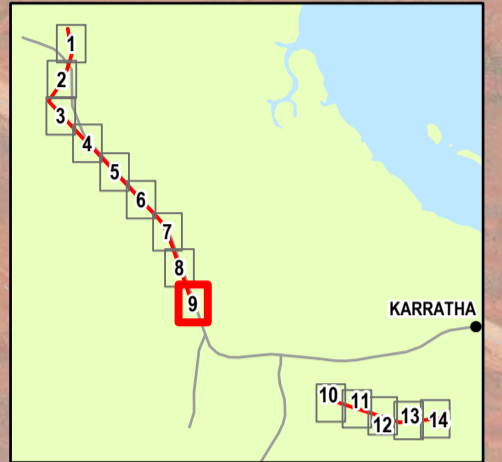
Project No. 61-38330
Revision No. 0
Date 6/08/2019

FIGURE 6
Page 8 of 14

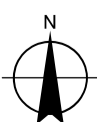


Legend

- Quadrats
- Main Roads
- Minor Roads
- - - Tracks
- ▭ Cadastre
- ▭ Survey Area



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

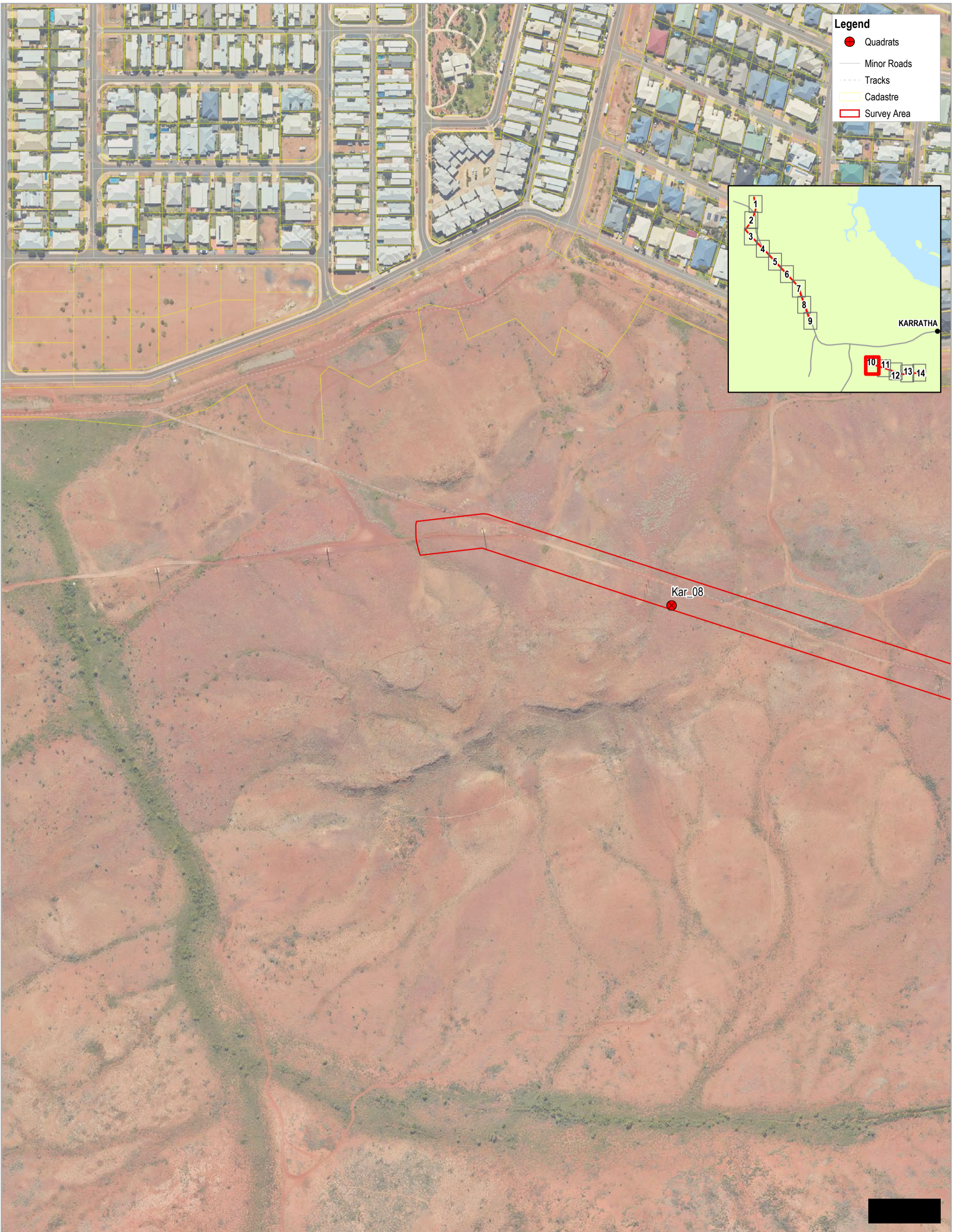


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

Survey Sampling Effort

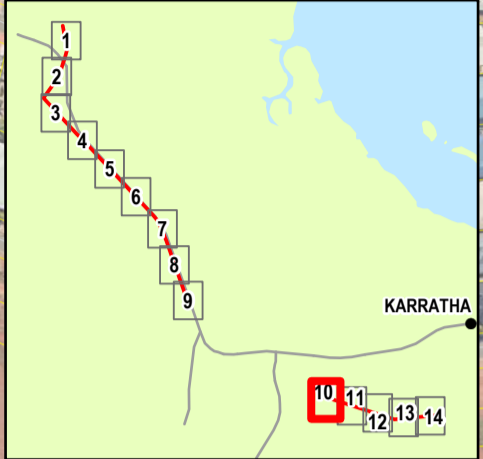
Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 6
 Page 9 of 14

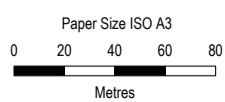


Legend

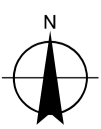
- Quadrats
- Minor Roads
- - - Tracks
- ▭ Cadastre
- ▭ Survey Area



Kar_08



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

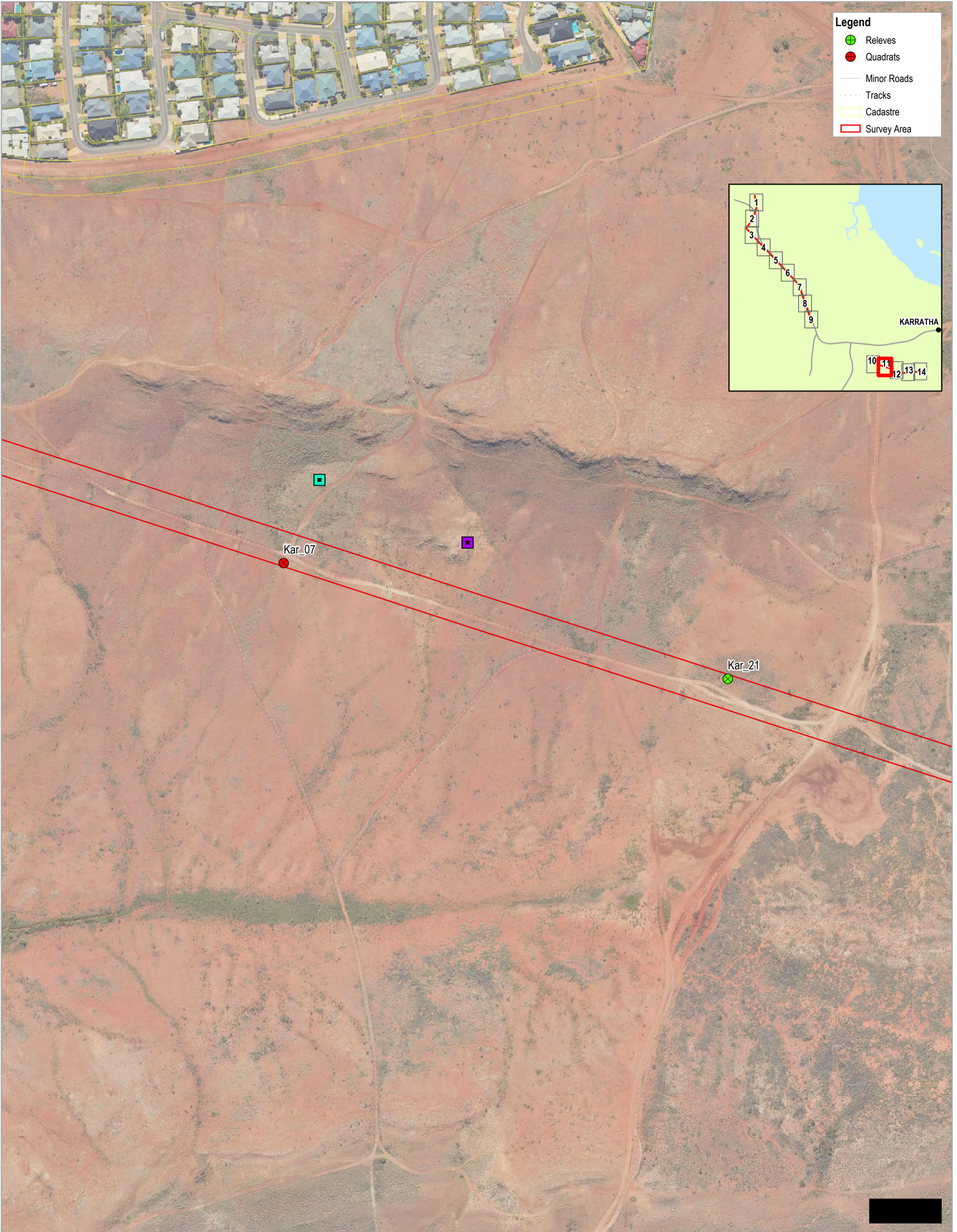


Horizon Power
124 - KRT- DMP 132kV Mapping & Field Fauna & Flora Survey

Survey Sampling Effort

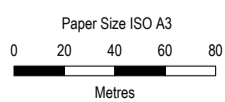
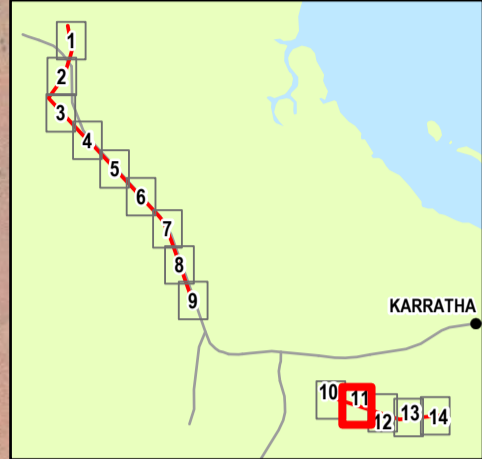
Project No. 61-38330
Revision No. 0
Date 6/08/2019

FIGURE 6
Page 10 of 14

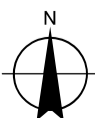


Legend

- Relevés
- Quadrats
- Minor Roads
- - - Tracks
- ▭ Cadastre
- ▭ Survey Area



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

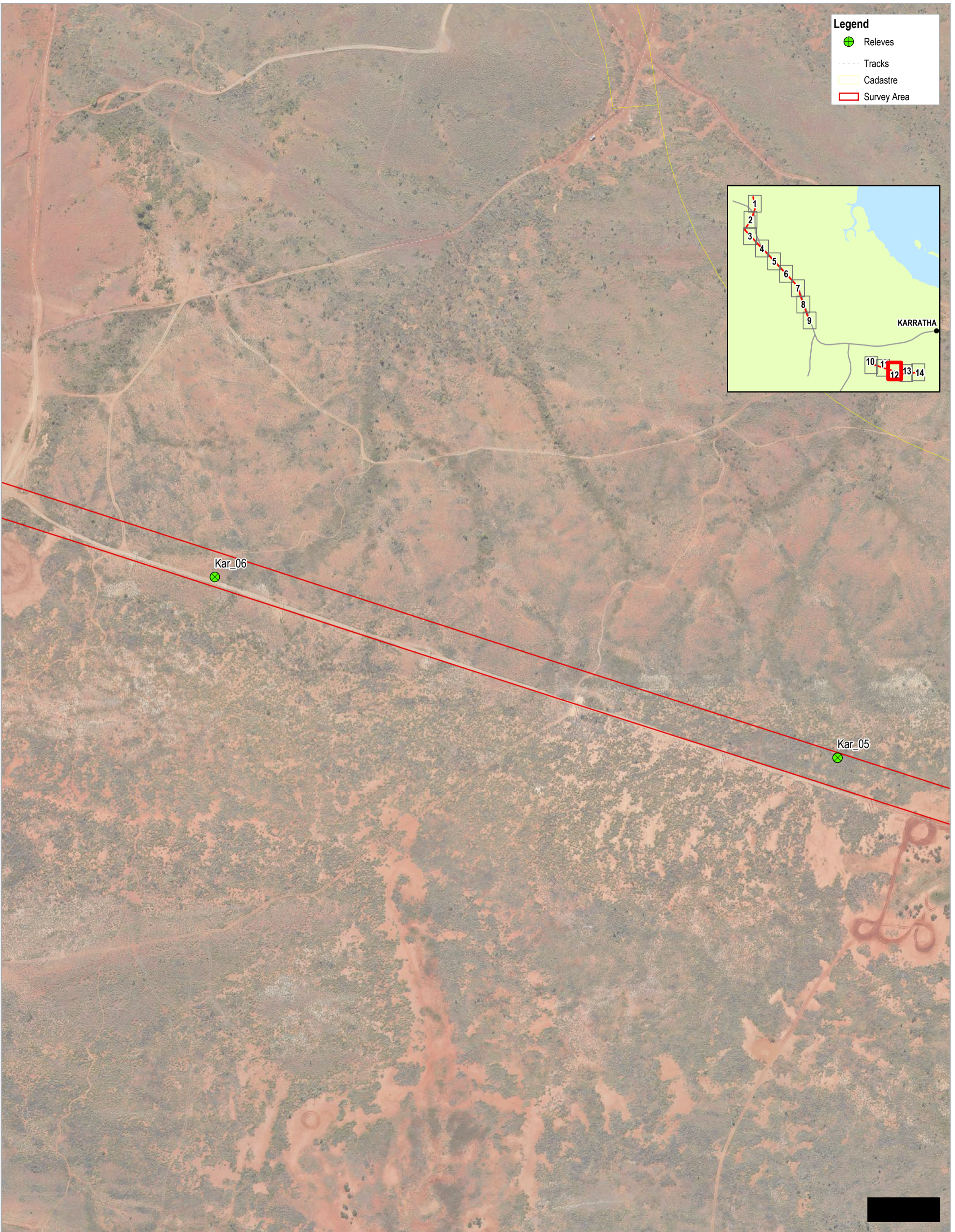


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

Survey Sampling Effort

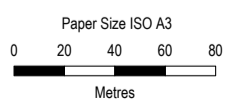
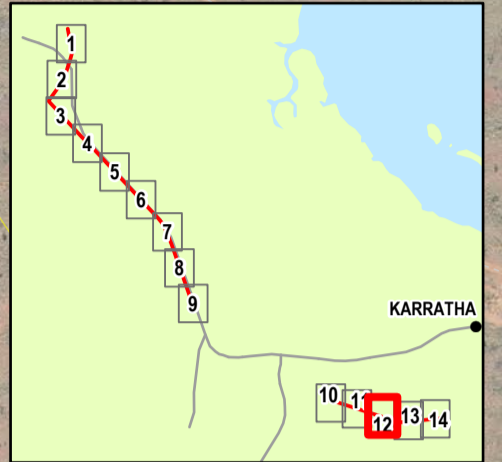
Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 6
 Page 11 of 14

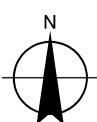


Legend

- ⊗ Relevés
- Tracks
- ▭ Cadastre
- ▭ Survey Area



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

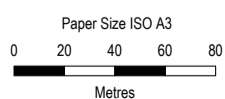
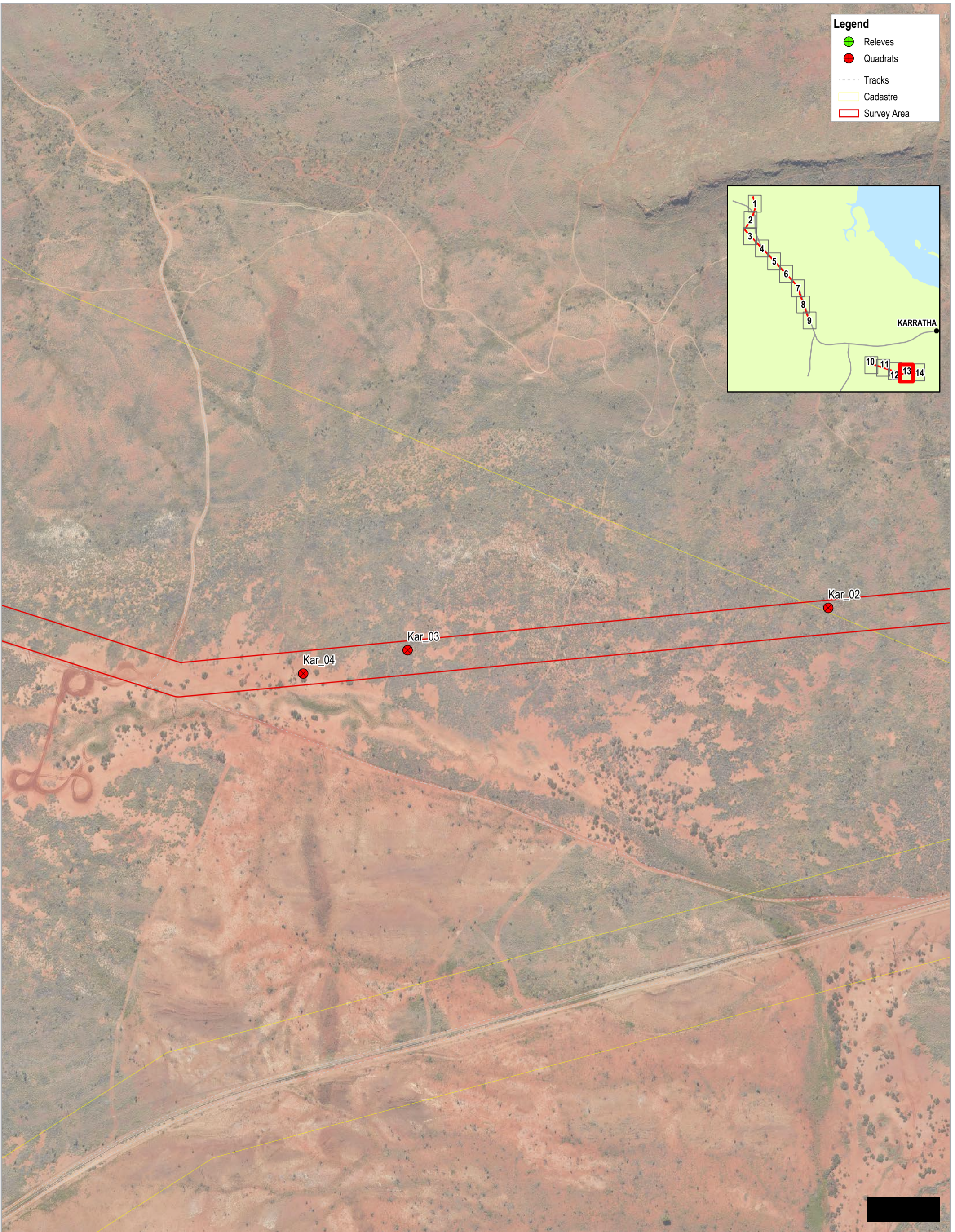


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

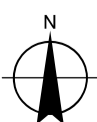
Survey Sampling Effort

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 6
 Page 12 of 14



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

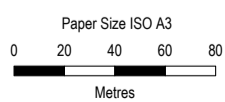
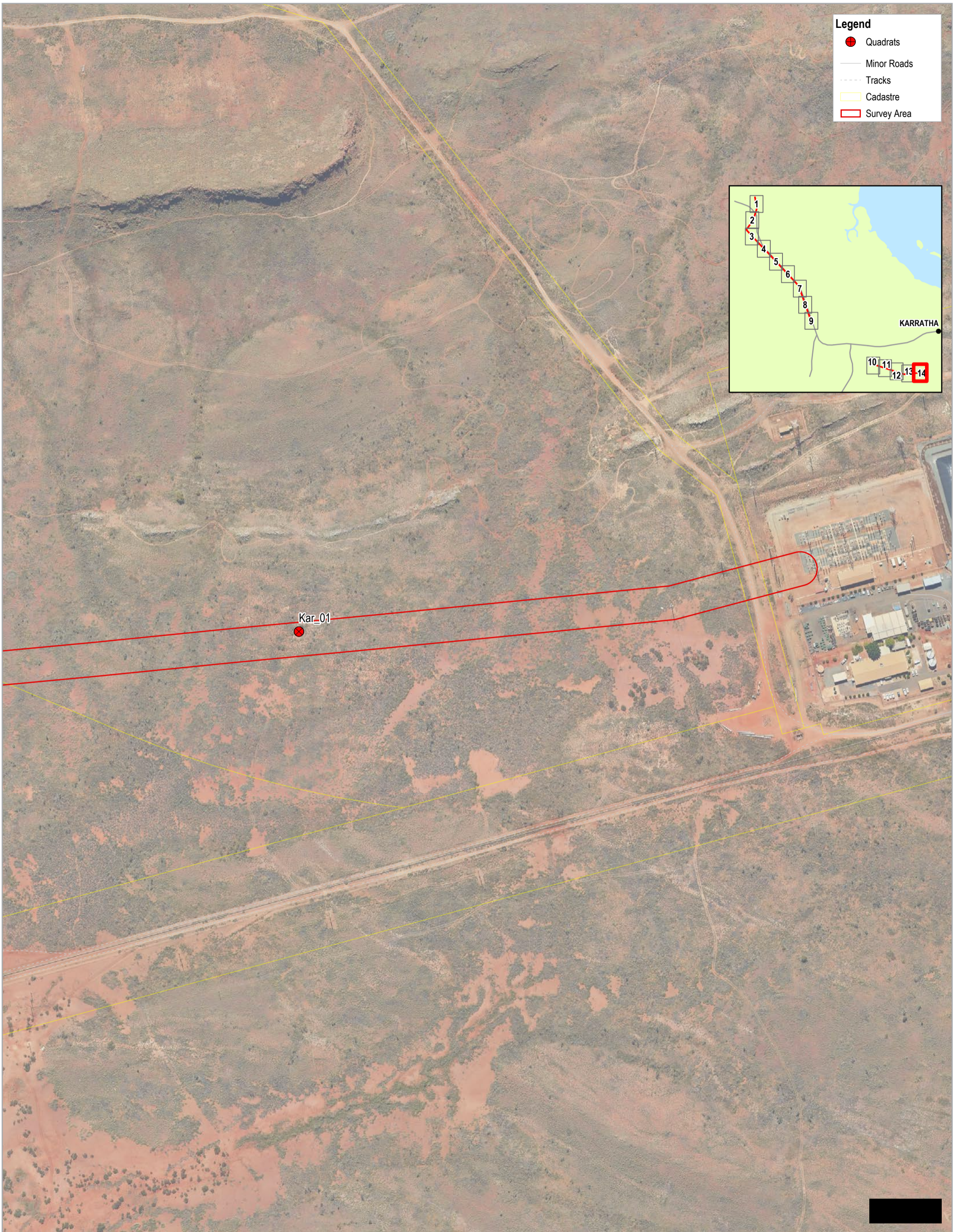


Horizon Power
124 - KRT- DMP 132kV Mapping &
Field Fauna & Flora Survey

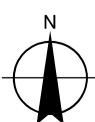
Survey Sampling Effort

Project No. 61-38330
Revision No. 0
Date 6/08/2019

FIGURE 6
Page 13 of 14



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

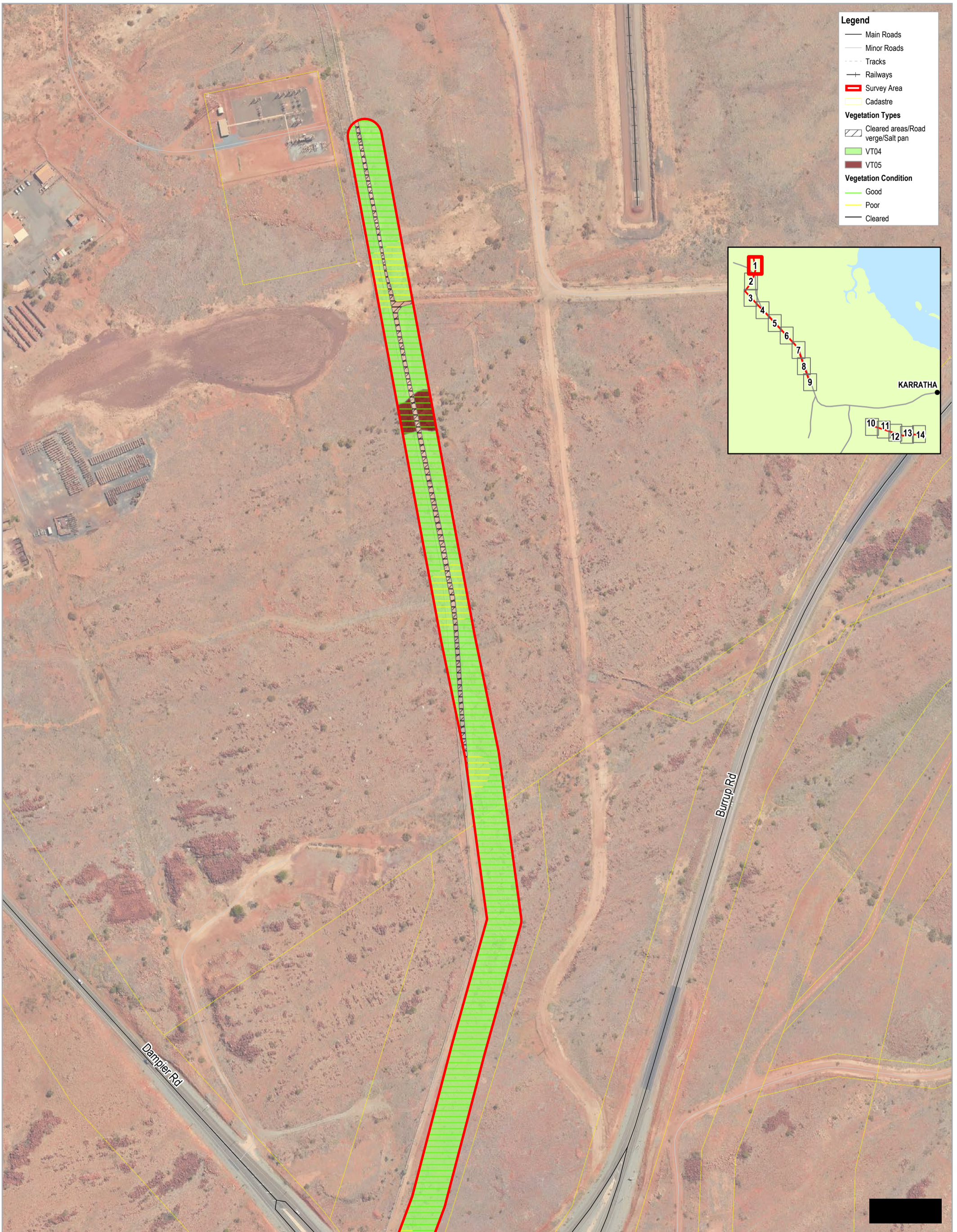


Horizon Power
124 - KRT- DMP 132kV Mapping &
Field Fauna & Flora Survey

Survey Sampling Effort

Project No. 61-38330
Revision No. 0
Date 6/08/2019

FIGURE 6
Page 14 of 14



Legend

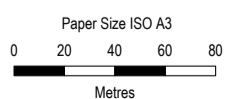
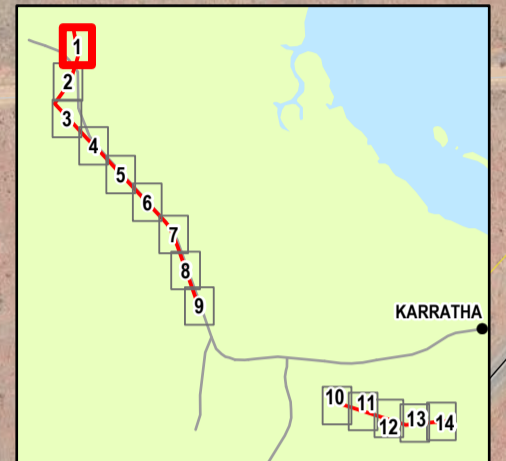
- Main Roads
- Minor Roads
- - - Tracks
- + Railways
- ▭ Survey Area
- ▭ Cadastre

Vegetation Types

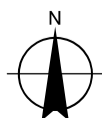
- ▨ Cleared areas/Road verge/Salt pan
- ▭ VT04
- ▭ VT05

Vegetation Condition

- Good
- Poor
- Cleared



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

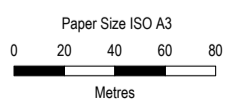
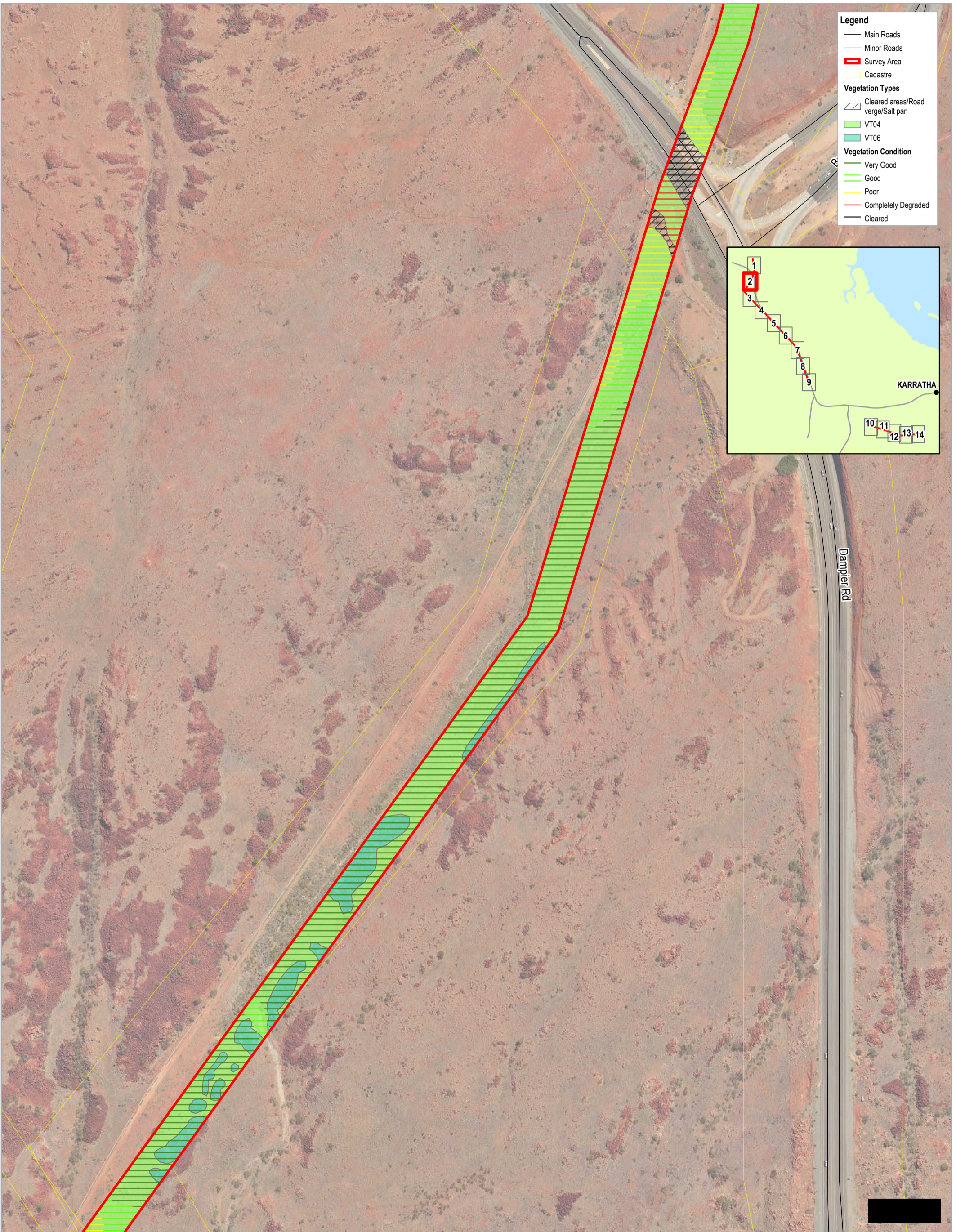


