PHOENIX
ENVIRONMENTAL SCIENCES

Basic fauna survey for the Mardie Salt Works Airport Project

Prepared for BCI Minerals

April 2024

Final

Basic fauna survey for the Mardie Salt Works Airport Project

Prepared for BCI Minerals

Version history

Author/s	Reviewer/s	Version	Version number	Date submitted	Submitted to
Ethan Broom	Floyd Holmes	Draft for client comments	0.1	08-Mar-24	Rebbekah Hearn
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EXECUTIVE SUMMARY

BCI Minerals (BCI) is undertaking assessment and approvals for the development of the Mardie Salt Works Airport Project (the Project), located on the Pilbara coast of Western Australia.

Phoenix Environmental Sciences Pty Ltd (Phoenix) was commissioned to undertake a basic terrestrial fauna survey and desktop fauna survey of the Study Area surrounding the existing Mardie airstrip. Data was used from previous reports by Phoenix, desktop reviews and reconnaissance fieldwork to identify significant fauna, habitat and bird attractants that may be present within a 13 km Buffer Zone around the Mardie airstrip Aerodrome Reference Point (ARP; defined here as the centre of the runway at Mardie airstrip).

Field surveys were undertaken in November 2023 and January 2024. They included reconnaissance site visits to potential bird attractants, and habitat assessments at survey sites. Sites for field reconnaissance were chosen based on identification of potential bird attractants with the 13 km Buffer Zone around the ARP.

The desktop review identified records of 159 terrestrial fauna species within the 13 km Buffer Zone. This included 16 species listed as Threatened, Conservation Dependent or Specially Protected under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and/or the Biodiversity Conservation Act 2016 (BC Act). Thirty-five avifauna species are listed as Migratory under the EPBC Act and/or BC Act, and 3 species are listed as Priority by Department of Biodiversity, Conservation and Attractions (DBCA).

Eleven fauna habitats were identified within the Study Area. Desktop analysis identified that tidal samphire mudflat, tidal channel and mangal communities hosted the majority of migratory shorebird records. Large numbers of birds, particularly migratory shorebirds, are likely to congregate in these habitat types within the 13 km Buffer Zone and Study Area during September– April of each year.

The desktop and field surveys also identified drainage lines and permanent open bodies of water within mudflat, spinifex grassland and shrubland habitat that may act as bird attractants. The largest drainage line in the Study Area is Fortescue River, which may attract large numbers of birds when it is flowing.

To mitigate the risk of bird strikes with low flying aircraft landing or leaving Mardie airstrip, it is recommended that attractants nearby the airstrip development footprint are limited and, where possible, flight paths avoid habitats supporting large numbers of birds.

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ACRONYMS AND ABBREVIATIONS

ARP	Aerodrome Reference Point
BoM	Bureau of Meteorology
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
IBRA	Interim Biogeographic Regionalisation of Australia
NES	National Environmental Significance
OS	Other Specially protected
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
TEC	Threatened Ecological Communities
WA	Western Australia

1 INTRODUCTION

BCI Minerals (BCI) is undertaking assessment and approvals for the development of the Mardie Salt Works Airport Project (the Project), located on the Pilbara coast of Western Australia (WA; Figure 1-1).

CQG Consulting, on behalf of BCI, requested Phoenix Environmental Sciences (Phoenix) conduct an ecological investigation to assist the application for a significant impact assessment for EPBC amendment referral, and a variation to the State approvals surrounding an existing airstrip (Mardie airstrip). Phoenix was also requested to assess the risks associated with bird strikes and any other direct or indirect impacts to Threatened and Migratory species brought about by the Project. This report represents the findings of the desktop assessment and field surveys.

The Study Area is defined in this report as the area encompassing the runway development footprint, the approach, takeoff and transition surfaces, and the area inside the conical surface. It is located in the Shire of Roebourne, entirely within the Roebourne subregion of the Pilbara bioregion, and in the Eremaean Climatic Region Botanical Province as defined by EPA (2020). The Study Area is approximately 13,127.9 ha (Figure 1-1).

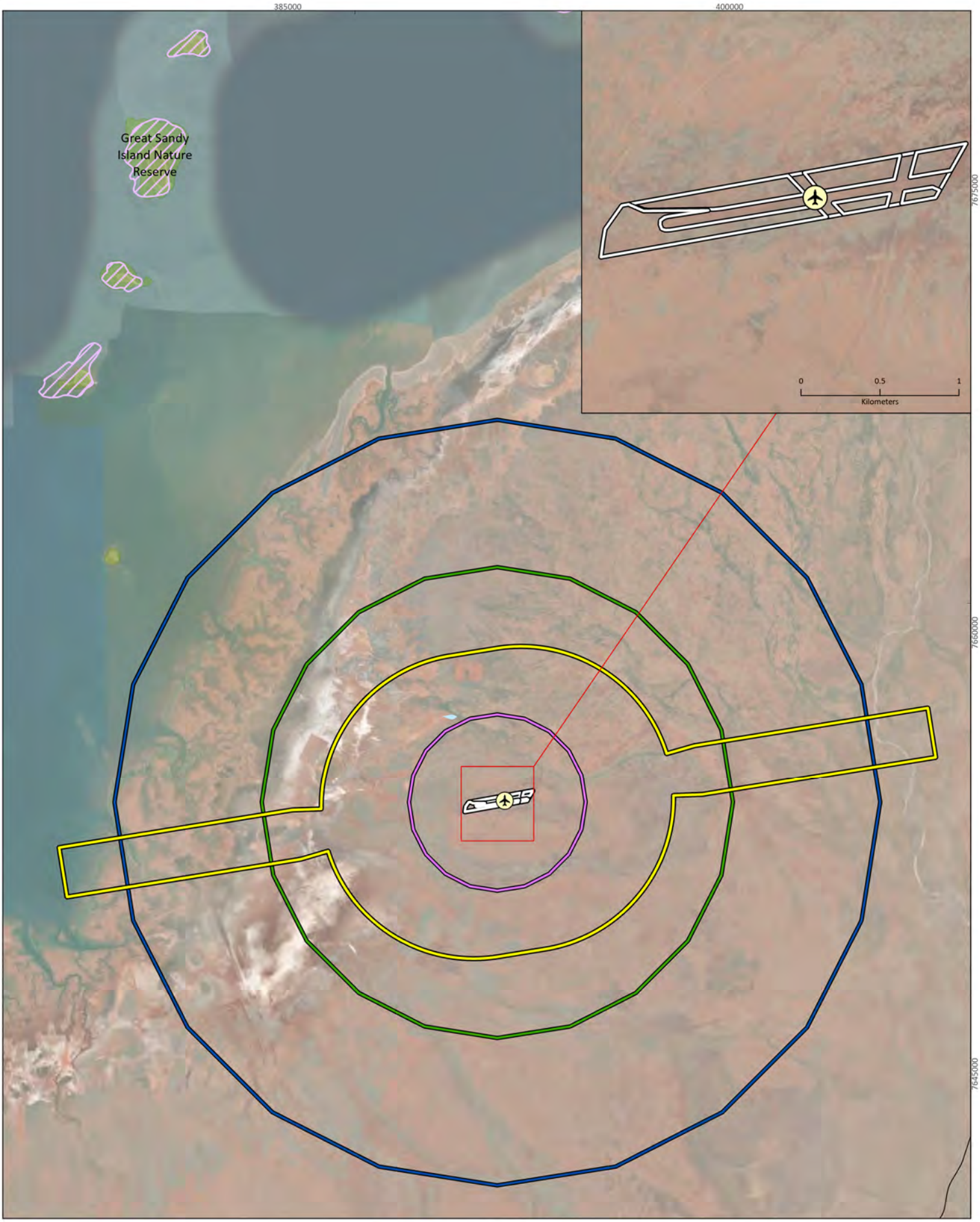
In accordance with guidance from the Australian Government Civil Aviation Authority, the report also includes consideration of the area encompassed by a 3 km Buffer Zone, 8 km Buffer Zone and 13 km Buffer Zone around the Aerodrome Reference Point (ARP; defined here as the centre of the airstrip development footprint at -21.20988°S,115.96298 °E). The 13 km Buffer Zone around the ARP has an area of 52,223.9 ha. The combined area of the Study Area and 13 km Buffer Zone is 52,935.37 ha.

Phoenix undertook a desktop study that included an assessment of potential indirect impacts of the Project on birdlife in the area. Any potential attractants or areas where large numbers of birds (specifically large raptors, parrots, waterbirds, and migratory shorebirds) within the 3 km, 8 km, and 13 km Buffer Zones were included in the assessment.

1.1 SCOPE OF WORK

The scope of work included:

- Basic fauna assessment of the Mardie airstrip and surrounding area with focus on migratory shorebirds and the risks associated with bird strikes and low flying aircraft in the area surrounding the airstrip.
- An assessment of likely direct and indirect impacts to Threatened and Migratory species, including recommended mitigation measures to avoid or reduce impacts.
- Development of a technical report summarising the findings of the survey.
- Provision of survey data in spatial data format compliant with IBSA requirements.



BCI Minerals Ltd
Mardie Salt Works Airport Project

Project No	1561
Date	7/03/2024
Drawn by	BK
Map author	EB

0 3 6
Kilometers

1:166,000 (at A4) GDA 1994 MGA Zone 50

- Mardie Airstrip Study Area
- Mardie Airstrip Development Footprint
- Aerodrome Reference Point
- 3 km Buffer Zone
- 8 km Buffer Zone
- 13 km Buffer Zone
- DBCA managed land
- Lakes
- Environmentally Sensitive Areas
- Roads

Figure 1-1

Project location and Study Area

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2 LEGISLATIVE CONTEXT

The protection of fauna in WA is principally governed by 3 acts:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- State *Biodiversity Conservation Act 2016* (BC Act)
- State *Environmental Protection Act 1986* (EP Act).

2.1 COMMONWEALTH

2.1.1 Matters of National Environmental Significance

The EPBC Act is administered by the Federal Department of Climate Change, Energy, the Environment and Water (DCCEEW). The EPBC Act provides for the listing of Threatened fauna as matters of National Environmental Significance (NES). Under the EPBC Act, actions that have, or are likely to have, a significant impact on a matter of NES, require approval from the Australian Government Minister for the Environment through a formal referral process. Key threats and habitat critical to the survival of EPBC Act Threatened species are usually defined in the conservation advice and/or recovery plan for the species.

Conservation categories applicable to Threatened fauna species under the EPBC Act are as follows:

- Extinct (EX)[1] – there is no reasonable doubt that the last individual has died
- Extinct in the Wild (EW) – taxa known to survive only in captivity
- Critically Endangered (CR) – taxa facing an extremely high risk of extinction in the wild in the immediate future
- Endangered (EN) – taxa facing a very high risk of extinction in the wild in the near future
- Vulnerable (VU) – taxa facing a high risk of extinction in the wild in the medium-term
- Conservation Dependent (CD)[1] – taxa whose survival depends upon ongoing conservation measures; without these measures, a conservation dependent taxon would be classified as Vulnerable, Endangered or Critically Endangered.

Threatened Ecological Communities (TECs) are also listed as matters of NES and are often associated with faunal values.

The EPBC Act is also the enabling legislation for protection of Migratory species as matters of NES under several international agreements:

- Japan-Australia Migratory Bird Agreement (JAMBA)
- China-Australia Migratory Bird Agreement (CAMBA)
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn)
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

2.2 STATE

2.2.1 Threatened and Priority species

In WA, the BC Act provides for the listing of Threatened fauna species (Government of Western Australia 2018a, b) in the following categories:

[1] Species listed as Extinct and Conservation Dependent are not matters of NES and therefore do not trigger the EPBC Act.

- Critically Endangered (CR) – species facing an extremely high risk of extinction in the wild in the immediate future[2]
- Endangered (EN) – species facing a very high risk of extinction in the wild in the near future[2]
- Vulnerable (VU) – species facing a high risk of extinction in the wild in the medium-term future[2].

Species may also be listed as Specially Protected (SP) under the BC Act in one or more of the following categories:

- species of special conservation interest (conservation dependent fauna, CD) – species with a naturally low population, restricted natural range, of special interest to science, or subject to or recovering from a significant population decline or reduction in natural range
- Migratory species (Mig.), including birds subject to international agreement
- species otherwise in need of special protection (OS).

The Department of Biodiversity, Conservation and Attractions (DBCA) administers the BC Act and also maintains a non-statutory list of Priority fauna. Priority species are still considered to be of conservation significance – that is they may be Threatened – but cannot be considered for listing under the BC Act until there is adequate understanding of threat levels imposed on them. Species on the Priority fauna list are assigned to one of 4 Priority (P) categories, P1 (highest) – P4 (lowest), based on level of knowledge/concern.

2.2.2 Critical habitat

Under the BC Act, habitat is eligible for listing as critical habitat if it is critical to the survival of a Threatened species or a TEC and its listing is otherwise in accordance with the ministerial guidelines.

2.2.3 Other significant fauna

Under the EPA's environmental factor guideline (EPA 2016a), fauna may be considered significant for reasons other than listing as a Threatened or Priority species, including:

- species with restricted distribution
- species subject to a degree of historical impact from threatening processes
- providing an important function required to maintain the ecological integrity of a significant ecosystem.

3 EXISTING ENVIRONMENT

3.1 INTERIM BIOGEOGRAPHIC REGIONALISATION OF AUSTRALIA

The Interim Biogeographic Regionalisation of Australia (IBRA) classifies Australia's landscapes into large 'bioregions' and 'subregions' based on climate, geology, landform, native vegetation and species information (DoEE 2016). The Study Area is located in the Roebourne subregion (PIL04) of the Pilbara (PIL) bioregion (Figure 3-1). The Pilbara bioregion is located in the central west of WA and is described a vast coastal plain and inland mountain range with deep gorges and cliffs. The total area of the PIL bioregion is approximately 17,822,614 ha (Department of Agriculture 2020). The PIL04 subregion is characterised as;

[2] As determined in accordance with criteria set out in the ministerial guidelines.

"Quaternary alluvial and older colluvial coastal and sub-coastal plains with a savanna of mixed hummock and bunch grasses and dwarf shrub steppe of Acacia stellaticeps *or* A. pyrifolia *and* A. inaequilatera*. The uplands are dominated by spinifex hummock grasslands. Ephemeral drainage lines support* Eucalyptus victrix *or* Corymbia hamersleyana *woodlands.* Tecticornia *(Samphire),* Sporobolus *and mangal occur on river deltas and marine alluvial flats. Resistant linear ranges of basalts occur across the coastal plains, with minimal exposures of granite. Nearby islands are either Quaternary sand accumulations or composed of basalt or limestone, or a combination of both. The climate is arid (semi-desert) tropical with highly variable rainfall primarily in summer. Cyclonic activity is significant, with several systems affecting the coast and hinterland annually. The subregional area is 1,861,724 ha (Department of Agriculture 2020)."*

3.2 LAND SYSTEMS AND SURFACE GEOLOGY

The Department of Primary Industries and Regional Development undertakes land system mapping for WA using a nesting soil-landscape mapping hierarchy (Schoknecht & Payne 2011). While the primary purpose of the mapping is to inform pastoral and agricultural land capability, it is also useful for informing biological assessments. Under this hierarchy, land systems are defined as areas with recurring patterns of landforms, soils, vegetation and drainage (Payne & Leighton 2004).

The Study Area intersects 7 land systems; The Horseflat, Littoral, Newman, Onslow, Peedamulla, River, and Yamerina systems (Table 3-1; Figure 3-2). The Horseflat system comprises 42.2% of the Study Area (5,541 ha), and the Litorral, Yamerina and Onslow systems comprise 21.3% (2,800.2 ha), 15.9% (2,083.6 ha) and 12.0% (1,572 ha) of the Study Area respectively. The Peedamulla, River and Newman systems comprise smaller areas of the Study Area, confined to 5.27% (692.1 ha), 1.84% (240.9 ha) and 0.1% (11.51 ha) respectively. Oceanic water comprises approximately 1.4% (186.1 ha) of the Study Area.