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

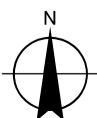
Vegetation Types and Conditions

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 7
 Page 1 of 14



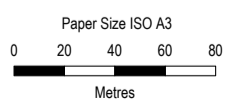
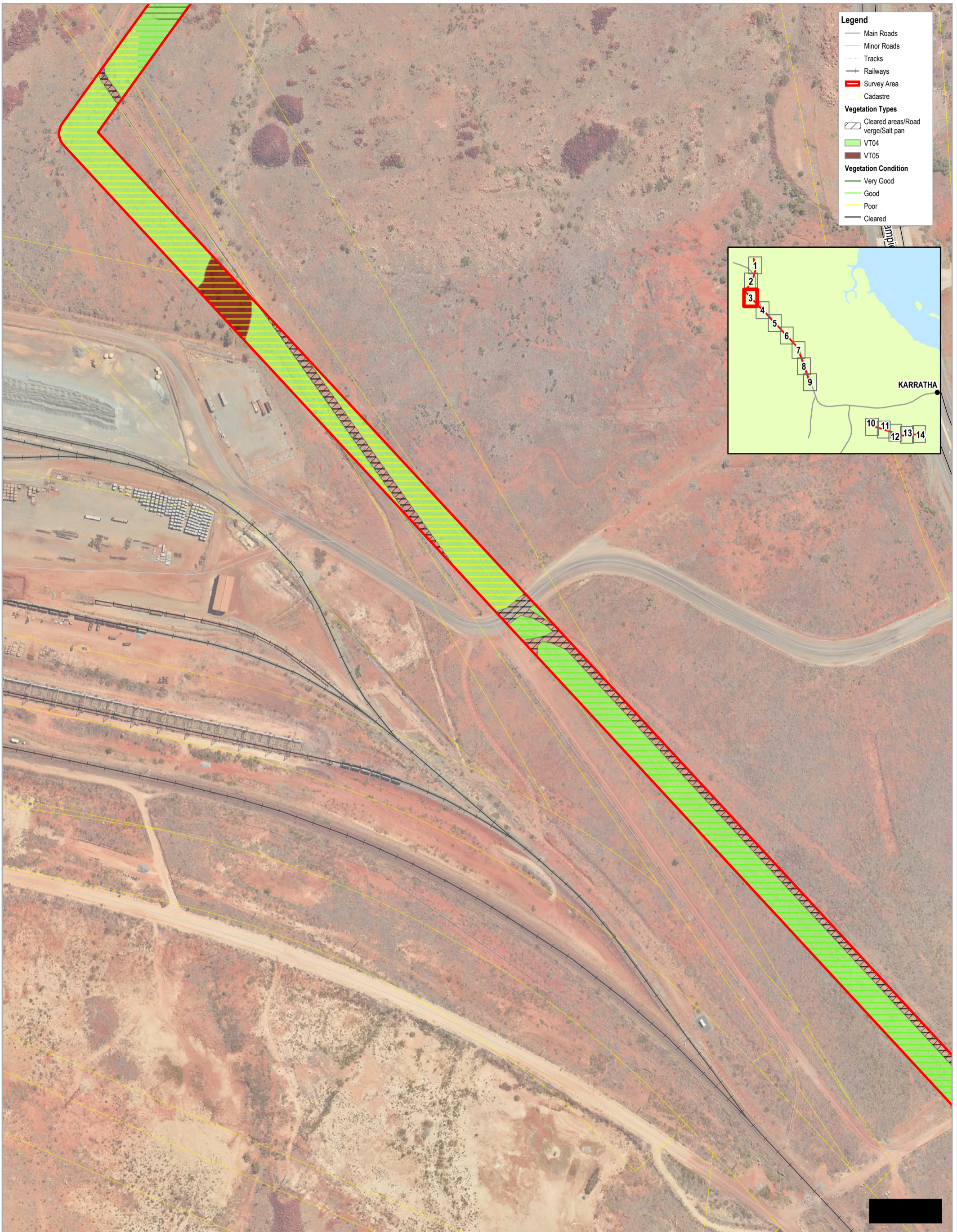
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50



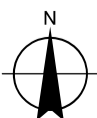
Horizon Power
124 - KRT- DMP 132kV Mapping &
Field Fauna & Flora Survey
Vegetation Types and Conditions

Project No. 61-38330
Revision No. 0
Date 6/08/2019

FIGURE 7
Page 2 of 14



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

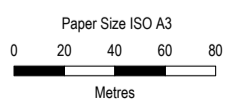
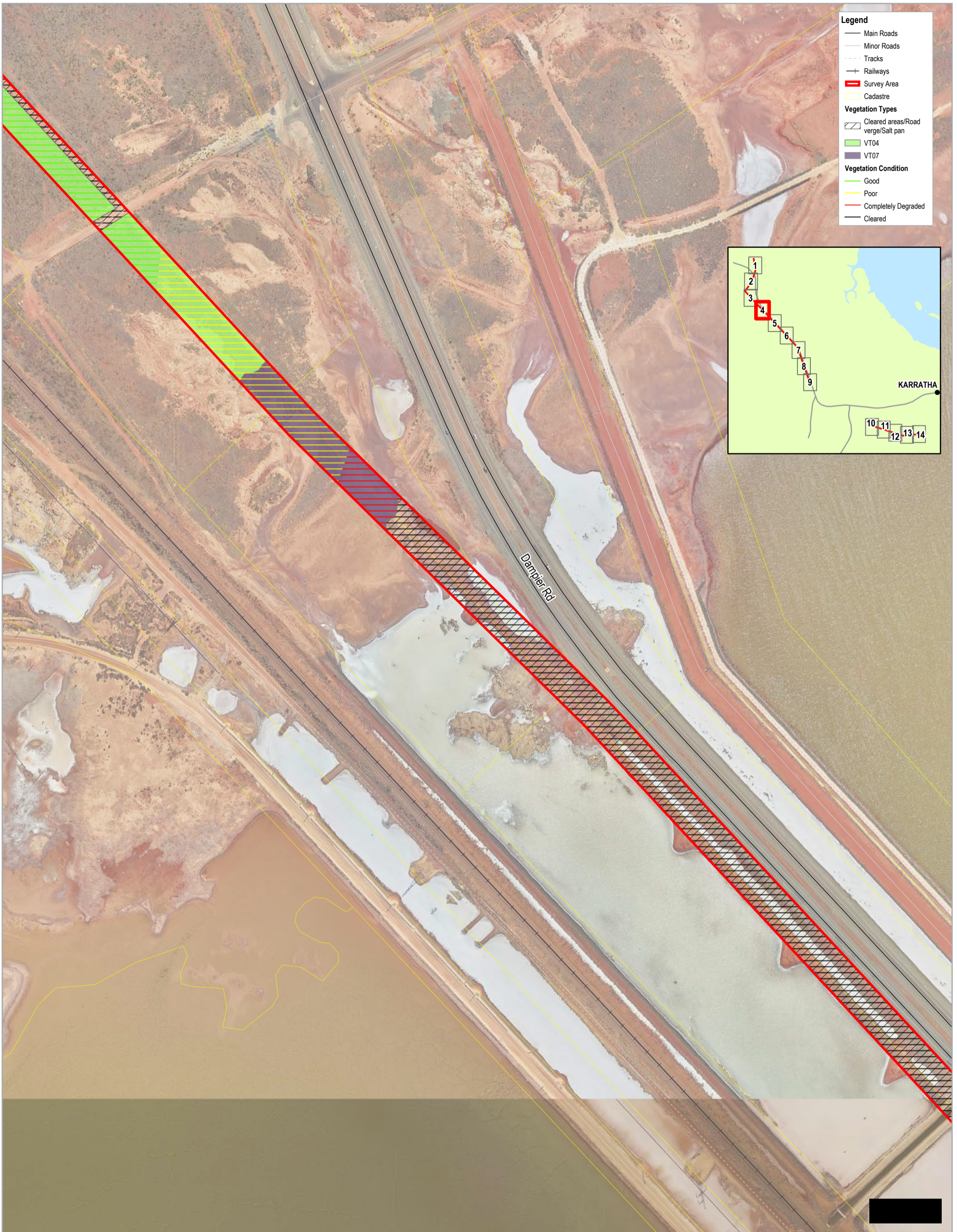


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

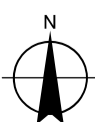
Vegetation Types and Conditions

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 7
 Page 3 of 14



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

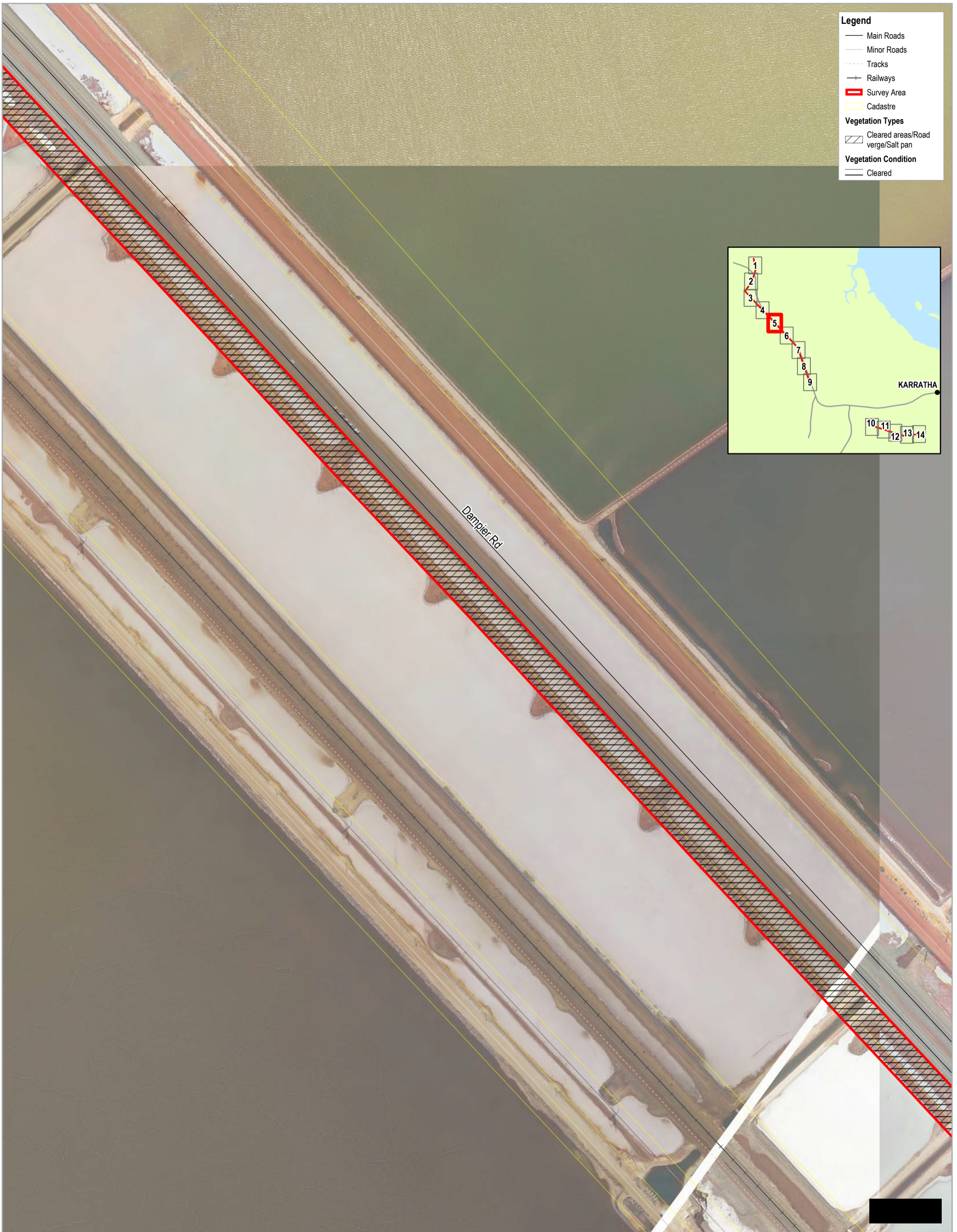


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

Vegetation Types and Conditions

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 7
 Page 4 of 14



Legend

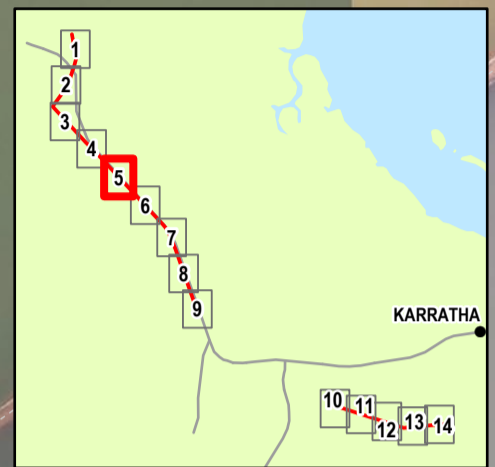
- Main Roads
- Minor Roads
- - - Tracks
- + Railways
- ▭ Survey Area
- ▭ Cadastre

Vegetation Types

- ▨ Cleared areas/Road verge/Salt pan

Vegetation Condition

- Cleared

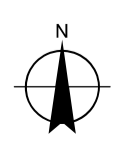


Dampier Rd

Paper Size ISO A3

0 20 40 60 80
Metres

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

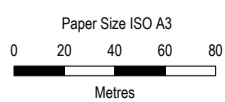
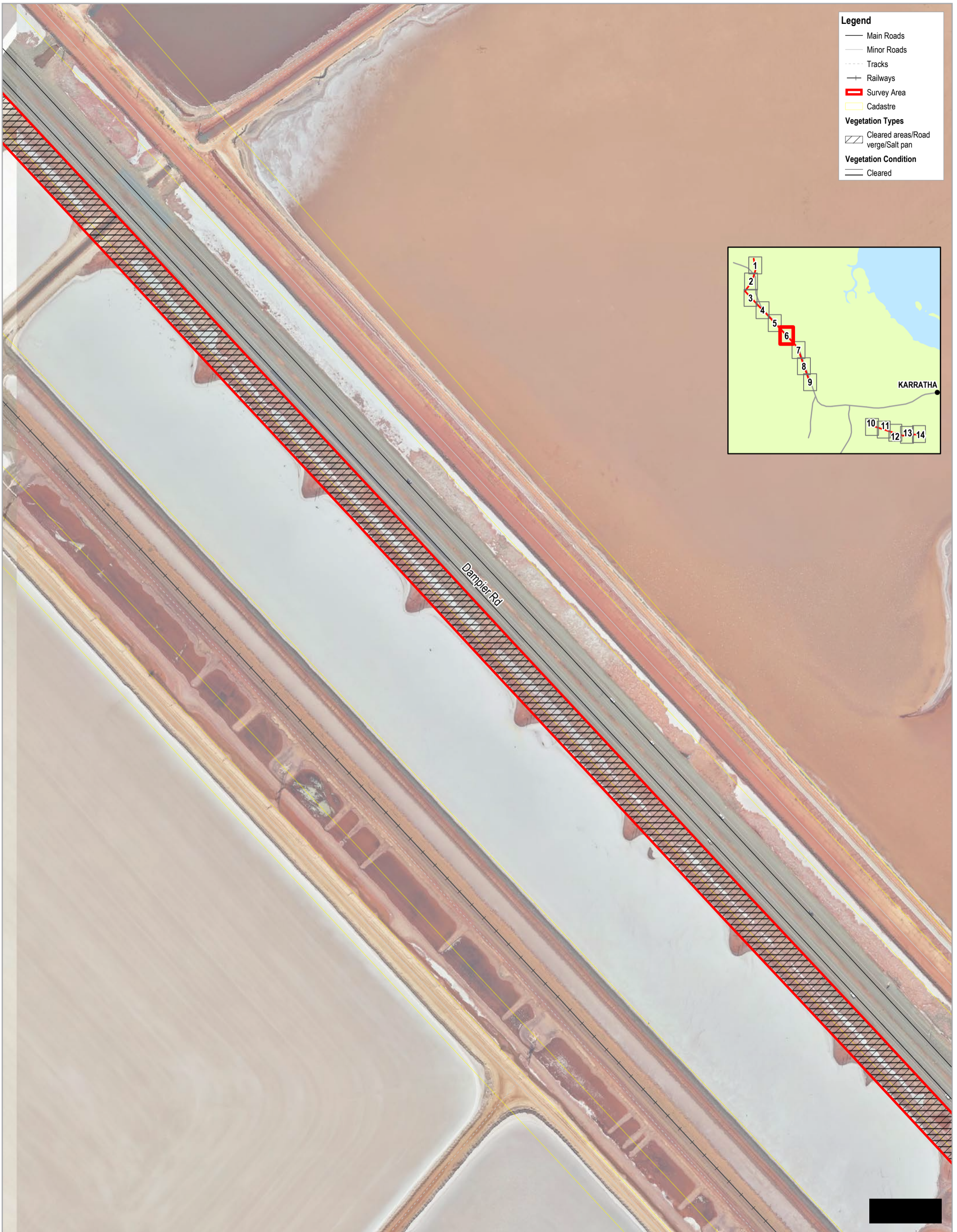


Horizon Power
124 - KRT- DMP 132kV Mapping &
Field Fauna & Flora Survey

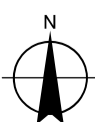
Vegetation Types and Conditions

Project No. 61-38330
Revision No. 0
Date 6/08/2019

FIGURE 7
Page 5 of 14



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

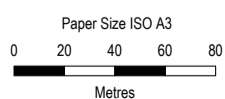
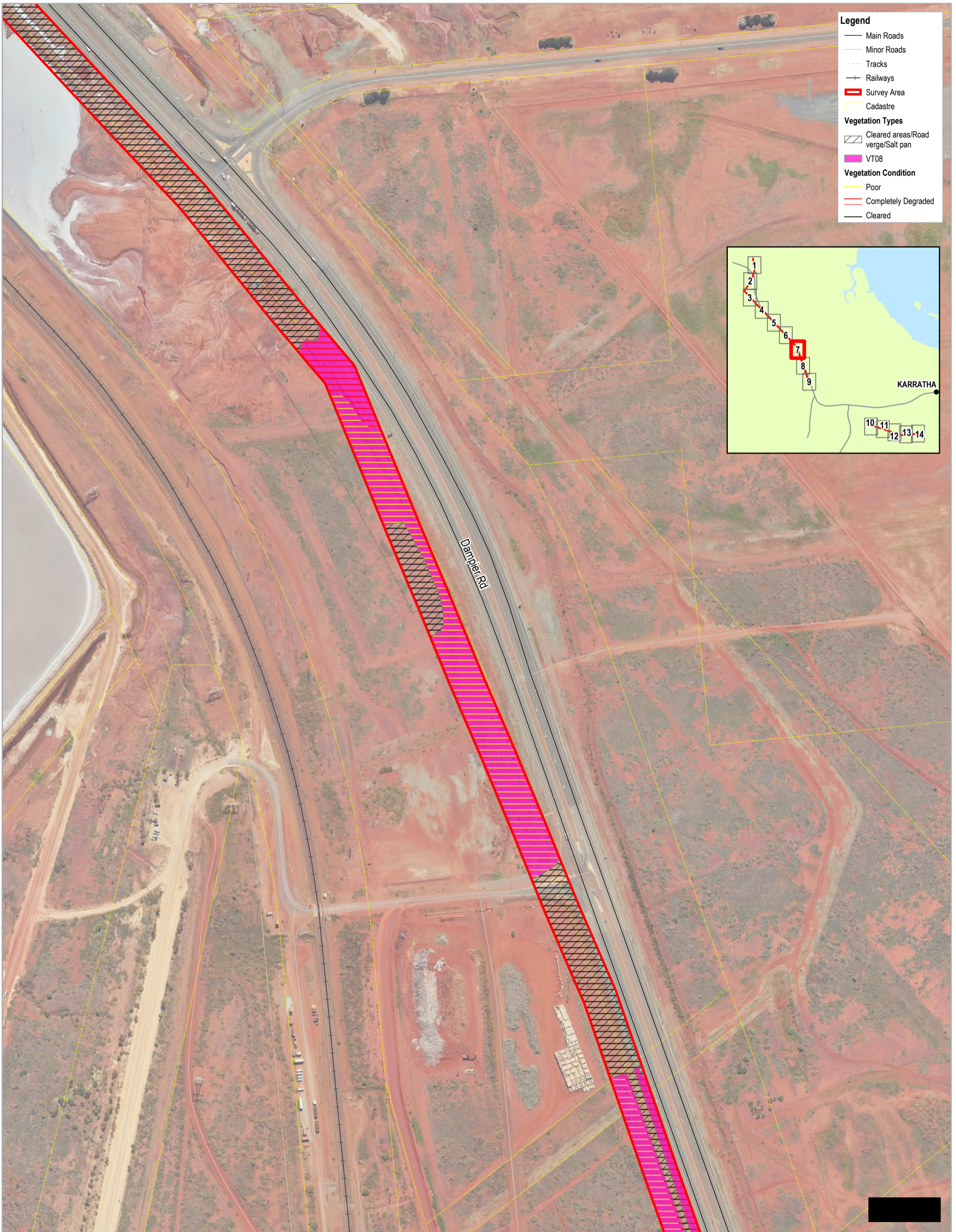


Horizon Power
124 - KRT- DMP 132kV Mapping &
Field Fauna & Flora Survey

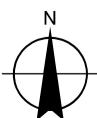
Vegetation Types and Conditions

Project No. 61-38330
Revision No. 0
Date 6/08/2019

FIGURE 7
Page 6 of 14



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

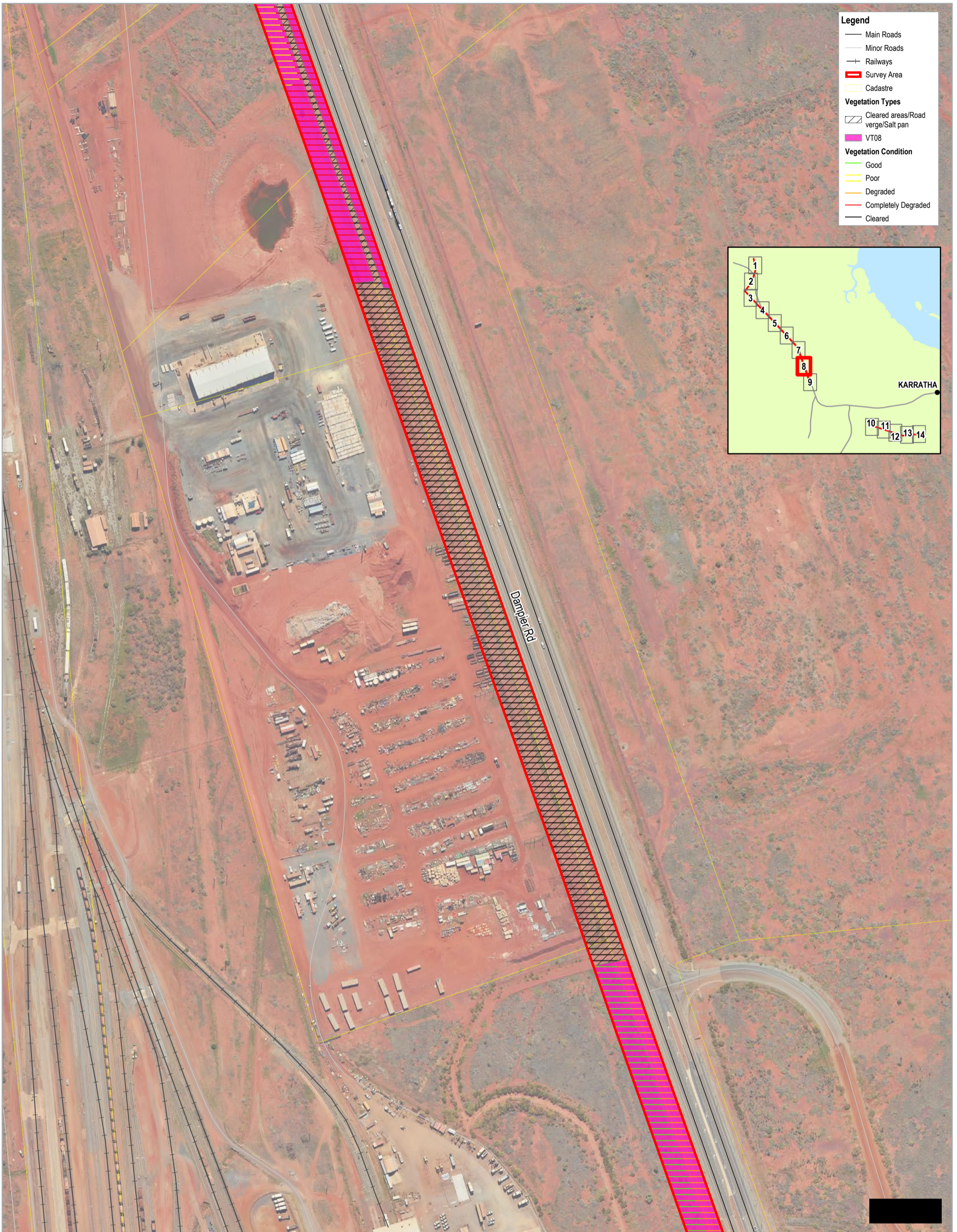


Horizon Power
124 - KRT- DMP 132kV Mapping &
Field Fauna & Flora Survey

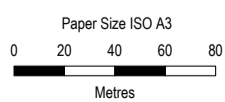
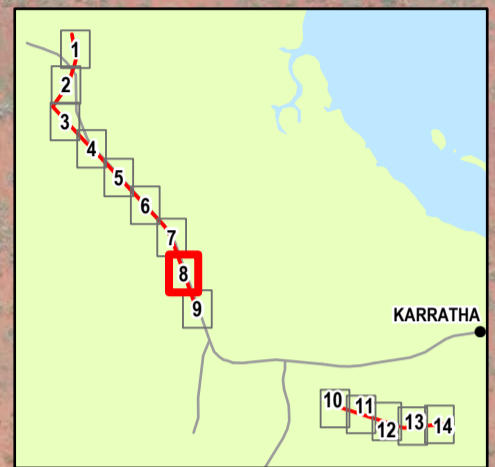
Vegetation Types and Conditions

Project No. 61-38330
Revision No. 0
Date 6/08/2019

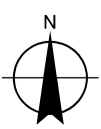
FIGURE 7
Page 7 of 14



- Legend**
- Main Roads
 - Minor Roads
 - Railways
 - Survey Area
 - Cadastre
- Vegetation Types**
- ▨ Cleared areas/Road verge/Salt pan
 - VT08
- Vegetation Condition**
- Good
 - Poor
 - Degraded
 - Completely Degraded
 - Cleared



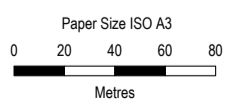
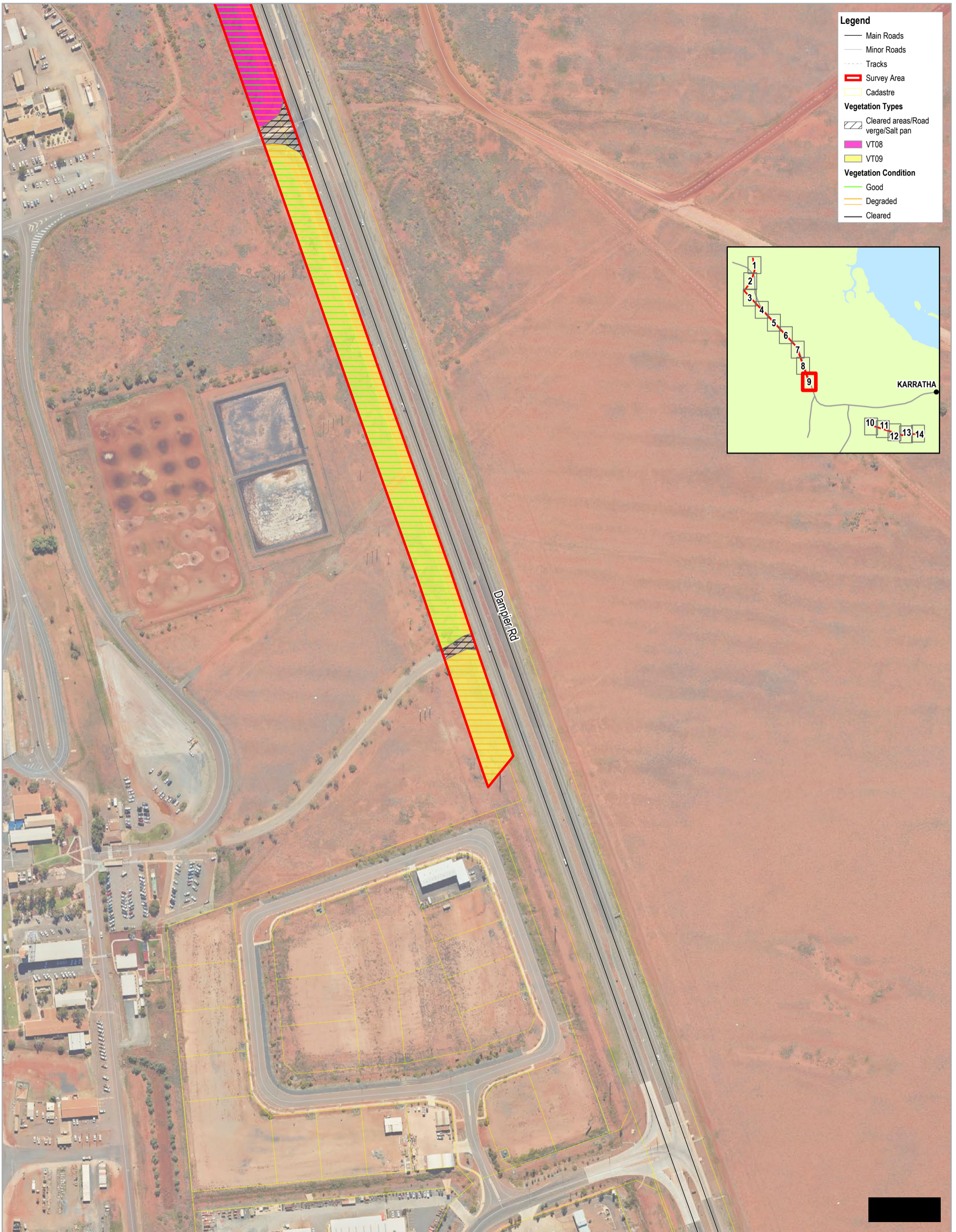
Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 50



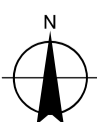
Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

Vegetation Types and Conditions

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019



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

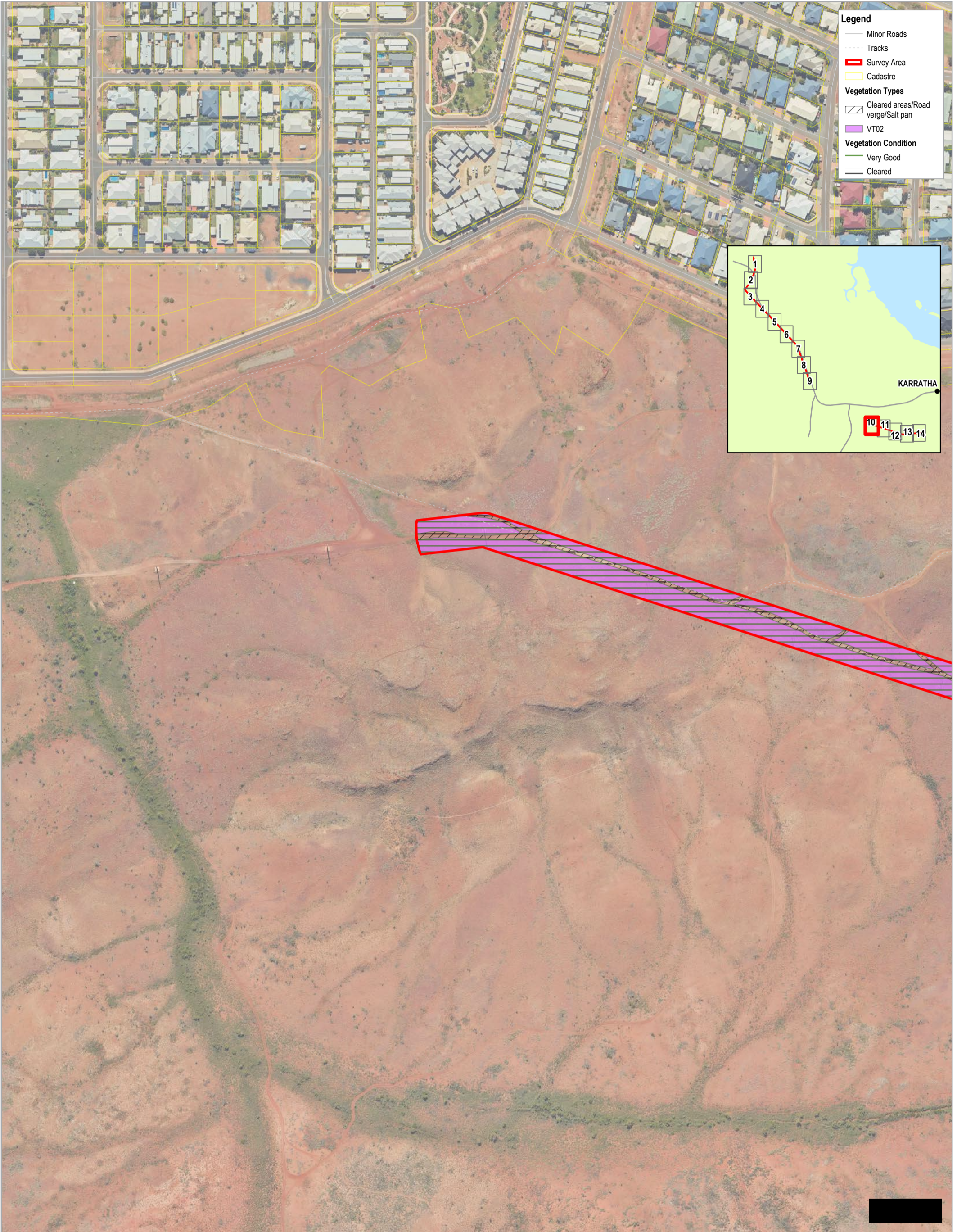


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

Vegetation Types and Conditions

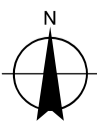
Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 7
Page 9 of 14



Paper Size ISO A3
 0 20 40 60 80
 Metres

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

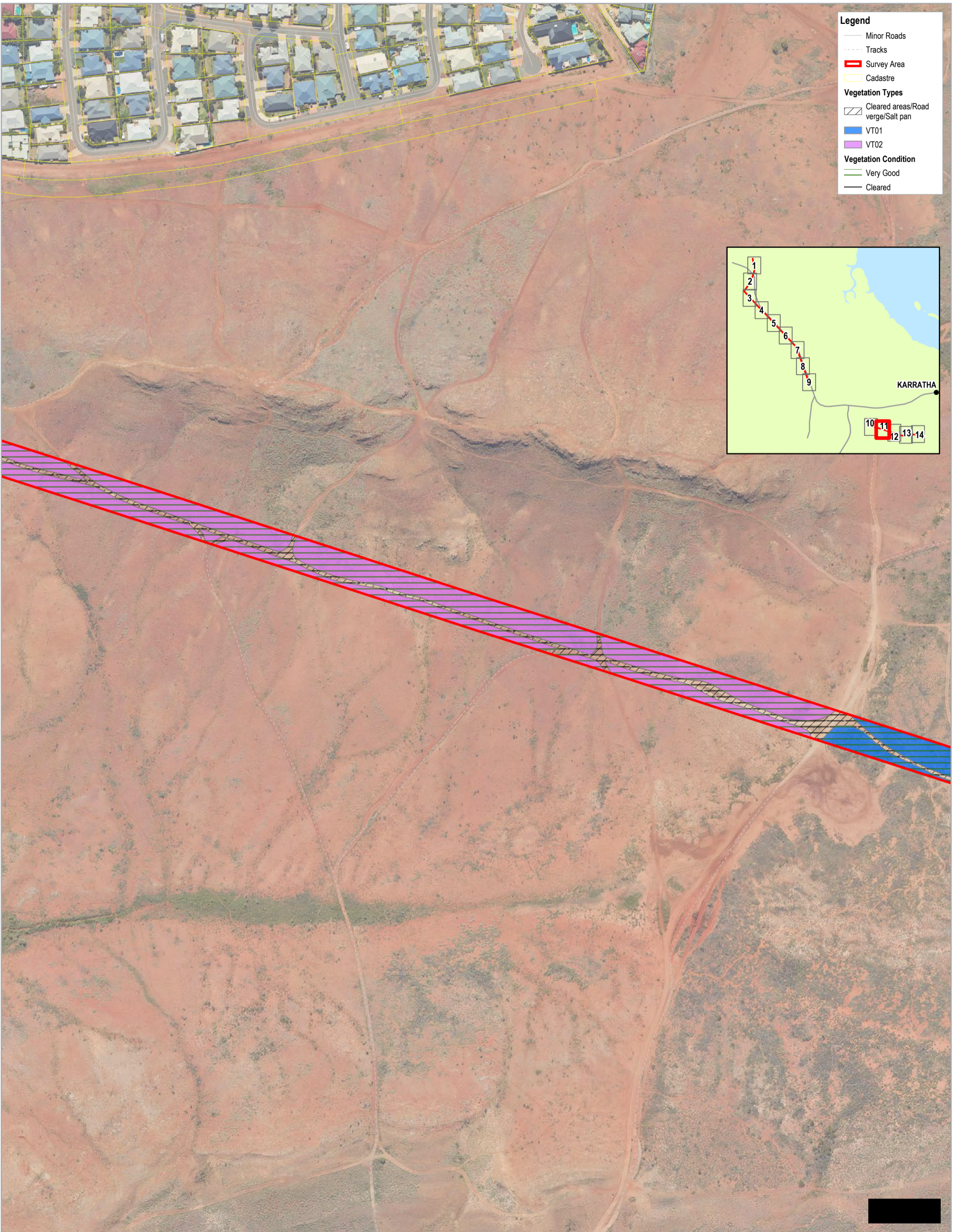


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

Vegetation Types and Conditions

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 7
Page 10 of 14



Legend

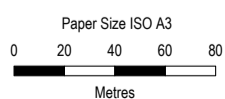
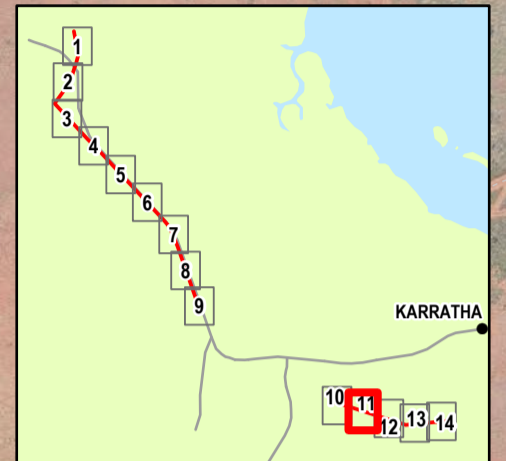
- Minor Roads
- Tracks
- ▭ Survey Area
- ▭ Cadastre

Vegetation Types

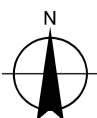
- ▨ Cleared areas/Road verge/Salt pan
- ▭ VT01
- ▭ VT02

Vegetation Condition

- ▭ Very Good
- ▭ Cleared



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

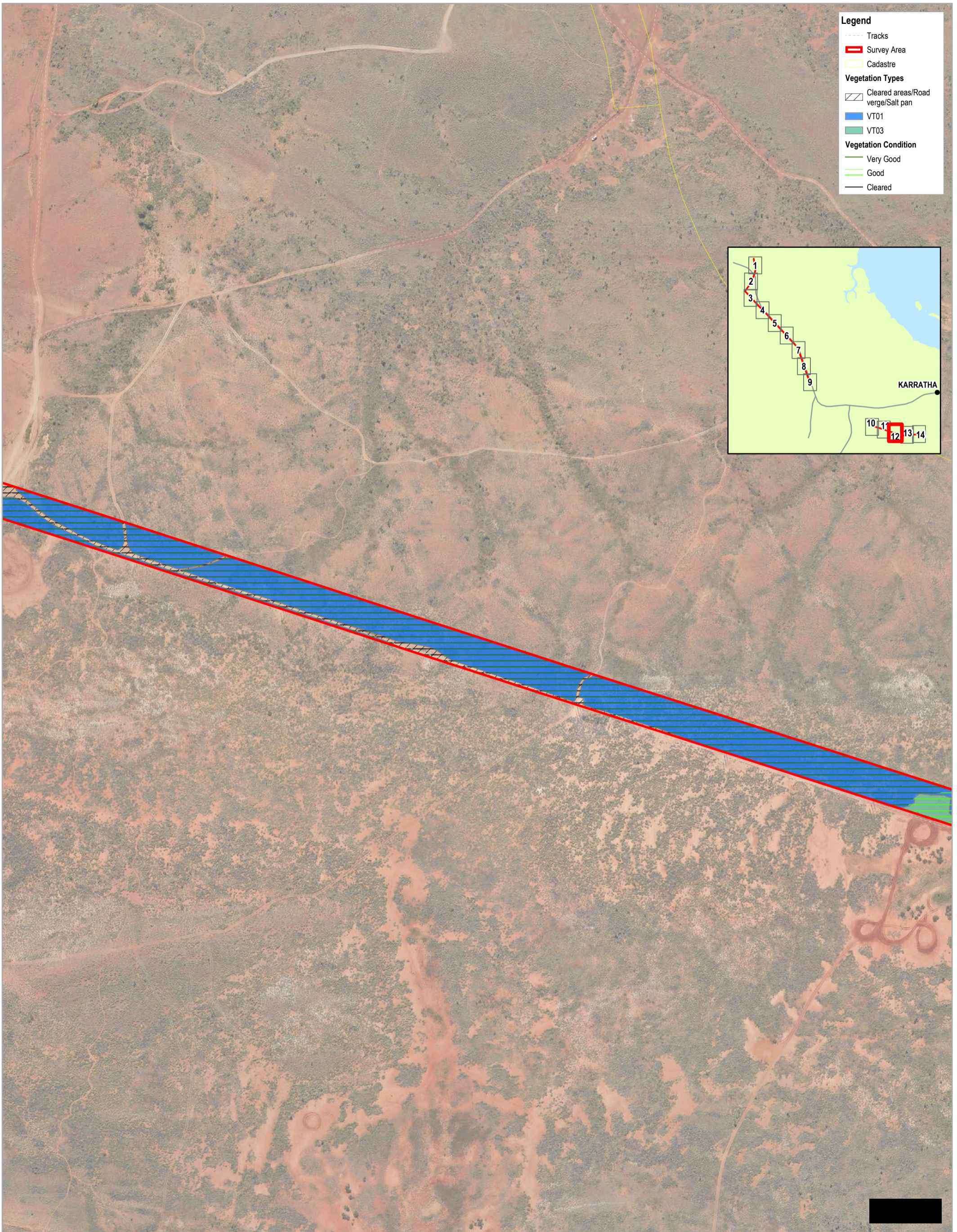


Horizon Power
124 - KRT- DMP 132kV Mapping & Field Fauna & Flora Survey

Vegetation Types and Conditions

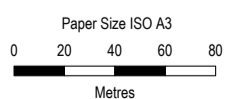
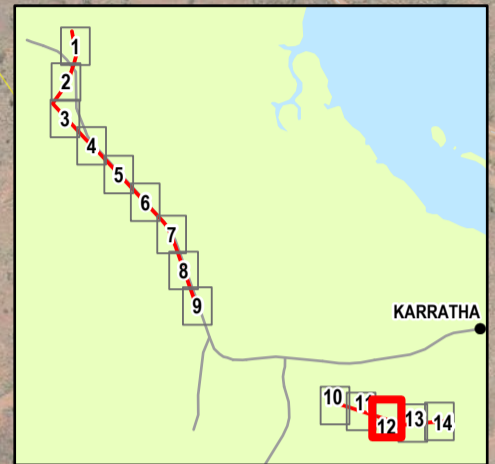
Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 7
Page 11 of 14

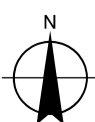


Legend

- Tracks
- ▭ Survey Area
- ▭ Cadastre
- Vegetation Types**
- ▨ Cleared areas/Road verge/Salt pan
- ▭ VT01
- ▭ VT03
- Vegetation Condition**
- ▭ Very Good
- ▭ Good
- ▭ Cleared



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

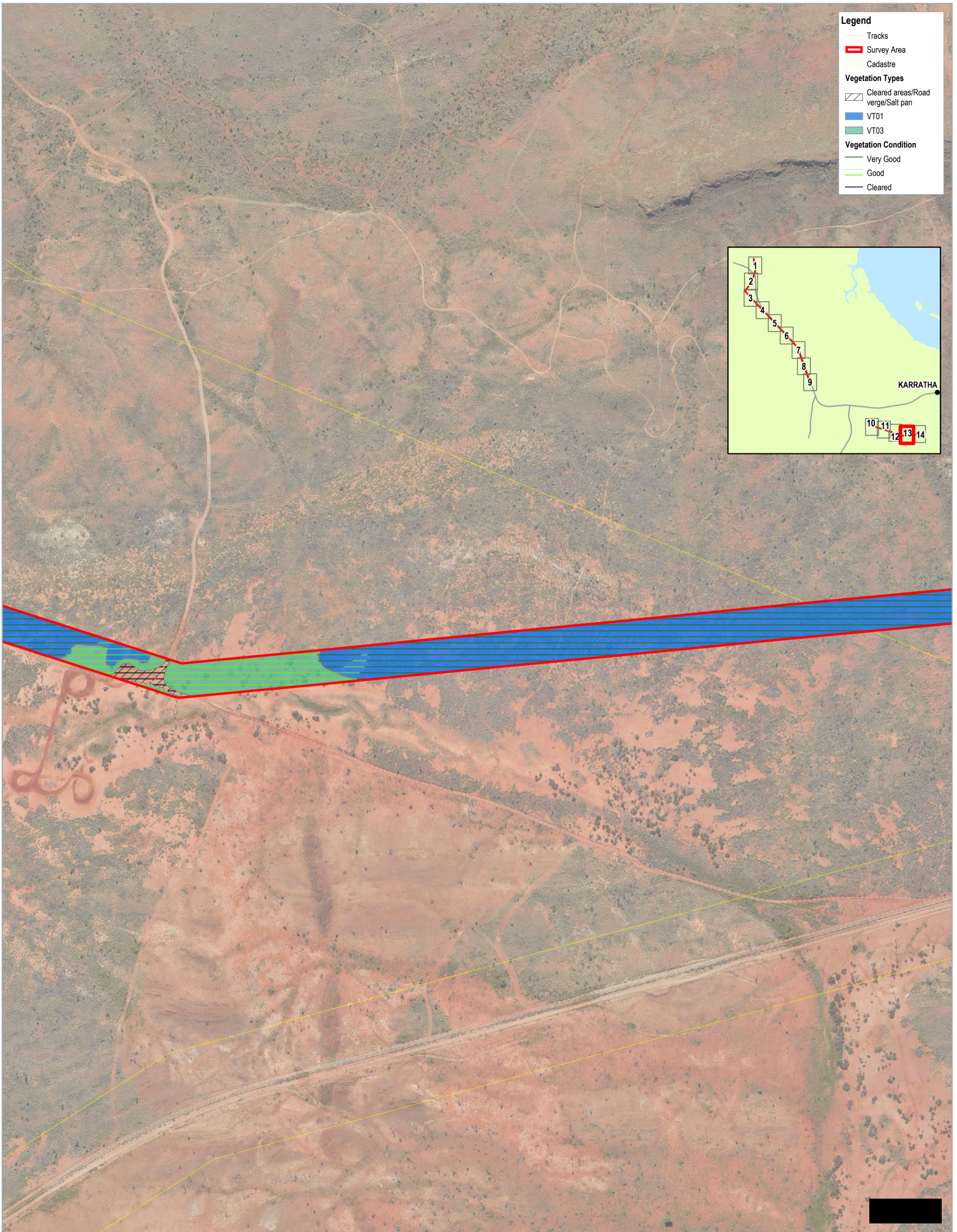


Horizon Power
124 - KRT- DMP 132kV Mapping & Field Fauna & Flora Survey

Vegetation Types and Conditions

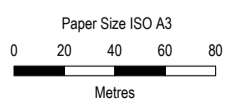
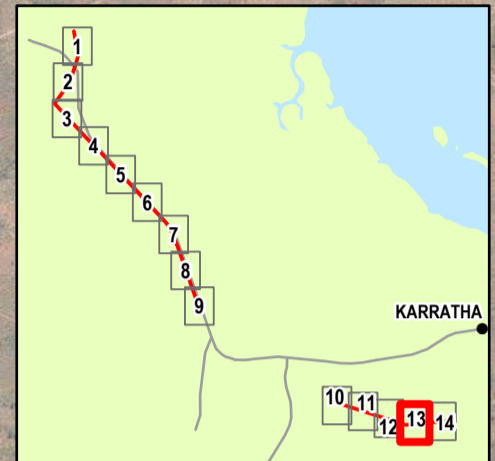
Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 7
Page 12 of 14

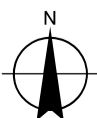


Legend

- Tracks
- ▭ Survey Area
- ▭ Cadastre
- Vegetation Types**
- ▨ Cleared areas/Road verge/Salt pan
- ▨ VT01
- ▨ VT03
- Vegetation Condition**
- ▨ Very Good
- ▨ Good
- ▨ Cleared



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

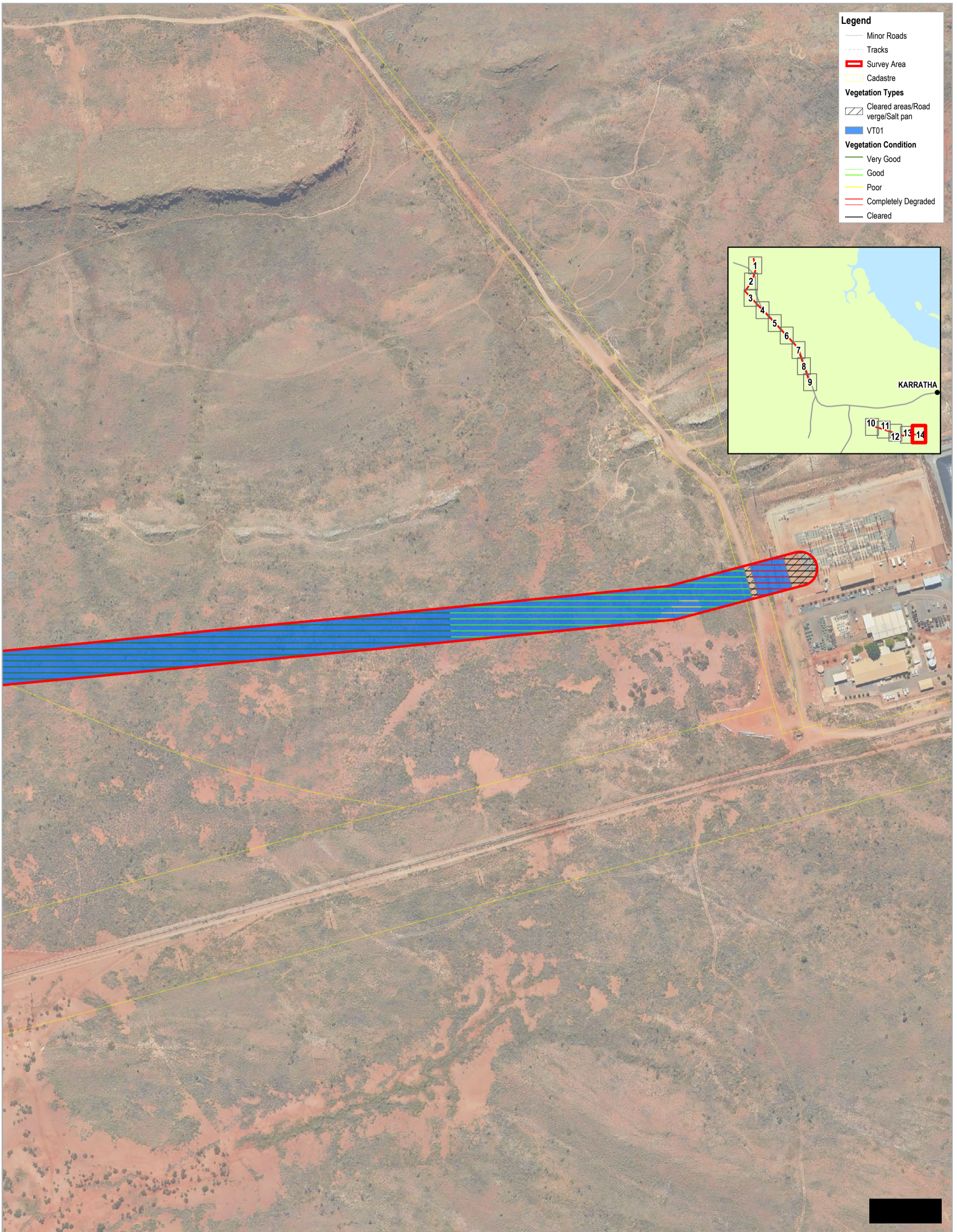


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

Vegetation Types and Conditions

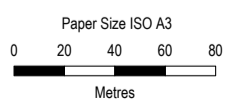
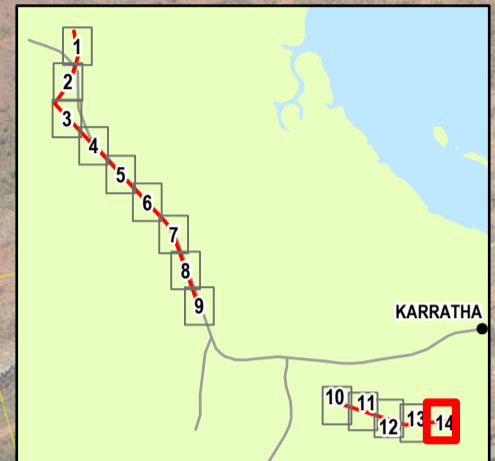
Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 7
Page 13 of 14

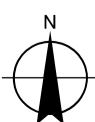


Legend

- Minor Roads
- Tracks
- ▭ Survey Area
- ▭ Cadastre
- Vegetation Types**
- ▨ Cleared areas/Road verge/Salt pan
- ▭ VT01
- Vegetation Condition**
- Very Good
- Good
- Poor
- Completely Degraded
- Cleared



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

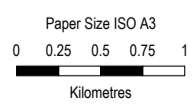
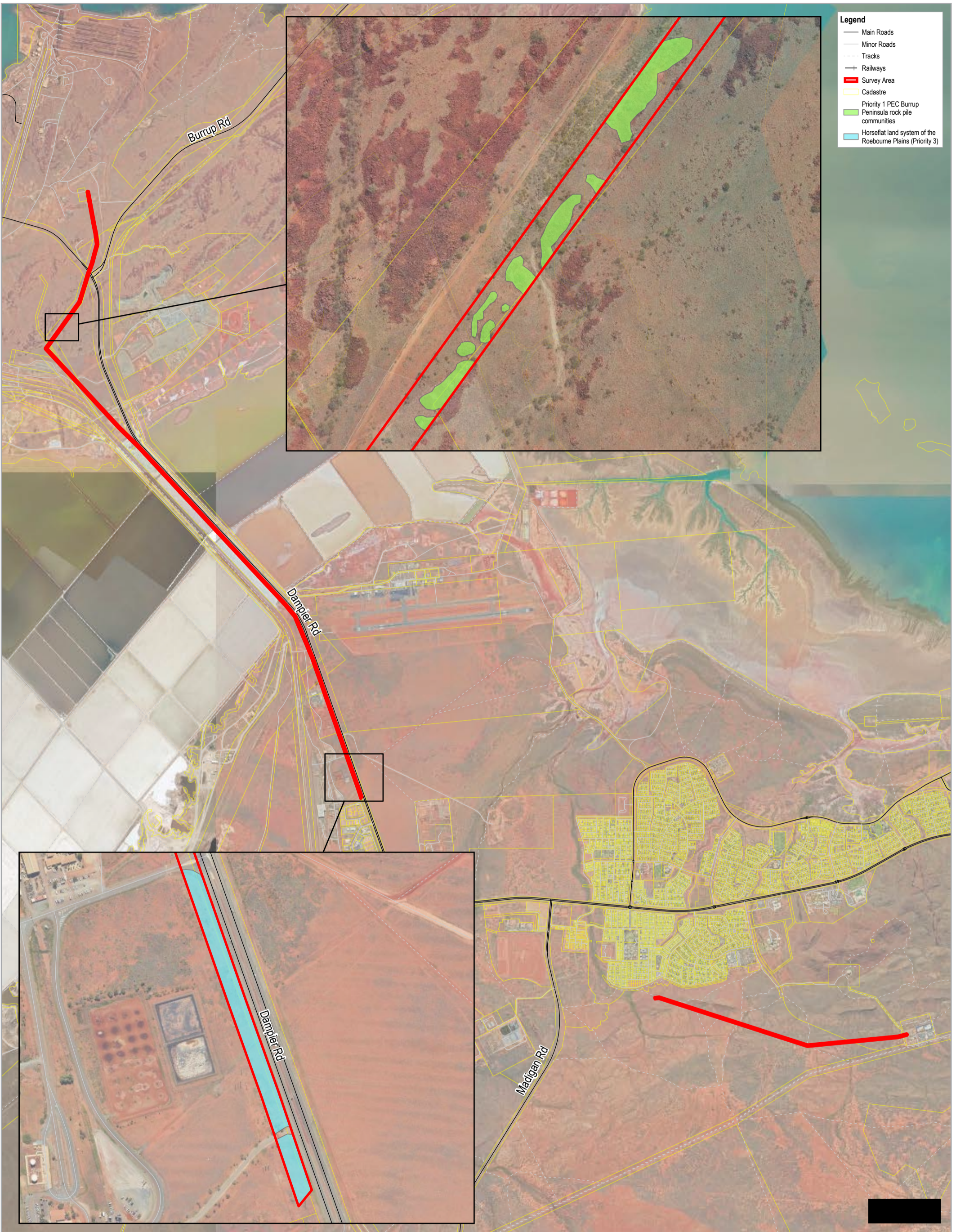


Horizon Power
 124 - KRT- DMP 132kV Mapping &
 Field Fauna & Flora Survey

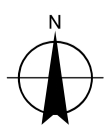
Vegetation Types and Conditions

Project No. 61-38330
 Revision No. 0
 Date 6/08/2019

FIGURE 7
 Page 14 of 14



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



Horizon Power
124 - KRT- DMP 132kV Mapping &
Field Fauna & Flora Survey
Priority Ecological Community Location

Project No. 61-38330
Revision No. B
Date 10/07/2019

FIGURE 8

Redacted

Appendix B – Relevant legislation and background information

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, fauna, 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 and fauna 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 the Environment and Energy (DEE).

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:

- a) Native vegetation should not be cleared if it comprises a high level of biodiversity.
- b) 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.
- c) Native vegetation should not be cleared if it includes, or is necessary, for the continued existence of rare flora.
- d) Native vegetation should not be cleared if it comprises the whole or part of native vegetation in an area that has been extensively cleared.
- e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.
- f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
- g) 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.
- h) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

- i) 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.
- j) 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 in decision-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 13 of the EPBC Act.
An area that is included on the Register of the National Estate (RNE), because of its natural values, under the <i>Australian Heritage Commission Act 1975</i> 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 <i>Environmental Protection (Gnangara Mound Crown Land) Policy 1992</i> .
The areas covered by the <i>Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002</i> .
The areas covered by the lakes to which the <i>Environmental Protection (Swan Coastal Plain Lakes) Policy 1992</i> (EPP Lakes) applies.
Protected wetlands as defined in the <i>Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998</i> .

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. DBCA managed conservation estate, is vested with the Conservation Commission of Western Australia. 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 Listed Wetlands

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” (DEE 2019b). 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” (DEE 2019b).

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 (DEE 2019a):

- 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 (2018), 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 at least every two years.

Vegetation condition

The vegetation condition can be assessed in accordance with the vegetation condition rating scale for the Eremaean and Northern 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 that caused by low levels of grazing or slightly aggressive weeds
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds..
Degraded	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Conservation codes

Species of significant flora, fauna 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

Conservation 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.

Conservation 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: <ul style="list-style-type: none"> A) is not critically endangered; and B) 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: <ul style="list-style-type: none"> A) is not critically endangered or endangered; and B) is facing a high risk of extinction in the wild in the medium-term 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)	
<u>Threatened Ecological Communities</u>	

Categories	Definition
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.
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 –

- (a) there is no reasonable doubt that the last occurrence of the ecological community has collapsed); or
- (b) the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover –
 - (i) its species composition or structure; or
 - (ii) 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.

Conservation categories and definitions for PECS as listed by the DBCA

Category	Description
Priority 1	<p>Poorly known ecological communities.</p> <p>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.</p>
Priority 2	<p>Poorly known ecological communities.</p> <p>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.</p>

Category	Description
Priority 3	<p>Poorly known ecological communities.</p> <p>(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:</p> <p>(ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;</p> <p>(iii) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.</p> <p>Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.</p>
Priority 4	<p>Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.</p> <p>(i) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.</p> <p>(ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.</p> <p>(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.</p>
Priority 5	<p>Conservation Dependent ecological communities.</p> <p>Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.</p>

Other significant vegetation

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

- Restricted distribution
- Degree of historical impact from threatening processes
- Local endemism in restricted habitats
- Novel combinations of taxa
- A role as a refuge
- 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)
- Being poorly reserved.

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 and fauna

Conservation significant flora and fauna

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 the DEE and/or the EPA.

The Federal conservation level of flora and fauna species and their significance status is assessed under the EPBC Act. The significance levels for flora and fauna 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 EPBC Act also protects land and migratory species that are listed under International Agreements. The list of migratory species established under section 209 of the EPBC Act comprises:

- Migratory species which are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II)
- Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China–Australia Migratory Bird Agreement (CAMBA)
- Native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the republic of Korea–Australia Migratory Bird Agreement (ROKAMBA)

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

Threatened species are those 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 Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

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

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

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

Conservation categories and definitions for EPBC Act and BC Act listed flora and fauna species

Conservation category	Definition
Threatened species	
Critically Endangered (CR)	<p>Threatened species considered to be “facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines”.</p> <p>Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.</p>
Endangered (EN)	<p>Threatened species considered to be “facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines”.</p> <p>Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines</p>
Vulnerable (VU)	<p>Threatened species considered to be “facing a high risk of extinction in the wild in the medium term future, as determined in accordance with criteria set out in the ministerial guidelines”.</p> <p>Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines.</p>
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).
Specially protected species	
Migratory (MI)	<p>Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).</p> <p>Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species</p>

Conservation category	Definition
Species of special conservation interest (conservation dependent fauna) (CD)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
Other specially protected fauna (OS)	Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Conservation codes for DBCA listed Priority flora and fauna

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

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 (2016b) states that significant flora may include taxa that have:

- A keystone role in a particular habitat for threatened or Priority flora or fauna 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
- Anomalous features that indicate a potential new discovery
- 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)
- The presence of 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)
- Being poorly reserved

Other significant fauna

Fauna species may be significant for a range of reasons other than those protected by international agreement or treaty, Specially Protected or Priority Fauna. Significant fauna may include short-range endemic species, species that have declining populations or declining distributions, species at the extremes of their range, or isolated outlying populations, or species which may be undescribed (EPA 2010).

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.
- DEE 2019a, *Criteria for determining nationally important wetlands*, retrieved 2019, from <http://www.environment.gov.au/topics/water/water-our-environment/wetlands/australian-wetlands-database/directory-important>.
- DEE 2019b, *The Ramsar Convention on Wetlands*, retrieved 2019, 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 2010, *Technical Guide – Terrestrial Fauna Surveys*, EPA, Perth, WA.
- 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 2018, *Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full report)*, Current as of December 2017, Perth Western Australia, Department of Environment and Conservation, from <https://www2.landgate.wa.gov.au/web/guest/downloader>.
- 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

EPBC Act PMST (20 km buffer)

NatureMap Flora Report (20 km buffer)

NatureMap Fauna Report (20 km buffer)



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: 13/02/19 11:28:07

[Summary](#)

[Details](#)

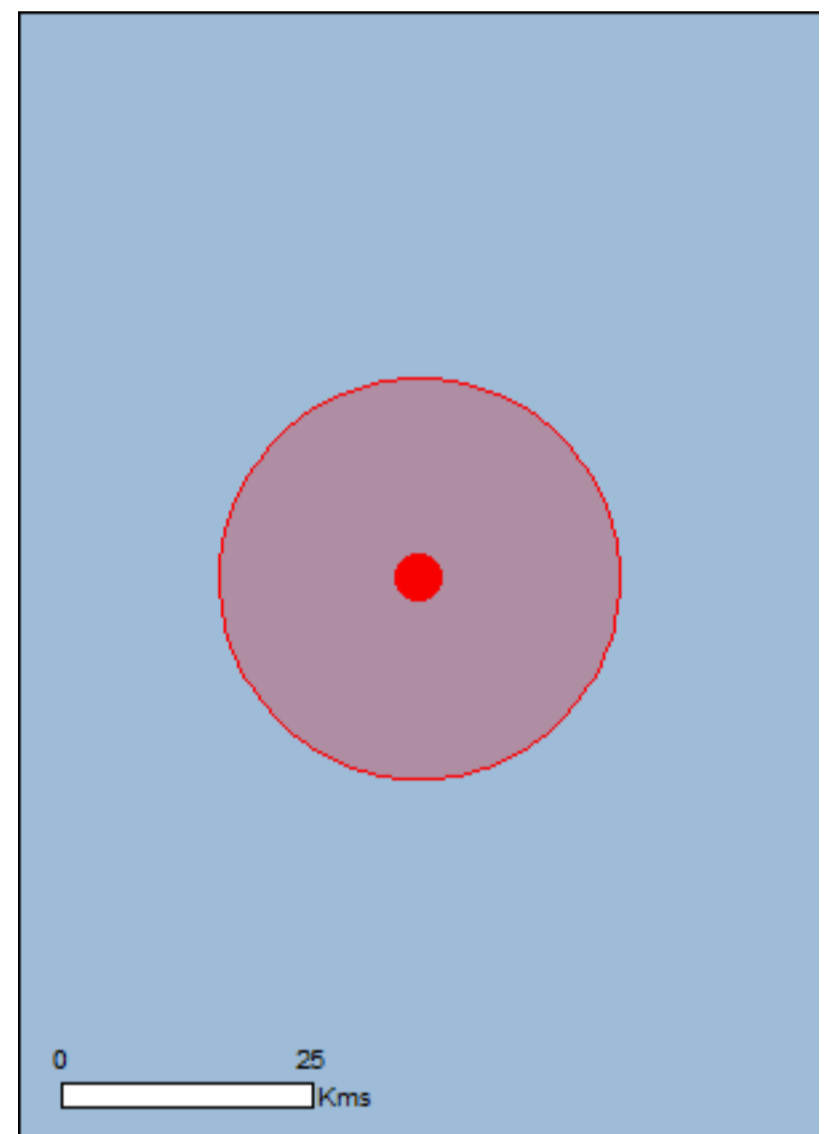
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

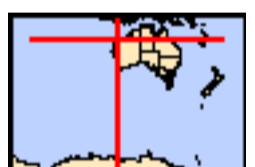
[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 20.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	31
Listed Migratory Species:	59

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:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	100
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	6
Regional Forest Agreements:	None
Invasive Species:	17
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

National Heritage Properties		[Resource Information]
Name	State	Status
Indigenous		
Dampier Archipelago (including Burrup Peninsula)	WA	Listed place

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
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may 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, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding known to occur within area

Name	Status	Type of Presence
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species 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 likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Rhinonictis aurantia (Pilbara form) Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Aipysurus apraefrontalis Short-nosed Seasnake [1115]	Critically Endangered	Species or species habitat likely to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding known to occur within area
Ctenotus angusticeps Northwestern Coastal Ctenotus, Airlie Island Ctenotus [25937]	Vulnerable	Species or species habitat likely 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	Breeding 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		
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat likely to occur within area
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 zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species

Name	Status	Type of Presence
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
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Onychoprion anaethetus Bridled Tern [82845]		Breeding known to occur within area
Sterna dougallii Roseate Tern [817]		Breeding likely 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
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding 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 known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding known to occur within area

Name	Threatened	Type of Presence
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat known to occur 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 zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Species or species habitat known 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 known to occur within area
Tursiops aduncus (Arafura/Timor Sea populations) Spotted Bottlenose Dolphin (Arafura/Timor Sea populations) [78900]		Species or species habitat known to occur within area
Migratory Terrestrial Species		
Hirundo rustica Barn Swallow [662]		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 may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area

Name	Threatened	Type of Presence
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 may occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		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
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species habitat known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Species or species

Name	Threatened	Type of Presence
Tringa nebularia Common Greenshank, Greenshank [832]		habitat known to occur within area Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Tringa totanus Common Redshank, Redshank [835]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Defence - KARRATHA TRAINING DEPOT

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 alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris alba Sanderling [875]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species

Name	Threatened	Type of Presence
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	habitat known to occur within area Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Species or species habitat known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat known to 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]		Species or species habitat known to occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Breeding known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Species or species habitat known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Species or species habitat known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
Larus novaehollandiae Silver Gull [810]		Breeding known to occur within area

Name	Threatened	Type of Presence
Limicola falcinellus Broad-billed Sandpiper [842]		Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		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 may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius phaeopus Whimbrel [849]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Species or species habitat known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species habitat known to occur within area
Pluvialis squatarola Grey Plover [865]		Species or species habitat known to occur within area
Puffinus pacificus Wedge-tailed Shearwater [1027]		Breeding known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		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 anaethetus Bridled Tern [814]		Breeding known to occur within area
Sterna caspia Caspian Tern [59467]		Breeding known to occur within area
Sterna dougallii Roseate Tern [817]		Breeding likely to occur within area
Stiltia isabella Australian Pratincole [818]		Species or species

Name	Threatened	Type of Presence
Tringa nebularia Common Greenshank, Greenshank [832]		habitat known to occur within area Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area
Tringa totanus Common Redshank, Redshank [835]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Species or species habitat known to occur within area
Fish		
Bulbonaricus brauni Braun's Pughead Pipefish, Pug-headed Pipefish [66189]		Species or species 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

Name	Threatened	Type of Presence
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		habitat may occur within area 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 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 known 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

Name	Threatened	Type of Presence
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	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding 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	Breeding known to occur within area
Hydrelaps darwiniensis Black-ringed Seasnake [1100]		Species or species habitat may occur within area
Hydrophis czeb lukovi Fine-spined Seasnake [59233]		Species or species habitat may occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Hydrophis mcdowellii 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		

Name	Status	Type of Presence
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may 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
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
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 known 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 known to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Murujuga	WA
Unnamed WA36907	WA
Unnamed WA36909	WA
Unnamed WA36910	WA
Unnamed WA36915	WA
Unnamed WA38287	WA

Invasive Species

[[Resource Information](#)]

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

Name	Status	Type of Presence
Birds		
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
<i>Passer domesticus</i> House Sparrow [405]		Species or species habitat likely to occur within area
<i>Passer montanus</i> Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Mammals		
<i>Canis lupus familiaris</i> Domestic Dog [82654]		Species or species habitat likely to occur within area
<i>Equus caballus</i> Horse [5]		Species or species habitat likely to occur within area
<i>Felis catus</i> Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
<i>Mus musculus</i> House Mouse [120]		Species or species habitat likely to occur within area
<i>Oryctolagus cuniculus</i> Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
<i>Rattus rattus</i> Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
<i>Vulpes vulpes</i> Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
<i>Cenchrus ciliaris</i> Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area
<i>Jatropha gossypifolia</i> Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
<i>Opuntia</i> spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
<i>Parkinsonia aculeata</i> Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
<i>Prosopis</i> spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Reptiles		
<i>Hemidactylus frenatus</i> Asian House Gecko [1708]		Species or species

Name	Status	Type of Presence
Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		habitat likely to occur within area Species or species habitat known to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-20.69227 116.73771

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.