Table 3-1 Land systems and extent in Study Area

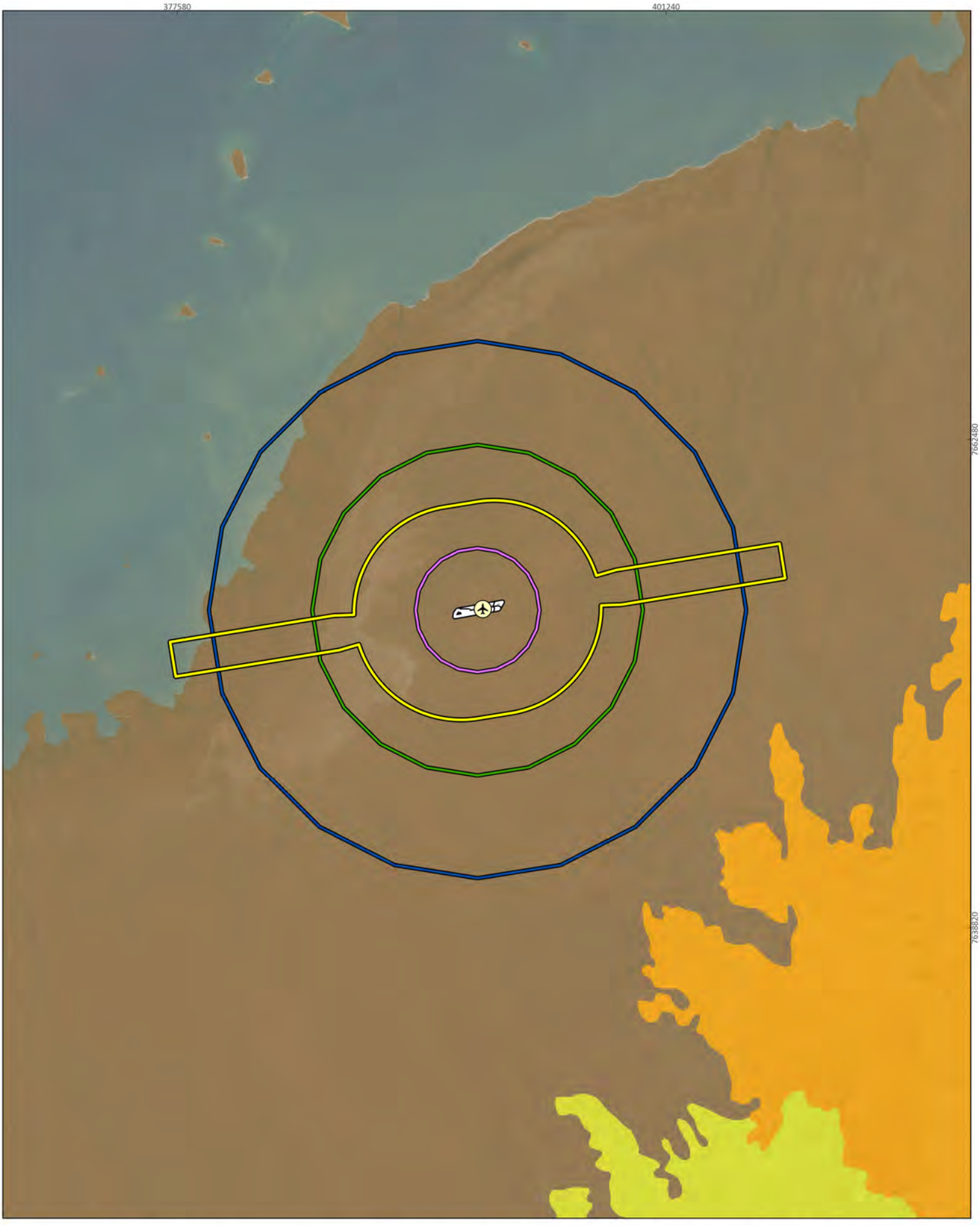
Land system	Description	Area (ha)	% of Study Area
Horseflat System	Gilgaied clay plains supporting Roebourne Plains grass grasslands and minor grassy snakewood shrublands.	5,541.4	42.2
Littoral System	Bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse *Acacia* shrublands and mangrove forests.	2,800.2	21.3
Yamerina System	Flood plains and deltaic deposits supporting tussock grasslands, woodlands with buffel grass and minor halophytic low shrublands.	2,083.7	15.9
Onslow System	Undulating sandplains, dunes and level clay plains supporting soft spinifex grasslands and minor tussock grasslands.	1,572.0	12.0
Peedamulla System	Gravelly plains supporting hard spinifex grasslands and minor snakewood shrublands.	692.1	5.3
River System	Narrow, seasonally active flood plains and major river channels supporting moderately	241.0	1.8

Land system	Description	Area (ha)	% of Study Area
	close, tall shrublands or woodlands of acacias and fringing communities of eucalypts sometimes with tussock grasses or spinifex.		
Newman System	Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands.	11.5	0.1
Oceanic water	-	186.1	1.4
	Total	**13,127.9**	**100.0**

According to the Surface Geology of Australia 1:1,000,000 scale, Western Australia database (Stewart *et al.* 2008), the Study Area intersects 5 geological formations (Table 3-2; Figure 3-3). Colluvium represents the dominant surface geology (7,710.4 ha, 58.73%) comprising the largest section of the Study Area. Alluvium (2,981.96 ha, 22.7%) represents a smaller section of the Study Area, along with estuarine and delta deposits (2,199.59 ha, 16.76%). Water is restricted to a small section in the west of the Study Area underneath the western end of the Takeoff Surface (235.1 ha, 1.79%), and Brockman Iron Formation (0.87 ha, 0.01%) is restricted to a very small section at the eastern end of the Study Area.

Table 3-2 Surface geology of the Study Area, extent by deposit type

Surface geology	Abbreviation	Description	Area (ha)	% of Study Area
Colluvium	Qrc	Colluvium, sheetwash, talus; gravel piedmonts and aprons over and around bedrock; clay-silt-sand with sheet and nodular kankar; alluvial and aeolian sand-silt-gravel in depressions and broad valleys in Canning Basin; local calcrete, reworked laterite	7,710.4	58.73
Alluvium	Qa	Channel and flood plain alluvium; gravel, sand, silt, clay, locally calcreted	2,982.0	22.71
Estuarine and delta deposits	Qe	Coastal silt and evaporite deposits; estuarine, lagoonal, and lacustrine deposits	2,199.6	16.76
Water	Water	Water	235.1	1.79
Brockman Iron Formation	Lchk	Banded iron formation, chert, mudstone and siltstone	0.87	0.01
		Total	**13,127.9**	**100.0**



Western Australia

PERTH

BCI Minerals Ltd
Mardie Salt Works Airport Project

Project No	1561
Date	7/03/2024
Drawn by	BK
Map author	EB

0 5 10
Kilometers

1:236,600 (at A4) GDA 1994 MGA Zone 50

- Mardie Airstrip Study Area
- Mardie Airstrip Development Footprint
- Aerodrome Reference Point
- 3 km Buffer Zone
- 8 km Buffer Zone
- 13 km Buffer Zone

Region, subregion

- Pilbara, Chichester
- Pilbara, Hamersley
- Pilbara, Roebourne

Figure 3-1

Study area in relation to IBRA bioregions and subregions

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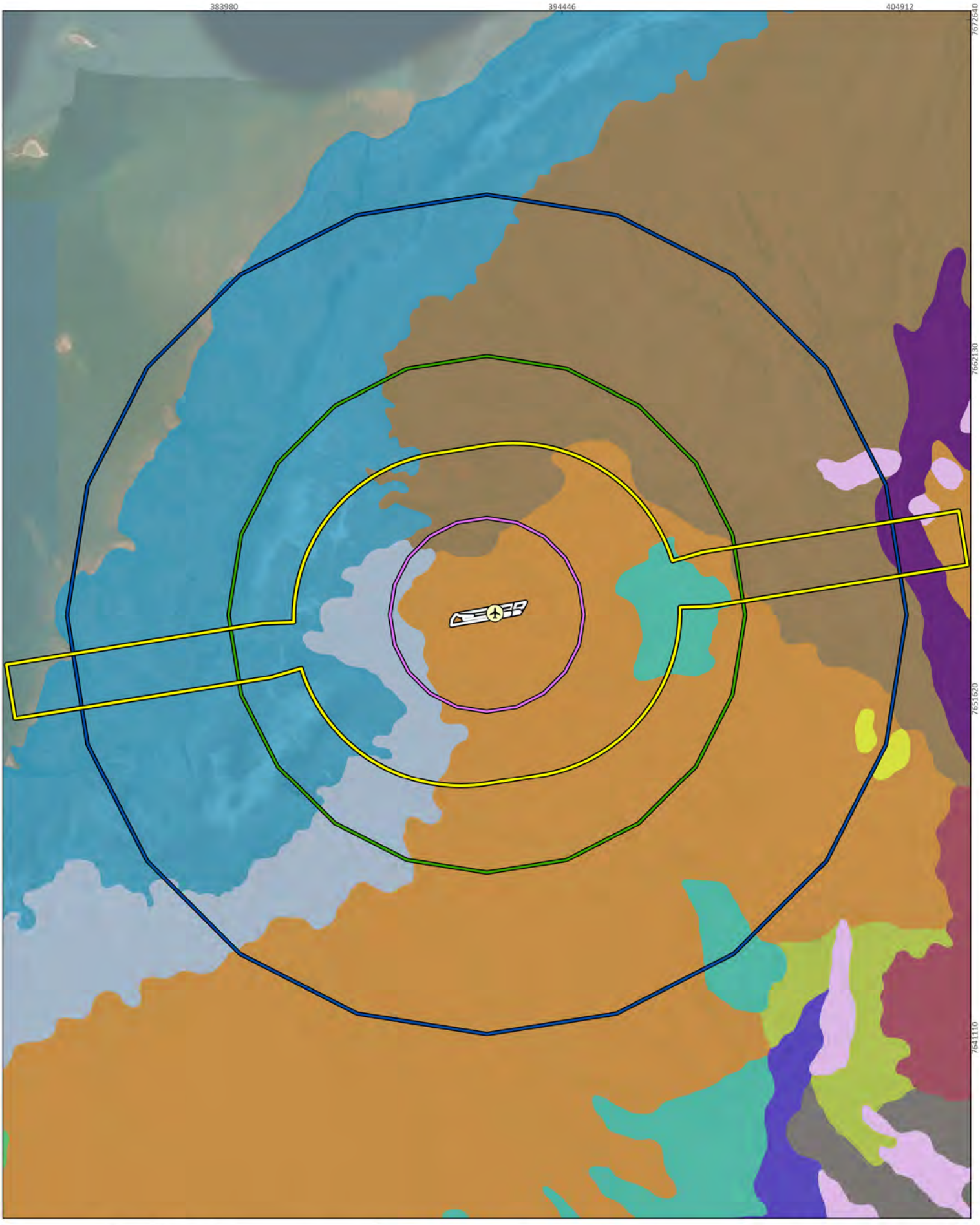

BCI Minerals Ltd
Mardie Salt Works Airport Project

Project No	1561
Date	7/03/2024
Drawn by	BK
Map author	EB

0 3 6
Kilometers

1:151,400 (at A4) GDA2020 MGA Zone 50

- Mardie Airstrip Study Area
- Mardie Airstrip Development Footprint
- Aerodrome Reference Point
- 3 km Buffer Zone
- 8 km Buffer Zone
- 13 km Buffer Zone

Land systems

- Boolgeeda System
- Cane System
- Horseflat System
- Littoral System
- Nanutarra System
- Newman System
- Onslow System
- Paraburdoo System
- Peedamulla System
- River System
- Rocklea System
- Ruth System
- Yamerina System

Figure 3-2

Land systems in the study area

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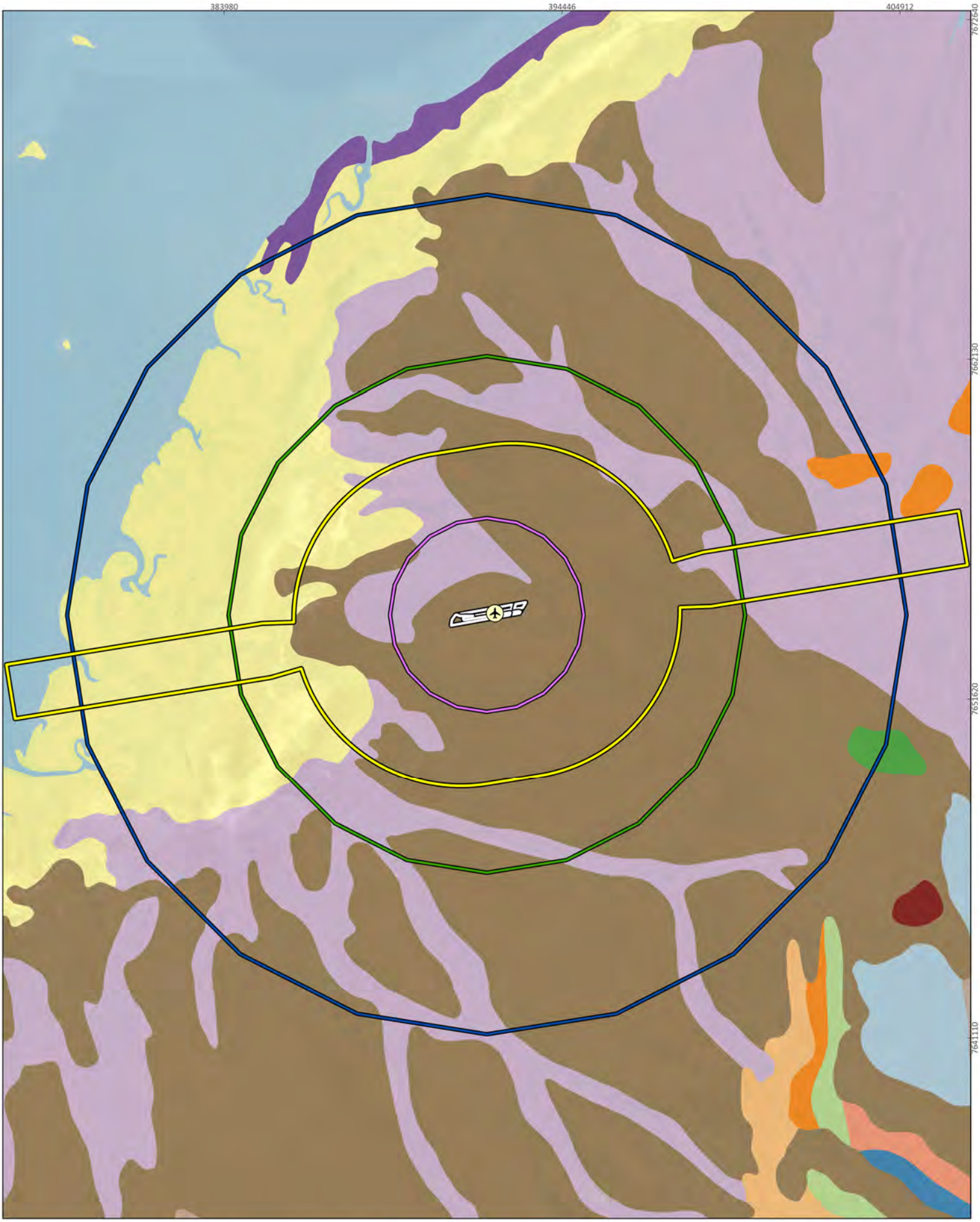

BCI Minerals Ltd
Mardie Salt Works Airport Project

Project No	1561
Date	7/03/2024
Drawn by	BK
Map author	EB

0 3 6
Kilometers

1:151,420 (at A4) GDA 1994 MGA Zone 50

- Mardie Airstrip Study Area
- Mardie Airstrip Development Footprint
- Aerodrome Reference Point
- 3 km Buffer Zone
- 8 km Buffer Zone
- 13 km Buffer Zone

Surface geology

- Abfm
- Achm
- Ashm
- Awf
- Awfj
- Awft
- Kswn
- Lchk
- Qa
- Qdc
- Qe
- Qrc
- water

Figure 3-3

Surface geology in the study area

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3.3 CLIMATE AND WEATHER

The climate of the Roebourne subregion is described as arid (semi-desert) tropical with highly variable rainfall, primarily in summer. Cyclonic activity is significant, with several systems affecting the coast and hinterland annually (Kendrick & Stanley 2001). The nearest Bureau of Meteorology (BoM) weather station with comprehensive data collection and recent historic climate data is Mardie (no. 005008), Latitude: 20.13°S Longitude 116.21°E), located within the Study Area.