NatureMap Species Report

Created By Guest user on 25/02/2019

Kingdom Plantae
Current Names Only Yes
Core Datasets Only Yes
Species Group Vascular Plants
Method 'By Circle'
Centre 116° 44' 55" E, 20° 42' 17" S
Buffer 20km
Group By Family

Family	Species	Records
Acanthaceae	3	23
Aizoaceae	6	33
Amaranthaceae	36	221
Apocynaceae	6	22
Araliaceae	4	22
Areaceae	1	1
Asteraceae	38	143
Bignoniaceae	1	1
Boraginaceae	12	59
Brassicaceae	3	18
Cactaceae	1	64
Capparaceae	2	9
Caryophyllaceae	2	8
Celastraceae	3	7
Chenopodiaceae	41	180
Cleomaceae	2	27
Combretaceae	4	61
Commelinaceae	1	4
Convolvulaceae	27	95
Cucurbitaceae	4	18
Cymodoceaceae	2	17
Cyperaceae	18	50
Elatinaceae	2	2
Euphorbiaceae	18	109
Fabaceae	110	693
Frankeniaceae	2	6
Gentianaceae	3	3
Geraniaceae	1	1
Goodeniaceae	13	79
Gyrostemonaceae	1	1
Hydrocharitaceae	6	28
Lamiaceae	3	9
Lauraceae	2	5
Lythraceae	3	7
Malvaceae	42	292
Menispermaceae	1	7
Molluginaceae	1	5
Montiaceae	1	1
Moraceae	6	26
Myrtaceae	5	20
Nyctaginaceae	8	30
Oleaceae	1	6
Passifloraceae	1	4
Phrymaceae	2	3
Phyllanthaceae	9	34
Pittosporaceae	1	5
Plantaginaceae	2	11
Plumbaginaceae	2	7
Poaceae	82	439
Polygalaceae	2	5
Polygonaceae	1	1
Portulacaceae	4	27
Primulaceae	1	1
Proteaceae	6	16
Pteridaceae	2	5
Rhizophoraceae	3	32
Rubiaceae	7	27
Santalaceae	1	5
Sapindaceae	4	16
Scrophulariaceae	3	23
Solanaceae	15	73
Stylidiaceae	1	3
Surianaceae	1	6
Thymelaeaceae	1	1
Violaceae	2	19
Zygophyllaceae	7	31
TOTAL	606	3207

Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
Acanthaceae				
1.	6828 <i>Avicennia marina</i> (White Mangrove)			
2.	14555 <i>Avicennia marina</i> subsp. <i>marina</i>			
3.	7166 <i>Dicliptera armata</i>			
Aizoaceae				
4.	2818 <i>Sesuvium portulacastrum</i>			
5.	2830 <i>Trianthema portulacastrum</i> (Giant Pigweed)	Y		
6.	44362 <i>Trianthema triquetrum</i>			
7.	44360 <i>Trianthema turgidifolium</i>			
8.	2834 <i>Zaleya galericulata</i> (Hogweed)			
9.	29095 <i>Zaleya galericulata</i> subsp. <i>galericulata</i>			
Amaranthaceae				
10.	2645 <i>Achyranthes aspera</i> (Chaff Flower)			
11.	2646 <i>Aerva javanica</i> (Kapok Bush)	Y		
12.	2651 <i>Alternanthera nana</i> (Hairy Joyweed)			
13.	2652 <i>Alternanthera nodiflora</i> (Common Joyweed)			
14.	2660 <i>Amaranthus cuspidifolius</i>			
15.	20018 <i>Amaranthus undulatus</i>			
16.	2674 <i>Gomphrena affinis</i>			
17.	18361 <i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>			
18.	2676 <i>Gomphrena canescens</i> (Batchelors Buttons)			
19.	2680 <i>Gomphrena cunninghamii</i>			
20.	2682 <i>Gomphrena flaccida</i> (Gomphrena Weed)			
21.	18367 <i>Gomphrena kanisii</i>			
22.	2683 <i>Gomphrena leptoclada</i>			
23.	18257 <i>Gomphrena leptoclada</i> subsp. <i>leptoclada</i>			
24.	11131 <i>Gomphrena sordida</i>			
25.	31074 <i>Gomphrena</i> sp. <i>Martins Well</i> (K.F. Kenneally 6116)			Y
26.	2690 <i>Ptilotus aevoides</i>			
27.	2696 <i>Ptilotus astrolasius</i>			
28.	2698 <i>Ptilotus auriculifolius</i>			
29.	2699 <i>Ptilotus axillaris</i> (Mat Mulla Mulla)			
30.	2704 <i>Ptilotus calostachyus</i> (Weeping Mulla Mulla)			
31.	2706 <i>Ptilotus carinatus</i>			
32.	2711 <i>Ptilotus clementii</i> (Tassel Top)			
33.	2717 <i>Ptilotus divaricatus</i> (Climbing Mulla Mulla)			
34.	2721 <i>Ptilotus exaltatus</i> (Tall Mulla Mulla)			
35.	2725 <i>Ptilotus fusiformis</i>			
36.	2728 <i>Ptilotus gomphrenoides</i>			
37.	2729 <i>Ptilotus grandiflorus</i>			
38.	2731 <i>Ptilotus helipteroides</i> (Hairy Mulla Mulla)			
39.	2741 <i>Ptilotus macrocephalus</i> (Featherheads)			
40.	2745 <i>Ptilotus murrayi</i>			
41.	2746 <i>Ptilotus nobilis</i> (Tall Mulla Mulla)			
42.	2747 <i>Ptilotus obovatus</i> (Cotton Bush)			
43.	2751 <i>Ptilotus polystachyus</i> (Prince of Wales Feather)			
44.	2766 <i>Ptilotus villosiflorus</i>			
45.	43203 <i>Surreya diandra</i>			
Apocynaceae				
46.	6580 <i>Asclepias curassavica</i> (Redhead Cottonbush)	Y		
47.	6567 <i>Carissa lanceolata</i> (Conkerberry, Marnuwiji)			
48.	6584 <i>Cynanchum floribundum</i> (Dumara Bush, Tjipa)			
49.	48280 <i>Cynanchum viminale</i> subsp. <i>australe</i>			
50.	12832 <i>Gymnanthera cunninghamii</i>		P3	
51.	6578 <i>Wrightia saligna</i>			
Araliaceae				
52.	6270 <i>Trachymene didiscoides</i>			
53.	6273 <i>Trachymene glaucifolia</i> (Wild Carrot)			
54.	6278 <i>Trachymene oleracea</i>			
55.	19043 <i>Trachymene oleracea</i> subsp. <i>oleracea</i>			
Arecaceae				
56.	17910 <i>Washingtonia filifera</i>	Y		
Asteraceae				
57.	7832 <i>Angianthus milnei</i> (Cone-spike Angianthus)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
58.	7854 <i>Bidens bipinnata</i> (Bipinnate Beggartick)	Y		
59.	7866 <i>Blumea tenella</i>			
60.	7905 <i>Calotis multicaulis</i> (Many-stemmed Burr-daisy)			
61.	7919 <i>Centipeda minima</i> (Spreading Sneezewood, Kanjirralaa, Inteng-inteng, Karengkal, Kata-palkalpa, Munyu-parnti-parnti)			
62.	19762 <i>Centipeda minima</i> subsp. <i>macrocephala</i>			
63.	33516 <i>Chrysocephalum gilesii</i>			
64.	7939 <i>Conyza bonariensis</i> (Flaxleaf Fleabane)	Y		
65.	35558 <i>Flaveria trinervia</i> (Speedy Weed)	Y		
66.	8088 <i>Ixiochlamys cuneifolia</i>			
67.	8095 <i>Lactuca saligna</i> (Wild Lettuce, Willow-leaf Lettuce)	Y		
68.	<i>Launaea sarmentosa</i>			
69.	8098 <i>Launaea sarmentosa</i>			
70.	8109 <i>Minuria integerrima</i> (Smooth Minuria)			
71.	8110 <i>Minuria leptophylla</i> (Minnie Daisy)			
72.	13494 <i>Pentalepis trichodesmoides</i>			
73.	42160 <i>Pentalepis trichodesmoides</i> subsp. <i>trichodesmoides</i>			
74.	8167 <i>Pluchea dentex</i>			
75.	17816 <i>Pluchea ferdinandi-muelleri</i>			
76.	43944 <i>Pluchea longiseta</i>			
77.	8168 <i>Pluchea rubelliflora</i>			
78.	8170 <i>Pluchea tetranthera</i>			
79.	8189 <i>Pseudognaphalium luteoalbum</i> (Jersey Cudweed)			
80.	<i>Pterocaulon</i> sp.			
81.	8192 <i>Pterocaulon sphacelatum</i> (Apple Bush, Fruit Salad Plant)			
82.	8193 <i>Pterocaulon sphaeranthoides</i>			
83.	13301 <i>Rhodanthe floribunda</i>			
84.	13246 <i>Rhodanthe humboldtiana</i>			
85.	13310 <i>Rhodanthe margarethae</i>			
86.	8231 <i>Sonchus oleraceus</i> (Common Sowthistle)	Y		
87.	8234 <i>Streptoglossa adscendens</i>			
88.	8235 <i>Streptoglossa bubakii</i>			
89.	8236 <i>Streptoglossa cylindriceps</i>			
90.	8237 <i>Streptoglossa decurrens</i>			
91.	8238 <i>Streptoglossa liatroides</i>			
92.	8240 <i>Streptoglossa odora</i>			
93.	8241 <i>Streptoglossa tenuiflora</i>			
94.	8252 <i>Tridax procumbens</i> (Tridax, Tridax Daisy)	Y		

Bignoniaceae

95.	48390 <i>Dolichandrone occidentalis</i>			
-----	---	--	--	--

Boraginaceae

96.	6682 <i>Ehretia saligna</i> (False Cedar)			
97.	14301 <i>Ehretia saligna</i> var. <i>saligna</i>			
98.	17301 <i>Heliotropium chrysocarpum</i>			
99.	6704 <i>Heliotropium conocarpum</i>			
100.	6706 <i>Heliotropium cunninghamii</i>			
101.	6707 <i>Heliotropium curassavicum</i> (Smooth Heliotrope)			
102.	6712 <i>Heliotropium heteranthum</i>			
103.	17307 <i>Heliotropium inexplicitum</i>			
104.	17315 <i>Heliotropium tanythrix</i>			
105.	6718 <i>Heliotropium tenuifolium</i> (Mamukata)			
106.	6727 <i>Trichodesma zeylanicum</i> (Camel Bush, Kumbalin)			
107.	11750 <i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			

Brassicaceae

108.	2995 <i>Brassica x napus</i>	Y		
109.	3035 <i>Lepidium pedicellosum</i>			
110.	3038 <i>Lepidium pholidogynum</i>			

Cactaceae

111.	5227 <i>Opuntia stricta</i> (Common Prickly Pear)	Y		
------	---	---	--	--

Capparaceae

112.	2981 <i>Capparis spinosa</i>			
113.	48291 <i>Capparis spinosa</i> subsp. <i>nummularia</i>			

Caryophyllaceae

114.	2901 <i>Polycarpaea holtzei</i>			
115.	2903 <i>Polycarpaea longiflora</i>			

Celastraceae

116.	4729 <i>Stackhousia clementii</i>			
------	-----------------------------------	--	--	--

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
			P3	
117.	4731 <i>Stackhousia intermedia</i>			
118.	19555 <i>Stackhousia muricata</i> subsp. <i>annual</i> (W.R. Barker 2172)			
Chenopodiaceae				
119.	2450 <i>Atriplex amnicola</i> (Swamp Saltbush)			
120.	2451 <i>Atriplex bunburyana</i> (Silver Saltbush)			
121.	2453 <i>Atriplex codonocarpa</i> (Flat-topped Saltbush)			
122.	2463 <i>Atriplex isatidea</i> (Coast Saltbush)			
123.	2466 <i>Atriplex lindleyi</i>			
124.	2476 <i>Atriplex semilunaris</i> (Annual Saltbush)			
125.	2504 <i>Dysphania plantaginella</i>			
126.	2506 <i>Dysphania rhadinostachya</i>			
127.	11653 <i>Dysphania rhadinostachya</i> subsp. <i>inflata</i>			
128.	11890 <i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>			
129.	2511 <i>Enchylaena tomentosa</i> (Barrier Saltbush)			
130.	12064 <i>Enchylaena tomentosa</i> var. <i>tomentosa</i> (Barrier Saltbush)			
131.	2544 <i>Maireana georgei</i> (Satiny Bluebush)			
132.	2556 <i>Maireana planifolia</i> (Low Bluebush)			
133.	2564 <i>Maireana stipitata</i>			
134.	11662 <i>Maireana tomentosa</i> subsp. <i>tomentosa</i>			
135.	2573 <i>Neobassia astrocarpa</i>			
136.	2582 <i>Rhagodia eremaea</i> (Thorny Saltbush)			
137.	2584 <i>Rhagodia preissii</i>			
138.	11240 <i>Rhagodia preissii</i> subsp. <i>obovata</i>			
139.	30434 <i>Salsola australis</i>			
140.	11650 <i>Sclerolaena bicornis</i> var. <i>bicornis</i> (Goathead Burr)			
141.	2604 <i>Sclerolaena costata</i>			
142.	2607 <i>Sclerolaena densiflora</i>			
143.	2609 <i>Sclerolaena diacantha</i> (Grey Copperburr)			
144.	8877 <i>Sclerolaena gardneri</i>			
145.	2633 <i>Sclerolaena uniflora</i> (Two-spined Saltbush)			
146.	2638 <i>Suaeda arbusculoides</i>			
147.	31616 <i>Tecticornia auriculata</i>			
148.	33236 <i>Tecticornia halocnemoides</i> (Shrubby Samphire)			
149.	33240 <i>Tecticornia halocnemoides</i> subsp. <i>longispicata</i>			
150.	33238 <i>Tecticornia halocnemoides</i> subsp. <i>tenuis</i>			
151.	33317 <i>Tecticornia indica</i>			
152.	33319 <i>Tecticornia indica</i> subsp. <i>bidens</i>			
153.	33356 <i>Tecticornia indica</i> subsp. <i>indica</i>			
154.	33357 <i>Tecticornia indica</i> subsp. <i>julacea</i>			
155.	33318 <i>Tecticornia indica</i> subsp. <i>leiostachya</i> (Samphire)			
156.	33299 <i>Tecticornia pergranulata</i> subsp. <i>elongata</i>			
157.	31618 <i>Tecticornia pruinosa</i>			
158.	33220 <i>Tecticornia pterygosperma</i> subsp. <i>denticulata</i>			
159.	2644 <i>Threlkeldia diffusa</i> (Coast Bonefruit)			
Cleomaceae				
160.	2985 <i>Cleome oxalidea</i>			
161.	2988 <i>Cleome viscosa</i> (Tickweed, Tjinduwadhu)			
Combretaceae				
162.	5300 <i>Terminalia canescens</i> (Joolal)			
163.	45698 <i>Terminalia circumalata</i>			
164.	5310 <i>Terminalia platyphylla</i> (Wild Plum, Durin)			
165.	5313 <i>Terminalia supranitifolia</i>		P3	
Commelinaceae				
166.	1165 <i>Commelina ensifolia</i> (Wandering Jew, Buargu)			
Convolvulaceae				
167.	11167 <i>Bonamia erecta</i>			
168.	6606 <i>Bonamia media</i>			
169.	6608 <i>Bonamia pannosa</i>			
170.	44782 <i>Bonamia pilbarensis</i>			
171.	6609 <i>Bonamia rosea</i> (Feltly Bellflower)			
172.	19880 <i>Convolvulus angustissimus</i>			
173.	6612 <i>Convolvulus clementii</i>			
174.	19565 <i>Cressa australis</i>			
175.	13733 <i>Cuscuta victoriana</i>			
176.	48738 <i>Distimake dissectus</i> var. <i>dissectus</i>	Y		
177.	6617 <i>Evolvulus alsinoides</i> (Tropical Speedwell)			
178.	11200 <i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
179.	6623 <i>Ipomoea coptica</i>			
180.	6624 <i>Ipomoea costata</i> (Rock Morning Glory, Kanti)			
181.	6631 <i>Ipomoea lonchophylla</i> (Cowvine)			
182.	6633 <i>Ipomoea muelleri</i> (Poison Morning Glory, Yumbu)			
183.	6635 <i>Ipomoea pes-caprae</i>			
184.	11312 <i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i>			
185.	6636 <i>Ipomoea plebeia</i> (Bellvine)			
186.	6637 <i>Ipomoea polymorpha</i>			
187.	<i>Ipomoea</i> sp.			
188.	6651 <i>Operculina aequisejala</i>			
189.	6652 <i>Operculina brownii</i> (Potato Vine, Bara)			
190.	6653 <i>Polymeria ambigua</i> (Morning Glory)			
191.	6655 <i>Polymeria calycina</i>			
192.	17513 <i>Polymeria lanata</i>			
193.	<i>Polymeria</i> sp.			
Cucurbitaceae				
194.	41720 <i>Cucumis argenteus</i>			
195.	7371 <i>Cucumis melo</i> (Ulcardo Melon)			
196.	41721 <i>Cucumis variabilis</i>			
197.	7381 <i>Trichosanthes cucumerina</i>			
Cymodoceaceae				
198.	131 <i>Halodule uninervis</i>			
199.	132 <i>Syringodium isoetifolium</i>			
Cyperaceae				
200.	750 <i>Bulbostylis barbata</i>			
201.	752 <i>Bulbostylis turbinata</i>			
202.	774 <i>Cyperus bifax</i> (Downs Nutgrass)			
203.	12801 <i>Cyperus blakeanus</i>			
204.	777 <i>Cyperus bulbosus</i> (Bush Onion, Tjanmata)			
205.	786 <i>Cyperus cunninghamii</i>			
206.	12811 <i>Cyperus cunninghamii</i> subsp. <i>cunninghamii</i>			
207.	789 <i>Cyperus difformis</i> (Rice Sedge)			
208.	798 <i>Cyperus iria</i>			
209.	804 <i>Cyperus nervulosus</i>			
210.	814 <i>Cyperus squarrosus</i>			
211.	818 <i>Cyperus vaginatus</i> (Stiffleaf Sedge)			
212.	827 <i>Eleocharis geniculata</i>			
213.	851 <i>Fimbristylis dichotoma</i> (Eight Day Grass)			
214.	862 <i>Fimbristylis microcarya</i>			
215.	878 <i>Fimbristylis rara</i>			
216.	16257 <i>Schoenoplectus subulatus</i>			
217.	1010 <i>Schoenus punctatus</i>		P3	
Elatinaceae				
218.	5183 <i>Bergia ammannioides</i>			
219.	5186 <i>Bergia trimera</i>			
Euphorbiaceae				
220.	4583 <i>Adriana tomentosa</i>			
221.	17422 <i>Adriana tomentosa</i> var. <i>tomentosa</i>			
222.	4617 <i>Euphorbia australis</i> (Namana)			
223.	35307 <i>Euphorbia australis</i> var. <i>australis</i>			
224.	35303 <i>Euphorbia australis</i> var. <i>subtomentosa</i>			
225.	4619 <i>Euphorbia biconvexa</i>			
226.	4620 <i>Euphorbia boophthona</i> (Gascoyne Spurge)			
227.	9048 <i>Euphorbia careyi</i>			
228.	4623 <i>Euphorbia coghlanii</i> (Namana)			
229.	4626 <i>Euphorbia drummondii</i> (Caustic Weed, Piwi)			
230.	4629 <i>Euphorbia hirta</i> (Asthma Plant)	Y		
231.	4635 <i>Euphorbia myrtoides</i>			
232.	4644 <i>Euphorbia sharkoensis</i>			
233.	4647 <i>Euphorbia tannensis</i>			
234.	12097 <i>Euphorbia tannensis</i> subsp. <i>eremophila</i> (Desert Spurge)			
235.	42879 <i>Euphorbia trigonosperma</i>			
236.	13281 <i>Euphorbia vaccaria</i>			
237.	42876 <i>Euphorbia vaccaria</i> var. <i>vaccaria</i>			
Fabaceae				
238.	3209 <i>Acacia ampliceps</i>			
239.	44580 <i>Acacia ampliceps</i> x <i>bivenosa</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
240.	44586 <i>Acacia ampliceps x sclerosperma subsp. sclerosperma</i>			
241.	3214 <i>Acacia ancistrocarpa (Fitzroy Wattle)</i>			
242.	3223 <i>Acacia arida</i>			
243.	3241 <i>Acacia bivenosa</i>			
244.	44588 <i>Acacia bivenosa x sclerosperma subsp. sclerosperma</i>			
245.	13403 <i>Acacia coleii</i>			
246.	17013 <i>Acacia coleii var. coleii</i>			
247.	3270 <i>Acacia coriacea (Wirewood)</i>			
248.	13500 <i>Acacia coriacea subsp. coriacea</i>			
249.	13502 <i>Acacia coriacea subsp. pendens</i>			
250.	16174 <i>Acacia elachantha</i>			
251.	12673 <i>Acacia glaucocaesia</i>			
252.	3356 <i>Acacia gregorii (Gregory's Wattle)</i>			
253.	3372 <i>Acacia holosericea (Candelbra Wattle, Liringgin)</i>			
254.	3377 <i>Acacia inaequilatera (Baderi)</i>			
255.	3434 <i>Acacia maitlandii (Maitland's Wattle)</i>			
256.	3471 <i>Acacia orthocarpa (Needleleaf Wattle)</i>			
257.	3506 <i>Acacia pyrifolia (Ranji Bush, Kandji)</i>			
258.	29016 <i>Acacia pyrifolia var. morrisonii</i>			
259.	29015 <i>Acacia pyrifolia var. pyrifolia</i>			
260.	13078 <i>Acacia sclerosperma subsp. sclerosperma</i>			
261.	29135 <i>Acacia sericophylla</i>			
262.	3551 <i>Acacia sphaerostachya</i>			
263.	19456 <i>Acacia stellaticeps</i>			
264.	13070 <i>Acacia synchronica</i>			
265.	3573 <i>Acacia tenuissima</i>			
266.	3579 <i>Acacia trachycarpa (Minni Ritchi, Balgali)</i>			
267.	3606 <i>Acacia xiphophylla</i>			
268.	3680 <i>Aeschynomene indica (Budda Pea)</i>			
269.	3609 <i>Albizia lebbek</i>			
270.	17147 <i>Alysicarpus muelleri</i>			
271.	11055 <i>Cajanus cinereus</i>			
272.	10972 <i>Cajanus marmoratus</i>			
273.	11150 <i>Cajanus pubescens</i>			
274.	3749 <i>Canavalia rosea (Wild Jack Bean)</i>			
275.	3769 <i>Clitoria ternatea</i>	Y		
276.	3774 <i>Crotalaria cunninghamii (Green Birdflower, Bilbun)</i>			
277.	19378 <i>Crotalaria dissitiflora subsp. benthamiana</i>			
278.	20179 <i>Crotalaria medicaginea var. neglecta</i>			
279.	3785 <i>Crotalaria novae-hollandiae (New Holland Rattlepod)</i>			
280.	11231 <i>Crotalaria novae-hollandiae subsp. novae-hollandiae</i>			
281.	17117 <i>Cullen cinereum</i>			
282.	17436 <i>Cullen graveolens</i>			
283.	17439 <i>Cullen lachnostachys</i>			
284.	17118 <i>Cullen leucanthum</i>			
285.	17119 <i>Cullen leucochaetes</i>			
286.	17120 <i>Cullen pogonocarpum</i>			
287.	3852 <i>Desmodium campylocaulon</i>			
288.	3853 <i>Desmodium filiforme</i>			
289.	3856 <i>Desmodium muelleri</i>			
290.	3612 <i>Dichrostachys spicata (Pied Piper Bush)</i>			
291.	3871 <i>Erythrina vespertilio (Yulbah)</i>			
292.	3938 <i>Glycine canescens (Silky Glycine)</i>			
293.	14587 <i>Indigostrum parviflorum</i>			
294.	3973 <i>Indigofera colutea (Sticky Indigo)</i>			
295.	3980 <i>Indigofera linifolia</i>			
296.	3981 <i>Indigofera linnaei (Birdsville Indigo)</i>			
297.	3982 <i>Indigofera monophylla</i>			
298.	3987 <i>Indigofera trita</i>			
299.	31035 <i>Indigofera trita subsp. trita</i>			
300.	3613 <i>Leucaena leucocephala (Leucaena)</i>	Y		
301.	4060 <i>Lotus australis (Austral Trefoil)</i>			
302.	4061 <i>Lotus cruentus (Redflower Lotus)</i>			
303.	3614 <i>Neptunia dimorphantha (Sensitive Plant)</i>			
304.	3675 <i>Petalostylis labicheoides (Slender Petalostylis)</i>			
305.	4190 <i>Rhynchosia australis (Rhynchosia)</i>			
306.	20862 <i>Rhynchosia bungarensis</i>		P4	
307.	4191 <i>Rhynchosia minima (Rhynchosia)</i>			
308.	12279 <i>Senna artemisioides subsp. helmsii</i>			
309.	12280 <i>Senna artemisioides subsp. oligophylla</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
310.	18444 <i>Senna charlesiana</i>			
311.	12303 <i>Senna costata</i>			
312.	18443 <i>Senna ferraria</i>			
313.	18346 <i>Senna glutinosa</i>			
314.	12305 <i>Senna glutinosa subsp. chatelainiana</i>			
315.	12307 <i>Senna glutinosa subsp. glutinosa</i>			
316.	12309 <i>Senna glutinosa subsp. pruinosa</i>			
317.	12308 <i>Senna glutinosa subsp. x luerssenii</i>			
318.	18451 <i>Senna hamersleyensis</i>			
319.	12312 <i>Senna notabilis</i>			
320.	18450 <i>Senna symonii</i>			
321.	12319 <i>Senna venusta</i>			
322.	4196 <i>Sesbania cannabina</i> (Sesbania Pea)			
323.	4198 <i>Sesbania formosa</i> (White Dragon Tree)			
324.	12353 <i>Stylosanthes hamata</i> (Verano Stylo)	Y		
325.	12356 <i>Swainsona formosa</i>			
326.	4231 <i>Swainsona kingii</i>			
327.	4233 <i>Swainsona leeana</i>			
328.	4234 <i>Swainsona maccullochiana</i> (Ashburton Pea)			
329.	4242 <i>Swainsona pterostylis</i>			
330.	<i>Tephrosia Fortescue</i> (A.A. Mitchell 606)			
331.	4263 <i>Tephrosia clementii</i>			
332.	49016 <i>Tephrosia densa</i>			
333.	4272 <i>Tephrosia leptoclada</i>			
334.	4280 <i>Tephrosia rosea</i> (Flinders River Poison, Bungoo'dah)			
335.	19531 <i>Tephrosia rosea</i> var. <i>clementii</i>			
336.	15947 <i>Tephrosia</i> sp. B Kimberley Flora (C.A. Gardner 7300)			
337.	17768 <i>Tephrosia</i> sp. Bungaroo Creek (M.E. Trudgen 11601)			
338.	15949 <i>Tephrosia</i> sp. D Kimberley Flora (R.D. Royce 1848)			
339.	42442 <i>Tephrosia</i> sp. NW Eremaean (S. van Leeuwen et al. PBS 0356)			
340.	40060 <i>Tephrosia</i> sp. clay soils (S. van Leeuwen et al. PBS 0273)			
341.	4285 <i>Tephrosia supina</i>			
342.	30716 <i>Vachellia farnesiana</i> (Mimosa Bush)	Y		
343.	4323 <i>Vigna lanceolata</i> (Maloga Vigna, Wega)			
344.	31391 <i>Vigna</i> sp. Hamersley Clay (A.A. Mitchell PRP 113)			
345.	46577 <i>Vigna triodiophila</i>		P3	
346.	4326 <i>Zornia albiflora</i>			
347.	12679 <i>Zornia muelleriana</i> subsp. <i>congesta</i>			
Frankeniaceae				
348.	5188 <i>Frankenia ambita</i>			
349.	5209 <i>Frankenia pauciflora</i> (Seaheath)			
Gentianaceae				
350.	6539 <i>Centaurium erythraea</i> (Common Centaury)	Y		
351.	41660 <i>Schenkia australis</i>			
352.	41646 <i>Schenkia clementii</i>			
Geraniaceae				
353.	4335 <i>Erodium cygnorum</i> (Blue Heronsbill)			
Goodeniaceae				
354.	7509 <i>Goodenia forrestii</i>			
355.	7515 <i>Goodenia heterochila</i>			
356.	7521 <i>Goodenia lamprosperma</i>			
357.	7526 <i>Goodenia microptera</i>			
358.	12552 <i>Goodenia muelleriana</i>			
359.	10982 <i>Goodenia stobbsiana</i>			
360.	7556 <i>Goodenia tenuiloba</i>			
361.	12578 <i>Scaevola acacioides</i>			
362.	7606 <i>Scaevola crassifolia</i> (Thick-leaved Fan-flower)			
363.	7608 <i>Scaevola cunninghamii</i>			
364.	7614 <i>Scaevola globulifera</i>			
365.	7644 <i>Scaevola spinescens</i> (Currant Bush, Maroon)			
366.	7660 <i>Velleia glabrata</i> (Pee the Bed)			
Gyrostemonaceae				
367.	2778 <i>Codonocarpus cotinifolius</i> (Native Poplar, Kundurangu)			
Hydrocharitaceae				
368.	162 <i>Halophila decipiens</i>			
369.	163 <i>Halophila minor</i>			
370.	164 <i>Halophila ovalis</i> (Sea Wrack)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
371.	165 <i>Halophila spinulosa</i>			
372.	139 <i>Najas tenuifolia</i> (Water Nymph)			
373.	169 <i>Thalassia hemprichii</i>			
Lamiaceae				
374.	6729 <i>Clerodendrum floribundum</i> (Lollybush)			
375.	6732 <i>Clerodendrum tomentosum</i>			
376.	13689 <i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>			
Lauraceae				
377.	2949 <i>Cassytha capillaris</i>			
378.	2950 <i>Cassytha filiformis</i> (Love Vine, Jirawan)			
Lythraceae				
379.	5277 <i>Ammannia baccifera</i>			
380.	5278 <i>Ammannia multiflora</i>			
381.	<i>Lawsonia inermis</i>			
Malvaceae				
382.	4886 <i>Abutilon amplum</i>			
383.	9080 <i>Abutilon cunninghamii</i>			
384.	4891 <i>Abutilon fraseri</i> (Lantern Bush)			
385.	18120 <i>Abutilon fraseri</i> subsp. <i>fraseri</i>			
386.	4895 <i>Abutilon lepidum</i>			
387.	4899 <i>Abutilon malvifolium</i> (Bastard Marshmallow)			
388.	4902 <i>Abutilon oxycarpum</i> (Flannel Weed)			
389.	43020 <i>Abutilon oxycarpum</i> subsp. <i>Prostrate</i> (A.A. Mitchell PRP 1266)			
390.	12716 <i>Brachychiton acuminatus</i>			
391.	18411 <i>Corchorus congener</i>		P3	
392.	4857 <i>Corchorus elachocarpus</i>			
393.	17339 <i>Corchorus incanus</i>			
394.	25847 <i>Corchorus incanus</i> subsp. <i>incanus</i>			
395.	13659 <i>Corchorus laniflorus</i>			
396.	4862 <i>Corchorus parviflorus</i>			
397.	4865 <i>Corchorus tridens</i>			
398.	13467 <i>Corchorus trilocularis</i>			
399.	4867 <i>Corchorus walcottii</i> (Woolly Corchorus)			
400.	4910 <i>Gossypium australe</i> (Native Cotton)			
401.	4913 <i>Gossypium hirsutum</i> (Upland Cotton)	Y		
402.	29316 <i>Hibiscus austrinus</i>			
403.	29317 <i>Hibiscus austrinus</i> var. <i>austrinus</i>			
404.	4923 <i>Hibiscus brachysiphonius</i>			
405.	4925 <i>Hibiscus coatesii</i>			
406.	4933 <i>Hibiscus leptocladus</i>			
407.	4942 <i>Hibiscus sturtii</i> (Sturt's Hibiscus)			
408.	4960 <i>Lawrencia viridigrisea</i>			
409.	4962 <i>Malvastrum americanum</i> (Spiked Malvastrum)	Y		
410.	5051 <i>Melhania oblongifolia</i>			
411.	<i>Sida Excedentifolia</i> (J.L. Egan 1925)			
412.	31758 <i>Sida arsinata</i>			
413.	4971 <i>Sida cardiophylla</i>			
414.	4976 <i>Sida echinocarpa</i>			
415.	4977 <i>Sida fibulifera</i> (Silver Sida)			
416.	4988 <i>Sida rohlenae</i>			
417.	33698 <i>Sida</i> sp. <i>Pilbara</i> (A.A. Mitchell PRP 1543)			
418.	16617 <i>Sida</i> sp. <i>spiciform panicles</i> (E. Leyland s.n. 14/8/90)			
419.	4989 <i>Sida spinosa</i> (Spiny Sida)			
420.	4873 <i>Triumfetta appendiculata</i>			
421.	14694 <i>Triumfetta clementii</i>			
422.	14942 <i>Triumfetta maconochieana</i>			
423.	5106 <i>Waltheria indica</i>			
Menispermaceae				
424.	2942 <i>Tinospora smilacina</i> (Snakevine, Oondala)			
Molluginaceae				
425.	48201 <i>Trigastrotheca molluginea</i>			
Montiaceae				
426.	2864 <i>Calandrinia ptychosperma</i>			
Moraceae				
427.	25811 <i>Ficus aculeata</i>			
428.	31578 <i>Ficus aculeata</i> var. <i>indecora</i> (Ranji)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
429.	19648 <i>Ficus brachypoda</i>			
430.	1753 <i>Ficus platypoda</i> (Native Fig, Makartu)			
431.	1759 <i>Ficus virens</i> (Albayi)			
432.	12096 <i>Ficus virens</i> var. <i>virens</i>			
Myrtaceae				
433.	17093 <i>Corymbia hamersleyana</i>			
434.	17092 <i>Corymbia opaca</i>			
435.	5714 <i>Eucalyptus microtheca</i> (Coolibah)			
436.	5752 <i>Eucalyptus prominens</i>			
437.	14548 <i>Eucalyptus victrix</i>			
Nyctaginaceae				
438.	2769 <i>Boerhavia burbridgeana</i>			
439.	2770 <i>Boerhavia coccinea</i> (Tar Vine, Wituka)			
440.	2772 <i>Boerhavia gardneri</i>			
441.	2773 <i>Boerhavia paludosa</i>			
442.	2774 <i>Boerhavia repleta</i>			
443.	2775 <i>Boerhavia schomburgkiana</i>			
444.	<i>Boerhavia</i> sp.			
445.	2776 <i>Commicarpus australis</i> (Perennial Tar Vine)			
Oleaceae				
446.	12059 <i>Jasminum didymum</i> subsp. <i>lineare</i> (Desert Jasmine)			
Passifloraceae				
447.	5226 <i>Passiflora foetida</i> (Stinking Passion Flower)	Y		
Phrymaceae				
448.	7082 <i>Mimulus gracilis</i>			
449.	18462 <i>Peplidium</i> sp. <i>E. Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)</i>			
Phyllanthaceae				
450.	4603 <i>Bridelia tomentosa</i>			
451.	4654 <i>Flueggea virosa</i>			
452.	12013 <i>Flueggea virosa</i> subsp. <i>melanthesoides</i> (Dogwood, Guwal)			
453.	38421 <i>Notoleptopus decaisnei</i>			
454.	38422 <i>Notoleptopus decaisnei</i> var. <i>decaisnei</i>			
455.	9056 <i>Phyllanthus baccatus</i>			
456.	17626 <i>Phyllanthus erwinii</i>			
457.	4680 <i>Phyllanthus maderaspatensis</i>			
458.	17794 <i>Phyllanthus tenellus</i>	Y		
Pittosporaceae				
459.	41300 <i>Pittosporum phillyreoides</i> (Weeping Pittosporum, Yaliti)			
Plantaginaceae				
460.	7098 <i>Stemodia grossa</i> (Marsh Stemodia, Mindjaara)			
461.	7099 <i>Stemodia kingii</i>			
Plumbaginaceae				
462.	6486 <i>Aegialitis annulata</i> (Club Mangrove)			
463.	6490 <i>Muellerolimon salicorniaceum</i>			
Poaceae				
464.	172 <i>Acrachne racemosa</i>			
465.	204 <i>Aristida burbridgeae</i>			
466.	207 <i>Aristida contorta</i> (Bunched Kerosene Grass)			
467.	215 <i>Aristida latifolia</i> (Feathertop Wiregrass)			
468.	217 <i>Aristida nitidula</i> (Flat-awned Threawn)			
469.	226 <i>Arundo donax</i> (Giant Reed)	Y		
470.	229 <i>Astrebala pectinata</i> (Barley Mitchell Grass)			
471.	258 <i>Cenchrus ciliaris</i> (Buffel Grass)	Y		
472.	259 <i>Cenchrus echinatus</i> (Burrgrass)	Y		
473.	41568 <i>Cenchrus setaceus</i> (Fountain Grass)	Y		
474.	29721 <i>Cenchrus setiger</i> (Birdwood Grass)	Y		
475.	266 <i>Chloris barbata</i> (Purpletop Chloris)	Y		
476.	269 <i>Chloris pectinata</i> (Comb Chloris)			
477.	270 <i>Chloris pumilio</i>			
478.	273 <i>Chrysopogon fallax</i> (Golden Beard Grass)			
479.	279 <i>Cymbopogon ambiguus</i> (Scentgrass)			
480.	280 <i>Cymbopogon bombycinus</i> (Silky Oilgrass)			
481.	281 <i>Cymbopogon obtectus</i> (Silkyheads)			
482.	46558 <i>Cynodon convergens</i>			
483.	46555 <i>Cynodon prostratus</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
484.	290 <i>Dactyloctenium radulans</i> (Button Grass)			
485.	303 <i>Dichanthium fecundum</i> (Curly Bluegrass)			
486.	13741 <i>Dichanthium sericeum</i> subsp. <i>humilius</i>			
487.	310 <i>Digitaria brownii</i> (Cotton Panic Grass)			
488.	313 <i>Digitaria ctenantha</i> (Comb Finger Grass)			
489.	328 <i>Echinochloa colona</i> (Awnless Barnyard Grass)	Y		
490.	343 <i>Ectrosia leporina</i> (Hare's-foot Grass)			
491.	357 <i>Enneapogon caerulescens</i> (Limestone Grass)			
492.	360 <i>Enneapogon lindleyanus</i> (Wiry Nineawn, Purple-head Nineawn)			
493.	363 <i>Enneapogon pallidus</i> (Conetop Nineawn)			
494.	365 <i>Enneapogon polyphyllus</i> (Leafy Nineawn)			
495.	368 <i>Enteropogon ramosus</i> (Windmill Grass, Curly Windmill Grass)			
496.	378 <i>Eragrostis dielsii</i> (Mallee Lovegrass)			
497.	380 <i>Eragrostis eriopoda</i> (Woollybutt Grass, Wangurnu)			
498.	16731 <i>Eragrostis exigua</i>			
499.	381 <i>Eragrostis falcata</i> (Sickle Lovegrass)			
500.	38505 <i>Eragrostis surreyana</i>		P3	
501.	398 <i>Eragrostis tenellula</i> (Delicate Lovegrass)			
502.	399 <i>Eragrostis xerophila</i> (Knotty-butt Neverfail)			
503.	400 <i>Eriachne aristidea</i>			
504.	403 <i>Eriachne benthamii</i> (Swamp Wanderrie)			
505.	413 <i>Eriachne mucronata</i> (Mountain Wanderrie Grass)			
506.	414 <i>Eriachne obtusa</i> (Northern Wandarrie Grass)			
507.	417 <i>Eriachne pulchella</i> (Pretty Wanderrie)			
508.	16485 <i>Eriachne pulchella</i> subsp. <i>dominii</i>			
509.	16486 <i>Eriachne pulchella</i> subsp. <i>pulchella</i>			
510.	421 <i>Eriachne tenuiculmis</i>			
511.	425 <i>Eriochloa procera</i> (Cupgrass)			
512.	11011 <i>Eulalia aurea</i>			
513.	458 <i>Iseilema dolichotrichum</i>			
514.	459 <i>Iseilema eremaeum</i>			
515.	465 <i>Iseilema vaginiflorum</i> (Red Flinders Grass)			
516.	503 <i>Panicum decompositum</i> (Native Millet, Kaltu-kaltu)			
517.	504 <i>Panicum effusum</i> (Hairy Panic Grass)			
518.	505 <i>Panicum laevinode</i>			
519.	515 <i>Paraneurachne muelleri</i> (Northern Mulga Grass)			
520.	10975 <i>Paspalidium basicladum</i>			
521.	518 <i>Paspalidium clementii</i> (Clements Paspalidium)			
522.	523 <i>Paspalidium rarum</i> (Rare Paspalidium)			
523.	525 <i>Paspalidium tabulatum</i>			
524.	606 <i>Setaria dielsii</i> (Diels' Pigeon Grass)			
525.	608 <i>Setaria italica</i> (Italian Millet)	Y		
526.	613 <i>Setaria verticillata</i> (Whorled Pigeon Grass)	Y		
527.	619 <i>Sorghum plumosum</i> (Plume Canegrass)			
528.	12919 <i>Sorghum plumosum</i> var. <i>plumosum</i>			
529.	622 <i>Sorghum timorense</i>			
530.	625 <i>Spinifex longifolius</i> (Beach Spinifex)			
531.	629 <i>Sporobolus australasicus</i> (Fairy Grass)			
532.	635 <i>Sporobolus virginicus</i> (Marine Couch)			
533.	17820 <i>Themeda</i> sp. <i>Hammersley Station</i> (M.E. Trudgen 11431)		P3	
534.	17819 <i>Themeda</i> sp. <i>Mt Barricade</i> (M.E. Trudgen 2471)			
535.	673 <i>Themeda triandra</i>			
536.	679 <i>Triodia angusta</i>			
537.	13131 <i>Triodia epactia</i>			
538.	696 <i>Triodia pungens</i> (Soft Spinifex)			
539.	704 <i>Triodia wiseana</i> (Limestone Spinifex)			
540.	706 <i>Triraphis mollis</i> (Needle Grass)			
541.	725 <i>Whiteochloa airoides</i>			
542.	728 <i>Whiteochloa cymbiformis</i>			
543.	729 <i>Xerochloa barbata</i> (Rice Grass)			
544.	731 <i>Xerochloa laniflora</i> (Rice Grass)			
545.	732 <i>Yakira australiensis</i>			
Polygalaceae				
546.	41365 <i>Polygala glaucifolia</i>			
547.	4572 <i>Polygala isingii</i>			
Polygonaceae				
548.	2443 <i>Rumex vesicarius</i> (Ruby Dock)	Y		
Portulacaceae				
549.	2878 <i>Portulaca conspicua</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
550.	2879 <i>Portulaca cyclophylla</i>			
551.	43981 <i>Portulaca decipiens</i>			
552.	2884 <i>Portulaca oleracea</i> (<i>Purslane, Wakati</i>)			
Primulaceae				
553.	6478 <i>Aegiceras corniculatum</i> (<i>River Mangrove</i>)			
Proteaceae				
554.	2079 <i>Grevillea pyramidalis</i> (<i>Caustic Bush, Tjungu</i>)			
555.	19570 <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>			
556.	15975 <i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>			
557.	13440 <i>Grevillea wickhamii</i> subsp. <i>aprica</i>			
558.	2177 <i>Hakea lorea</i> (<i>Witinti</i>)			
559.	19137 <i>Hakea lorea</i> subsp. <i>lorea</i>			
Pteridaceae				
560.	33 <i>Cheilanthes contigua</i>			
561.	12818 <i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			
Rhizophoraceae				
562.	5291 <i>Bruguiera exaristata</i> (<i>Ribbed Mangrove</i>)			
563.	39680 <i>Ceriops australis</i>			
564.	5295 <i>Rhizophora stylosa</i> (<i>Spotted-leaved Red Mangrove</i>)			
Rubiaceae				
565.	7317 <i>Dentella asperata</i>			
566.	7318 <i>Dentella minutissima</i>			
567.	7338 <i>Oldenlandia crouchiana</i>			
568.	19640 <i>Oldenlandia</i> sp. <i>Hamersley Station (A.A. Mitchell PRP 1479)</i>		P3	
569.	<i>Pomax Desert (A.S. George 11968)</i>			Y
570.	7363 <i>Synaptantha tillaeacea</i>			
571.	13339 <i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>			
Santalaceae				
572.	2357 <i>Santalum lanceolatum</i> (<i>Northern Sandalwood, Yarnguli</i>)			
Sapindaceae				
573.	4739 <i>Alectryon oleifolius</i>			
574.	11487 <i>Alectryon oleifolius</i> subsp. <i>oleifolius</i>			
575.	4745 <i>Diplopeltis eriocarpa</i> (<i>Hairy Pepperflower</i>)			
576.	4759 <i>Dodonaea coriacea</i>			
Scrophulariaceae				
577.	7234 <i>Eremophila longifolia</i> (<i>Berrigan, Tulypurpa</i>)			
578.	16363 <i>Eremophila maculata</i> subsp. <i>brevifolia</i> (<i>Native Fuchsia</i>)			
579.	17158 <i>Myoporum montanum</i> (<i>Native Myrtle</i>)			
Solanaceae				
580.	6963 <i>Datura metel</i> (<i>Downy Thornapple</i>)	Y		
581.	6971 <i>Nicotiana benthamiana</i> (<i>Tjuntiwari</i>)			
582.	6976 <i>Nicotiana occidentalis</i> (<i>Native Tobacco</i>)			
583.	11331 <i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>			
584.	11856 <i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			
585.	20652 <i>Physalis angulata</i>	Y		
586.	6998 <i>Solanum cleistogamum</i>			
587.	7002 <i>Solanum diversiflorum</i>			
588.	7007 <i>Solanum esuriale</i> (<i>Quena</i>)			
589.	7009 <i>Solanum gabrielae</i>			
590.	7014 <i>Solanum horridum</i>			
591.	7018 <i>Solanum lasiophyllum</i> (<i>Flannel Bush, Mindjulu</i>)			
592.	7022 <i>Solanum nigrum</i> (<i>Black Berry Nightshade</i>)	Y		
593.	7029 <i>Solanum phlomoides</i>			
594.	7036 <i>Solanum sturtianum</i> (<i>Thargomindah Nightshade</i>)			
Stylidiaceae				
595.	7729 <i>Stylidium fluminense</i>			
Surianaceae				
596.	3182 <i>Stylobasium spathulatum</i> (<i>Pebble Bush</i>)			
Thymelaeaceae				
597.	5230 <i>Pimelea ammocharis</i>			
Violaceae				
598.	5215 <i>Hybanthus aurantiacus</i>			
599.	5219 <i>Hybanthus enneaspermus</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Zygophyllaceae				
600.	48900 <i>Roepera retivalvis</i>			
601.	4375 <i>Tribulus cistoides</i>			
602.	4377 <i>Tribulus hirsutus</i>			
603.	4379 <i>Tribulus macrocarpus</i>			
604.	4380 <i>Tribulus occidentalis (Perennial Caltrop)</i>			
605.	4381 <i>Tribulus platypterus (Cork Hopbush)</i>			
606.	4383 <i>Tribulus terrestris (Caltrop)</i>	Y		

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 wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

NatureMap Fauna Species Report

Created By Guest user on 12/02/2019

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 116° 44' 55" E, 20° 42' 17" S
Buffer 20km
Group By Species Group

Species Group	Species	Records
Amphibian	4	49
Bird	207	5509
Fish	125	159
Invertebrate	212	445
Mammal	42	439
Reptile	104	1284
TOTAL	694	7885

Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
Amphibian				
1.	25371 <i>Cyclorana australis</i> (Giant Frog)			
2.	25375 <i>Cyclorana maini</i> (Sheep Frog)			
3.	25392 <i>Litoria rubella</i> (Little Red Tree Frog)			
4.	25430 <i>Notaden nichollsi</i> (Desert Spadefoot)			
Bird				
5.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
6.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
7.	25755 <i>Acrocephalus australis</i> (Australian Reed Warbler)			
8.	41323 <i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
9.	25544 <i>Aegotheles cristatus</i> (Australian Owllet-nightjar)			
10.	24312 <i>Anas gracilis</i> (Grey Teal)			
11.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
12.	47414 <i>Anhinga novaehollandiae</i> (Australasian Darter)			
13.	24505 <i>Anous stolidus</i> subsp. <i>pileatus</i> (Common Noddy)		IA	
14.	25670 <i>Anthus australis</i> (Australian Pipit)			
15.	25554 <i>Apus pacificus</i> (Fork-tailed Swift, Pacific Swift)		IA	
16.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
17.	25559 <i>Ardea intermedia</i> (Intermediate Egret)			
18.	41324 <i>Ardea modesta</i> (great egret, white egret)			
19.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
20.	24610 <i>Ardeotis australis</i> (Australian Bustard)			
21.	25736 <i>Arenaria interpres</i> (Ruddy Turnstone)		IA	
22.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
23.	25567 <i>Artamus leucorhynchus</i> (White-breasted Woodswallow)			
24.	24354 <i>Artamus leucorhynchus</i> subsp. <i>leucopygialis</i> (White-breasted Woodswallow)			
25.	24355 <i>Artamus minor</i> (Little Woodswallow)			
26.	24356 <i>Artamus personatus</i> (Masked Woodswallow)			
27.	24357 <i>Artamus superciliosus</i> (White-browed Woodswallow)			
28.	24318 <i>Aythya australis</i> (Hardhead)			
29.	<i>Barnardius zonarius</i>			
30.	24359 <i>Burhinus grallarius</i> (Bush Stone-curlew)			
31.	47897 <i>Butorides striata</i> (Striated Heron, Mangrove Heron)			
32.	25715 <i>Cacatua roseicapilla</i> (Galah)			
33.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
34.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
35.	24779 <i>Calidris acuminata</i> (Sharp-tailed Sandpiper)		IA	
36.	24780 <i>Calidris alba</i> (Sanderling)		IA	
37.	25738 <i>Calidris canutus</i> (Red Knot, knot)		IA	
38.	24784 <i>Calidris ferruginea</i> (Curlew Sandpiper)		T	
39.	24788 <i>Calidris ruficollis</i> (Red-necked Stint)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
40.	24789 <i>Calidris subminuta</i> (Long-toed Stint)		IA	
41.	24790 <i>Calidris tenuirostris</i> (Great Knot)		IA	
42.	25600 <i>Centropus phasianinus</i> (Pheasant Coucal)		T	
43.	25575 <i>Charadrius leschenaultii</i> (Greater Sand Plover)		T	
44.	25576 <i>Charadrius mongolus</i> (Lesser Sand Plover)		T	
45.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
46.	24378 <i>Charadrius veredus</i> (Oriental Plover)		IA	
47.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
48.	41332 <i>Chlidonias leucopterus</i> (White-winged Black Tern, white-winged tern)		IA	
49.	<i>Chroicocephalus novaehollandiae</i>			
50.	24431 <i>Chrysococcyx basalis</i> (Horsfield's Bronze Cuckoo)			
51.	24288 <i>Circus approximans</i> (Swamp Harrier)			
52.	24289 <i>Circus assimilis</i> (Spotted Harrier)			
53.	24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt)			
54.	24399 <i>Columba livia</i> (Domestic Pigeon)	Y		
55.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
56.	24416 <i>Corvus bennetti</i> (Little Crow)			
57.	25593 <i>Corvus orru</i> (Torresian Crow)			
58.	24419 <i>Corvus splendens</i> (House Crow)			
59.	25701 <i>Coturnix ypsilophora</i> (Brown Quail)			
60.	24673 <i>Coturnix ypsilophora subsp. australis</i> (Brown Quail)			
61.	24672 <i>Coturnix ypsilophora subsp. cervina</i> (Brown Quail)			
62.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
63.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
64.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
65.	24322 <i>Cygnus atratus</i> (Black Swan)			
66.	24325 <i>Dendrocygna eytoni</i> (Plumed Whistling Duck)			
67.	25607 <i>Dicaeum hirundinaceum</i> (Mistletoebird)			
68.	24470 <i>Dromaius novaehollandiae</i> (Emu)			
69.	<i>Egretta garzetta</i>			
70.	<i>Egretta novaehollandiae</i>			
71.	<i>Elanus axillaris</i>			
72.	24290 <i>Elanus caeruleus subsp. axillaris</i> (Australian Black-shouldered Kite)			
73.	47937 <i>Euseiornis melanops</i> (Black-fronted Dotterel)			
74.	24631 <i>Emblema pictum</i> (Painted Finch)			
75.	<i>Eolophus roseicapillus</i>			
76.	24653 <i>Eopsaltria pulverulenta</i> (Mangrove Robin)			
77.	25578 <i>Ephippiorhynchus asiaticus</i> (Black-necked Stork)			
78.	24568 <i>Epthianura aurifrons</i> (Orange Chat)			
79.	24570 <i>Epthianura tricolor</i> (Crimson Chat)			
80.	24837 <i>Eremiornis carteri</i> (Spinifex-bird)			
81.	24379 <i>Erythrogonys cinctus</i> (Red-kneed Dotterel)			
82.	47938 <i>Esacus magnirostris</i> (Beach Stone-curlew, Beach Thick-knee)			
83.	24368 <i>Eurostopodus argus</i> (Spotted Nightjar)			
84.	25621 <i>Falco berigora</i> (Brown Falcon)			
85.	24471 <i>Falco berigora subsp. berigora</i> (Brown Falcon)			
86.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
87.	25623 <i>Falco longipennis</i> (Australian Hobby)			
88.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
89.	24475 <i>Falco peregrinus subsp. macropus</i> (Australian Peregrine Falcon)		S	
90.	24476 <i>Falco subniger</i> (Black Falcon)			
91.	24478 <i>Fregata ariel</i> (Lesser Frigatebird)		IA	
92.	25727 <i>Fulica atra</i> (Eurasian Coot)			
93.	25730 <i>Gallirallus philippensis</i> (Buff-banded Rail)			
94.	24765 <i>Gallirallus philippensis subsp. mellori</i> (Buff-banded Rail)			
95.	42314 <i>Gavicalis virescens</i> (Singing Honeyeater)			
96.	47954 <i>Gelochelidon nilotica</i> (Gull-billed Tern)		IA	
97.	24401 <i>Geopelia cuneata</i> (Diamond Dove)			
98.	24402 <i>Geopelia humeralis</i> (Bar-shouldered Dove)			
99.	25585 <i>Geopelia striata</i> (Zebra Dove)			
100.	24403 <i>Geopelia striata subsp. placida</i> (Peaceful Dove)			
101.	24404 <i>Geophaps plumifera</i> (Spinifex Pigeon)			
102.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
103.	<i>Gerygone sp.</i>			
104.	24276 <i>Gerygone tenebrosa</i> (Dusky Gerygone)			
105.	24481 <i>Glareola maldivarum</i> (Oriental Pratincole)		IA	
106.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
107.	24484 <i>Grus rubicunda</i> (Brolga)			
108.	25627 <i>Haematopus fuliginosus</i> (Sooty Oystercatcher)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
109.	24487 <i>Haematopus longirostris</i> (Pied Oystercatcher)			
110.	<i>Haematopus ostralegus</i>			Y
111.	24293 <i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)			
112.	25541 <i>Haliastur indus</i> (Brahminy Kite)			
113.	24294 <i>Haliastur indus</i> subsp. <i>girrenera</i> (Brahminy Kite)			
114.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
115.	24297 <i>Hamirostra melanostemon</i> (Black-breasted Buzzard)			
116.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
117.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
118.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
119.	25630 <i>Hirundo rustica</i> (Barn Swallow)		IA	
120.	48587 <i>Hydroprogne caspia</i> (Caspian Tern)		IA	
121.	24367 <i>Lalage tricolor</i> (White-winged Triller)			
122.	25637 <i>Larus novaehollandiae</i> (Silver Gull)			
123.	25638 <i>Larus pacificus</i> (Pacific Gull)			
124.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
125.	24582 <i>Lichmera indistincta</i> subsp. <i>indistincta</i> (Brown Honeyeater)			
126.	25739 <i>Limicola falcinellus</i> (Broad-billed Sandpiper)		IA	
127.	30932 <i>Limosa lapponica</i> (Bar-tailed Godwit)		IA	
128.	25741 <i>Limosa limosa</i> (Black-tailed Godwit)		IA	
129.	24326 <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)			
130.	25651 <i>Malurus lamberti</i> (Variegated Fairy-wren)			
131.	25652 <i>Malurus leucopterus</i> (White-winged Fairy-wren)			
132.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
133.	24736 <i>Melopsittacus undulatus</i> (Budgerigar)			
134.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)			
135.	25542 <i>Milvus migrans</i> (Black Kite)			
136.	25545 <i>Mirafa javanica</i> (Horsfield's Bushlark, Singing Bushlark)			
137.	25685 <i>Neochmia ruficauda</i> (Star Finch)			
138.	<i>Neopsephotus bourkii</i>			
139.	24798 <i>Numenius madagascariensis</i> (Eastern Curlew)		T	
140.	24799 <i>Numenius minutus</i> (Little Curlew, Little Whimbrel)		IA	
141.	25742 <i>Numenius phaeopus</i> (Whimbrel)		IA	
142.	25564 <i>Nycticorax caledonicus</i> (Rufous Night Heron)			
143.	24742 <i>Nymphicus hollandicus</i> (Cockatiel)			
144.	24497 <i>Oceanites oceanicus</i> (Wilson's Storm-petrel)		IA	
145.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
146.	41347 <i>Onychoprion anaethetus</i> (Bridled Tern)		IA	
147.	24620 <i>Pachycephala lanioides</i> (White-breasted Whistler)			
148.	25678 <i>Pachycephala melanura</i> (Mangrove Golden Whistler)			
149.	24621 <i>Pachycephala melanura</i> subsp. <i>melanura</i> (Mangrove Golden Whistler)			
150.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
151.	48591 <i>Pandion cristatus</i> (Osprey, Eastern Osprey)		IA	
152.	24627 <i>Pardalotus rubricatus</i> (Red-browed Pardalote)			
153.	48053 <i>Pardalotus rubricatus</i> subsp. <i>rubricatus</i> (Red-browed Pardalote)			Y
154.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
155.	25687 <i>Passer domesticus</i> (House Sparrow)	Y		
156.	24642 <i>Passer montanus</i> (Eurasian Tree Sparrow)	Y		
157.	24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)			
158.	<i>Peneoenanthe pulverulenta</i>			
159.	48060 <i>Petrochelidon ariel</i> (Fairy Martin)			
160.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
161.	25697 <i>Phalacrocorax carbo</i> (Great Cormorant)			
162.	25698 <i>Phalacrocorax melanoleucos</i> (Little Pied Cormorant)			
163.	24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
164.	25699 <i>Phalacrocorax varius</i> (Pied Cormorant)			
165.	24411 <i>Phaps histrionica</i> (Flock Bronzewing, Flock Pigeon)			
166.	24677 <i>Pitta moluccensis</i> (Blue-winged Pitta)			
167.	24842 <i>Platalea regia</i> (Royal Spoonbill)			
168.	24843 <i>Plegadis falcinellus</i> (Glossy Ibis)		IA	
169.	24382 <i>Pluvialis fulva</i> (Pacific Golden Plover)		IA	
170.	24383 <i>Pluvialis squatarola</i> (Grey Plover)		IA	
171.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
172.	24679 <i>Podargus strigoides</i> subsp. <i>brachypterus</i> (Tawny Frogmouth)			
173.	24681 <i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)			
174.	<i>Ptilonorhynchus guttatus</i>			
175.	24716 <i>Puffinus pacificus</i> (Wedge-tailed Shearwater)		IA	
176.	42344 <i>Purnella albifrons</i> (White-fronted Honeyeater)			
177.	24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)			
178.	48096 <i>Rhipidura albiscapa</i> (Grey Fantail)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
179.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
180.	24457 <i>Rhipidura phasiana</i> (Mangrove Grey Fantail)			
181.	30948 <i>Smicromis brevirostris</i> (Weebill)			
182.	24521 <i>Sterna bengalensis</i> (Lesser Crested Tern)			
183.	25640 <i>Sterna dougallii</i> (Roseate Tern)		IA	
184.	25642 <i>Sterna hirundo</i> (Common Tern)		IA	
185.	48593 <i>Sternula albifrons</i> (Little Tern)		IA	
186.	48594 <i>Sternula nereis</i> (Fairy Tern)			
187.	24329 <i>Stictonetta naevosa</i> (Freckled Duck)			
188.	24482 <i>Stiltia isabella</i> (Australian Pratincole)			
189.	25589 <i>Streptopelia chinensis</i> (Spotted Turtle-Dove)	Y		
190.	25754 <i>Sula leucogaster</i> (Brown Booby)		IA	
191.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
192.	30870 <i>Taeniopygia guttata</i> (Zebra Finch)			
193.	<i>Thalasseus bengalensis</i>			
194.	48597 <i>Thalasseus bergii</i> (Crested Tern)		IA	
195.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
196.	25548 <i>Todiramphus chloris</i> (Collared Kingfisher)			
197.	24306 <i>Todiramphus chloris</i> subsp. <i>pilbara</i> (Pilbara Collared Kingfisher)			
198.	42351 <i>Todiramphus pyrrhopygius</i> (Red-backed Kingfisher)			
199.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
200.	24309 <i>Todiramphus sanctus</i> subsp. <i>sanctus</i> (Sacred Kingfisher)			
201.	48141 <i>Tribonyx ventralis</i> (Black-tailed Native-hen)			
202.	24803 <i>Tringa brevipes</i> (Grey-tailed Tattler)		P4	
203.	24806 <i>Tringa glareola</i> (Wood Sandpiper)		IA	
204.	24808 <i>Tringa nebularia</i> (Common Greenshank, greenshank)		IA	
205.	24809 <i>Tringa stagnatilis</i> (Marsh Sandpiper, little greenshank)		IA	
206.	24851 <i>Turnix velox</i> (Little Button-quail)			
207.	<i>Tyto delicatula</i>			
208.	25577 <i>Vanellus miles</i> (Masked Lapwing)			
209.	24386 <i>Vanellus tricolor</i> (Banded Lapwing)			
210.	41351 <i>Xenus cinereus</i> (Terek Sandpiper)		IA	
211.	24857 <i>Zosterops luteus</i> (Yellow White-eye)			

Fish

212.	??			
213.	<i>Abudefduf bengalensis</i>			
214.	<i>Acanthopagrus latus</i>			
215.	<i>Acentrogobius gracilis</i>			
216.	<i>Acentrogobius</i> sp.			
217.	<i>Alepes apercna</i>			
218.	<i>Alepes mate</i>			Y
219.	<i>Ambassis vachellii</i>			
220.	<i>Amblyeleotris gymnocephala</i>			
221.	<i>Amblygobius bynoensis</i>			
222.	<i>Amniataba caudavittata</i>			
223.	<i>Amniataba percoides</i>			
224.	<i>Apistus carinatus</i>			
225.	<i>Arius leptaspis</i>			Y
226.	<i>Asterorhombus intermedius</i>			
227.	<i>Bathygobius fuscus</i>			
228.	<i>Bathygobius laddi</i>			
229.	<i>Batrachomoeus dahli</i>			
230.	<i>Bostrychus sinensis</i>			Y
231.	<i>Callionymus japonicus</i>			Y
232.	<i>Callionymus</i> sp.			
233.	<i>Carangoides</i> sp.			
234.	<i>Caranx bucculentus</i>			
235.	<i>Carcharhinus brachyurus</i>			
236.	<i>Centrogenys vaigiensis</i>			
237.	<i>Cephalopholis boenak</i>			
238.	<i>Chelmon marginalis</i>			
239.	<i>Chelmon muelleri</i>			
240.	<i>Chirocentrus dorab</i>			
241.	<i>Coris</i> sp.			
242.	<i>Craterocephalus pauciradiatus</i>			
243.	<i>Ctenotrypauchen microcephalus</i>			
244.	<i>Cynoglossus maculipinnis</i>			
245.	<i>Cynoglossus</i> sp.			
246.	<i>Dexillus muelleri</i>			
247.	<i>Drombus</i> sp.			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
248.	<i>Eleutheronema tetradactylum</i>			
249.	<i>Elops hawaiiensis</i>			
250.	<i>Enneapterygius gracilis</i>			
251.	<i>Enneapterygius philippinus</i>			
252.	<i>Enneapterygius</i> sp.			
253.	<i>Epinephelus coioides</i>			
254.	<i>Epinephelus malabaricus</i>			
255.	<i>Epinephelus sexfasciatus</i>			
256.	<i>Euristhmus microceps</i>			
257.	<i>Euristhmus sandrae</i>			Y
258.	<i>Eviota queenslandica</i>			
259.	<i>Favonigobius melanobranchus</i>			
260.	<i>Gerres filamentosus</i>			
261.	<i>Gerres subfasciatus</i>			
262.	<i>Glossogobius giuris</i>			
263.	<i>Gnatholepis argus</i>			
264.	<i>Gobiodon rivulatus</i>			
265.	<i>Gobiodon</i> sp.			
266.	<i>Halichoeres nigrescens</i>			
267.	<i>Halichoeres</i> sp.			
268.	<i>Halieutaea brevicaudata?</i>			
269.	<i>Halophryne diemensis</i>			
270.	<i>Hippichthys penicillus</i>			
271.	<i>Hypopterus macropterus</i>			
272.	<i>Inegocia japonica</i>			
273.	<i>Istiblennius meleagris</i>			
274.	<i>Istigobius ornatus</i>			
275.	<i>Leiognathus</i> sp.			
276.	<i>Lepidotrigla</i> sp.			
277.	<i>Liocranium praepositum</i>			
278.	<i>Liza subviridis</i>			
279.	<i>Liza vaigiensis</i>			
280.	<i>Lophiocharon trisignatus</i>			
281.	<i>Lutjanus argentimaculatus</i>			
282.	<i>Lutjanus malabaricus</i>			
283.	<i>Lutjanus russellii</i>			
284.	<i>Melanotaenia australis</i>			
285.	<i>Metavelifer multiradiatus</i>			
286.	<i>Micrognathus micronotopterus</i>			
287.	<i>Monacanthus chinensis</i>			
288.	<i>Monodactylus argenteus</i>			
289.	<i>Mugil cephalus</i>			
290.	<i>Nebrius ferrugineus</i>			Y
291.	<i>Nemipterus celebicus</i>			
292.	<i>Netuma proxima</i>			
293.	<i>Omobranchus punctatus</i>			
294.	<i>Omobranchus rotundiceps</i>			
295.	<i>Omobranchus</i> sp.			
296.	<i>Ophichthys celebicus?</i>			
297.	<i>Opistognathus darwiniensis</i>			
298.	<i>Oxyurichthys</i> sp.			
299.	<i>Pandaka lidwilli</i>			
300.	<i>Parachaeturichthys</i> sp.			Y
301.	<i>Paraexocoetus brachypterus</i>			Y
302.	<i>Paramonacanthus choirocephalus</i>			
303.	<i>Parapercis diplospilus</i>			
304.	<i>Parascorpaena picta</i>			
305.	<i>Pentapodus porosus</i>			
306.	<i>Pentapodus</i> sp.			
307.	<i>Periophthalmus argentiineatus</i>			
308.	<i>Pisodonophis cancrivorus</i>			
309.	<i>Platycephalus</i> sp.			
310.	<i>Pleurosicya</i> sp.			
311.	<i>Polydactylus multiradiatus</i>			
312.	<i>Pomadasys maculatus</i>			
313.	<i>Priacanthus hamrur</i>			
314.	<i>Priolepis nuchifasciata</i>			
315.	<i>Protonibea diacanthus</i>			
316.	<i>Rastrelliger kanagurta</i>			
317.	<i>Repomucenus calcaratus</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
318.	<i>Scatophagus argus</i>			
319.	<i>Scolecenchelys macroptera</i>			
320.	<i>Scolopsis taenioptera</i>			
321.	<i>Secutor insidiator</i>			
322.	<i>Sillago burrus</i>			
323.	<i>Sillago lutea</i>			
324.	<i>Sorsogona tuberculata</i>			
325.	<i>Sphyaena barracuda</i>			
326.	<i>Sphyaena sp.</i>			
327.	<i>Suggrundus macracanthus</i>			
328.	<i>Synanceia horrida</i>			
329.	<i>Terapon jarbua</i>			
330.	<i>Triacanthus sp.</i>			
331.	<i>Tylosurus crocodilus</i>			
332.	<i>Valamugil seheli</i>			
333.	<i>Valenciennesa muralis</i>			
334.	<i>Yirrkala sp.</i>			
335.	<i>Yongeichthys nebulosus</i>			
336.	<i>Zebrias quagga</i>			