Mardie records the highest mean maximum monthly temperature (37.9.°C) in January (lowest in July 27.8°C) and the lowest minimum mean monthly temperature (11.9°C) in July (highest in February, 25.4°C) (BoM 2023). Median annual rainfall is 239.4 mm, with February and June recording the highest monthly median (26.5 and 18.2 mm respectively; Figure 3-4). Mardie experienced minimal rainfall over the months preceding the 2024 field survey, with approximately 15 mm between July 2023 and January 2024, however there was higher total monthly rainfall during August and November than the median long-term average. February and March 2023 had much higher than average rainfall, with approximately 4 times and 3 times the long-term averages, respectively.

Mean daily max temperatures at Mardie preceding the 2024 surveys were slightly higher than the long-term averages from August to October 2023, though slightly below the long-term average from November 2023 to January 2024 (Figure 3-4). Mean daily minimum temperatures were also slightly above the long-term average from August to October 2023, before falling below the long-term average from November 2023 to January 2024.

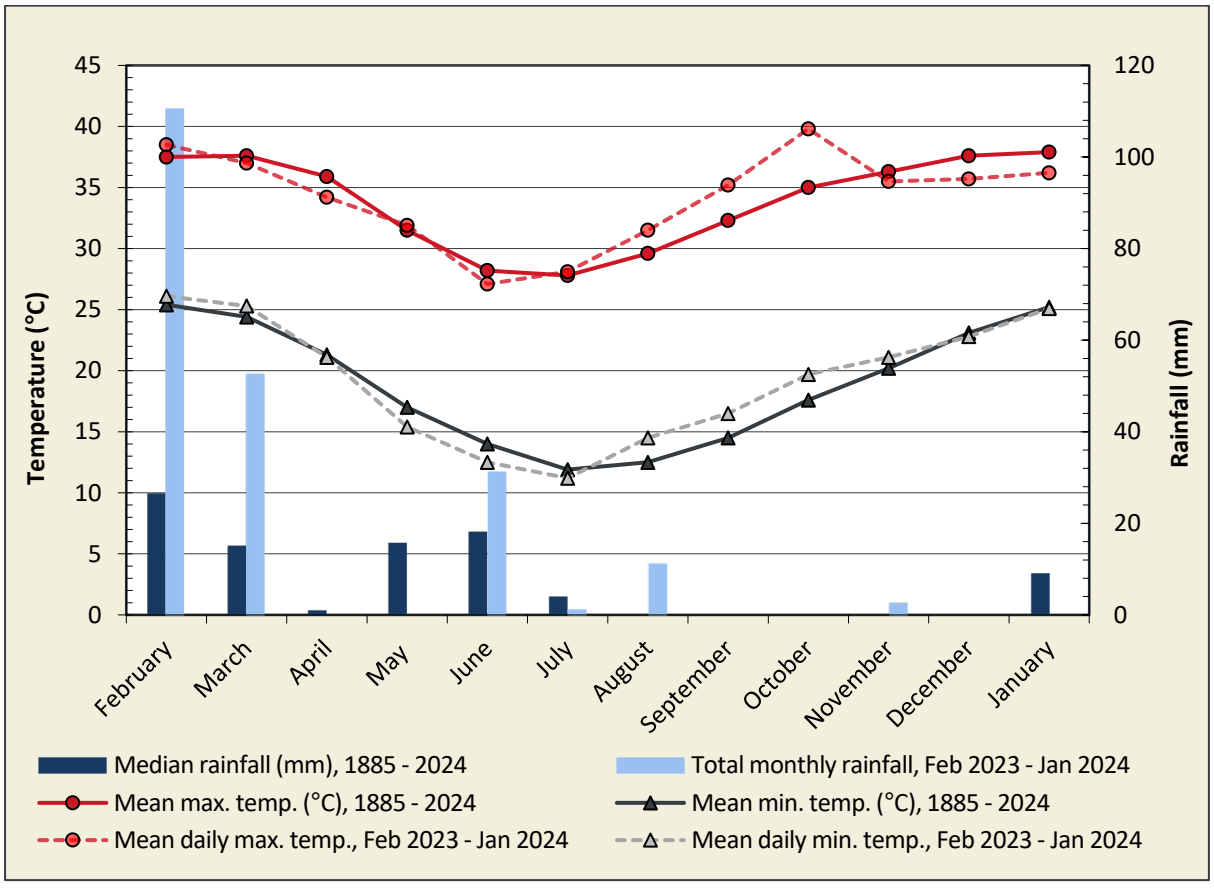


Figure 3-4 **Annual climate and weather data for Mardie(no. 005008) and mean monthly data for the 12 months preceding the survey (BoM 2024)**

3.4 LAND USE

The Roebourne subregion is sparsely populated, and primary land uses include grazing of native pastures, Aboriginal lands and reserves, conservation, mining leases and urban areas. Dominant land uses in the Roebourne subregion include grazing native vegetation (cattle), mining exploration, pastoral leases and other minimal use such as residual native cover. Historical land uses include, grazing on native pastures, Aboriginal lands and Reserves, conservation, mining leases and urban areas (May & McKenzie 2003). Existing land use within the Study Area is primarily for production through grazing of native vegetation (61.1%). The other major land use is natural vegetation (36.7%), with water taking up 1.9% of the Study Area. The remaining 0.3% of the Study Area is described as 'intensive uses', which includes the airstrip itself.

Table 3-3 Land use of the Study Area, according to ABARES (2018)

Land Use	PIL4 subregion		Study Area	
	Area (ha)	Area (%)	Area (ha)	Area %
Conservation and natural environments	530,259.7	26.5	4,815.9	36.7
Intensive uses	9,118.8	0.46	36.3	0.3
Production from dryland agriculture and plantations	394.64	<0.1	-	-
Production from relatively natural environments	1,402,003.8	70.1	8,025.1	61.1
Production from irrigated agriculture and plantations	0.4	<0.1	-	-
Water	54,528.3	2.9	254.9	1.9
Total	**2,000,310.6**	**100.0**	**13,127.9**	**100.0**

3.5 CONSERVATION RESERVES AND ENVIRONMENTALLY SENSITIVE AREAS

There are no nature conservation reserves on the mainland within or immediately adjacent to the Study Area. The nearest reserves are the numerous offshore islands associated with the Great Sandy Island Nature Reserve (Class B), within the Passage Island Archipelago. These are managed by DBCA for the conservation of flora and fauna and are vested with the Conservation Commission of WA. The closest mainland reserve is Cane River Conservation Park (Class C), located approximately 80 km south-southwest of the Study Area (Figure 1-1).

4 METHODS

The basic fauna survey was conducted in accordance with relevant survey guidelines and guidance, including:

- *EPA Environmental Factor Guideline: Terrestrial fauna* (EPA 2016a)
- *EPA Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020)
- *EPBC Act Policy Statement 3.21 - Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (DoEE 2017)
- *CASA Advisory Circular AC 139.C-16v1.0 Wildlife hazard management* (Australian Government Civil Aviation Authority 2023)

4.1 DESKTOP REVIEW

Searches of several biological databases were undertaken to identify and prepare lists of significant fauna that may occur within the 3 km, 8 km and 13 km Buffer Zones (Table 4-1). The 13 km Buffer Zone was chosen as the maximum buffer area in line with guidance from the Australian Government Civil Aviation Authority (Australian Government Civil Aviation Authority 2023). A literature search was conducted for accessible reports for biological surveys conducted nearby the 13 km Buffer Zone to build on the lists developed from the database searches (Table 4-2).

Table 4-1 Database searches conducted for the desktop review

Database	Target group/s	Search coordinates and extent
Protected Matters Search Tool (DCCEEW 2024a)	EPBC Act Threatened fauna	13 km Buffer Zone
DBCA Threatened and Priority Fauna Database (DBCA 2024b)	Threatened and Priority fauna	13 km Buffer Zone
BirdLife BirdData (Birdlife 2024)	Avifauna	13 km Buffer Zone
DBCA Naturemap database (DBCA 2024a)	All fauna species records	13 km Buffer Zone
Phoenix biological database (Phoenix 2024)	All fauna species records	13 km Buffer Zone

Table 4-2 Survey reports included in the desktop review

Report author	Survey description	Project
Biota (Biota 2005a)	Fauna and Fauna assemblage survey	Yannarie Salt Project
Biota (Biota 2005b)	Mangrove and coastal ecosystem study. Baseline ecological assessment	Yannarie Salt Project
Maunsell AECOM (Maunsell AECOM 2008a)	Consolidated vegetation, flora and fauna assessment	Balmoral South
Maunsell AECOM (Maunsell AECOM 2008b)	Consolidated vegetation, flora and fauna assessment	Cape Preston Mining Estate
Storr & Harold (Storr & Harold 1985)	Herpetofauna of the Onslow Region, Western Australia	-

Report author	Survey description	Project
GHD (GHD 2013)	Flora and fauna review	Cape Preston East Environmental Studies
ENV Australia (ENV Australia 2011)	Flora, vegetation and fauna assessment	Onslow Townsite Strategy
Ecoscape (Ecoscape 2016)	Northern Quoll targeted survey	Cape Preston Mining Estate
Phoenix Environmental Sciences (Phoenix 2017)	Environmental desktop review and reconnaissance site visit	Mardie Salt Project
Phoenix Environmental Sciences (Phoenix 2019)	Terrestrial fauna survey	Mardie Salt Project
Phoenix Environmental Sciences (Phoenix 2020)	Level 2 targeted terrestrial fauna survey	Mardie Salt Project
Phoenix Environmental Sciences (Phoenix 2022)	Basic Fauna and SRE Survey	Mardie Salt Project
Phoenix Environmental Sciences (Phoenix 2023)	Long-term migratory shorebird monitoring program	Mardie Salt Project

4.2 FIELD SURVEY

4.2.1 Survey timing

Field survey dates are provided in Table 4-3.

Table 4-3 Survey dates

Survey type	Season	Dates
Basic Fauna survey	Spring	13-17 November 2024
Basic Fauna survey	Summer	18–19 January 2024

4.2.2 Field methods

Field methods for the fauna survey included:

- habitat assessment (see 4.2.2.1)

A total of 26 site descriptions were made across the 2 survey periods (Figure 4-1; Appendix 1).

4.2.2.1 Habitat assessment

Initial habitat characterisation was undertaken using various remote geographical tools, including aerial imagery, land system maps and topographic maps. Habitats with the potential to support significant terrestrial fauna species were identified based on known habitats of such species within the Pilbara bioregion. Tentative sites were selected for the terrestrial fauna survey to represent all habitat types. Final survey site selection was conducted after ground-truthing of site characteristics.

At the broadest scale, site selection considered aspect, topography and land systems. At the finer scale, consideration was given to proximity to water bodies (drainage lines and creek), vegetation complexes and condition and soil type. Sites were primarily chosen to represent the best example of distinct habitats within the broader habitat associations of the Study Area with a focus on species of conservation significance identified in the desktop review.

Habitat assessments were conducted at all sites (Appendix 2). Twenty-two of these assessments were carried out during previous work by Phoenix in February 2023, though some additional assessments were required to include consideration of potential bird attractants in the vicinity of the airstrip development footprint. These surveys at additional sites were carried out in January 2024. The buffers used for bird strike assessments around airfields, as recommended by both the Australian Transport Safety Bureau and the International Civil Aviation Organization, are 3 km, 8 km, and 13 km from the runway. These Buffer Zones were used for this survey and any attractants within said Buffer Zones were assessed.

4.2.3 Likelihood of occurrence assessment

Following the field survey, the likelihood of occurrence for each significant fauna species identified in the desktop review was assessed and assigned to one of 4 ratings:

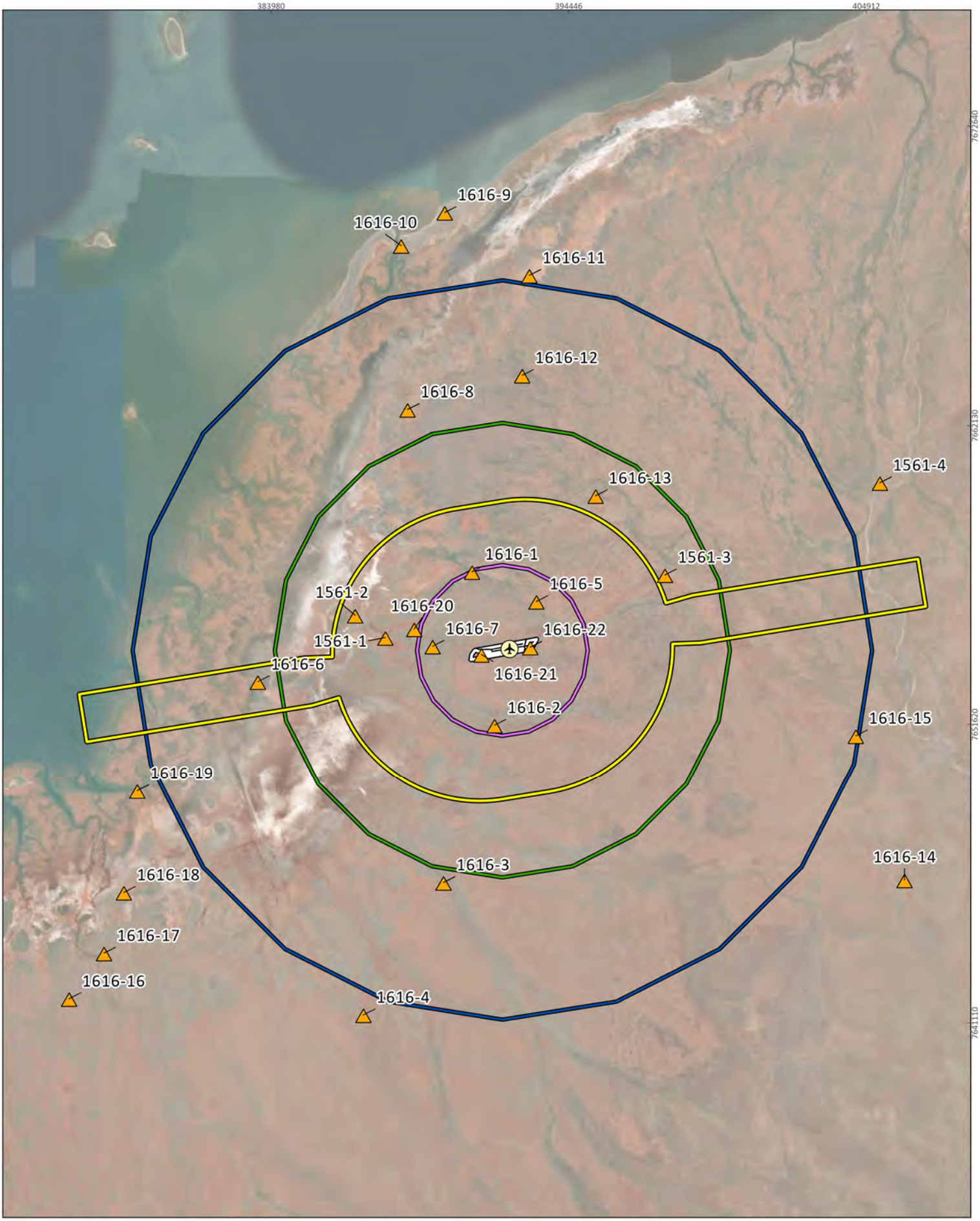
- recorded – species recorded within the Study Area by previous or current survey
- likely – Study Area within current known range of species, suitable habitat within the Study Area and home range of species intersects Study Area based on known records
- possible – Study Area within current known range of species, suitable habitat within the Study Area and home range of species does not intersect Study Area based on known records
- unlikely – Study Area outside current known range of species or no suitable habitat present in Study Area.