Invertebrate

337.	<i>Actacarus pacificus</i>			
338.	<i>Agauopsis arborea</i>			Y
339.	<i>Agauopsis dasyderma</i>			Y
340.	<i>Agauopsis moorea</i>			Y
341.	<i>Agauopsis obtusa</i>			Y
342.	<i>Agraptocorixa parvipunctata</i>			
343.	<i>Allodessus bistrigatus</i>			
344.	<i>Alluaudomyia sp.</i>			
345.	<i>Alona cf. verrucosa</i>			
346.	<i>Alona rigidicaudis</i>			
347.	<i>Amblyomma triguttatum</i>			
348.	<i>Aname mainae</i>			
349.	<i>Aname mellosa</i>			
350.	<i>Anax papuensis</i>			
351.	<i>Anisops canaliculatus</i>			
352.	<i>Anisops hackeri</i>			
353.	<i>Anisops nasutus</i>			
354.	<i>Anisops sp.</i>			
355.	<i>Anomalohalacarus dampierensis</i>			Y
356.	<i>Anopheles annulipes s.l.</i>			
357.	<i>Anuraeopsis navicula</i>			
358.	<i>Arcella sp.</i>			
359.	<i>Arthrorhabdus paucispinus</i>			
360.	<i>Austrostrophus stictopygus</i>			
361.	<i>Bdelloidea sp. 2:2</i>			
362.	<i>Bennelongia minimus</i>			
363.	<i>Berosus pulchellus</i>			
364.	<i>Boeckella triarticulata</i>			
365.	<i>Bolboleaus truncatus</i>			
366.	<i>Boreoheesperus undulatus</i>			
367.	<i>Brachionus n sp P2 (PSW)</i>			
368.	<i>Brachionus quadridentatus</i>			
369.	<i>Carenum pulchrum</i>			
370.	<i>Carenum subplanatum</i>			
371.	<i>Carenum venustum</i>			
372.	<i>Catadromus lacordairei</i>			
373.	<i>Cephalodella cf forficula</i>			
374.	<i>Cephalodella gibba</i>			
375.	<i>Ceriodaphnia cornuta</i>			
376.	<i>Ceriodaphnia n. sp. a (Bermer sp.#3) (SAP)</i>			
377.	<i>Ceriodaphnia n. sp. c (Bermer sp.#1) (SAP)</i>			
378.	<i>Cheumatopsyche wellsae</i>			
379.	<i>Chironomus aff. alternans (V24) (CB)</i>			
380.	<i>Chlaenius australis</i>			
381.	<i>Cloeon sp.</i>			
382.	<i>Copidognathus lutarius</i>			Y
383.	<i>Copidognathus meridianus</i>			
384.	<i>Copidognathus piger</i>			Y
385.	<i>Cryptochironomus griseidorsum</i>			
386.	<i>Cryptoerithus halli</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
387.	<i>Cryptoerithus occultus</i>			
388.	<i>Culex (Culex) annulirostris</i>			
389.	<i>Culex crinicauda</i>			
390.	<i>Culex palpalis</i>			
391.	<i>Cybister tripunctatus</i>			
392.	<i>Cypretta ?lutea</i>			
393.	<i>Cypretta sp PSW074</i>			
394.	<i>Cypricercus sp. 422 (CB)</i>			
395.	<i>Dasyheleinae sp. P2 (PSW)</i>			
396.	<i>Diaphanosoma excisum</i>			
397.	<i>Dicrotendipes P5 (=balciunasi?) (PSW)</i>			
398.	<i>Diffugia sp. P1</i>			
399.	<i>Dineutus australis</i>			
400.	<i>Diplacodes bipunctata</i>			
401.	<i>Diplacodes haematodes</i>			
402.	<i>Ecnomus pilbarensis</i>			
403.	<i>Encentridophorus sarasini</i>			
404.	<i>Enchytraeidae sp.</i>			
405.	<i>Enochrus deserticola</i>			
406.	<i>Enochrus sp.</i>			
407.	<i>Ephemeropterus barroisi s.l.</i>			
408.	<i>Ephydriidae sp.</i>			
409.	<i>Ephydriidae sp. 12 (PSW)</i>			
410.	<i>Epistylis sp</i>			
411.	<i>Eretes australis</i>			
412.	<i>Ethmostigmus curtipes</i>			
413.	<i>Euchlanis dilatata</i>			
414.	<i>Euchlanis lyra</i>			
415.	<i>Euglypha sp.</i>			
416.	<i>Geoscaptus laevisissimus</i>			
417.	<i>Glyptophysa sp</i>			
418.	<i>Halacaridae sp.</i>			
419.	<i>Hellyethira sp.</i>			
420.	<i>Hemicordulia sp.</i>			
421.	<i>Hemicypris megalops</i>			
422.	<i>Heterocypris sp.</i>			
423.	<i>Heterocypris tatei</i>			
424.	<i>Hexarthra cf brandorffi (PSW)</i>			
425.	<i>Hogna crispipes</i>			
426.	<i>Hydrachna sp. 4/5 (PSW)</i>			
427.	<i>Hydraena sp.</i>			
428.	<i>Hydrobiidae sp P1 (not assimineid) (PSW)</i>			
429.	<i>Hydrochus obscuroeneus</i>			
430.	<i>Hydroglyphus grammaopterus (=trilineatus)</i>			
431.	<i>Hydroglyphus leai</i>			
432.	<i>Hydroglyphus orthogrammus</i>			
433.	<i>Hyphydrus elegans</i>			
434.	<i>Hyphydrus lyratus</i>			
435.	<i>Ilyocypris australiensis</i>			
436.	<i>Ilyodromus sp BOS25</i>			
437.	<i>Indolpium sp.</i>			
438.	<i>Ischnura aurora aurora</i>			
439.	<i>Isidorella egraria</i>			
440.	<i>Isobactrus australiensis</i>			Y
441.	<i>Isobactrus obesus</i>			Y
442.	<i>Isopedella gibsandi</i>			
443.	<i>Isopedella tindalei</i>			
444.	<i>Keratella procurva</i>			
445.	<i>Laccophilus sharpi</i>			
446.	<i>Lacinularia flosculosa</i>			
447.	<i>Lampona ampeinna</i>			
448.	<i>Lampona cylindrata</i>			
449.	<i>Lamponina scutata</i>			
450.	<i>Larsia albiceps</i>			
451.	<i>Latonopsis australis</i>			
452.	<i>Latrodectus geometricus</i>			
453.	<i>Leberis cf. diaphanus</i>			
454.	<i>Lecane bulla</i>			
455.	<i>Lecane cf. rhenana (SAP)</i>			
456.	<i>Lecane luna</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
457.	<i>Lecane papuana</i>			
458.	<i>Lecane punctata</i>			
459.	<i>Lecane thalera</i>			
460.	<i>Lecane unguolata</i>			
461.	<i>Lepadella patella</i>			
462.	<i>Limbodessus compactus</i>			
463.	<i>Limnadopsis "pilbarensis" (ex P2)(PSW)</i>			Y
464.	<i>Limnadopsis birchii</i>			
465.	<i>Limnocythere dorsosicula</i>			
466.	<i>Litarachna bartschae</i>			Y
467.	<i>Loxandrus micantior</i>			
468.	<i>Lychas sp. 2</i>			
469.	<i>Macrochaetus sp.</i>			
470.	<i>Macrothrix sp.</i>			
471.	<i>Meedo houstoni</i>			
472.	<i>Megacephala greyana</i>			
473.	<i>Mesocyclops brooksi</i>			
474.	<i>Mesovelia hungerfordi</i>			
475.	<i>Metacyclops sp. P2 (PSW)</i>			
476.	<i>Microcyclops varicans</i>			
477.	<i>Micronecta gracilis</i>			
478.	<i>Micronecta n. sp. P3 (PSW)</i>			
479.	<i>Microvelia (Austromicrovelia) peramoena</i>			
480.	<i>Monommata sp.</i>			
481.	<i>Muscidae sp. P1</i>			
482.	<i>Naididae (ex Tubificidae)</i>			
483.	<i>Nematoda sp. P2/P4 (PSW)</i>			
484.	<i>Nephila edulis</i>			
485.	<i>Omoedus orbiculatus</i>			
486.	<i>Opisthopera sp.</i>			
487.	<i>Orthetrum caledonicum</i>			
488.	<i>Orthomorpha coarctata</i>			
489.	<i>Ostracoda (unident.)</i>			
490.	<i>Ovatalona cf. cambouei</i>			
491.	<i>Oxyopes variabilis</i>			
492.	<i>Ozestheria packardi</i>			
493.	<i>Pantala flavescens</i>			
494.	<i>Paracymus pygmaeus</i>			
495.	<i>Paracymus spenceri</i>			
496.	<i>Paratanytarsus sp. P2 (PSW)</i>			
497.	<i>Pediana horni</i>			
498.	<i>Pediana tenuis</i>			
499.	<i>Phreodrilid with dissimilar ventral chaetae</i>			
500.	<i>Phreodrilid with similar ventral chaetae</i>			
501.	<i>Pilbarascutigera incola</i>			
502.	<i>Pilbarophreatoicus platyarthicus</i>			
503.	<i>Polyarthra dolichoptera</i>			
504.	<i>Polypedilum nubifer</i>			
505.	<i>Pontarachne australis</i>			Y
506.	<i>Procladius paludicola</i>			
507.	<i>Prodidomus woodleigh</i>			
508.	<i>Quistrachia legendrei</i>			
509.	<i>Regimbartia attenuata</i>			
510.	<i>Rhagada angulata</i>			
511.	<i>Rhagada convicta</i>			
512.	<i>Rhagada dampierana</i>			
513.	<i>Rhagada minima</i>			
514.	<i>Rhagada perprima</i>			
515.	<i>Rheotanytarsus trivittatus</i>			
516.	<i>Rhombognathus dispar</i>			Y
517.	<i>Rhombognathus ocularis</i>			Y
518.	<i>Rhombognathus scutulatus</i>			
519.	<i>Scaptognathides hawaiiensis</i>			Y
520.	<i>Scaptognathides ornatus</i>			Y
521.	<i>Scirtidae sp.</i>			
522.	<i>Scolopendra laeta</i>			
523.	<i>Scolopendra morsitans</i>			
524.	<i>Simaetha tenuior</i>			
525.	<i>Simognathus platyaspis</i>			Y
526.	<i>Simognathus salebrosus</i>			Y

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
527.	<i>Simognathus tener</i>			Y
528.	<i>Simulium ornatipes</i>			
529.	<i>Sternolophus australis</i>			
530.	<i>Stratiomyidae</i> sp.			
531.	<i>Supunna picta</i>			
532.	<i>Tabanidae</i> sp.			
533.	<i>Tanytarsus fuscithorax/semibarbitarsus</i>			
534.	<i>Tanytarsus</i> sp. D (SAP)			
535.	<i>Tasmanocoenis arcuata</i>			
536.	<i>Testudinella patina</i>			
537.	<i>Thermocyclops decipiens</i>			
538.	<i>Tramea stenoloba</i>			
539.	<i>Trichocerca similis</i>			
540.	<i>Trichocyclops nigropunctatus</i>			
541.	<i>Triops australiensis australiensis</i>			
542.	<i>Urodacus armatus</i>			
543.	<i>Venatrix arenaris</i>			
544.	<i>Wesmaldra nixaut</i>			
545.	<i>Wyndundra kennedy</i>			
546.	<i>Wyndundra nixaut</i>			Y
547.	<i>Zenodorus orbiculatus</i>			
548.	<i>Zonocyprretta kalimna</i>			

Mammal

549.	48920	<i>Canis familiaris</i> (Dog, Dingo)	Y	
550.	24253	<i>Capra hircus</i> (Goat)	Y	
551.	24181	<i>Chaerephon jobensis</i> (Greater Northern Freetail-bat, Northern Mastiff Bat)		
552.	24091	<i>Dasykaluta rosamondae</i> (Little Red Kaluta)		
553.	24093	<i>Dasyurus hallucatus</i> (Northern Quoll)		T
554.	24084	<i>Dugong dugon</i> (Dugong)		S
555.	24041	<i>Felis catus</i> (Cat)	Y	
556.	24215	<i>Hydromys chrysogaster</i> (Water-rat, Rakali)		P4
557.	24217	<i>Leggadina lakedownensis</i> (Northern Short-tailed Mouse, Lakeland Downs Mouse, Kerakenga)		P4
558.	24180	<i>Macroderma gigas</i> (Ghost Bat)		T
559.	25489	<i>Macropus robustus</i> (Euro, Biggada)		
560.	24135	<i>Macropus robustus</i> subsp. <i>erubescens</i> (Euro, Biggada)		
561.	24136	<i>Macropus rufus</i> (Red Kangaroo, Marlu)		
562.	24051	<i>Megaptera novaeangliae</i> (Humpback Whale)		S
563.		<i>Mormopterus</i> (<i>Ozimops</i>) <i>cobourgianus</i>		
564.	24183	<i>Mormopterus loriae</i> (Little Northern Freetail-bat)		
565.	24223	<i>Mus musculus</i> (House Mouse)	Y	
566.	24095	<i>Ningaul timealeyi</i> (Pilbara Ningauli)		
567.	24224	<i>Notomys alexis</i> (<i>Spinifex</i> Hopping-mouse)		
568.	24192	<i>Nyctophilus arnhemensis</i> (Arnhem Land Long-eared Bat)		
569.	24194	<i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)		
570.		<i>Nyctophilus geoffroyi</i> subsp. <i>palescens</i>		
571.	24085	<i>Oryctolagus cuniculus</i> (Rabbit)	Y	
572.	48034	<i>Osphranter robustus</i> (Euro, Biggada)		
573.	34016	<i>Ovis aries</i> (Sheep)		
574.	24144	<i>Petrogale rothschildi</i> (Rothschild's Rock-wallaby)		
575.		<i>Planigale</i> sp. nov.		
576.	24105	<i>Pseudantechinus roryi</i> (Rory's <i>Pseudantechinus</i>)		
577.	24106	<i>Pseudantechinus woolleyae</i> (Woolley's <i>Pseudantechinus</i>)		
578.	24233	<i>Pseudomys chapmani</i> (Western Pebble-mound Mouse, Ngadji)		P4
579.	24234	<i>Pseudomys delicatulus</i> (Delicate Mouse)		
580.	24237	<i>Pseudomys hermannsburgensis</i> (Sandy Inland Mouse)		
581.	24173	<i>Pteropus scapulatus</i> (Little Red Flying-fox)		
582.	24245	<i>Rattus rattus</i> (Black Rat)	Y	
583.	24246	<i>Rattus tunneyi</i> (Pale Field-rat)		
584.	24116	<i>Sminthopsis macroura</i> (Stripe-faced Dunnart)		
585.	24207	<i>Tachyglossus aculeatus</i> (Short-beaked Echidna)		
586.	24175	<i>Taphozous georgianus</i> (Common Sheath-tailed Bat)		
587.	30954	<i>Tursiops aduncus</i> (Indo-Pacific Bottlenose Dolphin)		
588.	24205	<i>Vespadelus finlaysoni</i> (Finlayson's Cave Bat)		
589.	24040	<i>Vulpes vulpes</i> (Red Fox)	Y	
590.	24248	<i>Zyzomys argurus</i> (Common Rock-rat)		

Reptile

591.		<i>Acanthophis wellsei</i>		
592.	25332	<i>Acanthophis wellsi</i> (Pilbara Death Adder)		

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
593.	30833 <i>Amphibolurus longirostris</i> (Long-nosed Dragon)			
594.	25317 <i>Antaresia childreni</i> (Children's Python)			
595.	25318 <i>Antaresia perthensis</i> (Pygmy Python)			
596.	25448 <i>Antaresia stimsoni</i> (Stimson's Python)			
597.	25241 <i>Antaresia stimsoni</i> subsp. <i>stimsoni</i> (Stimson's Python)			
598.	25320 <i>Aspidites melanocephalus</i> (Black-headed Python)			
599.	25236 <i>Aspidites ramsayi</i> (Woma)			
600.	25331 <i>Brachyuropsis approximans</i> (North-western Shovel-nosed Snake)			
601.	25015 <i>Carlia munda</i> (Shaded-litter Rainbow Skink)			
602.	25017 <i>Carlia triacantha</i> (Desert Rainbow Skink)			
603.	25336 <i>Chelonia mydas</i> (Green Turtle)		T	
604.	24919 <i>Crenadactylus ocellatus</i> subsp. <i>horni</i> (Clawless Gecko)			
605.	30893 <i>Cryptoblepharus buchananii</i>			
606.	25020 <i>Cryptoblepharus plagiocephalus</i>			
607.	30892 <i>Cryptoblepharus ustulatus</i>			
608.	25458 <i>Ctenophorus caudicinctus</i> (Ring-tailed Dragon)			
609.	24865 <i>Ctenophorus caudicinctus</i> subsp. <i>caudicinctus</i> (Ring-tailed Dragon)			
610.	25459 <i>Ctenophorus isolepis</i> (Crested Dragon, Military Dragon)			
611.	24876 <i>Ctenophorus isolepis</i> subsp. <i>isolepis</i> (Crested Dragon, Military Dragon)			
612.	24882 <i>Ctenophorus nuchalis</i> (Central Netted Dragon)			
613.	24886 <i>Ctenophorus reticulatus</i> (Western Netted Dragon)			
614.	25024 <i>Ctenotus angusticeps</i> (Airlie Island Ctenotus, Northwestern coastal Ctenotus)		P3	
615.	25027 <i>Ctenotus australis</i>			
616.	25036 <i>Ctenotus duricola</i>			
617.	25462 <i>Ctenotus grandis</i>			
618.	25043 <i>Ctenotus grandis</i> subsp. <i>titan</i>			
619.	25045 <i>Ctenotus helenae</i>			
620.	25052 <i>Ctenotus leonhardii</i>			
621.	25463 <i>Ctenotus pantherinus</i> (Leopard Ctenotus)			
622.	25060 <i>Ctenotus pantherinus</i> subsp. <i>acripes</i> (Leopard Ctenotus)			
623.	25064 <i>Ctenotus pantherinus</i> subsp. <i>ocellifer</i> (Leopard Ctenotus)			
624.	25070 <i>Ctenotus robustus</i>			
625.	25072 <i>Ctenotus rubicundus</i>			
626.	25073 <i>Ctenotus saxatilis</i> (Rock Ctenotus)			
627.	25074 <i>Ctenotus schomburgkii</i>			
628.	25077 <i>Ctenotus serventyi</i>			
629.	25466 <i>Cyclodomorphus melanops</i> (Slender Blue-tongue)			
630.	25090 <i>Cyclodomorphus melanops</i> subsp. <i>melanops</i> (Slender Blue-tongue)			
631.	25001 <i>Delma nasuta</i>			
632.	25002 <i>Delma pax</i>			
633.	25004 <i>Delma tincta</i>			
634.	25468 <i>Demansia psammophis</i> (Yellow-faced Whipsnake)			
635.	25295 <i>Demansia psammophis</i> subsp. <i>cupreiceps</i> (Yellow-faced Whipsnake)			
636.	25297 <i>Demansia rufescens</i> (Rufous Whipsnake)			
637.	24926 <i>Diplodactylus conspicillatus</i> (Fat-tailed Gecko)			
638.	41404 <i>Diplodactylus galaxias</i> (Northern Pilbara Beak-faced Gecko)			
639.	24937 <i>Diplodactylus mitchelli</i>			
640.	24944 <i>Diplodactylus savagei</i> (Southern Pilbara Beak-faced Gecko)			
641.	25092 <i>Egernia depressa</i> (Southern Pygmy Spiny-tailed Skink)			
642.	25101 <i>Egernia pilbarensis</i> (Pilbara Skink)			
643.	25362 <i>Ephalophis greyae</i>			
644.	42404 <i>Eremiascincus isolepis</i>			
645.	41409 <i>Eremiascincus musivus</i> (Mosaic Desert Skink)			
646.	25342 <i>Eretmochelys imbricata</i> subsp. <i>bissa</i> (Hawksbill Turtle)		T	
647.	25327 <i>Fordonia leucobalia</i> (White-bellied Mangrove Snake)			
648.	25301 <i>Furina ornata</i> (Moon Snake)			
649.	24956 <i>Gehyra pilbara</i>			
650.	24958 <i>Gehyra punctata</i>			
651.	24959 <i>Gehyra variegata</i>			
652.	25232 <i>Hemidactylus frenatus</i> (Asian House Gecko)	Y		
653.	24961 <i>Heteronotia binoei</i> (Bynoe's Gecko)			
654.	25363 <i>Hydrelaps darwiniensis</i>			
655.	25125 <i>Lerista bipes</i>			
656.	30928 <i>Lerista clara</i>			
657.	30929 <i>Lerista jacksoni</i>			
658.	25155 <i>Lerista muelleri</i>			
659.	30925 <i>Lerista verhmens</i>			
660.	25005 <i>Lialis burtonis</i>			
661.	25238 <i>Liasis olivaceus</i> subsp. <i>barroni</i> (Pilbara Olive Python)		T	
662.	25239 <i>Liasis olivaceus</i> subsp. <i>olivaceus</i> (Olive Python)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
663.	30933 <i>Lucasium stenodactylum</i>			
664.	25184 <i>Menetia greyii</i>			
665.	25187 <i>Menetia surda</i> subsp. <i>surda</i>			
666.	25495 <i>Morethia ruficauda</i>			
667.	25193 <i>Morethia ruficauda</i> subsp. <i>exquisita</i>			
668.	25344 <i>Natator depressus</i> (Flatback Turtle)		T	
669.	25196 <i>Notoscincus butleri</i> (lined soil-crevice skink (Dampier))		P4	
670.	25197 <i>Notoscincus ornatus</i> subsp. <i>ornatus</i>			
671.	24976 <i>Oedura marmorata</i> (Marbled Velvet Gecko)			
672.	25510 <i>Pogona minor</i> (Dwarf Bearded Dragon)			
673.	24907 <i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)			
674.	25261 <i>Pseudechis australis</i> (Mulga Snake)			
675.	42416 <i>Pseudonaja mengdeni</i> (Western Brown Snake)			
676.	25263 <i>Pseudonaja modesta</i> (Ringed Brown Snake)			
677.	25264 <i>Pseudonaja nuchalis</i> (Gwardar, Northern Brown Snake)			
678.	24924 <i>Strophurus ciliaris</i> subsp. <i>aberrans</i>			
679.	24927 <i>Strophurus elderi</i>			
680.	24932 <i>Strophurus jeanae</i>			
681.	24949 <i>Strophurus wellingtonae</i>			
682.	25269 <i>Suta fasciata</i> (Rosen's Snake)			
683.	25307 <i>Suta punctata</i> (Spotted Snake)			
684.	25202 <i>Tiliqua multifasciata</i> (Central Blue-tongue)			
685.	30814 <i>Tympanocryptis cephalus</i> (Pebble Dragon)			
686.	25209 <i>Varanus acanthurus</i> (Spiny-tailed Monitor)			
687.	25210 <i>Varanus brevicauda</i> (Short-tailed Pygmy Monitor)			
688.	25212 <i>Varanus eremius</i> (Pygmy Desert Monitor)			
689.	25216 <i>Varanus giganteus</i> (Perentie)			
690.	25218 <i>Varanus gouldii</i> (Bungarra or Sand Monitor)			
691.	25223 <i>Varanus panoptes</i> subsp. <i>rubidus</i>			
692.	25224 <i>Varanus pilbarensis</i> (Pilbara Rock Monitor, Northern Pilbara Rock Goanna)			
693.	25526 <i>Varanus tristis</i> (Racehorse Monitor)			
694.	25227 <i>Varanus tristis</i> subsp. <i>tristis</i> (Racehorse Monitor)			

Conservation Codes

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

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

Appendix D – Flora data

Flora species list

Quadrat and releve data

Conservation significant flora locations

Flora likelihood of occurrence assessment

Flora species recorded within the survey area

Family	Taxon	Status
Aizoaceae	<i>Trianthema pilosum</i>	
Aizoaceae	<i>Trianthema turgidifolia</i>	
Amaranthaceae	<i>Aerva javanica</i>	*
Amaranthaceae	<i>Gomphrena cunninghamii</i>	
Amaranthaceae	<i>Ptilotus aevoides</i>	
Amaranthaceae	<i>Ptilotus astrolasius</i>	
Amaranthaceae	<i>Ptilotus auriculifolius</i>	
Amaranthaceae	<i>Ptilotus calostachyus</i>	
Amaranthaceae	<i>Ptilotus exaltatus</i>	
Amaranthaceae	<i>Ptilotus fusiformis</i>	
Amaranthaceae	<i>Ptilotus helipteroides</i>	
Amaranthaceae	<i>Ptilotus nobilis</i>	
Amaranthaceae	<i>Ptilotus obovatus</i>	
Araliaceae	<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	
Asteraceae	<i>Chrysocephalum gilesii</i>	
Asteraceae	<i>Pluchea dentex</i>	
Asteraceae	<i>Pterocaulon sphacelatum</i>	
Asteraceae	<i>Pterocaulon sphaeranthoides</i>	
Asteraceae	<i>Streptoglossa decurrens</i>	
Asteraceae	<i>Streptoglossa tenuiflora</i>	
Boraginaceae	<i>Ehretia saligna</i> var. <i>saligna</i>	
Boraginaceae	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	
Capparaceae	<i>Capparis spinosa</i>	
Chenopodiaceae	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	
Chenopodiaceae	<i>Rhagodia preissii</i>	
Chenopodiaceae	<i>Salsola australis</i>	
Chenopodiaceae	<i>Sclerolaena costata</i>	
Chenopodiaceae	<i>Sclerolaena diacantha</i>	
Chenopodiaceae	<i>Tecticornia ?indica</i> subsp. <i>leiostachya</i>	
Chenopodiaceae	<i>Tecticornia ?pterygosperma</i>	
Cleomaceae	<i>Cleome viscosa</i>	
Combretaceae	<i>Terminalia circumalata</i>	
Convolvulaceae	<i>Bonamia erecta</i>	
Convolvulaceae	<i>Evolvulus alsinoides</i>	
Convolvulaceae	<i>Ipomoea costata</i>	
Cucurbitaceae	<i>Cucumis variabilis</i>	
Cyperaceae	<i>Bulbostylis barbata</i>	
Cyperaceae	<i>Cyperus vaginatus</i>	
Cyperaceae	<i>Fimbristylis ?dichotoma</i>	
Euphorbiaceae	<i>Adriana tomentosa</i> var. <i>tomentosa</i>	
Euphorbiaceae	<i>Euphorbia australis</i>	
Euphorbiaceae	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	
Euphorbiaceae	<i>Euphorbia trigonosperma</i>	
Euphorbiaceae	<i>Euphorbia vaccaria</i> var. <i>vaccaria</i>	

Family	Taxon	Status
Fabaceae	<i>*Vachellia farnesiana</i>	*
Fabaceae	<i>Acacia ampliceps</i>	
Fabaceae	<i>Acacia ancistrocarpa</i>	
Fabaceae	<i>Acacia arida</i>	
Fabaceae	<i>Acacia bivenosa</i>	
Fabaceae	<i>Acacia coriacea</i> subsp. <i>coriacea</i>	
Fabaceae	<i>Acacia inaequilatera</i>	
Fabaceae	<i>Acacia maitlandii</i>	
Fabaceae	<i>Acacia orthocarpa</i>	
Fabaceae	<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	
Fabaceae	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>	
Fabaceae	<i>Acacia sericophylla</i>	
Fabaceae	<i>Acacia stellaticeps</i>	
Fabaceae	<i>Acacia synchronicia</i>	
Fabaceae	<i>Acacia tumida</i> var. <i>pilbarensis</i>	
Fabaceae	<i>Acacia xiphophylla</i>	
Fabaceae	<i>Cajanus cinereus</i>	
Fabaceae	<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	
Fabaceae	<i>Indigofera monophylla</i>	
Fabaceae	<i>Indigofera trita</i>	
Fabaceae	<i>Rhynchosia bungarensis</i>	Priority 4
Fabaceae	<i>Rhynchosia minima</i>	
Fabaceae	<i>Senna artemisioides</i>	
Fabaceae	<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	
Fabaceae	<i>Senna glutinosa</i>	
Fabaceae	<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
Fabaceae	<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	
Fabaceae	<i>Senna venusta</i>	
Fabaceae	<i>Swainsona formosa</i>	
Fabaceae	<i>Tephrosia supina</i>	
Goodeniaceae	<i>Goodenia forrestii</i>	
Goodeniaceae	<i>Goodenia lamprosperma</i>	
Goodeniaceae	<i>Goodenia microptera</i>	
Goodeniaceae	<i>Goodenia stobbsiana</i>	
Goodeniaceae	<i>Scaevola spinescens</i>	
Lamiaceae	<i>Clerodendrum tomentosum</i> var. <i>lanceolata</i>	
Lauraceae	<i>Cassytha capillaris</i>	
Malvaceae	<i>*Malvastrum americanum</i>	*
Malvaceae	<i>Abutilon lepidum</i>	
Malvaceae	<i>Brachychiton acuminatus</i>	
Malvaceae	<i>Corchorus incanus</i> subsp. <i>incanus</i>	
Malvaceae	<i>Corchorus parviflorus</i>	
Malvaceae	<i>Gossypium australe</i>	
Malvaceae	<i>Hibiscus sturtii</i> var. <i>?platyklamys</i>	
Malvaceae	<i>Lawrenzia viridigrisea</i>	
Malvaceae	<i>Malvastrum americanum</i>	

Family	Taxon	Status
Malvaceae	<i>Sida fibulifera</i>	
Malvaceae	<i>Triumfetta clementii</i>	
Malvaceae	<i>Triumfetta propinqua</i>	
Malvaceae	<i>Triumfetta propinqua</i>	
Malvaceae	<i>Waltheria indica</i>	
Menispermaceae	<i>Tinospora smilacina</i>	
Molluginaceae	<i>Trigastrotheca molluginea</i>	
Moraceae	<i>Ficus aculeata</i> var. <i>indecora</i>	
Myrtaceae	<i>Eucalyptus camaldulensis</i>	
Nyctaginaceae	<i>Boerhavia coccinea</i>	
Oleaceae	<i>Jasminum didymum</i> subsp. <i>lineare</i>	
Phyllanthaceae	<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	
Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>	
Pittosporaceae	<i>Pittosporum angustifolium</i>	
Passifloraceae	<i>Passiflora foetida</i>	
Poaceae	<i>Aristida contorta</i>	
Poaceae	<i>Cenchrus ciliaris</i>	
Poaceae	<i>Cenchrus setiger</i>	
Poaceae	<i>Chrysopogon fallax</i>	
Poaceae	<i>Cymbopogon ambiguus</i>	
Poaceae	<i>Cymbopogon obtectus</i>	
Poaceae	<i>Dactyloctenium radulans</i>	
Poaceae	<i>Eragrostis desertorum</i>	
Poaceae	<i>Eragrostis xerophila</i>	
Poaceae	<i>Eriachne benthamii</i>	
Poaceae	<i>Eriachne aristidea</i>	
Poaceae	<i>Iseilema vaginiflorum</i>	
Poaceae	<i>Paraneurachne muelleri</i>	
Poaceae	<i>Sporobolus australasicus</i>	
Poaceae	<i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471)	
Poaceae	<i>Themeda triandra</i>	
Poaceae	<i>Triodia angusta</i>	
Poaceae	<i>Triodia epactia</i>	
Poaceae	<i>Triodia wiseana</i>	
Portulacaceae	<i>Portulaca oleracea</i>	
Proteaceae	<i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>	
Proteaceae	<i>Hakea lorea</i> subsp. <i>lorea</i>	
Rubiaceae	<i>Operculina aequisepala</i>	
Sapindaceae	<i>Alectryon oleifolius</i> subsp. <i>oleifolius</i>	
Sapindaceae	<i>Diplopeltis eriocarpa</i>	
Scrophulariaceae	<i>Eremophila longifolia</i>	
Solanaceae	<i>Solanum diversiflorum</i>	
Solanaceae	<i>Solanum lasiophyllum</i>	
Violaceae	<i>Hybanthus aurantiacus</i>	

Quadrat and releve data

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_01	<i>Acacia inaequilatera</i>	<10%	3	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_01	<i>Hakea lorea</i> subsp. <i>lorea</i>	<2% Numerous	2.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_01	<i>Acacia bivenosa</i>	<2% Numerous	2	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_01	<i>Indigofera monophylla</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_01	<i>Triodia wiseana</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_01	<i>Triodia epactia</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_01	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_01	<i>Eremophila longifolia</i>	<2% Few than 10	1	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_01	<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	<2% Few than 10	0.75	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_01	<i>Solanum lasiophyllum</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_01	<i>Pterocaulon sphacelatum</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_01	<i>Senna glutinosa</i>	<2% Few than 10	0.75	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_01	<i>Cymbopogon ambiguus</i>	<2% Few than 10	0.25	Tussock grass (G)	Quadrat
KAR_01	<i>Cassytha capillaris</i>	<2% Few than 10	0.25	Vine (G)	Quadrat
KAR_01	<i>Fimbristylis ?dichotoma</i>	<2% Numerous	0.1	Sedge (G)	Quadrat
KAR_01	<i>Bulbostylis barbata</i>	<2% Numerous	0.1	Sedge (G)	Quadrat
KAR_01	<i>Erianchne aristidea</i>	<2% Few than 10	0.25	Tussock grass (G)	Quadrat
KAR_01	<i>Bonamia erecta</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_01	<i>Solanum diversiflorum</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_01	<i>Gossypium australe</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_01	<i>Hibiscus sturtii</i> var. <i>?platyklamys</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_01	<i>Acacia ancistrocarpa</i>	<2% Few than 10	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_02	<i>Acacia inaequilatera</i>	<10%	3	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_02	<i>Hakea lorea</i> subsp. <i>lorea</i>	<2% Few than 10	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_02	<i>Acacia bivenosa</i>	<2% Numerous	2	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_02	<i>Indigofera monophylla</i>	<2% Numerous	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_02	<i>Triodia wiseana</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_02	<i>Triodia epactia</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_02	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_02	<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	<2% Few than 10	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_02	<i>Diplopeltis eriocarpa</i>	<2% Few than 10	0.75	Forb (G)	Quadrat
KAR_02	<i>Rhynchosia minima</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_02	<i>Fimbristylis ?dichotoma</i>	<2% Numerous	0.1	Sedge (G)	Quadrat
KAR_02	<i>Bulbostylis barbata</i>	<2% Numerous	0.1	Sedge (G)	Quadrat
KAR_02	<i>Erianchne aristidea</i>	<2% Few than 10	0.25	Tussock grass (G)	Quadrat
KAR_02	<i>Bonamia erecta</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_02	<i>Solanum diversiflorum</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_02	<i>Gossypium australe</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_02	<i>Hibiscus sturtii</i> var. <i>?platyklamys</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_02	<i>Acacia ancistrocarpa</i>	<2% Few than 10	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_03	<i>Acacia inaequilatera</i>	<2% Few than 10	3	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_03	<i>Hakea lorea</i> subsp. <i>lorea</i>	<2% Few than 10	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_03	<i>Acacia bivenosa</i>	<10%	2	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_03	<i>Indigofera monophylla</i>	<2% Numerous	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_03	<i>Triodia wiseana</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_03	<i>Triodia epactia</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_03	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_03	<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	<2% Few than 10	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_03	<i>Fimbristylis ?dichotoma</i>	<2% Numerous	0.1	Sedge (G)	Quadrat
KAR_03	<i>Bulbostylis barbata</i>	<2% Numerous	0.1	Sedge (G)	Quadrat
KAR_03	<i>Solanum diversiflorum</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_03	<i>Gossypium australe</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_03	<i>Hibiscus sturtii</i> var. <i>?platyklamys</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_03	<i>Eremophila longifolia</i>	<2% Few than 10	1	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_03	<i>Acacia synchronicia</i>	<2% Few than 10	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_03	<i>Rhagodia preissii</i>	<2% Few than 10	0.75	Chenopod shrub (M)	Quadrat
KAR_03	<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	<2% Few than 10	1	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_03	<i>Dactyloctenium radulans</i>	<2% Few than 10	0.1	Other grass (G)	Quadrat
KAR_03	<i>Sporobolus australasicus</i>	<2% Few than 11	0.1	Other grass (G)	Quadrat
KAR_03	<i>Euphorbia vaccaria</i> var. <i>vaccaria</i>	<2% Few than 12	0.1	Forb (G)	Quadrat
KAR_04	<i>Acacia xiphophylla</i>	30-10%	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_04	<i>Triodia epactia</i>	70-30%	0.75	Hummock grass (G)	Quadrat
KAR_04	<i>Fimbristylis ?dichotoma</i>	<2% Numerous	0.1	Sedge (G)	Quadrat
KAR_04	<i>Cenchrus ciliaris</i>	<2% Numerous	0.5	Tussock grass (G)	Quadrat
KAR_04	<i>Gossypium australe</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_04	<i>Hibiscus sturtii</i> var. <i>?platyklamys</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_04	<i>Rhagodia preissii</i>	<2% Few than 10	1	Chenopod shrub (M)	Quadrat
KAR_04	<i>Pterocaulon sphacelatum</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_04	<i>Triodia wiseana</i>	30-10%	0.5	Hummock grass (G)	Quadrat
KAR_04	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	<2% Few than 10	0.25	Chenopod shrub (M)	Quadrat
KAR_04	<i>Senna artemisioides</i>	<2% Few than 10	1.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_04	<i>Acacia bivenosa</i>	<2% Few than 10	1	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_04	<i>Bonamia erecta</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_04	<i>Bulbostylis barbata</i>	<2% Numerous	0.1	Sedge (G)	Quadrat
KAR_04	<i>Streptoglossa decurrens</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_04	<i>Ptilotus helipteroides</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_04	<i>Sclerolaena costata</i>	<2% Few than 10	0.1	Chenopod shrub (M)	Quadrat
KAR_04	<i>Indigofera trita</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_05	<i>Acacia inaequilatera</i>	<2% Few than 10	3	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_05	<i>Hakea lorea</i> subsp. <i>lorea</i>	<2% Few than 10	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_05	<i>Acacia bivenosa</i>	<10%	2	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_05	<i>Indigofera monophylla</i>	<2% Numerous	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_05	<i>Triodia wiseana</i>	70-30%	0.5	Hummock grass (G)	Releve
KAR_05	<i>Triodia epactia</i>	70-30%	0.5	Hummock grass (G)	Releve
KAR_05	<i>Fimbristylis ?dichotoma</i>	<2% Numerous	0.1	Sedge (G)	Releve
KAR_05	<i>Solanum diversiflorum</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_05	<i>Gossypium australe</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_05	<i>Diplopeltis eriocarpa</i>	<2% Numerous	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_05	<i>Eremophila longifolia</i>	<2% Few than 10	1	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_06	<i>Acacia inaequilatera</i>	<2% Few than 10	3	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_06	<i>Hakea lorea</i> subsp. <i>lorea</i>	<2% Few than 10	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_06	<i>Acacia bivenosa</i>	<10%	2	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_06	<i>Acacia stellaticeps</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_06	<i>Triodia wiseana</i>	70-30%	0.5	Hummock grass (G)	Releve
KAR_06	<i>Fimbristylis ?dichotoma</i>	<2% Numerous	0.1	Sedge (G)	Releve
KAR_06	<i>Diplopeltis eriocarpa</i>	<2% Numerous	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_06	<i>Eremophila longifolia</i>	<2% Few than 10	1	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_06	<i>Indigofera monophylla</i>	<2% Numerous	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_06	<i>Acacia ancistrocarpa</i>	<2% Few than 10	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_07	<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	<2% Few than 10	3	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_07	<i>Acacia bivenosa</i>	<2% Few than 10	2	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_07	<i>Acacia arida</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_07	<i>Triodia wiseana</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_07	<i>Indigofera monophylla</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_07	<i>Fimbristylis ?dichotoma</i>	<2% Few than 10	0.1	Sedge (G)	Quadrat
KAR_07	<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	<2% Few than 10	1.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_07	<i>Bulbostylis barbata</i>	<2% Few than 10	0.1	Sedge (G)	Quadrat

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_07	<i>Hybanthus aurantiacus</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_07	<i>Scaevola spinescens</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_07	<i>Acacia maitlandii</i>	<2% Few than 10	1	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_07	<i>Triumfetta clementii</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_07	<i>Ptilotus calostachyus</i>	<2% Few than 10	0.5	Forb (G)	Quadrat
KAR_08	<i>Acacia inaequilatera</i>	<2% Few than 10	3	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_08	<i>Acacia bivenosa</i>	<2% Few than 10	2	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_08	<i>Acacia arida</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_08	<i>Triodia wiseana</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_08	<i>Indigofera monophylla</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_08	<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	<2% Few than 10	1.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_08	<i>Scaevola spinescens</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_08	<i>Acacia ancistrocarpa</i>	<2% Few than 10	1	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_09	<i>Cenchrus ciliaris</i>	70-30%	0.5	Tussock grass (G)	Quadrat
KAR_09	<i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_09	<i>Hakea lorea</i> subsp. <i>lorea</i>	<2% Few than 10	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_09	<i>Eragrostis desertorum</i>	<10%	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_09	<i>Ehretia saligna</i> var. <i>saligna</i>	<10%	0.5	Forb (G)	Quadrat
KAR_09	<i>Triodia epactia</i>	<2% Few than 10	0.5	Hummock grass (G)	Quadrat
KAR_09	<i>Indigofera monophylla</i>	<2% Few than 10	0.5	Vine (G)	Quadrat
KAR_09	<i>Cassytha capillaris</i>	<2% Numerous	0.25	Vine (G)	Quadrat
KAR_09	<i>Streptoglossa decurrens</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_09	<i>Solanum lasiophyllum</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_09	<i>Diplopeltis eriocarpa</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_09	<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	<2% Few than 10	0.1	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_09	<i>Trianthema pilosum</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_09	<i>Acacia inaequilatera</i>	<2% Few than 10	2	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_10	<i>Cenchrus ciliaris</i>	70-30%	0.5	Tussock grass (G)	Quadrat
KAR_10	<i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>	<2% Few than 10	2	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_10	<i>Triodia epactia</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_10	<i>Eucalyptus camaldulensis</i>	<10%	9	Tree, palm (U)	Quadrat
KAR_10	<i>Solanum lasiophyllum</i>	<2% Few than 10	0.1	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_10	<i>Cyperus vaginatus</i>	<2% Few than 10	0.75	Sedge (G)	Quadrat
KAR_10	<i>Triumfetta propinqua</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_10	<i>Cleome viscosa</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_10	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_10	<i>Trianthema pilosum</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_10	<i>Swainsona formosa</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_10	* <i>Vachellia farnesiana</i>	<2% Few than 10	0.1	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_10	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>	<2% Few than 10	1.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_10	<i>Triodia wiseana</i>	30-10%	0.5	Hummock grass (G)	Quadrat
KAR_10	<i>Ptilotus nobilis</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_11	<i>Acacia tumida</i> var. <i>pilbarensis</i>	<2% Few than 10	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_11	<i>Terminalia circumalata</i>	<2% Numerous	9	Tree, palm (U)	Quadrat
KAR_11	* <i>Vachellia farnesiana</i>	<2% Numerous	2	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_11	<i>Cymbopogon obtectus</i>	<2% Numerous	0.75	Tussock grass (G)	Quadrat
KAR_11	<i>Triodia epactia</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_11	<i>Acacia ?sericophylla</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_11	<i>Acacia inaequilatera</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_11	<i>Cenchrus ciliaris</i>	<2% Numerous	0.5	Tussock grass (G)	Quadrat
KAR_11	<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_11	<i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>	<2% Few than 10	2	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_11	<i>Senna artemisioides</i>	<2% Few than 10	1.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_11	<i>Indigofera monophylla</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_11	<i>Portulaca oleracea</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_11	<i>Solanum diversiflorum</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_11	<i>Corchorus parviflorus</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_11	<i>Triumfetta propinqua</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_11	<i>Evolvulus alsinoides</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_11	<i>Cucumis variabilis</i>	<2% Few than 10	0.25	Vine (G)	Quadrat
KAR_11	<i>Acacia orthocarpa</i>	<2% Few than 10	1.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_11	<i>Triumfetta clementii</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_11	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_11	<i>Tinospora smilacina</i>	<2% Few than 10	0.75	Vine (G)	Quadrat
KAR_11	<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_12	<i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>	<10%	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_12	* <i>Vachellia farnesiana</i>	<2% Numerous	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_12	<i>Triumfetta propinqua</i>	<2% Numerous	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_12	<i>Triodia epactia</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_12	<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_12	<i>Indigofera monophylla</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_12	<i>Boerhavia coccinea</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_12	<i>Cajanus cinereus</i>	<2% Few than 10	1.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_12	<i>Gomphrena cunninghamii</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_12	<i>Portulaca oleracea</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_12	<i>Cucumis variabilis</i>	<2% Few than 10	0.1	Vine (G)	Quadrat
KAR_12	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_12	<i>Swainsona formosa</i>		0.1	Forb (G)	Quadrat
KAR_12	<i>Abutilon lepidum</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_12	<i>Themeda</i> sp. Mt Barricade (M.E. Trudgen 2471)	<2% Few than 10	0.5	Tussock grass (G)	Quadrat

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_13	<i>Triumfetta propinqua</i>	<2% Numerous	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_13	<i>Triodia epactia</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_13	<i>Gomphrena cunninghamii</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_13	<i>Abutilon lepidum</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_13	<i>Brachychiton acuminatus</i>	<2% Few than 10	4	Tree, palm (U)	Quadrat
KAR_13	<i>Ipomoea costata</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_13	<i>Cenchrus ciliaris</i>	<10%	0.5	Tussock grass (G)	Quadrat
KAR_13	<i>Solanum diversiflorum</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_13	<i>Abutilon lepidum</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_13	<i>Aerva javanica</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_13	<i>Rhynchosia bungarensis</i> (P4)	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_13	<i>Cymbopogon ambiguus</i>	<2% Few than 10	1	Tussock grass (G)	Quadrat
KAR_13	<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_13	<i>Triumfetta clementii</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_13	* <i>Vachellia farnesiana</i>	<2% Few than 10	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_13	<i>Jasminum didymum</i> subsp. <i>lineare</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_13	<i>Cleome viscosa</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_13	<i>Clerodendrum tomentosum</i> var. <i>lanceolata</i>	<2% Few than 10	2.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_13	<i>Indigofera monophylla</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_14	<i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_14	<i>Triodia epactia</i>	70-30%	0.5	Hummock grass (G)	Releve
KAR_14	<i>Indigofera monophylla</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_14	<i>Terminalia circumalata</i>	<2% Numerous	2.75	Tree, palm (U)	Releve
KAR_14	<i>Acacia inaequilatera</i>	<2% Numerous	2	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_14	<i>Triafetta propinqua</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_14	<i>Acacia orthocarpa</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_14	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	<2% Few than 10	0.1	Forb (G)	Releve

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_14	<i>Swainsona formosa</i>		0.1	Forb (G)	Releve
KAR_14	<i>Acacia ampliceps</i>	<2% Few than 10	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_15	<i>Triumfetta propinqua</i>	<2% Numerous	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_15	<i>Triodia epactia</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_15	<i>Gomphrena cunninghamii</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_15	<i>Brachychiton acuminatus</i>	<2% Few than 10	4	Tree, palm (U)	Quadrat
KAR_15	<i>Ipomoea costata</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_15	<i>Cenchrus ciliaris</i>	<2% Numerous	0.5	Tussock grass (G)	Quadrat
KAR_15	<i>Solanum diversiflorum</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_15	<i>Rhynchosia bungarensis</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_15	<i>Cymbopogon ambiguus</i>	<2% Few than 10	1	Tussock grass (G)	Quadrat
KAR_15	<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_15	<i>Triumfetta clementii</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_15	<i>Jasminum didymum</i> subsp. <i>lineare</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_15	<i>Clerodendrum tomentosum</i> var. <i>lanceolata</i>	<2% Few than 10	2.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_15	<i>Indigofera monophylla</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_15	<i>Acacia ampliceps</i>	<2% Few than 10	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_15	<i>Ficus aculeata</i> var. <i>indecora</i>	<2% Few than 10	1.75	Tree, palm (U)	Quadrat
KAR_15	<i>Cassytha capillaris</i>	<2% Few than 10	0.5	Vine (G)	Quadrat
KAR_15	<i>Acacia orthocarpa</i>	<2% Few than 10	2	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_16	<i>Triumfetta propinqua</i>	<2% Numerous	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_16	<i>Triodia epactia</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_16	<i>Gomphrena cunninghamii</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_16	<i>Brachychiton acuminatus</i>	<2% Few than 10	4	Tree, palm (U)	Quadrat
KAR_16	<i>Ipomoea costata</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_16	<i>Cenchrus ciliaris</i>	70-30%	0.5	Tussock grass (G)	Quadrat
KAR_16	<i>Rhynchosia bungarensis</i>	<2% Few than 10	0.25	Forb (G)	Quadrat

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_16	<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_16	<i>Indigofera monophylla</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_17	<i>Cenchrus ciliaris</i>	30-10%	0.5	Tussock grass (G)	Quadrat
KAR_17	<i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>	<2% Few than 10	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_17	<i>Hakea lorea</i> subsp. <i>lorea</i>	<2% Few than 10	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_17	<i>Ehretia saligna</i> var. <i>saligna</i>	<2% Numerous	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_17	<i>Triodia epactia</i>	30-10%	0.5	Hummock grass (G)	Quadrat
KAR_17	<i>Solanum lasiophyllum</i>	<2% Numerous	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_17	<i>Portulaca oleracea</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_17	<i>Diplopeltis eriocarpa</i>	<10%	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_17	<i>Trianthema pilosum</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_17	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_17	<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	30-10%	0.75	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_17	<i>Trigastrotheca molluginea</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_17	<i>Corchorus incanus</i> subsp. <i>incanus</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_17	<i>Aristida contorta</i>	<2% Few than 10	0.25	Tussock grass (G)	Quadrat
KAR_17	<i>Goodenia microptera</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_17	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_17	<i>Ptilotus nobilis</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_17	<i>Ptilotus aevoides</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_17	<i>Acacia stellaticeps</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_17	<i>Acacia bivenosa</i>	<10%	1.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_17	<i>Triodia wiseana</i>	70-30%	0.5	Hummock grass (G)	Quadrat
KAR_18	<i>Acacia bivenosa</i>	30-10%	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_18	<i>Acacia synchronicia</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_18	<i>Aristida contorta</i>	<10%	0.1	Tussock grass (G)	Releve
KAR_18	<i>Acacia ancistrocarpa</i>	<2% Numerous	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Releve

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_18	<i>Cenchrus ciliaris</i>	<2% Numerous	0.25	Tussock grass (G)	Releve
KAR_18	<i>Solanum lasiophyllum</i>	<2% Few than 10	0.25	Forb (G)	Releve
KAR_18	<i>Ptilotus helipteroides</i>	<2% Few than 10	0.1	Forb (G)	Releve
KAR_19	<i>Acacia bivenosa</i>	30-10%	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_19	<i>Acacia synchronicia</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_19	<i>Aristida contorta</i>	<10%	0.1	Tussock grass (G)	Releve
KAR_19	<i>Acacia ancistrocarpa</i>	<2% Numerous	1.75	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_19	<i>Cenchrus ciliaris</i>	<2% Numerous	0.25	Tussock grass (G)	Releve
KAR_19	<i>Solanum lasiophyllum</i>	<2% Few than 10	0.25	Forb (G)	Releve
KAR_19	<i>Ptilotus helipteroides</i>	<2% Few than 10	0.1	Forb (G)	Releve
KAR_19	<i>Triodia wiseana</i>	30-10%	0.5	Hummock grass (G)	Releve
KAR_19	<i>Indigofera monophylla</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_19	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	<2% Few than 10	0.1	Forb (G)	Releve
KAR_19	<i>Triodia epactia</i>	70-30%	0.5	Hummock grass (G)	Releve
KAR_19	<i>Scaevola spinescens</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_19	<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	<10%	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_19	<i>Eremophila longifolia</i>	<2% Numerous	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_20	<i>Dactyloctenium radulans</i>	<2% Numerous	0.1	Tussock grass (G)	Quadrat
KAR_20	<i>Salsola australis</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_20	<i>Cenchrus setiger</i>	<2% Numerous	0.5	Tussock grass (G)	Quadrat
KAR_20	<i>Eragrostis xerophila</i>	70-30%	0.25	Tussock grass (G)	Quadrat
KAR_20	<i>Corchorus incanus</i> subsp. <i>incanus</i>	<2% Few than 10	0.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_20	<i>Chrysopogon fallax</i>	<2% Numerous	1.25	Tussock grass (G)	Quadrat
KAR_20	<i>Evolvulus alsinoides</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_20	<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	<2% Numerous	1.25	Shrub, cycad, grass-tree, tree-fern (M)	Quadrat
KAR_20	<i>Triodia epactia</i>	<2% Numerous	0.25	Hummock grass (G)	Quadrat
KAR_20	<i>Eriachne benthamii</i> (<10%	0.25	Tussock grass (G)	Quadrat

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_20	<i>Cucumis variabilis</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_20	<i>Portulaca oleracea</i>	<2% Few than 10	0.1	Forb (G)	Quadrat
KAR_20	<i>Rhynchosia minima</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_20	<i>Phyllanthus maderaspatensis</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_20	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	<2% Few than 10	0.5	Chenopod shrub (M)	Quadrat
KAR_20	<i>Chrysocephalum gilesii</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_20	<i>Operculina aequisejala</i>	<2% Few than 10	0.25	Forb (G)	Quadrat
KAR_21	<i>Acacia stellaticeps</i>	30-10%	1.3	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_21	<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	<2% Few than 10	0.9	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_21	<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	<2% Few than 10	1.6	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_21	<i>Cymbopogon ambiguus</i>	<2% Few than 10	1	Tussock grass (G)	Releve
KAR_21	<i>Bonamia erecta</i>	<10%	0.2	Forb (G)	Releve
KAR_21	<i>Ptilotus exaltatus</i>	<2% Few than 10	0.1	Forb (G)	Releve
KAR_21	<i>Diplopeltis eriocarpa</i>	<10%	0.2	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_21	<i>Corchorus incanus</i> subsp. <i>incanus</i>	<2% Few than 10	0.2	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_21	<i>Triodia wiseana</i>	>70%	0.8	Hummock grass (G)	Releve
KAR_21	<i>Indigofera monophylla</i>	<2% Few than 10	0.3	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_21	<i>Scaevola spinescens</i>	<2% Few than 10	0.4	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_21	<i>Cassutha capillaris</i>	<2% Few than 10	climber	Forb (G)	Releve
KAR_21	<i>Acacia inaequilatera</i>	<2% Few than 10	1.7	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_21	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>	<2% Few than 10	1.7	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_21	<i>Acacia arida</i>	<10%	1	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_21	<i>Triodia epactia</i>	<10%	0.5	Hummock grass (G)	Releve
KAR_21	<i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>	<2% Few than 10	1.8	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_21	<i>Acacia bivenosa</i>	<2% Few than 10	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_21	<i>Trigastrotheca molluginea</i>	<2% Few than 10	0.2	Forb (G)	Releve
KAR_22	<i>Triodia angusta</i>	70-30%	0.5	Hummock grass (G)	Releve

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_22	<i>Tecticornia ?indica</i> subsp. <i>leiostachya</i>	<2% Few than 10	0.3	Chenopod shrub (M)	Releve
KAR_22	<i>Tecticornia ?pterygosperma</i>	<2% Few than 10	0.3	Chenopod shrub (M)	Releve
KAR_22	<i>Chrysocephalum gilesii</i>	<2% Few than 10	0.4		Releve
KAR_22	<i>Salsola australis</i>	<2% Few than 10	0.2	Chenopod shrub (M)	Releve
KAR_22	<i>Aerva javanica</i>	<2% Few than 10	0.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_22	<i>Euphorbia trigonosperma</i>	<2% Few than 10	0.2	Forb (G)	Releve
KAR_22	<i>Solanum</i> sp.	<2% Few than 10	0.1	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_22	<i>Trianthema turgidifolia</i>	<2% Few than 10	0.2	Forb (G)	Releve
KAR_22	<i>Corchorus</i> sp.	<2% Few than 10	0.2	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_22	<i>Diplopeltis eriocarpa</i>	<2% Few than 10	0.2	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_22	<i>Lawrenzia viridigrisea</i>	<2% Few than 10	0.4		Releve
KAR_22	<i>Diplopeltis eriocarpa</i>	<2% Few than 10	0.3	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_22	<i>Sclerolaena diacantha</i>	<2% Few than 10	0.2	Chenopod shrub (M)	Releve
KAR_22	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	<2% Few than 10	0.2	Forb (G)	Releve
KAR_22	<i>Streptoglossa tenuiflora</i>	<2% Few than 10	0.2	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_22	<i>Cenchrus ciliaris</i>	30-10%	0.5	Tussock grass (G)	Releve
KAR_23	<i>Acacia bivenosa</i>	<10%	2.1	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_23	<i>Grevillea pyramidalis</i> subsp. <i>pyramidalis</i>	<10%	2.7	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_23	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>	<10%	2.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_23	<i>Triodia epactia</i>	70-30%	0.8	Hummock grass (G)	Releve
KAR_23	<i>Triodia wiseana</i>	70-30%	0.9	Hummock grass (G)	Releve
KAR_23	<i>Cenchrus ciliaris</i>	30-10%	0.4	Tussock grass (G)	Releve
KAR_23	<i>Brachychiton acuminatus</i>	<2% Few than 10	2	Tree, palm (U)	Releve
KAR_23	<i>Swainsona formosa</i>	<2% Few than 10	0.3	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_23	<i>Euphorbia australis</i>	<2% Few than 10	0.1	Forb (G)	Releve
KAR_23	<i>Ipomoea costata</i>	<2% Few than 10	climber	Vine (G)	Releve
KAR_23	<i>Indigofera monophylla</i>	<2% Few than 10	0.4	Shrub, cycad, grass-tree, tree-fern (M)	Releve

Site name	Taxa	Cover	Height	Form/stratum	Site type
KAR_23	<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	<2% Few than 10	2	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_23	<i>Acacia tumida</i> var. <i>pilbarensis</i>	<2% Few than 10	1.9	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_23	<i>Goodenia microptera</i>	<2% Few than 10	0.3	Forb (G)	Releve
KAR_23	<i>Corymbia hamersleyana</i>	<10%	3	Tree, palm (U)	Releve
KAR_24	<i>Corymbia hamersleyana</i>	<10%	4	Tree, palm (U)	Releve
KAR_24	<i>Acacia sericophylla</i>	70-30%	3.5	Tree, palm (U)	Releve
KAR_24	<i>Ehretia saligna</i> var. <i>saligna</i>	<2% Few than 10	3	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_24	<i>Triodia epactia</i>	70-30%	0.8	Hummock grass (G)	Releve
KAR_24	<i>Cenchrus ciliaris</i>	30-10%	0.4	Tussock grass (G)	Releve
KAR_24	<i>Acacia arida</i>	<2% Few than 10	1.5	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_24	<i>Evolvulus alsinoides</i> (<2% Few than 10	0.1	Forb (G)	Releve
KAR_24	<i>Solanum lasiophyllum</i>	<2% Few than 10	0.2	Shrub, cycad, grass-tree, tree-fern (M)	Releve
KAR_24	<i>Goodenia microptera</i>	<2% Few than 10	0.3	Forb (G)	Releve

Conservation significant flora recorded within the survey area

Genus	Species	Population count	Easting	Northing
Fabaceae	<i>Rhynchosia bungarensis</i>	1	471511.3	7713375
Fabaceae	<i>Rhynchosia bungarensis</i>	3	471501.9	7713362
Fabaceae	<i>Rhynchosia bungarensis</i>	3	471506.9	7713357
Fabaceae	<i>Rhynchosia bungarensis</i>	4	471491.9	7713355
Fabaceae	<i>Rhynchosia bungarensis</i>	3	471572.5	7713451
Fabaceae	<i>Rhynchosia bungarensis</i>	3	471584.2	7713486
Fabaceae	<i>Rhynchosia bungarensis</i>	5	471592.6	7713500
Fabaceae	<i>Rhynchosia bungarensis</i>	5	471641.6	7713575
Fabaceae	<i>Rhynchosia bungarensis</i>	1	471651.8	7713598
Fabaceae	<i>Rhynchosia bungarensis</i>	6	471686.1	7713633
Fabaceae	<i>Rhynchosia bungarensis</i>	1	471694.5	7713645
Fabaceae	<i>Rhynchosia bungarensis</i>	6	471774.3	7713733
Fabaceae	<i>Rhynchosia bungarensis</i>	2	471811.1	7713782
Fabaceae	<i>Rhynchosia bungarensis</i>	5	471819.6	7713793

Flora likelihood of occurrence assessment guidelines

Likelihood of occurrence	Guideline
Known	Species recorded within survey area from field survey results.
Likely	Species previously recorded within 20 km and large areas of suitable habitat occur in the project area.
Possible	Species previously recorded within 20 km and areas of suitable habitat occur/may occur in the project area.
Unlikely	Species previously recorded within 20 km, but suitable habitat does not occur in the project area.
Highly unlikely	Species not previously recorded within 20 km, suitable habitat does not occur in the project area and/or the project 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

Flora likelihood of occurrence assessment

Family	Taxon	Status		Description (if available) (WA Herbarium 1998–)	Likelihood of occurrence	Source
		EPBC Act	BC Act / DBCA			
Aizoaceae	<i>Trianthera</i> sp. Python Pool (G.R. Guerin & M.E. Trudgen GG 1023)		P2	Prostrate to near prostrate annual herb. Flowers pink. Clayey-sand, clayey-loam. Plains, low undulating hills.	Unlikely – the closest known record is located more than 20 km south of the survey area. Was not recorded during the survey.	WAHerb
Apocynaceae	<i>Gymnanthera cunninghamii</i>		P3	Erect shrub, 1-2 m high. Flowers cream-yellow-green, January to December. Sandy soils.	Unlikely – no suitable habitat is present within the survey area.	NatureMap
Celastraceae	<i>Stackhousia clementii</i>		P3	Dense broom-like perennial, herb, to 0.45 m high. Flowers green/yellow/brown. Skeletal soils. Sandstone hills.	Unlikely – the species has been recorded within 500 m of the survey area. Suitable habitat is present however given survey effort this species is considered unlikely to occur within the survey area.	NatureMap, TPFL, WAHerb

Family	Taxon	Status		Description (if available) (WA Herbarium 1998–)	Likelihood of occurrence	Source
		EPBC Act	BC Act / DBCA			
Combretaceae	<i>Terminalia supranitifolia</i>		P3	Spreading, tangled shrub or tree, 1.5-3 m high. Flowers green-yellow, May or July or December. Sand. Among basalt rocks.	Unlikely – the species has been recorded within 1.1 km of the survey area. Suitable habitat is present however given the survey effort this species is considered unlikely to occur within the survey area.	NatureMap, TPFL, WAHerb
Cyperaceae	<i>Schoenus punctatus</i>		P3	Shortly rhizomatous, tufted perennial, grass-like or herb (sedge), ca 0.6 m high. Flowers brown, August. Watercourses.	Unlikely – there are no records of the species in close proximity to the survey area. Limited suitable habitat is present however given the survey effort this species is considered unlikely to occur within the survey area.	NatureMap
Fabaceae	<i>Acacia glaucocaesia</i>		P3	Dense, glabrous shrub or tree, 1.8-6 m high. Fl. yellow, Jul to Sep. Red loam, sandy loam, clay. Floodplains.	Unlikely – the species has been recorded within 20 km of the project area. Limited suitable habitat present. Given the survey effort this species is considered unlikely to occur within the survey area.	WAHerb
Fabaceae	<i>Rhynchosia bungarensis</i>		P4	Compact, prostrate shrub, to 0.5 m high. Flowers yellow. Pebbly, shingly coarse sand amongst boulders. Banks of flow line in the mouth of a gully in a valley wall.	Present – the species was recorded in the northern section of the survey area on the Burrup Peninsula.	NatureMap, WAHerb

Family	Taxon	Status		Description (if available) (WA Herbarium 1998–)	Likelihood of occurrence	Source
		EPBC Act	BC Act / DBCA			
Fabaceae	<i>Vigna triodiophila</i>		P3	Fine-stemmed prostrate or scrambling vine, small, ovate to elliptic leaves. Known to flower and fruit between May and September. Endemic to basalt rockpile habitats in shallow, red-brown or brown, clayey sand or loam.	Unlikely – the species has been recorded within 3.2 km of the project area. Suitable habitat is present however given the survey effort this species is considered unlikely to occur within the survey area.	NatureMap, WAHerb
Malvaceae	<i>Corchorus congener</i>		P3	Spreading shrub, to 0.6 m high. Flowers yellow, April to June or August to November. Sand, red sandy loam with limestone. Sand dunes, plains	Unlikely – limited suitable habitat present. Given survey effort this species is unlikely to occur within the survey area.	NatureMap
Poaceae	<i>Eragrostis surreyana</i>		P3	-	Unlikely – the species has not been recorded within 10 km of the survey area. Given survey effort this species is unlikely to occur within the survey area.	NatureMap
Poaceae	<i>Themeda</i> sp. <i>Hamersley Station</i> (M.E. Trudgen 11431)		P3	Tussocky perennial, grass-like or herb, 0.9-1.8 m high. Flowers August. Red clay. Clay pan, grass plain.	Unlikely – there is one record immediately adjacent to the survey area (1992). This area was thoroughly searched and no specimens were identified during the survey. Additionally the area had been disturbed. Given survey effort this species is unlikely to occur within the survey area.	NatureMap, WAHerb

Family	Taxon	Status		Description (if available) (WA Herbarium 1998–)	Likelihood of occurrence	Source
		EPBC Act	BC Act / DBCA			
Rubiaceae	<i>Oldenlandia</i> sp. <i>Hamersley Station</i> (A.A. Mitchell PRP 1479)		P3	Spreading annual, herb, 0.05-0.1 m high. Flowers blue, March. Cracking clay, basalt. Gently undulating plain with large surface rocks, flat crabholed plain.	Unlikely – the species has been recorded within 5 km of the survey area. Limited suitable habitat is present.	NatureMap