4.2.4 Survey personnel

The personnel involved in the surveys are listed in Table 4-4. All survey work was carried out under relevant licences issued by DBCA under the BC Act (Table 4-4).

Table 4-4 Survey personnel

Name	Qualifications	Role/s
Floyd Holmes	PhD, BSc (Hons)	Field work, reporting
Patrick Williams	MSc (Research), BSc	Field work, reporting
Ethan Broom	Bsc (Hons)	Reporting



BCI Minerals Ltd
Mardie Salt Works Airport Project

Project No	1561
Date	7/03/2024
Drawn by	BK
Map author	EB

0 3.5 7
Kilometers

1:171,900 (at A4) GDA 1994 MGA Zone 50

- Mardie Airstrip Study Area
- Mardie Airstrip Development Footprint
- Aerodrome Reference Point
- 3 km Buffer Zone
- 8 km Buffer Zone
- 13 km Buffer Zone
- Sites

Figure 4-1

Survey site locations

PHOENIX ENVIRONMENTAL SCIENCES

5 RESULTS

5.1 DESKTOP REVIEW

The desktop review identified records of 159 vertebrate taxa within the 13 km desktop search extent. The list comprised 35 reptiles, 113 birds (including no naturalised species) and 11 mammals (including 4 introduced species) (Table 5-1; Appendix 3). Previous surveys within the Study Area conducted by Phoenix have recorded 8 species from within 3 km from the ARP and 12 species from within 8 km of the ARP.

Forty-seven significant vertebrate species were identified in the desktop review, including 16 species listed as Threatened, Conservation Dependent or Specially Protected under the EPBC Act and/or BC Act (Table 5-2). Thirty-five avifauna species are listed as Migratory under the EPBC Act and/or BC Act. A further 3 species are listed as Priority by DBCA (Table 5-2).

Only one significant vertebrate species was recorded from within 0-3 km of the ARP in the desktop search; Lined Soil-crevice Skink (Dampier), *Notoscincus butleri* (P4). Eight significant vertebrate species were recorded from within 3-8 km of the ARP during previous surveys by Phoenix, and a further 19 significant vertebrate species were recorded from within 8-13 km of the ARP. Of the 27 significant vertebrate species found in the 13 km Buffer Zone during previous surveys by Phoenix, 15 are migratory shorebird species.

Table 5-1 Summary of terrestrial fauna desktop results

Class	Native	Introduced	Total
Reptiles	35	-	35
Birds	113	-	113
Mammals	7	4	11
Total	157	4	159

Table 5-2 Significant vertebrate fauna identified in the desktop review

Species	Status	Proximity to ARP	Habitat
Aves (41)			
Actitis hypoleucos Common Sandpiper	Mig. (EPBC & BC Acts)	8-13 km	Found across a wide range of wetlands: small ponds, large inlets and mudflats where they forage on the shore usually close to the vegetation (DCCEEW 2023). Prefers rocky creeks, channels, dams, and mangrove-lined inlets (Geering *et al.* 2007).
Anous stolidus Common Noddy	Mig. EPBC & BC Acts)	Projected distribution	Occurs mainly in the ocean off the Queensland coast, but also off the north-west and central WA coast (DCCEEW 2024b). During the breeding season, it occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand (DCCEEW 2024b).
Apus pacificus Fork-tailed Swift	(Mig. EPBC & BC Acts)	Projected distribution	Occurs in a wide range of dry or open habitats, including riparian woodlands, tea-tree swamps, low scrub, heathland, Saltmarsh, grassland and spinifex sandplains, open farmland and inland and coastal sand-dunes (DCCEEW 2024b).
Arenaria interpres Ruddy Turnstone	Mig. (EPBC & BC Acts)	8-13 km	Usually found in coastal regions containing exposed rocks. They are also found in tidal pools and beaches and are also known to be found on clay ridges and occasionally in estuaries, harbours and lagoons. They have been recorded on sewage ponds and on mudflats (DCCEEW 2024b).
Calidris acuminata Sharp-tailed Sandpiper	Mig. (EPBC & BC Acts)	Projected distribution	Muddy edges of shallow fresh or brackish vegetated wetlands, including lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland (DCCEEW 2024b).
Calidris alba Sanderling	Mig. (EPBC & BC Acts)	8-13 km	Found utilising coastal environments open to sea swell, sandbars, spits and shingle banks. They also occur on wave-washed rock outcrops. They are less frequently found in estuaries and inlet harbours and near coastal inland wetlands (DCCEEW 2024b).
Calidris canutus Red Knot	EN/Mig./EN (EPBC Act; BC Act)	8-13 km	Typically occupy intertidal mudflats, sandflats and sheltered coasts. They are also known to occupy beaches, lagoons, harbours and sandy beaches. They have also been recorded occupying saline terrestrial wetlands and sewage ponds and are rarely found in freshwater swamps (DCCEEW 2024b).

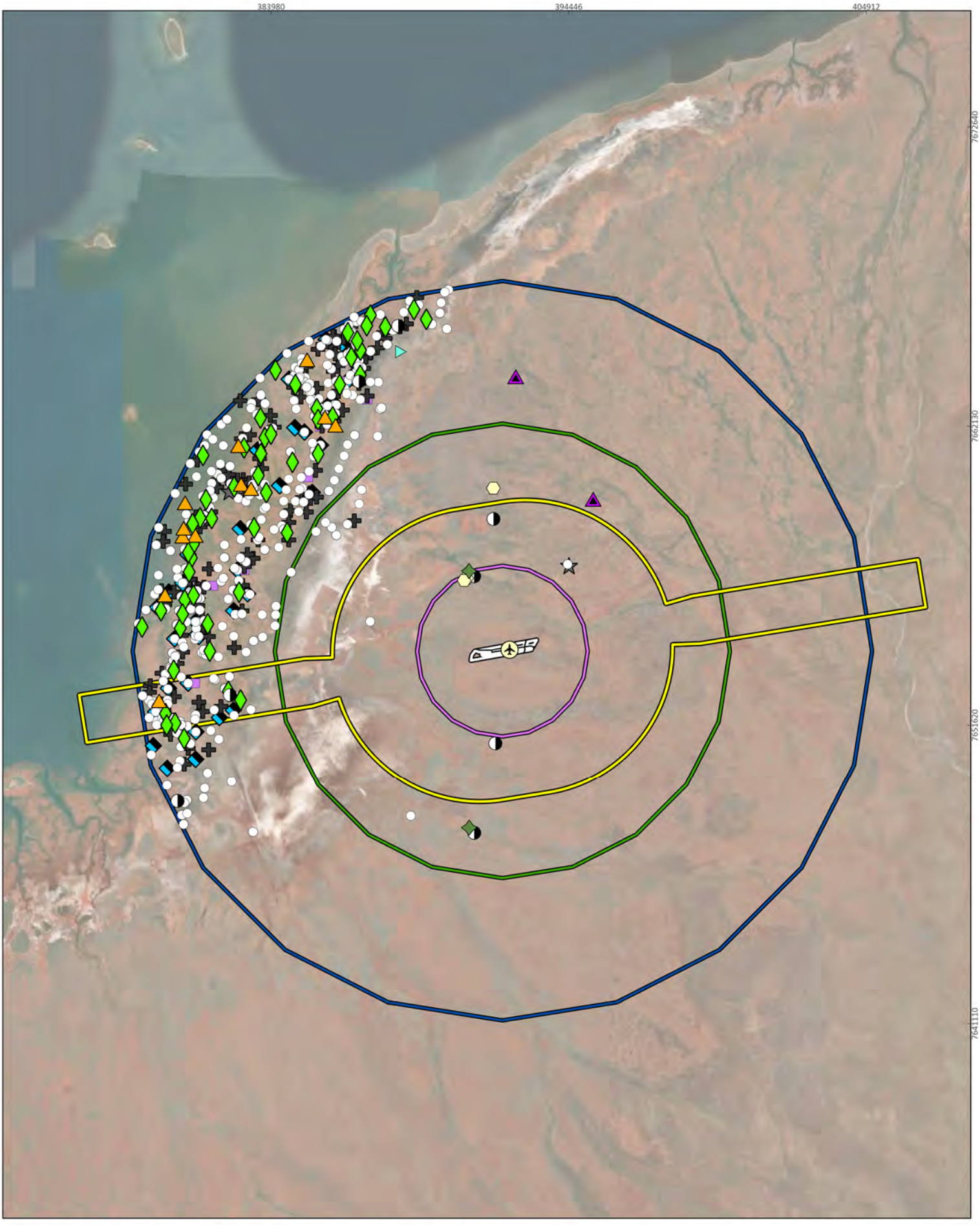
Species	Status	Proximity to ARP	Habitat
Calidris ferruginea Curlew Sandpiper	CR/Mig./CR (EPBC Act; BC Act)	8-13 km	Occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons. They are known to favour non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bores/drains, usually with bare edges of mud or sand (DCCEEW 2024b).
Calidris ruficollis Red-necked Stint	Mig. (EPBC & BC Acts)	3-8 km	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 (DCCEEW 2024b).
Calidris tenuirostris Great Knot	CR/Mig./CR (EPBC Act; BC Act)	8-13 km	Occupy sheltered coastal habitats, mudflats and sandflats such as inlets, bays, harbours, estuaries and lagoons. They are known to occupy reefs and rock platforms as well as shorelines and mangroves. There are also records in swamps near the coast, saltlakes and non-tidal lagoons (DCCEEW 2024b).
Calonectris leucomelas Streaked Shearwater	(Mig. EPBC & BC Acts)	Projected distribution	The species occurs over pelagic and inshore waters. In northern Australia, the streaked shearwater is usually found in offshore waters more than 18 kilometres from the mainland coast (Marchant & Higgins 1990).
Charadrius leschenaultii Greater Sand Plover	VU/Mig./VU (EPBC Act; BC Act)	8-13 km	Utilises coastal and estuarine environments. They typically occupy sheltered sandy or muddy beaches as well as intertidal sandbanks, mudflats, reefs and rock platforms. They have occasional records occupying saltworks, saltlakes and marginal saltmarshes and brackish swamps (DCCEEW 2024b).
Charadrius veredus Oriental Plover	Mig. (EPBC & BC Acts)	3-8 km	Oriental Plovers spend a few weeks in coastal habitats such as estuarine mudflats, sandbanks, on sandy/rocky ocean beaches, nearby reefs, or in near-coastal grasslands. They then disperse further inland, where they occur in sparsely vegetated plains or recently burnt open areas (DCCEEW 2024d).
Chlidonias leucopterus White-winged Black Tern	Mig. (EPBC & BC Acts)	8-13 km	Typically occurs in wetland environments such as brackish, saline and coastal areas. They are also known to occupy sheltered areas such as estuaries, harbours and lagoons, particularly those with sandflats and mudflats (DCCEEW 2024b).
Erythrotriorchis radiatus Red Goshawk	VU (EPBC & BC Acts)	Projected distribution	Occurs in tropical and temperate climates in coastal and sub-coastal forested lands of Northern Australia. Inhabits coastal and sub-coastal tall open forests and woodlands, tropical savannas traversed by wooded or forested rivers, and the edges of rainforests. Appears to favour areas with permanent water which are high productivity and contain nesting trees (DCCEEW 2023).

Species	Status	Proximity to ARP	Habitat
Falco hypoleucos Grey Falcon	VU (BC Act)	3-8 km	The Grey Falcon is a widespread but rare species inhabiting much of the hot, semi-arid and arid interior of Australia. Occurs in a wide variety of arid habitats including open woodlands and open *Acacia* shrubland, hummock and tussock grasslands and low shrublands, particularly where crossed by tree-lined water courses (Schoenjahn *et al.* 2019; Threatened Species Scientific Committee 2020).
Fregata ariel Lesser Frigatebird	Mig. (EPBC & BC Acts)	Projected distribution	Usually pelagic and often found far from land, but is also found over shelf waters, in inshore areas, and inland over continental coastlines (Marchant & Higgins 1990).
Gelochelidon nilotica Gull-billed Tern	Mig. (BC Act)	8-13 km	Occur in freshwater swamps, salt lakes, beaches, mudflats and sewage farms, and are rarely found over the ocean (DCCEEW 2024b).
Glareola maldivarum Oriental Pratincole	Mig. (EPBC & BC Acts)	3-8 km	In Australia, it inhabits open plains, floodplains and grasslands, often with extensive bare areas (DCCEEW 2024b).
Hydroprogne caspia Caspian Tern	Mig. (EPBC & BC Acts)	8-13 km	Found in sheltered coastal habitats and near-coastal terrestrial wetlands (DCCEEW 2024b).
Limnodromus semipalmatus Asian Dowitcher	Mig. (EPBC & BC Acts)	Projected distribution	Inhabits sheltered coastal habitats including tidal creeks, coastal lagoons and estuaries. There are many records utilising mudflats and sandflats. They are also known to occupy ponds, saltworks and sewage farms (DCCEEW 2024b).
Limosa lapponica Bar-tailed Godwit	Mig. (EPBC & BC Acts)	8-13 km	Occupies a variety of aquatic habitats such as intertidal sandflats, banks, mudflats, estuaries coastal lagoons and harbours. They have also been found in saltmarshes and brackish coastal wetlands (DCCEEW 2024b).
Limosa lapponica menzbieri Bar-tailed Godwit (Northern Siberian)	CR/Mig./VU/Mig. (EPBC Act; BC Act)	Projected distribution	Occupies a variety of aquatic habitats such as intertidal sandflats, banks, mudflats, estuaries coastal lagoons and harbours. They have also been found in saltmarshes and brackish coastal wetlands (DCCEEW 2024b).
Macronectes giganteus Southern Giant Petrel	EN/Mig./Mig. (EPBC Act; BC Act)	Projected distribution	Pelagic. Breeds on six subantarctic and Antarctic islands in Australian territory (DCCEEW 2024b).
Motacilla cinerea Grey Wagtail	(Mig. EPBC & BC Acts)	Projected distribution	Vagrant visitor to Australia that inhabits fast-flowing streams and rivers (IUCN 2019).
Motacilla tschutschensis Eastern Yellow Wagtail	(Mig. EPBC & BC Acts)	Projected distribution	Uncommon but regular visitor to Pilbara; primarily inhabits a range of damp or wet habitats with low vegetation including damp meadows, marshes, waterside pastures, and sewage farms (IUCN 2019; Johnstone *et al.* 2013).

Species	Status	Proximity to ARP	Habitat
Numenius madagascariensis Eastern Curlew	CR/Mig./CR (EPBC Act; BC Act)	8-13 km	Occurs mainly on intertidal mudflats, on exposed seagrass beds or mudflats (Geering *et al.* 2007). Also utilises sand spits of estuaries, mangroves, lake shores and ocean beaches.
Numenius phaeopus Whimbrel	Mig. (EPBC & BC Acts)	8-13 km	Usually forage on intertidal mudflats and sheltered coastal areas. They have also been found in other waterbodies including harbours, lagoons, estuaries, rivers and mangroves. Occasionally they are found in sandy and rocky beaches or intertidal areas (DCCEEW 2024b).
Pandion haliaetus Osprey	Mig. (EPBC & BC Acts)	8-13 km	Occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. Occur in a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes (DCCEEW 2024b).
Pezoporus occidentalis Night Parrot	EN (EPBC & BC Acts)	Projected distribution	Appears to favour areas of dense vegetation comprising old-growth (often > 50 years unburnt) Spinifex (*Triodia* spp.) especially hummocks that are ring-forming for roosting and nesting. Such areas must also be associated with foraging habitat containing various native grasses and herbs in addition to spinifex, and these areas may or may not contain shrubs or low trees. Suitability of habitat is thought to depend on particular stages of regeneration after fire (DCCEEW 2024b).
Phaethon rubricauda westralis (Indian Ocean Red-tailed Tropicbird)	EN/P4 (EPBC Act; BC Act)	Projected distribution	A pelagic bird that breeds on offshore islands (DCCEEW 2024b).
Pluvialis fulva Pacific Golden Plover	Mig. (EPBC & BC Acts)	3-8 km	Typically inhabits coastal environments and occasionally can be found in wetlands, mudflats and sandflats in sheltered areas. They have been found on islands, sand and coral cays, terrestrial environments, usually near waterbodies, and paddock areas (DCCEEW 2024b)
Rostratula australis Australian Painted Snipe	EN (EPBC & BC Acts)	Projected distribution	Inhabits shallow terrestrial fresh-brackish wetlands, including temporary and permanent lakes, swamps and claypans, waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains.
Sterna hirundo Common Tern	Mig. (EPBC & BC Acts)	8-13 km	In Australia, they inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets (DCCEEW 2024b).
Sternula albifrons Little Tern	Mig. (EPBC & BC Acts)	8-13 km	Inhabit a variety of aquatic environments including estuaries, lagoons, sheltered coastal areas, lakes, bays and harbours. Particularly those with sandbanks or splits and exposed ocean beaches. This species is widespread but not favouring offshore continental islands or coral cays (DCCEEW 2024b).

Species	Status	Proximity to ARP	Habitat
Sternula nereis subsp. nereis Fairy Tern	VU (EPBC & BC Acts)	Projected distribution	They nest on sheltered, sandy beaches. They have also been known to occur on the edges of offshore, estuaries, islands, wetlands and other areas of the mainland coastline (DCCEEW 2024b).
Thalasseus bergii Crested Tern	Mig. (EPBC & BC Acts)	8-13 km	Occurs in marine, coastal and pelagic environments and are usually observed in coastal waters in beaches, platforms and sheltered areas including harbours and estuaries (DCCEEW 2024b).
Tringa brevipes Grey-tailed Tattler	Mig. EPBC and BC Acts; P4 DBCA list	8-13 km	Occurs on sheltered coasts with reefs and rock platforms or mudflats and can also be found on reefs or platforms that are exposed at low tide (DCCEEW 2024b).
Tringa glareola Wood Sandpiper	Mig. (EPBC & BC Acts)	Projected distribution	Uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes (DCCEEW 2024b).
Tringa nebularia Common Greenshank	Mig. (EPBC & BC Acts)	8-13 km	Mostly occurs on the coast but sometimes inland; uses permanent and ephemeral terrestrial wetlands, including rivers and creeks (DCCEEW 2024b).
Xenus cinereus Terek Sandpiper	Mig. (EPBC & BC Acts)	8-13 km	Inhabits coastal mudflats, sheltered estuaries and lagoons. In Australia, it has a primarily coastal distribution, with occasional records inland (Morcombe 2004).
Mammalia (4)			
Dasyurus hallucatus Northern Quoll	EN (EPBC & BC Acts)	3-8 km	Found in a variety of habitats including rocky areas, eucalypt woodlands, rainforests, shrubland, sandy areas, grasslands and desert. Rocky areas provide important denning habitat, while they forage in nearby grasslands and creek lines (DCCEEW 2024c)
Macroderma gigas Ghost Bat	VU (EPBC & BC Acts)	Projected distribution	Present in a variety of habitats from the Pilbara to tropical savanna woodlands and rainforests further north and east. Prefers to roost in caves beneath bluffs of low, rounded hills composed of Marra Mamba geology, and granite rock piles in the Pilbara and sandstone elsewhere, as well as adits (abandoned mines) Scientific Committee, 2016 #12754; Armstrong, 2021 #15559}.
Rhinonicteris aurantia (Pilbara) Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	3-8 km	Normally restricted to caves and mine adits (horizontal shafts) with stable, warm and humid microclimates (Van Dyck & Strahan 2008), but temporary roosts such as crevices and tree hollows may be used in warm and humid conditions, allowing greater dispersal during the wet season.
Ozimops cobourgianus North-Western Free-tailed Bat	P1 (DBCA list)	3-8 km	Primarily found in mangroves, and adjacent creek lines and grasslands (Reardon 2014).
Reptilia (2)			

Species	Status	Proximity to ARP	Habitat
Liasis olivaceus barroni Pilbara Olive Python	VU (EPBC & BC Acts)	Projected distribution	Commonly found in rocky areas in association with watercourses and pools and often associated with areas of permanent pooling water near rocky habitats, such as gullies, gorges and rocky ranges or boulder sites. It has also been recorded in riparian vegetation along major rivers (Barker & Barker 1994; Pearson 2003).
Notoscincus butleri Lined Soil-crevice Skink (Dampier)	P4 (DBCA list)	0-3 km	The species is endemic to the Pilbara region, with records scattered across the far west of the region from south of Karratha and Dampier, including West Intercourse Island, to approximately 40 km northwest of Tom Price (Storr *et al.* 1999; Wilson & Swan 2013). Little is known on the species' preferred habitats; however, the limited records are often associated with spinifex dominated vegetation near creek and river margins (Cogger 2014; Wilson & Swan 2013; Wilson & Knowles 1988).



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Drawn by	BK
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0 3.5 7
Kilometers

1:171,900 (at A4) GDA 1994 MGA Zone 50

- Mardie Airstrip Study Area
- Mardie Airstrip Development Footprint
- Aerodrome Reference Point
- 3 km Buffer Zone
- 8 km Buffer Zone
- 13 km Buffer Zone

Status

- CR/Mig./CR (EPBC Act; BC Act)
- EN (EPBC & BC Acts)
- EN/Mig./EN (EPBC Act; BC Act)
- Mig. (BC Act)
- Mig. (EPBC & BC Acts)
- Mig. (EPBC & BC Acts)
- Mig. EPBC and BC Acts; P4 DBCA list
- P1 (DBCA list)
- P4 (DBCA list)
- VU (BC Act)
- VU (EPBC & BC Acts)
- VU/Mig./VU (EPBC Act; BC Act)

Figure 5-1

Desktop records of significant fauna

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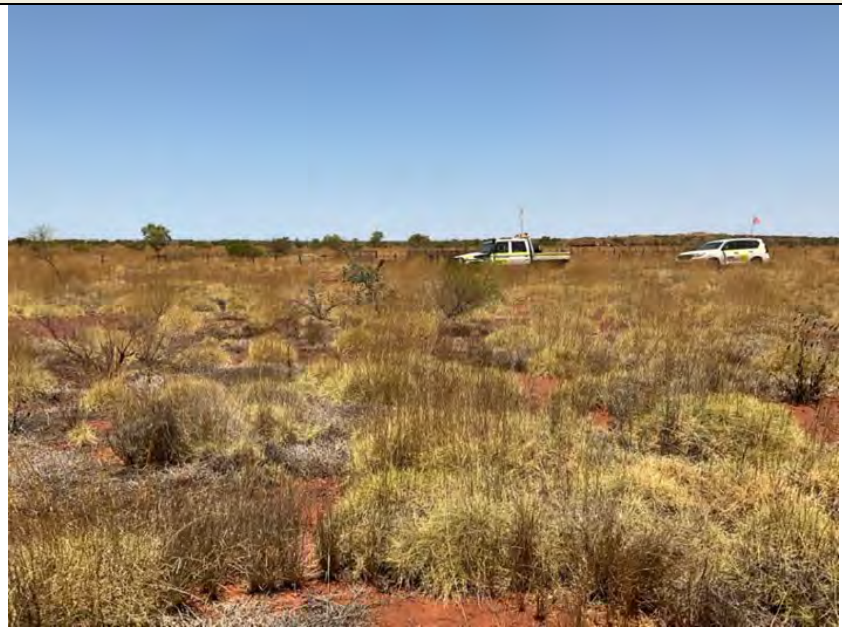
5.2 FIELD SURVEY

5.2.1 Vertebrate fauna

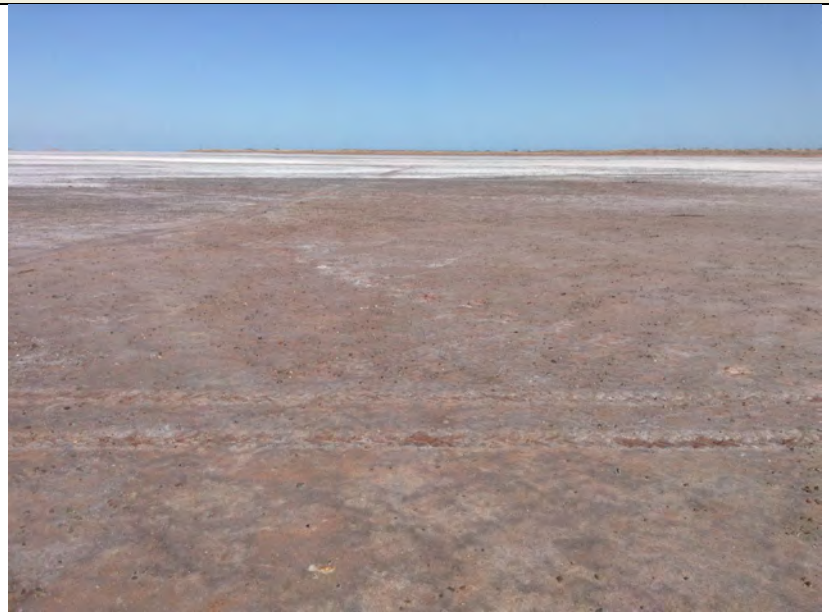
5.2.1.1 Habitats

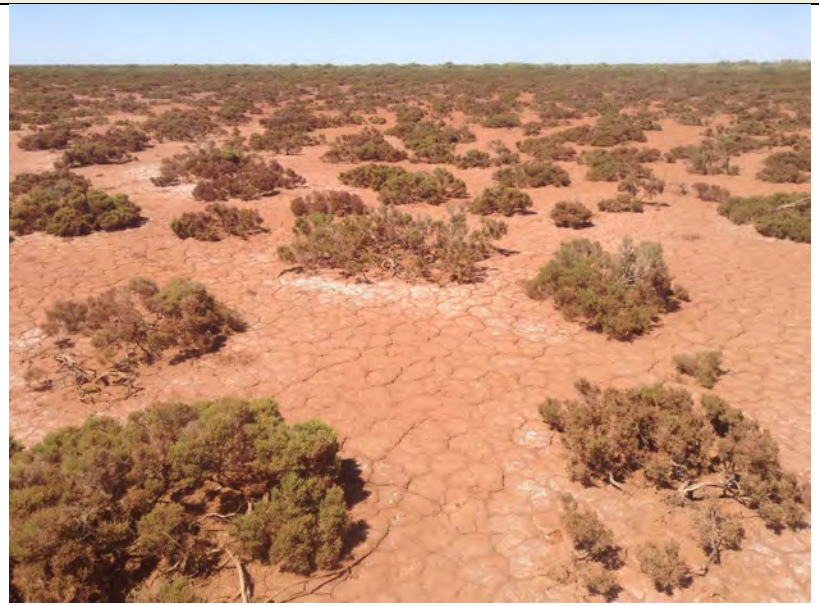
Eleven broad fauna habitat types were identified in the Study Area during field surveys and desktop analysis (Table 5-3; Figure 5-2). They are listed below in order of extent.

Table 5-3 Extent and description of each fauna habitat in the Study Area

Habitat type	Site/s	Description	Extent in Study Area and % of Study Area	Representative photograph
Shrubland over spinifex grassland	1616-2, 1616-4, 1616-7, 1616-12, 1616-13, 1616-14, 1616-15, 1616-18,	Scattered mixed *Acacia* over spinifex grassland, often on red brown clay loam plain. *Acacia* shrubs often mixed with Mesquite (*Prosopsis* spp.) Occasional presence of perennial grasses. More structurally complex than spinifex grasslands.	6,505.4 ha (49.6)	

Habitat type	Site/s	Description	Extent in Study Area and % of Study Area	Representative photograph
Spinifex grassland	1616-11,1616-16, 1616-17, 1616-20, 1616-3, 1616-5, 1616-9, 1616-6, 1616-8	Grassland consisting primarily of large spinifex hummocks, often with occasional mixed *Acacia* and Mesquite shrubs. Some areas of spinifex grassland are heavily impacted by cattle and Mesquite. However, there are also large areas of high quality, mature spinifex hummock grassland.	2,899.0 ha (22.1)	

Habitat type	Site/s	Description	Extent in Study Area and % of Study Area	Representative photograph
Mudflat/saltflat	1561-2	Mudflat or saltflat areas predominantly devoid of vegetation. Supports very few fauna species, though small numbers of migratory shorebirds are present.	2,282.9, (17.4)	

Habitat type	Site/s	Description	Extent in Study Area and % of Study Area	Representative photograph
Tidal samphire mudflat	-	Coastal shrubland with *Tecticornia* spp. (samphire) growing on an intertidal mudflat which is inundated by larger tides. This habitat is commonly used by migratory shorebirds for feeding.	498.9 ha (3.8)	

Habitat type	Site/s	Description	Extent in Study Area and % of Study Area	Representative photograph
Tidal channel or ocean	-	Channel of oceanic water between mudflats and mangal communities. Important conduits for the tidal waters that inundate the samphire mudflats and mudflats/saltflats during spring tides. Attracts migratory shorebirds and seabirds.	247.5 ha (1.89)	

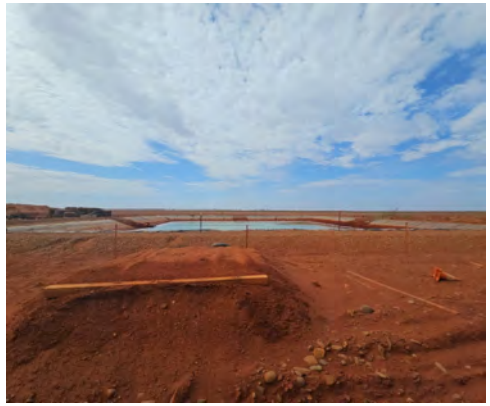
Habitat type	Site/s	Description	Extent in Study Area and % of Study Area	Representative photograph
Drainage line	-	Open woodland over mixed tall shrubs, and mixed low shrubs along drainage lines. Sparse *Triodia* hummocks and buffel grass (*Cenchrus ciliaris*) also present. Attracts terrestrial birds and waterbirds, including larger species.	337.8 ha (2.6)	