Appendix E – Fauna data

Fauna species

Fauna likelihood of occurrence assessment

Fauna species recorded from the survey area

Family	Genus	Species	Common Name	Status	Notes
Birds					
Acanthizidae	<i>Smicromis</i>	<i>brevirostris</i>	Weebill		
Acanthizidae	<i>Gerygone</i>	<i>tenebrosa</i>	Dusky Gerygone		
Accipitridae	<i>Aquila</i>	<i>audax</i>	Wedge-tailed Eagle		
Accipitridae	<i>Circus</i>	<i>assimilis</i>	Spotted Harrier		
Accipitridae	<i>Elanus</i>	<i>axillaris</i>	Black-shouldered Kite		
Accipitridae	<i>Haliaeetus</i>	<i>leucogaster</i>	White-bellied Sea Eagle		
Accipitridae	<i>Haliastur</i>	<i>indus</i>	Brahminy Kite		
Accipitridae	<i>Haliastur</i>	<i>sphenurus</i>	Whistling Kite		
Accipitridae	<i>Milvus</i>	<i>migrans</i>	Black Kite		
Aegothelidae	<i>Aegotheles</i>	<i>cristatus</i>	Australian Owlet-nightjar		
Artamidae	<i>Artamus</i>	<i>cinereus</i>	Black-faced Woodswallow		
Artamidae	<i>Artamus</i>	<i>leucorhynchus</i>	White-breasted Woodswallow		
Artamidae	<i>Artamus</i>	<i>minor</i>	Little Woodswallow		
Artamidae	<i>Cracticus</i>	<i>nigrogularis</i>	Pied Butcherbird		
Burhinidae	<i>Burhinus</i>	<i>grallarius</i>	Bush Stone-curlew		
Cacatuidae	<i>Cacatua</i>	<i>sanguinea westralensis</i>	Little Corella		
Cacatuidae	<i>Eolophus</i>	<i>roseicapilla</i>	Galah		
Cacatuidae	<i>Nymphicus</i>	<i>hollandicus</i>	Cockatiel		
Campephagidae	<i>Coracina</i>	<i>novaehollandiae</i>	Black-faced Cuckoo-Shrike		
Campephagidae	<i>Lalage</i>	<i>sueurii</i>	White-winged Triller		
Columbidae	<i>Geophaps</i>	<i>plumifera</i>	Spinifex Pigeon		
Columbidae	<i>Geopelia</i>	<i>cuneata</i>	Diamond Dove		
Columbidae	<i>Geopelia</i>	<i>striata</i>	Peaceful Dove		
Columbidae	<i>Ocyphaps</i>	<i>lophotes</i>	Crested Pigeon		
Corvidae	<i>Corvus</i>	<i>orru</i>	Torresian Crow		
Cuculidae	<i>Cacomantis</i>	<i>pallidus</i>	Pallid Cuckoo		
Estrildidae	<i>Emblema</i>	<i>pictum</i>	Painted Finch		
Estrildidae	<i>Taeniopygia</i>	<i>guttata</i>	Zebra Finch		
Falconidae	<i>Falco</i>	<i>cenchroides</i>	Nankeen Kestrel		
Falconidae	<i>Falco</i>	<i>berigora</i>	Brown Falcon		
Falconidae	<i>Falco</i>	<i>longipennis</i>	Hobby Falcon		
Halcyonidae	<i>Todiramphus</i>	<i>pyrrhopygius</i>	Red-backed Kingfisher		
Hirundinidae	<i>Hirundo</i>	<i>neoxena</i>	Welcome Swallow		
Hirundinidae	<i>Petrochelidon</i>	<i>nigricans</i>	Tree Martin		
Megaluridae	<i>Cincloramphus</i>	<i>cruralis</i>	Brown Songlark		
Megaluridae	<i>Cincloramphus</i>	<i>mathewsi</i>	Rufous Songlark		

Family	Genus	Species	Common Name	Status	Notes
Meliphagidae	<i>Epthianura</i>	<i>tricolor</i>	Crimson Chat		
Meliphagidae	<i>Lichenostomus</i>	<i>penicillatus</i>	White-plumed Honeyeater		
Meliphagidae	<i>Lichenostomus</i>	<i>virescens</i>	Singing Honeyeater		
Meliphagidae	<i>Lichmera</i>	<i>indistincta</i>	Brown Honeyeater		
Meliphagidae	<i>Manorina</i>	<i>flavigula</i>	Yellow-throated Miner		
Meropidae	<i>Merops</i>	<i>ornatus</i>	Rainbow Bee-eater		
Monarchidae	<i>Grallina</i>	<i>cyanoleuca</i>	Magpie-lark		
Motacillidae	<i>Anthus</i>	<i>novaeeseelandiae</i>	Australasian Pipit		
Pachycephalidae	<i>Colluricincla</i>	<i>harmonica</i>	Grey Shrike-thrush		
Psittacidae	<i>Barnardius</i>	<i>zonarius</i> <i>zonarius</i>	Port Lincoln Parrot		
Psittacidae	<i>Melopsittacus</i>	<i>undulatus</i>	Budgerigar		
Ptilonorhynchidae	<i>Ptilonorhynchus</i>	<i>guttatus</i>	Western Bowerbird		
Rhipiduridae	<i>Rhipidura</i>	<i>leucophrys</i>	Willie Wagtail		
Tunicidae	<i>Turnix</i>	<i>velox</i>	Little Button-quail		
Reptiles					
Agamidae	<i>Ctenophorus</i>	<i>caudocinctus</i> <i>caudocinctus</i>	Ringtail Dragon		
Gekkonidae	<i>Gehyra</i>	<i>peninsularis</i>	Burrup Peninsular Dtella		
Gekkonidae	<i>Gehyra</i>	<i>punctata</i>	Spotted Dtella		
Gekkonidae	<i>Gehyra</i>	<i>vaiegata or</i> <i>crypta</i>	Dtella		
Gekkonidae	<i>Heteronotia</i>	<i>binoei</i>	Bynoe's Gecko		
Scincidae	<i>Cryptoblephurus</i>	<i>ustulatus</i>	Russet Snake-eyed Skink		
Scincidae	<i>Ctenotus</i>	<i>pantherinus</i> <i>ocellifer</i>	Panther's Skink		
Scincidae	<i>Ctenotus</i>	<i>saxatalis</i>	Rock Ctenotus		
Scincidae	<i>Lerista</i>	<i>clara</i>	Sharp-blazed Three-toed Skink		
Scincidae	<i>Lerista</i>	<i>onsloviana</i>	Onslow Broad-striped Slider		
Scincidae	<i>Menetia</i>	<i>surda surda</i>	Surd's Dwarf Skink		
Scincidae	<i>Morethia</i>	<i>ruficauda</i> <i>exquisita</i>	Fire-tailed Skink		
Varanidae	<i>Varanus</i>	<i>accanthurus</i>	Ridge-tailed Monitor		
Varanidae	<i>Varanus</i>	<i>panopties</i> <i>rubidus</i>	Yellow spotted Monitor		
Mammals					
Canidae	<i>Canus</i>	<i>lupis domesticus</i>	Dog	intro	
Dasyuridae	<i>Pseudantechinus</i>	<i>woolleyae</i>	Woolley's Pseudantechinus		Camera
Emballonuridae	<i>Taphozous</i>	<i>georgianus</i>	Common Sheathtail-bat		Present
Felidae	<i>Felis</i>	<i>catus</i>	Cat	intro	Camera
Macropodidae	<i>Macropus</i>	<i>robustus</i>	Euro		

Family	Genus	Species	Common Name	Status	Notes
Macropodidae	<i>Petrogale</i>	<i>rothchildi</i>	Rothchilds Rock Wallaby		Camera
Molossidae	<i>Austronomus</i>	<i>australis</i>	White-striped freetail Bat		Present
Molossidae	<i>Chaerephon</i>	<i>jobensis</i>	Northern Freetail Bat		Probable
Molossidae	<i>Mormopetrus</i>	<i>ozimops cobourgianus</i>	North-western Free-tail Bat		Probable
Molossidae	<i>Mormopetrus</i>	<i>ozimops lumsdenae</i>	Northern Free-tailed Bat		Probable
Muridae	<i>Rattus</i>	<i>rattus</i>	Black Rat	intro	Camera
Tachyglossidae	<i>Tachyglossus</i>	<i>aculeatus</i>	Echidna		
Vespertilionidae	<i>Vespadelus</i>	<i>finlaysoni</i>	Inland Cave Bat		Present

Parameters of fauna likelihood of occurrence assessment

Assessment outcome	Description
Likely	Species are likely to occur in the project area where there is suitable habitat within the project area and there are recent records of occurrence of the species in close proximity to the project area. OR Species known distribution overlaps with the project area and there is suitable habitat within the project area.
Unlikely	Species assessed as unlikely include those species previously recorded within 5 km of the project area however: <ul style="list-style-type: none"> • There is limited (i.e. the type, quality and quantity of the habitat is generally poor or restricted) habitat in the project area. • The suitable habitat within the project area is isolated from other areas of suitable habitat and the species has no capacity to migrate into the project area. OR Those species that have a known distribution overlapping with the project area however: <ul style="list-style-type: none"> • There is limited habitat in the project area (i.e. the type, quality and quantity of the habitat is generally poor or restricted). • The suitable habitat within the project area is isolated from other areas of suitable habitat and species has no capacity to migrate into the project area.
Highly unlikely	Species that are considered highly unlikely to occur in the project area include: <ul style="list-style-type: none"> • Those species that have no suitable habitat within the project area. • Those species that have become locally extinct, or are not known to have ever been present in the region of the project area.

Definitions

Term	Description
Study area	A 20 km buffer around the survey area
Survey area	The potential project footprint
Cr	Critically endangered
En	Endangered
Vu	Vulnerable
IA	International agreement
Mi, Ma	Migratory, Marine
CD	Conservation dependent
OS	Other specially protected fauna
P1 – P4	Priority 1 – Priority 4
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
DBCA	Department of Biodiversity and Conservation Attractions 2019 WA Government, Department of Parks and Wildlife Threatened and Priority fauna rankings
BC Act	<i>Biodiversity Conservation Act 2016</i>

Fauna likelihood of occurrence assessment

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
Birds							
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi	Mi	X		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 (DEE 2019)	Unlikely Species known from the region and may opportunistically occur on minor drainage lines during the wet season however use would be opportunistic and seasonal.
<i>Arenaria interpres</i>	Ruddy Turnstone	Mi	Mi	X		In Australasia, the Ruddy Turnstone is mainly found on 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. In north Australia it is known to occur in a wide variety of habitats, and may prefer wide mudflats. In southern Australia the Ruddy Turnstone prefers rockier coastlines and is less numerous on large embayments with extensive mudflats. On Flinders Island, Tasmania, it has been sighted around rocky reefs during spring and summer, and moves to bays and estuaries for autumn and winter. In south-west Australia, it	Unlikely Project area provides a limited amount of seasonally suitable habitat.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						may occur on pebble-strewn shores of salt lakes near the coast. On Rottnest Island, the Ruddy Turnstone prefers shores with scattered fragments of limestone. In New Zealand it has occasionally been recorded in paddocks or grassy areas. Surveys demonstrate that the Ruddy Turnstone can live away from coastal areas in habitats such as river beds, and on inland lakes and adjacent farmland (Higgins & Davies 1996).	
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Mi	Mi	X		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, salt pans and hypersaline salt lakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgeland and other ephemeral wetlands, but leave when they dry (DEE 2019).	Unlikely Species known from the region and may opportunistically occur on the salt pans however use would be opportunistic and seasonal.
<i>Calidris alba</i>	Sanderling	Mi	Mi	X		In Australia, the species is almost always found on the coast, mostly on open sandy beaches exposed to open sea-swell, and also on exposed sandbars and spits, and shingle banks, where they forage in the wave-wash zone and amongst rotting seaweed. Sanderlings also occur on beaches that may contain wave-washed rocky outcrops. Less often the species occurs on more sheltered sandy shorelines of estuaries, inlets and harbours (DEE 2019)	Unlikely No suitable present within the survey area.
<i>Calidris canutus</i>	Red Knot, knot	EN	EN, MI	X	X	In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands	Unlikely Species known from the region and may opportunistically occur on the salt pans however use would be opportunistic and seasonal.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps. They rarely use inland lakes or swamps (DEE 2019).	
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR	CR, MI	X	X	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. 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. 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 (DEE 2019).	Unlikely Species known from the region and may opportunistically occur on the salt pans however use would be opportunistic and seasonal.
<i>Calidris ruficollis</i>	Red-necked Stint	MI	MI	X		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. 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).	Unlikely Species known from the region and may opportunistically occur on the salt pans however use would be opportunistic and seasonal.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
<i>Calidris subminuta</i>	Long-toed Stint	MI	MI	X		In Australia, the Long-toed Stint occurs in a variety of terrestrial wetlands. They prefer shallow freshwater or brackish wetlands including lakes, swamps, river floodplains, streams, lagoons and sewage ponds. The species is also fond of areas of muddy shoreline, growths of short grass, weeds, sedges, low or floating aquatic vegetation, reeds, rushes and occasionally stunted samphire. It has also been observed at open, less vegetated shores of larger lakes and ponds and is common on muddy fringes of drying ephemeral lakes and swamps. The Long-toed Stint also frequents permanent wetlands such as reservoirs and artificial lakes (DEE 2019).	Unlikely Species known from the region and may opportunistically occur on the salt pans however use would be opportunistic and seasonal.
<i>Calidris tenuirostris</i>	Great Knot	CR	CR, MI	X	X	In Australasia, the species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, saltlakes and non-tidal lagoons. The Great Knot rarely occurs on inland lakes and swamps (Higgins & Davies 1996). Typically, the Great Knot roosts in large groups in open areas, often at the waters edge or in shallow water close to feeding grounds (Higgins & Davies 1996; Rogers 2001). It is known that in hot conditions, waders prefer to roost where a damp substrate lowers the local temperature (Rogers 1999b). 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).	Unlikely Species known from the region and may opportunistically occur on the salt pans however use would be opportunistic and seasonal.
<i>Charadrius leschenaultii</i>	Greater Sand Plover	V	V, MI	X	X	In the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches	Unlikely Species known from the region and may opportunistically occur on

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons and inshore reefs, rock platforms, small rocky islands or sand cays on coral reefs. They are occasionally recorded on near-coastal saltw orks and saltlakes, including marginal saltmarsh, and on brackish sw amps (Stewart et al. 2007).	the salt pans however use would be opportunistic and seasonal.
<i>Charadrius mongolus</i>	Lesser Sand Plover	EN	EN, MI	X	X	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, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. In north-western Australia, the species appears to use the Port Hedland saltw orks in preference to nearby beaches. The species is seldom recorded away from the coast, at margins of lakes, soaks and sw amps associated with artesian bores (Marchant & Higgins 1993).	Unlikely Species known from the region and may opportunistically occur on the salt pans however use would be opportunistic and seasonal.
<i>Charadrius veredus</i>	Oriental Plover	MI	MI	X		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 clay pans, dry paddocks, playing fields, lawns and cattle camps or open areas that have been recently burnt (Storr 1980).	Unlikely Species known from the region and may opportunistically occur on the salt pans however use would be opportunistic and seasonal.
<i>Chlidonias leucopterus</i>	White-winged Black Tern, white-winged tern	MI	MI	X		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 (Barrett et al. 2003; Blakers et al. 1984; Chatto 2006; Higgins	Unlikely The project area represents marginal habitat at best.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						& Davies 1996; Johnstone & Storr 1998). In Western Australia, 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.	
<i>Falco peregrinus</i>	Peregrine Falcon	OS		X		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 This species is likely to fly over, and opportunistically utilise portions of the habitat.
<i>Gelochelidon nilotica</i>	Gull-billed Tern	MI	MI	X		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, floodwaters, sewage farms, irrigated croplands and grasslands, where resources are favourable (Morcombe 2004). 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).	Unlikely The Project area represents marginal habitat at best.
<i>Glaeola maldivarum</i>	Oriental Pratincole	MI	MI	X		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, saltworks 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 Species known from the region and may opportunistically occur on the salt pans however use would be opportunistic and seasonal.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
<i>Hirundo rustica</i>	Barn Swallow	MI	MI	X		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 (Schodde & Mason 1999).	Unlikely The grassland plains provide suitable foraging habitat for this species. However the species is a rare vagrant to Western Australia and is likely to occur on an occasional or seasonal basis
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	MI	MI	X		The Broad-billed Sandpiper occurs in sheltered parts of the coast, favouring estuarine mudflats but also occasionally occur on saltmarshes, shallow freshwater lagoons, saltworks and sewage farms, and in areas with large soft intertidal mudflats, which may have shell or sandbanks nearby. Occasionally they occur on reefs or rocky platforms. They have also been recorded in creeks, swamps and lakes near the coast, particularly those with bare mudflats or sand exposed by receding water. They often favour mud among, or fringed by, mangroves, particularly on the seaward side and sometimes occur in estuaries edged by saltmarsh. They are rarely recorded inland. Foraging occurs on exposed flats of soft mud or wet sand at edges of coastal and near-coastal wetlands, often around channels on mudflats or in accumulated mud in swales between shell banks. In northern Australia, they forage in soft mud near mangroves, but may remain on same muddy section, even though fresher substrate may be exposed by the receding tide. They also forage in shallow water on muddy edges of ponds. They roost on the banks of sheltered sandy, shelly or shingly beaches (Higgins & Davies 1996). They nest on the ground, frequently in the top of a tussock (Cramp 1985).	Unlikely Species known from the region and may opportunistically occur on the salt pans however use would be opportunistic and seasonal.
<i>Limosa lapponica baueri</i>	Bar-tailed Godwit (baueri), Western	VU	VU		X	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks,	Unlikely

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
	Alaskan Bar-tailed Godwit					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, saltlakes 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).	Limited suitable habitat present. Species may opportunistically occur however use would be opportunistic and seasonal.
<i>Limosa lapponica menzbieri</i>	Northern Siberian Bar-tailed Godwit, Gar-tailed Godwit (menzbieri)	CR	CR		X	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 (Morcombe 2004). They usually forage near the edge of water or in shallow water, mainly in tidal estuaries and harbours and roost on sandy beaches, sandbars, spits and also in near-coastal saltmarshes (Marchant & Higgins 1993).	Unlikely Limited suitable habitat present. Species may opportunistically occur however use would be opportunistic and seasonal.
<i>Limosa limosa</i>	Black-tailed Godwit	MI	MI	X		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).	Unlikely Limited suitable habitat present. Species may opportunistically occur however use would be opportunistic and seasonal.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
<i>Macronectes giganteus</i>	Southern Giant-Petrel	MI	EN, MI		X	The Southern Giant Petrel is a marine bird and occurs over open seas and inshore waters in Antarctic and subtropical waters. In summer it occurs predominantly in sub-Antarctic to Antarctic waters, usually below 60° S in the South Pacific and southeast Indian Oceans. During winter most adults disperse widely and are rare in the southern waters of the Indian Ocean. The Southern Giant Petrel breeds on the Antarctic Continent, Peninsula and islands, and on sub-Antarctic islands and South America (Morcombe 2004).	Highly unlikely The habitat is not considered suitable to support this species
<i>Numenius madagascariensis</i>	Eastern Curlew	CR	CR, MI	X		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 sewage 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 saltflats, saltmarshes, rockpools, 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 shallow water of lagoons, near-coastal wetlands, in trees and posts (Morcombe 2004).	Unlikely Limited suitable habitat present. Species may opportunistically occur however use would be opportunistic and seasonal.
<i>Numenius minutus</i>	Little Curlew, Little Whimbrel	MI	MI	X		When resting during the heat of day, the Little Curlew congregates around pools, river beds and water-filled tidal channels, and shallow	Unlikely No suitable habitat present within the survey area.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						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 blacksoil 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).	
<i>Numenius phaeopus</i>	Whimbrel	MI	MI	X		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). It has also been recorded in coastal dunes and on a football field (Smith & Chafer 1987).	Unlikely Limited suitable habitat present. Species may opportunistically occur however use would be opportunistic and seasonal.
<i>Pandion cristatus</i>	Osprey, Eastern Osprey	MI	MI	X		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	Likely Suitable habitat is present within the survey area.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						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 elevated islands in some parts of their range, but may also occur on low sandy, muddy or rocky shores and over coral cays.	
<i>Pezoporus occidentalis</i>	Night Parrot	CR	EN		X	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 <i>Triodia</i> grasslands in stony or sandy environments and of samphire and chenopod shrublands, including genera such as <i>Atriplex</i> , <i>Bassia</i> and <i>Maireana</i> , 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 <i>Muehlenbecki</i> growth when flushed from a more typical habitat (Boles et al. 1994).	Unlikely The Dampier region is considered marginal in terms of potential habitat for this species.
<i>Plegadis falcinellus</i>	Glossy Ibis	MI	MI	X		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).	Unlikely The survey area represents marginal wetland habitat at best for the Glossy Ibis
<i>Pluvialis fulva</i>	Pacific Golden Plover	MI	MI	X		In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as <i>Sarcocornia</i> , or beds of seagrass) in	Unlikely Limited suitable habitat present. Species may opportunistically occur however use would be opportunistic and seasonal.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks. The species is also sometimes recorded on islands, sand and coral cays and exposed reefs and rocks. They are less often recorded in terrestrial habitats, usually wetlands such as fresh, brackish or saline lakes, billabongs, pools, swamps and wet claypans, especially those with muddy margins and often with submerged vegetation or short emergent grass. Other terrestrial habitats inhabited include short (or, occasionally, long) grass in paddocks, crops or airstrips, or ploughed or recently burnt areas, and they are very occasionally recorded well away from water (Marchant & Higgins 1993).	
<i>Pluvialis squatarola</i>	Grey Plover	MI	MI	X		In non-breeding grounds in Australia, Grey Plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or saltlakes. The species is also very occasionally recorded further inland, where they occur around wetlands or saltlakes (Marchant & Higgins 1993).	Unlikely Limited suitable habitat present. Species may opportunistically occur however use would be opportunistic and seasonal.
<i>Puffinus pacificus</i>	Wedge-tailed Shearwater	EN		X		The Wedge-tailed Shearwater is a pelagic, marine bird known from tropical and subtropical waters. The species tolerates a range of surface-temperatures and salinities, but is most abundant where temperatures are greater than 21 °C and salinity is greater than 34.6 ‰. In tropical zones the species may feed over cool nutrient-rich waters.	Unlikely The habitat is not considered suitable to support this species
<i>Rostratula australis</i>	Australian painted-snipe	EN	EN		X	The Australian Painted Snipe is rarely seen as it is extremely secretive, keeping to dense vegetation of swamps, emerging only in	Unlikely

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						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).	No suitable habitat present within the survey area.
<i>Sterna hirundo</i>	Common Tern	MI	MI	X		Common Terns are marine, pelagic and coastal. In Australia, they are recorded in all marine zones, but are commonly observed in near-coastal waters, both on ocean beaches, platforms and headlands and in sheltered waters, such as bays, harbours and estuaries with muddy, sandy or rocky shores. Occasionally they are recorded in coastal and near-coastal wetlands, either saline or freshwater, including lagoons, rivers, lakes, swamps and saltworks. Sometimes they occur in mangroves or saltmarsh and, in bad weather, in coastal sand-dunes or coastal embayments (Brandis et al. 1992; Chatto 2006; Higgins & Davies 1996; Hitchcock 1965; Morris 1989; Morris et al. 1981, 1990; Wood 1991). Common Terns forage in marine environments, often close to the shore, including sheltered embayments and in the surf-zone, but also well out to sea. They also forage in near-coastal terrestrial wetlands, including estuaries, rivers and swamps (Cramp 1985; Gochfeld & Burger 1996; Higgins & Davies 1996; Hitchcock 1965; Milledge 1977; Nisbet 2002; Serventy et al. 1971).	Unlikely The Project area represents marginal coastal habitat at best for this species.
<i>Sternula albifrons</i>	Little Tern	MI	MI	X		The Little Tern is a small, slender and elegant marine tern. In Australia, Little Terns inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets, especially those with exposed sandbanks or sand-spits, and also on exposed ocean beaches. Little Terns nest on sand-spits, banks, ridges or islets in sheltered coastal environments, such as coastal lakes, estuaries and inlets, and also on	Unlikely The Project area represents marginal coastal habitat at best for this species.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						wide and flat or gently sloping sandy ocean beaches, and also, occasionally, in sand-dunes.	
<i>Sternula nereis nereis</i>	Australian Fairy Tern	VU	VU		X	The habitat of the fairy tern is essentially marine, including sheltered coasts, bays, inlets, estuaries, coastal lagoons, ocean beaches but rarely out to sea or out of sight of land. They also inhabit wetlands near the coast including salt ponds and lakes. This species favours sites with sand spits and small sand islets in river mouth channels (Morcombe 2004).	Unlikely The Project area represents marginal coastal habitat at best for this species.
<i>Sula leucogaster</i>	Brown Booby	MI	MI	X		The Brown Booby is common in the north west of WA and offshore of the Dampier Archipelago. Nests are scrapes in sand, or low collection of sponges, seaweeds; on edges of and in small clearings on islands in groups.	Unlikely The Project area represents marginal coastal habitat at best for this species.
<i>Thalasseus bergii</i>	Crested Tern	MI	MI	X		The habitat of the Crested Tern comprises coastal, offshore waters; beaches, bays, inlets, tidal rivers, salt swamps, lakes and larger rivers.	Unlikely The Project area represents marginal coastal habitat at best for this species.
<i>Tringa brevipes</i>	Grey-tailed Tattler	P4, MI	MI	X		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. It has been found around shores of rock, shingle, gravel or shells and also on intertidal mudflats in embayments, estuaries and coastal lagoons, especially fringed with mangroves. In Moreton Bay, Queensland, it is most abundant in areas with dense beds of seagrass. In Tasmania it is also abundant in areas with seagrass beds. It is less often on open flat sandy beaches or sandbanks, especially around accumulated seaweed or isolated clumps of dead coral. It is occasionally found around	Unlikely No suitable habitat present within the survey area.
<i>Tringa glareola</i>	Wood Sandpiper	MI	MI	X		The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps,	Unlikely

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						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 occur within a few metres of one another and are concentrated at a few sites in a wetland (Higgins & Davies 1996).	No suitable habitat present within the survey area.
<i>Tringa nebularia</i>	Common Greenshank, greenshank	MI	MI	X		The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded 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 saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. The edges of the wetlands used are generally of mud or clay, occasionally of sand, and may be bare or with	Unlikely Species known from the region and may opportunistically occur on claypans and minor drainage lines during the wet season however use would be opportunistic and seasonal.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						emergent or fringing vegetation, including short sedges and saltmarsh, mangroves, thickets of rushes, and dead or live trees. It was once recorded with Black-winged Stilts (<i>Himantopus himantopus</i>) in pasture, but are generally not found in dry grassland (Higgins & Davies 1996).	
<i>Tringa stagnatilis</i>	Marsh Sandpiper, little greenshank	MI	MI	X		The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, 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). In the south-east Gulf of Carpentaria they have been recorded round both saline and freshwaters (Garnett 1989). 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).	Unlikely Species may opportunistically occur on claypans however use would be opportunistic and seasonal.
<i>Xenus cinereus</i>	Terek Sandpiper	MI	MI	X		The Terek Sandpiper mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or	Unlikely

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						<p>lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire (<i>Halosarcia</i> spp.). Birds are seldom near the edge of water, however, birds may wade into the water (Marchant & Higgins 1993). Occasionally, on sandy beaches, among seaweed and other debris and in rocky areas, Terek Sandpipers will use the supralittoral or upper littoral zone, where a film of water covers the sand. However, on exposed rock platforms, the species forages in the lower littoral zone and not the supralittoral or upper littoral zones (Marchant & Higgins 1993). Less often seen on sandy or shingle beaches, or on rock or coral reefs or platforms, Terek Sandpipers are occasionally sighted around drying sewage ponds and salt pans if surrounded by mudflats. The species is also found around brackish coastal swamps, lagoons and dune-lakes; and also on gravel or rocky edges of estuarine pools and freshwater river-pools (Marchant & Higgins 1993). Very occasionally, birds use swampy, grassy or cultivated paddocks near the coast (Marchant & Higgins 1993). Preferring to roost in or among mangroves, birds may perch in branches or roots up to 2 m from the ground, or beneath them in the shade on hot days. Occasionally, they roost in dead trees or among tangled driftwood. In Westernport Bay, Victoria, the Terek Sandpiper prefers to roost on isolated banks of mangroves, surrounded by water. Elsewhere, they may roost with other waders on flat shores, on muddy spits, islets or banks, and sometimes on sandy and pebbly beaches (Marchant & Higgins 1993).</p>	The survey area does not provide significant habitat for this species.
Mammals							

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
<i>Dasyurus hallucatus</i>	Northern Quoll	EN	EN	X	X	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. 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).	Likely Known to occur locally, and rocky areas within the survey area provide suitable habitat. No evidence of their presence was recorded during the survey.
<i>Hydromys chrysogaster</i>	Water-rat, Rakali	P4		X		The Water Rat lives in the vicinity of permanent bodies of fresh or brackish water, from sub-alpine streams to lakes and farm dams, and on sheltered coastal beaches, mangroves and offshore islands. It can travel considerable distance overland and is an occasional vagrant to temporary waters. Water Rat's dens are made at the end of tunnels in banks and occasionally in logs (Van Dyck and Strahan 2008).	Likely This species is known to occur on the Burrup Peninsula. The habitat within the survey area is considered marginally suitable.
<i>Leggadina lakedownensis</i>	Northern Short-tailed Mouse, Lakeland Downs Mouse, Kerakenga	P4		X		The Lakeland Downs Mouse occupies a diverse range of habitats from the monsoon tropical coast to semiarid climates, including spinifex and tussock grasslands, samphire and sedgelands, Acacia shrublands, tropical Eucalyptus and Melaleuca woodlands and stony ranges. Most habitats, however, are seasonally inundated on red or white sandy-clay soils. They are nocturnal, largely solitary, and individuals spend the day in simple, single-chambered burrows (Van Dyck and Strahan 2008).	Unlikely There are no records within 10 km of the survey area. There is very limited suitable habitat within the survey area.
<i>Macroderma gigas</i>	Ghost Bat	Vu	VU	X	X	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,	Unlikely This species has been previously recorded on the Burrup Peninsula and nearby West Intercourse

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						and is sensitive to disturbance (Van Dyck and Strahan 2008).	Island and is known to occur on the adjacent mainland. The survey area does not provide suitable roosting habitat however the area may be used occasionally for foraging.
<i>Macrotis lagotis</i>	Greater Bilby	VU	VU		X	Bilbies are generalist animals and were once found across 70% of Australia. They now occur in fragmented populations in mulga shrublands and spinifex grasslands in the Tanami Desert of the Northern Territory; in the Gibson and Great Sandy Deserts and the Pilbara and Kimberley regions of Western Australia; and the Mitchell Grasslands of south west Queensland (DotEE 2019).	Highly unlikely The project area lacks suitable habitat and lacks local records of species occurrence.
<i>Pseudomys chapmani</i>	Western Pebble-mound Mouse, Ngadji	P4		X		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 This species is known to have or likely to have become extinct on the Burrup Peninsula and around Karratha town. No potential pebble mounds were observed within the survey area.
<i>Rhinioncteris aurantia</i>	Pilbara Leaf-nosed Bat	VU	VU		X	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	Highly unlikely The project area lacks suitable roosting caves. There are no records of this species within 20 km of the survey area.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						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 and around gravelly watercourses with Melaleuca leucadendron.	
Reptiles							
<i>Ctenotus angusticeps</i>	Airlie Island Ctenotus, Northwestern coastal Ctenotus	P3	VU	X	X	This species was formerly known from only two widely separated localities in Western Australia: Airlie Island, off the north-west coast and Roebuck Bay, just south of Broome. On Airlie Island it inhabits Acacia shrublands, coastal spinifex and tussock grasses. On the mainland, the Airlie Island Ctenotus generally inhabits samphire shrubland in the intertidal zone along mangrove (Grey Mangrove (<i>Avicennia marina</i>) with occasional Red Mangrove (<i>Rhizophora stylosa</i>) margins, however, subtle differences in vegetation/topography exist among sites where the species has been recorded. The Roebuck Bay lizards have been observed on coastal mudflats vegetated with samphire (Wilson and Swan 2010). Earlier this year (2012) this species was recorded in Port Hedland in samphire adjacent to mangroves. Recent surveys to determine the extent of this species' distribution outside of Port Hedland recorded species 70 km west and 50 km east of Port Hedland and an additional 10 locations between Karratha and Broome (BHP pers. comm.) therefore showing	Unlikely There is no suitable habitat within the survey area.

Species name	Common name	Status		Search		Description and habitat requirements (DEE 2019)	Likelihood of occurrence
		State	Federal	NM	PMST		
						the distribution of this species is more widespread than previously thought.	
<i>Liasis olivaceus subsp. barroni</i>	Pilbara Olive Python	Vu	VU	X	X	The Olive Python (Pilbara subspecies) is a dull olive-brown to pale fawn or rich-brown python with a white underside and pale finely dotted lips. This species reaches an average size of 2.5 m but can grow up to 4 m long. The Olive Python's range is restricted to the Pilbara region, north Western Australia, and the Dampier Archipelago. Habitat consists of rocky escarpments, gorges and waterholes within the Pilbara region. The preferred microhabitats for this species are under rock piles, on top of rocks, and under spinifex as well as in man-made features such as overburden heaps, railway embankments and sewerage treatment ponds. The species' breeding season occurs from June to August, with males moving long distances in search of breeding females (Wilson and Swan 2010).	Likely Species known to occur locally and rocky habitat within survey area is considered suitable habitat however there are no permanent pools within the survey area.
<i>Notoscincus butleri</i>	Lined soil-crevice skink (Dampier)	P4		X		<i>Notoscincus butleri</i> is a pale coppery-brown skink with bold black vertebral and dorsal stripes, broad black upper lateral stripes, white midlateral stripes and a narrow dark ventrolateral stripe. <i>Notoscincus butleri</i> range is restricted to arid, rocky areas of near-coastal Pilbara region. Habitat is found in spinifex dominated areas near creek and river margins (Wilson and Swan 2010).	Likely Species known to occur locally (West Intercourse island and less than 2 km south of Karratha). The rocky habitat within the survey area is considered suitable habitat however there are no major creeks or rivers within the survey area.

GHD

Level 10

999 Hay Street

T: 61 8 6222 8222 F: 61 8 6222 8555 E: permail@ghd.com

© GHD 2019

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

6138330-

20149/[https://projects.ghd.com/oc/WesternAustralia2/krtcmp132kvmappingfi/Delivery/Documents/6138330-RPT-124-KRT-DMP 132kV Line Upgrade Biological Assessment.docx](https://projects.ghd.com/oc/WesternAustralia2/krtcmp132kvmappingfi/Delivery/Documents/6138330-RPT-124-KRT-DMP%20132kV%20Line%20Upgrade%20Biological%20Assessment.docx)

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	E Lynch J Collins	J Tindiglia		J Tindiglia		8/8/2019

www.ghd.com