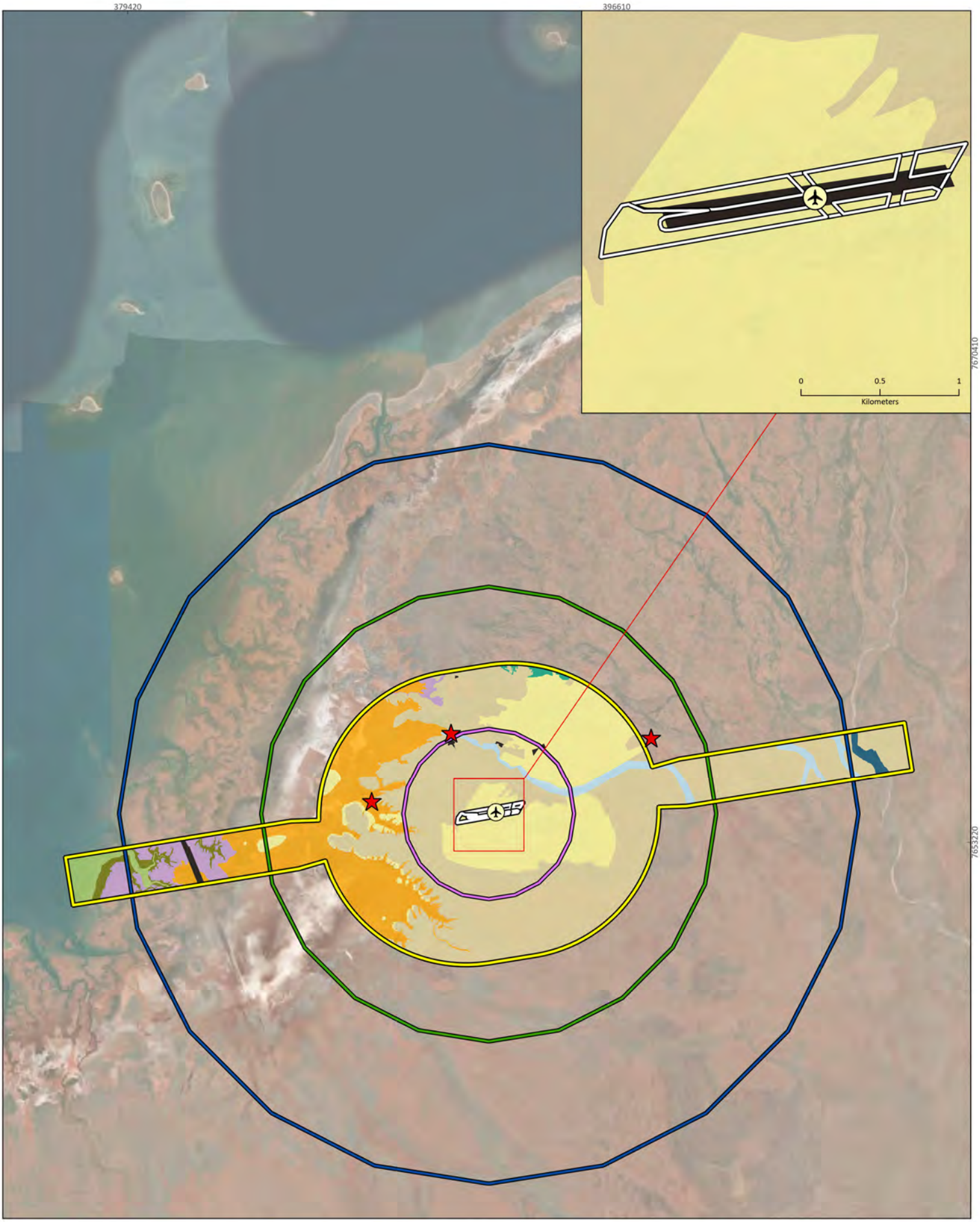
Habitat type	Site/s	Description	Extent in Study Area and % of Study Area	Representative photograph
Mangal community	1616-10, 1616-19	Mangrove shrubland over low samphire shrubs. Occur adjacent to water along the coastline and adjacent to tidal creeks. Provides roosting habitat for migratory shorebirds.	164.5 ha (1.25)	

Habitat type	Site/s	Description	Extent in Study Area and % of Study Area	Representative photograph
Major drainage line	1561-4	Large drainage line (Fortescue River) splitting into floodplain. Lined with large *Eucalyptus* trees. Likely attracts large flocks of Galahs, Corellas and other birds when flowing.	67.0 (0.5)	

Habitat type	Site/s	Description	Extent in Study Area and % of Study Area	Representative photograph
Cleared	1561-5, 1561-6	Cleared areas with or without infrastructure (including the existing Mardie airstrip)	75.3 ha (0.57)	

Habitat type	Site/s	Description	Extent in Study Area and % of Study Area	Representative photograph
Tussock grassland	-	Typically comprised of **Prosopis glandulosa* x *velutina* over low *Eragrostis xerophila* tussock grassland over isolated low *Corchorus tridens* forbs on flat plains. Other grasslands include buffel grass and sparse, low *Triodia* spp., Kuykuyu, and mesquite with shrubland of tall and medium *Grevillea* and *Acacia* shrubs.	49.01 ha (0.37)	

Habitat type	Site/s	Description	Extent in Study Area and % of Study Area	Representative photograph
Freshwater pool	1616-1, 1561-1, 1561-3	Permanent pool of water (artificial or natural). Important habitat feature that attracts waterbirds and terrestrial birds.	0.51 ha (0.003)	 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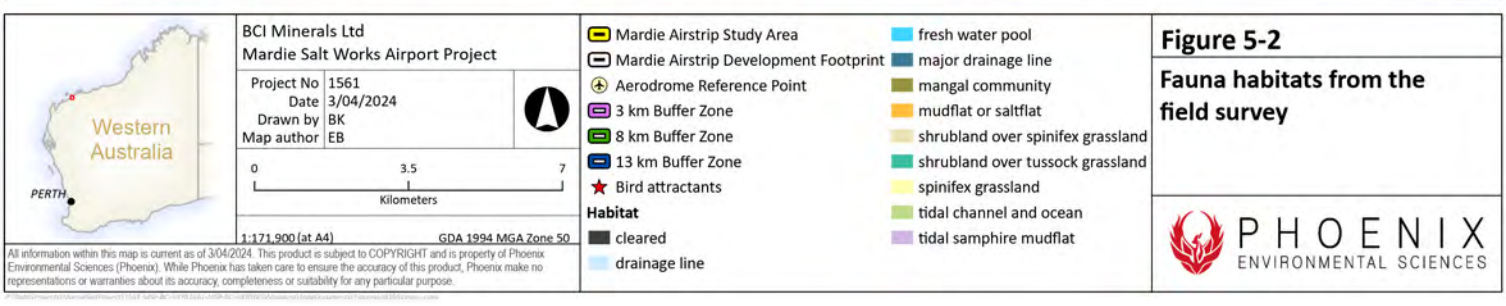
Western Australia
PERTH
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Map author EB
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Kilometers
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Mardie Airstrip Study Area
Mardie Airstrip Development Footprint
Aerodrome Reference Point
3 km Buffer Zone
8 km Buffer Zone
13 km Buffer Zone
Bird attractants
Habitat
cleared
drainage line
fresh water pool
major drainage line
mangal community
mudflat or saltflat
shrubland over spinifex grassland
shrubland over tussock grassland
spinifex grassland
tidal channel and ocean
tidal samphire mudflat
Figure 5-2
Fauna habitats from the field survey
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5.2.1.2 Significant vertebrate fauna

Zero Threatened or Priority vertebrate fauna were recorded during the basic fauna survey, which was predominately focussed on habitat assessments and bird attractants in the vicinity of the airstrip development footprint.

Previous surveys carried out by Phoenix have recorded 20 significant vertebrate fauna from the Study Area and 27 from the 13 km Buffer Zone. Fifteen of these are migratory shorebird species, which are particularly likely to occur in intertidal samphire mudflats, tidal channels and mangal community habitat underneath the western end of the proposed flightpath and along the coast in the 13 km Buffer Zone (Phoenix 2020, 2022).

The likelihood of occurrence assessment for the significant species identified in the desktop review (section 5.1) determined 28 were likely to occur in the Study Area and 13 km Buffer Zone, 5 may possibly occur and 15 are unlikely to occur (Table 5-4).

Table 5-4 Likelihood of occurrence of relevant significant vertebrate fauna identified in the desktop review

Species	Status	Proximity to ARP	Habitat	Likelihood	Comment
Aves (41)					
Actitis hypoleucos Common Sandpiper	Mig. (EPBC & BC Acts)	8-13 km	Found across a wide range of wetlands: small ponds, large inlets and mudflats where they forage on the shore usually close to the vegetation (DCCEEW 2023). Prefers rocky creeks, channels, dams, and mangrove-lined inlets (Geering *et al.* 2007).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Anous stolidus Common Noddy	(Mig. EPBC & BC Acts)	Projected distribution	Occurs mainly in the ocean off the Queensland coast, but also off the north-west and central WA coast (DCCEEW 2024b). During the breeding season, it occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand (DCCEEW 2024b).	**Unlikely**	Mainly occurs some distance off the coast, not often recorded close to land.
Apus pacificus Fork-tailed Swift	(Mig. EPBC & BC Acts)	Projected distribution	Occurs in a wide range of dry or open habitats, including riparian woodlands, tea-tree swamps, low scrub, heathland, Saltmarsh, grassland and spinifex sandplains, open farmland and inland and coastal sand-dunes (DCCEEW 2024b).	**Possible (foraging)**	Suitable habitat occurs in the 13 km Buffer Zone, but no nearby records.
Arenaria interpres Ruddy Turnstone	Mig. (EPBC & BC Acts)	8-13 km	Usually found in coastal regions containing exposed rocks. They are also found in tidal pools and beaches and are also known to be found on clay ridges and occasionally in estuaries, harbours and lagoons. They have been recorded on sewage ponds and on mudflats (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.

Species	Status	Proximity to ARP	Habitat	Likelihood	Comment
Calidris acuminata Sharp-tailed Sandpiper	Mig. (EPBC & BC Acts)	Projected distribution	Muddy edges of shallow fresh or brackish vegetated wetlands, including lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland (DCCEEW 2024b).	**Unlikely**	No freshwater wetlands and no records nearby the Study Area or 13 km Buffer Zone.
Calidris alba Sanderling	Mig. (EPBC & BC Acts)	8-13 km	Found utilising coastal environments open to sea swell, sandbars, spits and shingle banks. They also occur on wave-washed rock outcrops. They are less frequently found in estuaries and inlet harbours and near-coastal inland wetlands (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Calidris canutus Red Knot	EN/Mig./EN (EPBC Act; BC Act)	8-13 km	Typically occupy intertidal mudflats, sandflats and sheltered coasts. They are also known to occupy beaches, lagoons, harbours and sandy beaches. They have also been recorded occupying saline terrestrial wetlands and sewage ponds and are rarely found in freshwater swamps (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Calidris ferruginea Curlew Sandpiper	CR/Mig./CR (EPBC Act; BC Act)	8-13 km	Occurs on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons. They are known to favour 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 bores/drains, usually with bare edges of mud or sand (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Calidris ruficollis Red-necked Stint	Mig. (EPBC & BC Acts)	3-8 km	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 (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Calidris tenuirostris Great Knot	CR/Mig./CR (EPBC Act; BC Act)	8-13 km	Occupy sheltered coastal habitats, mudflats and sandflats such as inlets, bays, harbours, estuaries and lagoons. They are known to occupy reefs and rock platforms as well as shorelines and mangroves. There are also records in swamps near the coast, saltlakes and non-tidal lagoons (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Calonectris leucomelas Streaked Shearwater	(Mig. EPBC & BC Acts)	Projected distribution	The species occurs over pelagic and inshore waters. In northern Australia, the streaked shearwater is usually found in offshore waters more than 18 kilometres from the mainland coast (Marchant & Higgins 1990).	**Recorded**	Mainly occurs some distance off the coast, not often recorded close to land.

Species	Status	Proximity to ARP	Habitat	Likelihood	Comment
Charadrius leschenaultii Greater Sand Plover	VU/Mig./VU (EPBC Act; BC Act)VU/Mig./ VU (EPBC Act; BC Act)	8-13 km	Utilises coastal and estuarine environments. They typically occupy sheltered sandy or muddy beaches as well as intertidal sandbanks, mudflats, reefs and rock platforms. They have occasional records occupying saltworks, saltlakes and marginal saltmarshes and brackish swamps (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Charadrius veredus Oriental Plover	Mig. (EPBC & BC Acts)	3-8 km	Oriental Plovers spend a few weeks in coastal habitats such as estuarine mudflats, sandbanks, on sandy/rocky ocean beaches, nearby reefs, or in near-coastal grasslands. They then disperse further inland, where they occur in sparsely vegetated plains or recently burnt open areas (DCCEEW 2024d).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Chlidonias leucopterus White-winged Black Tern	Mig. (EPBC & BC Acts)	8-13 km	Typically occurs in wetland environments such as brackish, saline and coastal areas. They are also known to occupy sheltered areas such as estuaries, harbours and lagoons, particularly those with sandflats and mudflats (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Erythrotriorchis radiatus Red Goshawk	VU (EPBC & BC Acts)	Projected distribution	Occurs in tropical and temperate climates in coastal and sub-coastal forested lands of northern Australia. Inhabits coastal and sub-coastal tall open forests and woodlands, tropical savannas traversed by wooded or forested rivers, and the edges of rainforests. Appears to favour areas with permanent water which are high productivity and contain nesting trees (DCCEEW 2023).	**Unlikely**	No suitable habitat is present within the Study Area.
Falco hypoleucos Grey Falcon	VU (BC Act)	3-8 km	The Grey Falcon is a widespread but rare species inhabiting much of the hot, semi-arid and arid interior of Australia. Occurs in a wide variety of arid habitats including open woodlands and open *Acacia* shrubland, hummock and tussock grasslands and low shrublands, particularly where crossed by tree-lined water courses (Schoenjahn *et al.* 2019; Threatened Species Scientific Committee 2020).	**Recorded**	No roosting habitat is present within or nearby the Study Area. However, due to nearby detections (2020) and suitable foraging habitat, the species may visit the Study Area occasionally.
Fregata ariel Lesser Frigatebird	(Mig. EPBC & BC Acts)	Projected distribution	Usually pelagic and often found far from land, but is also found over shelf waters, in inshore areas, and inland over continental coastlines (Marchant & Higgins 1990).	**Unlikely**	Mainly occurs some distance off the coast, not often recorded close to land.

Species	Status	Proximity to ARP	Habitat	Likelihood	Comment
Gelochelidon nilotica Gull-billed Tern	Mig. (BC Act)	8-13 km	Occur in freshwater swamps, salt lakes, beaches, mudflats and sewage farms, and are rarely found over the ocean (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Glareola maldivarum Oriental Pratincole	Mig. (EPBC & BC Acts)	3-8 km	In Australia, it inhabits open plains, floodplains and grasslands, often with extensive bare areas (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Hydroprogne caspia Caspian Tern	Mig. (EPBC & BC Acts)	8-13 km	Found in sheltered coastal habitats and near-coastal terrestrial wetlands (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Limnodromus semipalmatus Asian Dowitcher	Mig. (EPBC & BC Acts)	Projected distribution	Inhabits sheltered coastal habitats including tidal creeks, coastal lagoons and estuaries. There are many records utilising mudflats and sandflats. They are also known to occupy ponds, saltworks and sewage farms (DCCEEW 2024b).	**Possible**	Suitable habitat is present within Study Area, but no nearby records. Species is naturally rare in Australia, with sightings.
Limosa lapponica Bar-tailed Godwit	Mig. (EPBC & BC Acts)	8-13 km	Occupies a variety of aquatic habitats such as intertidal sandflats, banks, mudflats, estuaries coastal lagoons and harbours. They have also been found in saltmarshes and brackish coastal wetlands (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Limosa lapponica menzbieri Bar-tailed Godwit (Northern Siberian)	CR/Mig./VU/ Mig. (EPBC Act; BC Act)	Projected distribution	Occupies a variety of aquatic habitats such as intertidal sandflats, banks, mudflats, estuaries coastal lagoons and harbours. They have also been found in saltmarshes and brackish coastal wetlands (DCCEEW 2024b).	**Likely**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Macronectes giganteus Southern Giant Petrel	EN/Mig./Mig. (EPBC Act; BC Act)	Projected distribution	Pelagic. Breeds on 6 subantarctic and Antarctic islands in Australian territory (DCCEEW 2024b).	**Unlikely**	Pelagic species that is rarely found close to the coast.

Species	Status	Proximity to ARP	Habitat	Likelihood	Comment
Motacilla cinerea Grey Wagtail	(Mig. EPBC & BC Acts)	Projected distribution	Vagrant visitor to Australia that inhabits fast-flowing streams and rivers (IUCN 2019).	**Unlikely**	Suitable habitat occurs in the 13 km Buffer Zone, but no nearby records and it is a vagrant species.
Motacilla tschutschensis Eastern Yellow Wagtail	Mig. (EPBC & BC Acts)	Projected distribution	Uncommon but regular visitor to Pilbara; primarily inhabits a range of damp or wet habitats with low vegetation including damp meadows, marshes, waterside pastures, and sewage farms (IUCN 2019; Johnstone *et al.* 2013).	**Unlikely**	Suitable habitat occurs in the 13 km Buffer Zone, but no nearby records and naturally rare species.
Numenius madagascariensis Eastern Curlew	CR/Mig./CR (EPBC Act; BC Act)	8-13 km	Occurs mainly on intertidal mudflats, on exposed seagrass beds or mudflats (Geering *et al.* 2007). Also utilises sand spits of estuaries, mangroves, lake shores and ocean beaches.	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Numenius phaeopus Whimbrel	Mig. (EPBC & BC Acts)	8-13 km	Usually forage on intertidal mudflats and sheltered coastal areas. They have also been found in other waterbodies including harbours, lagoons, estuaries, rivers and mangroves. Occasionally they are found in sandy and rocky beaches or intertidal areas (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Pandion haliaetus Osprey	Mig. (EPBC & BC Acts)	8-13 km	Occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. Occur in a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Pezoporus occidentalis Night Parrot	EN (EPBC & BC Acts)	Projected distribution	Appears to favour areas of dense vegetation comprising old-growth (often > 50 years unburnt) Spinifex (*Triodia* spp.) especially hummocks that are ring-forming for roosting and nesting. Such areas must also be associated with foraging habitat containing various native grasses and herbs in addition to spinifex, and these areas may or may not contain shrubs or low trees. Suitability of habitat is thought to depend on particular stages of regeneration after fire (DCCEEW 2024b).	**Unlikely**	Unlikely to occur within the Study Area given the absence of long-unburnt mature spinifex and the high shrub cover.

Species	Status	Proximity to ARP	Habitat	Likelihood	Comment
Phaethon rubricauda westralis (Indian Ocean Red-tailed Tropicbird)	EN/P4 (EPBC Act; BC Act)	Projected distribution	A pelagic bird that breeds on offshore islands (DCCEEW 2024b).	**Unlikely**	Pelagic species that is rarely found close to the coast.
Pluvialis fulva Pacific Golden Plover	Mig. (EPBC & BC Acts)	3-8 km	Typically inhabits coastal environments and occasionally can be found in wetlands, mudflats and sandflats in sheltered areas. They have been found on islands, sand and coral cays, terrestrial environments, usually near waterbodies, and paddock areas (DCCEEW 2024b)	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Rostratula australis Australian Painted Snipe	EN (EPBC & BC Acts)	Projected distribution	Inhabits shallow terrestrial fresh-brackish wetlands, including temporary and permanent lakes, swamps and claypans, waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains.	**Unlikely**	No nearby records and naturally rare species.
Sterna hirundo Common Tern	VU (EPBC & BC Acts)	8-13 km	In Australia, they inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes, bays, harbours and inlets (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Sternula albifrons Little Tern	Mig. EPBC and BC Acts; P4 DBCA list	8-13 km	Inhabit a variety of aquatic environments including estuaries, lagoons, sheltered coastal areas, lakes, bays and harbours. Particularly those with sandbanks or splits and exposed ocean beaches. This species is widespread but not favouring offshore continental islands or coral cays (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Sternula nereis subsp. nereis Fairy Tern	Mig. (EPBC & BC Acts)	Projected distribution	They nest on sheltered, sandy beaches. They have also been known to occur on the edges of offshore, estuaries, islands, wetlands and other areas of the mainland coastline (DCCEEW 2024b).	**Possible**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Thalasseus bergii Crested tern	Mig. (EPBC & BC Acts)	8-13 km	Occurs in marine, coastal and pelagic environments and are usually observed in coastal waters in beaches, platforms and sheltered areas including harbours and estuaries (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone

Species	Status	Proximity to ARP	Habitat	Likelihood	Comment
Tringa brevipes Grey-tailed Tattler	Mig. (EPBC & BC Acts)	8-13 km	Occurs on sheltered coasts with reefs and rock platforms or mudflats and can also be found on reefs or platforms that are exposed at low tide (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Tringa nebularia Common Greenshank	Mig. (EPBC & BC Acts)	8-13 km	Uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes (DCCEEW 2024b).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Tringa glareola Wood Sandpiper	Mig. (EPBC & BC Acts)	Projected distribution	Mostly occurs on the coast but sometimes inland; uses permanent and ephemeral terrestrial wetlands, including rivers and creeks (DCCEEW 2024b).	**Unlikely**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Xenus cinereus Terek Sandpiper	Mig. (EPBC & BC Acts)	8-13 km	Inhabits coastal mudflats, sheltered estuaries and lagoons. In Australia, it has a primarily coastal distribution, with occasional records inland (Morcombe 2004).	**Recorded**	Suitable habitat is present in the western end of the Study Area and along the coast in the 13 km Buffer Zone.
Mammalia (4)					
Dasyurus hallucatus Northern Quoll	EN (EPBC & BC Acts)	3-8 km	Found in a variety of habitats including rocky areas, eucalypt woodlands, rainforests, shrubland, sandy areas, grasslands and desert. Rocky areas provide important denning habitat, while they forage in nearby grasslands and creek lines (DCCEEW 2024c)	**Recorded**	Presence of suitable habitat and nearby records.
Macroderma gigas Ghost Bat	VU (EPBC & BC Acts)	Projected distribution	Present in a variety of habitats from the Pilbara to tropical savanna woodlands and rainforests further north and east. Prefers to roost in caves beneath bluffs of low, rounded hills composed of Marra Mamba geology, and granite rock piles in the Pilbara and sandstone elsewhere, as well as adits (abandoned mines) Scientific Committee, 2016 #12754; Armstrong, 2021 #15559}.	**Recorded**	No suitable habitat is present within the Study Area
Rhinonicteris aurantia (Pilbara) Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)	3-8 km	Normally restricted to caves and mine adits (horizontal shafts) with stable, warm and humid microclimates (Van Dyck & Strahan 2008), but temporary roosts such as crevices and tree hollows may be used in warm and humid conditions, allowing greater dispersal during the wet season.	**Recorded**	Suitable foraging habitat is present in the area, and the species was recorded in the Study Area in 2018 (Phoenix 2020).

Species	Status	Proximity to ARP	Habitat	Likelihood	Comment
Ozimops cobourgianus North-Western Free-tailed Bat	P1 (DBCA list)	3-8 km	Primarily found in mangroves, and adjacent creek lines and grasslands (Reardon 2014).	**Recorded**	Suitable foraging habitat is present in the area, and the species was recorded in the Study Area in 2018 (Phoenix 2020).
Reptilia (2)					
Liasis olivaceus barroni Pilbara Olive Python	VU (EPBC & BC Acts)	Projected distribution	Commonly found in rocky areas in association with watercourses and pools and often associated with areas of permanent pooling water near rocky habitats, such as gullies, gorges and rocky ranges or boulder sites. It has also been recorded in riparian vegetation along major rivers (Barker & Barker 1994; Pearson 2003).	**Possible**	Suitable habitat is present at open water pools and along drainage lines in the Study Area.
Notoscincus butleri Lined Soil-crevice Skink (Dampier)	P4 (DBCA list)	0-3 km	The species is endemic to the Pilbara region, with records scattered across the far west of the region from south of Karratha and Dampier, including West Intercourse Island, to approximately 40 km northwest of Tom Price (Storr *et al.* 1999; Wilson & Swan 2013). Little is known on the species' preferred habitats; however, the limited records are often associated with spinifex dominated vegetation near creek and river margins (Cogger 2014; Wilson & Swan 2013; Wilson & Knowles 1988).	**Recorded**	Suitable habitat is present within the Study Area. Multiple records approximately 3km north-west of the ARP.

5.3 SURVEY LIMITATIONS

The limitations of the terrestrial fauna survey have been considered in accordance with EPA (2016b, c) (Table 5-5).

Table 5-5 Consideration of potential survey limitations

Limitations	Comments
Availability of contextual information at a regional and local scale	Database searches and previous surveys within the vicinity of the Project provided a comprehensive species list for the region.
Competency/experience of the team carrying out the survey	The survey team have more than 10 years of combined experience conducting fauna surveys in the Pilbara region of WA.
Scope and completeness	The scope was sufficient for the size of the Study Area and the fauna habitats present and is considered complete.
Access within the Study Area	All parts of the Study Area were accessible.
Timing, rainfall, season	Timing of the survey (Summer season) was optimal for the Study Area and consistent with EPA (2020) guidance for the Eremaean Climatic Province.
Disturbance that may have affected the results of the survey	No disturbances affected the results of the survey.

6 DISCUSSION

6.1 FAUNA HABITATS

Eleven terrestrial fauna habitats were recorded within the Study Area, which was dominated by shrubland over spinifex grassland (6,505 ha; 49.6%), spinifex grassland (2,899 ha; 22.1%) and mudflat/saltflat habitat (2,283 ha; 17.4%). Several other habitat types occupied a smaller extent of the Study Area (Table 5-3).

Habitat types directly adjacent to the airstrip development footprint are predominately spinifex grassland and shrubland over spinifex grassland. These habitat types have previously been found to support the largest number of species overall in the Mardie area, but few significant terrestrial fauna species (Phoenix 2020). Habitat assessments in close proximity to the airstrip development footprint did not identify any potential bird attractants, and the habitat directly around the airstrip development footprint has minimal value for birds.

Habitats within the Study Area and 13 km Buffer Zone that are likely to contain large numbers of birds, including migratory shorebirds, are tidal samphire mudflats, tidal channel and ocean and mangal communities. Previous surveys by Phoenix have noted that tidal channel and ocean habitat and tidal samphire mudflats are used predominately for foraging by migratory shorebirds, whilst mangal communities are mainly used for roosting (Phoenix 2022). These habitat types are confined to the western end of the Study Area, particularly under the Takeoff Surface. Some tidal samphire mudflat habitat occurs within the 8 km Buffer Zone around the ARP, though tidal channel and mangal communities are mostly absent. Each of these habitat types is common along the coast within the 13 km Buffer Zone.

Drainage lines within the Study Area and 13 km Buffer Zone likely act as attractants for larger terrestrial birds (e.g., Galahs, Little Corellas, raptors), as watercourses in the Pilbara are known to provide an important refuge (Burbidge *et al.* 2010; Johnstone *et al.* 2013). One major drainage (Fortescue River) runs through the eastern side of the Study Area under the Takeoff Surface and is likely to attract large numbers of birds when flowing. Some drainage lines feed permanent freshwater pools (e.g. Mardie Pool; 3.2 km from the ARP), which are likely important habitat features and attract larger terrestrial birds and waterbirds. Other creeks within the Study Area may feed ephemeral freshwater pools that are likely to be used seasonally by birds when they are present.

A small number of artificial freshwater pools are also present within the Study Area and 13 km Buffer Zone. The nearest permanent artificial open waterbody detected during the 2024 reconnaissance surveys was located approximately 4.4 km from the ARP, within the 8 km Buffer Zone. As with natural permanent sources of water, these pools have the potential to attract larger birds.

6.2 VERTEBRATE FAUNA

6.2.1 Migratory shorebirds

Conservation Significant Migratory shorebird species are seasonally present in the Study Area and 13 km Buffer Zone from September – April. Previous surveys by Phoenix have identified 20 of the 37 species listed under EPBC Act Policy Statement 3.21 (DoEE 2017) in the vicinity of the Mardie Salt Works Study Area (Phoenix 2023). The closest record of a Conservation Significant Migratory shorebird is approximately 5.3 km from the ARP, though most records are 10 – 15 km from the ARP in suitable mudflat and coastal habitat.

Migratory shorebirds forage and roost in large mixed flocks and are prone to disturbances, which often lead to large groups of shorebirds taking flight simultaneously (Smit & Visser 1993; Lilleyman *et al.* 2016). Most migratory shorebirds typically fly at a range of heights, with heights of 1,000 – 5,000 m

reported as typical (Geering *et al.* 2007). During the migratory shorebird season in Australia, shorebird activity is dependent on tides, with foraging occurring during low tide and roosting occurring during high tides. Natural undisturbed flight usually occurs in the transitional period between tides, when birds are moving between foraging and roosting habitat.

6.2.2 Oriental Pratincole, *Glareola maldivarum* (Mig. EPBC Act and BC Act)

Annual shorebird monitoring in 2023 observed Oriental Pratincole in nationally and internationally significant numbers (Phoenix 2023). Based on the highest count of Oriental Pratincoles per helicopter flight during 2023, it was estimated that at least 171,079 individuals (5.94% of the global population) were utilising the Mardie Salt Works Migratory Shorebird Study Area during the 2023 field season. In contrast, only 6 Oriental Pratincole were recorded during migratory shorebird surveys in 2024. However, local densities of Oriental Pratincole are known to vary substantially between years and it is feasible that large flocks may reoccur within the Study Area and 13 km Buffer Zone around the ARP.

Large flocks of Oriental Pratincole similar to that observed in 2023 would pose additional risk for the operation of Mardie airstrip. Unlike most migratory shorebirds, Oriental Pratincoles inhabit open plains, floodplains or short grassland as well as coastal mangal communities and seasonally inundated mudflats. The closest record of Oriental Pratincole is from mudflat/saltflat habitat 5.3 km from the ARP, only 627 m from the closest boundary of the Study Area. Foraging heights for Oriental Pratincoles appear to be relatively low and have been described as "*Low over grass or saltmarsh vegetation*" and "*several metres above low vegetation*" (Piersma & Hassell 2010). However, thermal soaring of "*600-700 m above ground*" with a slow descent was also reported as "*regularly seen*."

6.2.3 Large avifauna

Avifauna that pose a notable risk of bird strikes include Galahs, Corellas, raptors, waterbirds and migratory shorebirds. These birds are larger than most birds inhabiting the shrublands and grasslands nearby the airstrip development footprint and are often attracted to open bodies of water. Galahs, Corellas and migratory shorebirds may pose a particular risk as they can be present in large flocks that disperse quickly when disturbed.

6.2.4 Non-avian ground-dwelling fauna

Only 2 conservation significant ground-dwelling species have records from within the 13 km Buffer Zone - Lined Soil-crevice Skink (Dampier) and Northern Quoll. No suitable habitat for either of these species is present within the airstrip development footprint, and there is no risk of these species interacting with aircraft in suitable habitat present within 3, 8 and 13 km Buffer Zones.

Without appropriate infrastructure preventing fauna from accessing the airstrip development footprint, strikes with non-conservation significant ground-dwelling fauna (e.g., mammals, reptiles) are possible during aircraft takeoff and landing. Strikes with larger mammals and reptiles pose a particular risk for the safe operation of Mardie airstrip. These strikes will only occur on the runway itself, and preventing access to the airstrip development footprint will alleviate strike risk.

6.2.5 Bats

Three species of insectivorous bat were identified in the desktop review, 2 of which have been previously recorded within the Study Area. These bats forage whilst flying and may be attracted to artificial lights around the airstrip development footprint due to the increased density of flying insect prey. As such, strike risk is highest in the immediate vicinity of the airstrip development footprint or any other nearby infrastructure with artificial lights. Bats may also be present in higher densities around drainage lines or open bodies of water. Given they are nocturnal, interaction of bats with

aircraft is unlikely for daytime flights, but any nighttime flights will be under increased risk of a bat strike.

6.3 RECOMMENDED MITIGATION MEASURES

Actions taken to limit the risk of bird strikes should be focussed on minimising attractants nearby the airstrip development footprint, and monitoring bird movements through the Takeoff Surface. Potential mitigation measures to consider include;

- Avoid installation of any artificial large open freshwater pools on the eastern side of the airstrip development footprint. Given the presence of bird-attractant habitat on the western coastline, restricting fresh water on the eastern side will decrease the likelihood of birds crossing the runway when flying between fresh water sources.
- Introduction of restrictions around dumping organic waste/rubbish in close proximity to the runway.
- Installation of bird spikes on infrastructure at Mardie airstrip and any other infrastructure nearby.
- Construction and maintenance of a fence around the airstrip development footprint to prevent strikes with terrestrial non-avian fauna during takeoff and landing.
- Where possible, restricting arrival and departure of aircraft to eastern side of the airstrip development footprint to avoid flying over the migratory shorebird habitat to the west of the airstrip development footprint.
- Where possible, restricting arrival and departure of aircraft to daytime to minimise the possibility of interaction with bats.
- Implementing regular monitoring of bird activity in the vicinity of the aerodrome to identify periods where bird strike risk increases and action adaptive management methods to reduce risk as needed.

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Appendix 1 Survey site locations

Sitename	Site type	Latitude	Longitude
1616-1	FS	-21.1852	115.9504
1616-10	FS	-21.0816	115.9271
1616-11	FS	-21.0913	115.9705
1616-12	FS	-21.1229	115.9682
1616-13	FS	-21.1613	115.9925
1616-14	FS	-21.2842	116.0963
1616-15	FS	-21.2382	116.0798
1616-16	FS	-21.3201	115.8129
1616-17	FS	-21.3057	115.8249
1616-18	FS	-21.2865	115.8317
1616-19	FS	-21.2542	115.8365
1616-2	FS	-21.234	115.9577
1616-20	FS	-21.2032	115.9307
1616-21	FS	-21.2093	115.9702
1616-22	FS	-21.1577	116.0887
1616-3	FS	-21.284	115.94
1616-4	FS	-21.3257	115.9127
1616-5	FS	-21.1947	115.9722
1616-6	FS	-21.2196	115.8777
1616-7	FS	-21.2088	115.9369
1616-8	FS	-21.1335	115.929
1616-9	FS	-21.0712	115.942
1561-1	FS	-21.2059	115.9209
1561-2	FS	-21.1988	115.9107
1561-3	FS	-21.1866	116.0157
1561-5	FS	-21.2112	115.9536

FS = Fauna site

Site details			
Site	1616-9	**Position (WGS84)**	POINT Z (115.94198032201 -21.0711649068899 6.00920429453254)
Slope	Negligible	**Topography**	Sand dune
Soil colour	Light-brown	**Soil texture**	None
Rock cover (%)	None	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Mixed *Acacia* and Mesquite over soft spinifex and hummock grassland located behind the main jetty operations building. Large amount of recent infrastructure and earthworks.

Habitat	Spinifex grassland
Disturbance	Evidence of feral animals, current operations, large-scale clearing, vehicle tracks, revegetation, weed infestation

Vegetation condition	Good	**Fire age**	>10
Total veg. Cover (%)	91.0	**Litter distribution**	Scattered
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	10.0	**Litter cover (%)**	1.0
Grass cover (%)	80.0		
Herb cover (%)	1.0		

Site details			
Site	1616-8	**Position (WGS84)**	POINT Z (115.928956628944 -21.1335362754832 4.75374984741211)
Slope	Gentle	**Topography**	Sand dune
Soil colour	Red-brown	**Soil texture**	Loamy sand
Rock cover (%)	None	**Rock type**	Ferrous - ironstone

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Soft spinifex grassland fringing mixed chenopod shrubland next to mudflats. Some infrastructure located behind the sand dune.

Habitat	Beach
Disturbance	Current operations, evidence of feral animals, vehicle tracks

Vegetation condition	Very Good	**Fire age**	>5
Total veg. Cover (%)	35.0	**Litter distribution**	Spring
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	10.0	**Litter cover (%)**	1.0
Grass cover (%)	20.0		
Herb cover (%)	5.0		

Site details			
Site	1616-7	**Position (WGS84)**	POINT Z (115.936907001523 -21.2087860844463 8.20302963256836)
Slope	Negligible	**Topography**	Plain
Soil colour	Red-brown, black	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	Ferrous - ironstone, quartz

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	14 Nov 2023	14 Nov 2023
1	Camera trap	14 Nov 2023	14 Nov 2023

Site description - visit 1 (14 Nov 2023)

Scattered mixed *Acacia* shrubland over hard spinifex grassland of stages 3-4 on a red-brown clay loam plain. Thin layer of black manganese gravel and ironstone and quartz cobbles. Adjacent to bins in laydown area.

Habitat	Shrubland
Disturbance	Evidence of feral animals, grazing-low, vehicle tracks, large-scale clearing

Vegetation condition	Very Good	**Fire age**	>5
Total veg. Cover (%)	61.0	**Litter distribution**	Under vegetation
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	20.0	**Litter cover (%)**	1.0
Grass cover (%)	40.0		
Herb cover (%)	1.0		

Site details			
Site	1616-6	**Position (WGS84)**	POINT Z (115.877632149247 -21.2196571807086 12.1130237698555)
Slope	Negligible	**Topography**	Intertidal zone
Soil colour	Red-brown	**Soil texture**	Loamy sand
Rock cover (%)	None	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	14 Nov 2023	14 Nov 2023
1	Opportunistic sighting	14 Nov 2023	14 Nov 2023
1	Camera trap	14 Nov 2023	14 Nov 2023

Site description - visit 1 (14 Nov 2023)

Spinifex and hummock grasses on a small island in the middle of intertidal mudflats.

Habitat	Playa
Disturbance	Evidence of feral animals, current operations

Vegetation condition	Poor	**Fire age**	>10
Total veg. Cover (%)	24.0	**Litter distribution**	Under vegetation
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	2.0	**Litter cover (%)**	1.0
Grass cover (%)	20.0		
Herb cover (%)	2.0		

Site details			
Site	1616-5	**Position (WGS84)**	POINT Z (115.972160585526 -21.1947767408088 10.2440452575684)
Slope	Negligible	**Topography**	Plain
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	Ferrous - ironstone, quartz

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	14 Nov 2023	14 Nov 2023
1	Camera trap	14 Nov 2023	14 Nov 2023

Site description - visit 1 (14 Nov 2023)

Scattered Mulga shrubland over spinifex and tussock grasses on a red-brown clay loam plain. Adjacent to homestead and access tracks.

Habitat	Spinifex grassland		
Disturbance	Evidence of feral animals, grazing-low, vehicle tracks, litter		
Vegetation condition	Good	**Fire age**	>5
Total veg. Cover (%)	66.0	**Litter distribution**	Under vegetation
Tree cover (%)	5.0	**Litter depth (cm)**	1.0
Shrub cover (%)	20.0	**Litter cover (%)**	1.0
Grass cover (%)	40.0		
Herb cover (%)	1.0		

Site details			
Site	1616-4	**Position (WGS84)**	POINT Z (115.912606119773 -21.325881581546 15.5424461364746)
Slope	Negligible	**Topography**	Plain
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	Ferrous - ironstone, quartz

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	14 Nov 2023	14 Nov 2023
1	Camera trap	14 Nov 2023	14 Nov 2023

Site description - visit 1 (14 Nov 2023)

Scattered Mulga shrubland over mixed perennial grasses on a red-brown clay loam plain adjacent to an access track.

Habitat	Shrubland
Disturbance	Evidence of feral animals, grazing-low, vehicle tracks, litter

Vegetation condition	Very Good	**Fire age**	>5
Total veg. Cover (%)	62.0	**Litter distribution**	Under vegetation
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	40.0	**Litter cover (%)**	1.0
Grass cover (%)	20.0		
Herb cover (%)	2.0		

Site details			
Site	1616-3	**Position (WGS84)**	POINT Z (115.940047939632 -21.2840426315775 9.98992538452148)
Slope	Gentle	**Topography**	Drainage line
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	Ferrous - ironstone, quartz

Sample and effort summary

Visit	Sample method	Date start	Date stop
1	Site description	14 Nov 2023	14 Nov 2023
1	Camera trap	14 Nov 2023	14 Nov 2023

Site description - visit 1 (14 Nov 2023)

Scattered *Corymbia* trees fringing a minor drainage line over mixed *Acacia*s. Understory of spinifex grassland with some Buffel grass throughout the drainage. Substrate of red-brown clay loam plain with ironstone and quartz cobbles

Habitat	Spinifex grassland
Disturbance	Evidence of feral animals, grazing-low, livestock tracks, vehicle tracks, weed infestation

Vegetation condition	Very Good	**Fire age**	>5
Total veg. Cover (%)	92.0	**Litter distribution**	Under vegetation
Tree cover (%)	10.0	**Litter depth (cm)**	1.0
Shrub cover (%)	20.0	**Litter cover (%)**	1.0
Grass cover (%)	60.0		
Herb cover (%)	2.0		

Site details			
Site	1616-20	**Position (WGS84)**	POINT Z (115.930709423468 -21.2032578147655 9.27388896327466)
Slope	Negligible	**Topography**	Plain
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Occasional Mesquite over spinifex grassland on red-brown clay loam plain adjacent to the main camp with lots of open cleared areas. Camera deployed in recently burnt area

Habitat	Spinifex grassland
Disturbance	Evidence of feral animals, current operations, litter, weed infestation, livestock tracks, large-scale clearing

Vegetation condition	Degraded	**Fire age**	1
Total veg. Cover (%)	81.0	**Litter distribution**	Under vegetation
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	20.0	**Litter cover (%)**	1.0
Grass cover (%)	60.0		
Herb cover (%)	1.0		

Site details			
Site	1616-2	**Position (WGS84)**	POINT Z (115.957688569264 -21.2340059525594 13.6912988079712)
Slope	Negligible	**Topography**	Plain
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	Quartz, ferrous - ironstone

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	14 Nov 2023	14 Nov 2023
1	Camera trap	14 Nov 2023	14 Nov 2023

Site description - visit 1 (14 Nov 2023)

Scattered mixed *Acacia* shrubland over Mitchell grass and hard spinifex nearby an access track on a red-brown clay loam plain with ironstone and quartz cobbles.

Habitat	Shrubland
Disturbance	Evidence of feral animals, current operations, grazing-low, vehicle tracks

Vegetation condition	Very Good	**Fire age**	>5
Total veg. Cover (%)	65.0	**Litter distribution**	Under vegetation
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	30.0	**Litter cover (%)**	5.0
Grass cover (%)	30.0		
Herb cover (%)	5.0		

Site details			
Site	1616-19	**Position (WGS84)**	POINT Z (115.836503714651 -21.2541576786827 6.43392530735582)
Slope	Negligible	**Topography**	Creek
Soil colour	REDBR	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Water intake station. Vegetation largely altered but consists of mangroves over mudflats edged by open water.

Habitat	Mangrove
Disturbance	Current operations, erosion channels ,large-scale clearing, vehicle tracks

Vegetation condition	Poor	**Fire age**	>10
Total veg. Cover (%)	21.0	**Litter distribution**	Under vegetation
Tree cover (%)	10.0	**Litter depth (cm)**	1.0
Shrub cover (%)	10.0	**Litter cover (%)**	1.0
Grass cover (%)	0.0		
Herb cover (%)	1.0		

Site details			
Site	1616-18	**Position (WGS84)**	POINT Z (115.831693538439 -21.286464931531 7.48128890991211)
Slope	Gentle	**Topography**	Sandy rise
Soil colour	Red-brown	**Soil texture**	Sandy loam
Rock cover (%)	None	**Rock type**	Limestone

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Occasional Mesquite plants over spinifex grasses along the edge of a sandy rise. Chenopod shrubland is present on low points in the flood plain.

Habitat	Chenopod shrubland
Disturbance	Current operations, evidence of feral animals, vehicle tracks, large-scale clearing

Vegetation condition	Good	**Fire age**	>5
Total veg. Cover (%)	72.0	**Litter distribution**	Spring
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	30.0	**Litter cover (%)**	1.0
Grass cover (%)	40.0		
Herb cover (%)	2.0		

Site details			
Site	1616-17	**Position (WGS84)**	POINT Z (115.824822700765 -21.3056907715189 11.5111656188965)
Slope	Negligible	**Topography**	Drainage line
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Scattered mixed *Acacia* and Mesquite over spinifex grassland, stages 3-5, on red-brown clay loam plain. Adjacent to a minor drainage line with a thin layer of ironstone and quartz cobbles on the surface.

Habitat	Spinifex grassland		
Disturbance	Grazing-low, vehicle tracks, weed infestation		
Vegetation condition	Very Good	**Fire age**	>5
Total veg. Cover (%)	82.0	**Litter distribution**	Under vegetation
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	10.0	**Litter cover (%)**	1.0
Grass cover (%)	70.0		
Herb cover (%)	2.0		

Site details			
Site	1616-16	**Position (WGS84)**	POINT Z (115.812877156397 -21.3200819833922 9.84688949584961)
Slope	Negligible	**Topography**	Plain
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Mixed scattered *Acacia* plants over spinifex grassland, stages 3-5, with a thin layer of ironstone and quartz cobbles over a red-brown clay loam plain. Adjacent to a minor creek line.

Habitat	Spinifex grassland
Disturbance	Vehicle tracks, grazing-low, livestock tracks

Vegetation condition	Very Good	**Fire age**	>5
Total veg. Cover (%)	71.0	**Litter distribution**	Spring
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	10.0	**Litter cover (%)**	1.0
Grass cover (%)	60.0		
Herb cover (%)	1.0		

Site details			
Site	1616-15	**Position (WGS84)**	POINT Z (116.080085104439 -21.2380847800681 33.4951435709372)
Slope	Negligible	**Topography**	Plain
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Scattered mixed *Acacia* over spinifex grassland of stages 2-4, on red-brown clay loam plain adjacent to water tanks used by cattle.

Habitat	Shrubland
Disturbance	Current operations, evidence of feral animals, grazing-high, livestock tracks, vehicle tracks

Vegetation condition	Good	**Fire age**	>5
Total veg. Cover (%)	90.0	**Litter distribution**	Scattered
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	20.0	**Litter cover (%)**	1.0
Grass cover (%)	60.0		
Herb cover (%)	10.0		

Site details			
Site	1616-14	**Position (WGS84)**	POINT Z (116.096300264921 -21.2841604421283 45.0674705505371)
Slope	Negligible	**Topography**	Plain
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	None

Sample and effort summary

Visit	Sample method	Date start	Date stop
1	Site description	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Scattered mixed *Acacia* plants over scattered hard spinifex of stages 2-4 on a red-brown clay loam plain. Some ironstone and quartz cobbles on the surface. Located nearby a large borrow pit.

Habitat	Shrubland
Disturbance	Current operations, evidence of feral animals, exploration (drill pads and access tracks),large-scale clearing, vehicle tracks

Vegetation condition	Very Good	**Fire age**	>5
Total veg. Cover (%)	81.0	**Litter distribution**	Scattered
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	20.0	**Litter cover (%)**	1.0
Grass cover (%)	60.0		
Herb cover (%)	1.0		

Site details			
Site	1616-13	**Position (WGS84)**	POINT Z (115.992459850494 -21.1612995284701 0)
Slope	Negligible	**Topography**	Plain
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Scattered *Corymbia* plants over Mesquite and other mixed shrubs over Buffel Grass on a red brown clay loam plain. A nearby water tank is being used by cattle.

Habitat	Shrubland
Disturbance	Current operations, evidence of feral animals, grazing-medium, livestock tracks, weed infestation, vehicle tracks

Vegetation condition	Good	**Fire age**	>5
Total veg. Cover (%)	96.0	**Litter distribution**	Under vegetation
Tree cover (%)	5.0	**Litter depth (cm)**	1.0
Shrub cover (%)	60.0	**Litter cover (%)**	1.0
Grass cover (%)	30.0		
Herb cover (%)	1.0		

Site details			
Site	1616-12	**Position (WGS84)**	POINT Z (115.967829979316 -21.1230493531701 7.84151809290052)
Slope	Negligible	**Topography**	Plain
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	Ferrous - ironstone, quartz

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Mesquite shrubland with some mixed *Acacia* throughout. A small drainage line nearby with tall *Corymbia* overstory. Located adjacent to a Telstra tower in an area that is soon to be cleared for crystallisation ponds.

Habitat	Shrubland
Disturbance	Current operations, vehicle tracks, weed infestation, grazing-low

Vegetation condition	Good	**Fire age**	>5
Total veg. Cover (%)	72.0	**Litter distribution**	Spring
Tree cover (%)	10.0	**Litter depth (cm)**	1.0
Shrub cover (%)	40.0	**Litter cover (%)**	1.0
Grass cover (%)	20.0		
Herb cover (%)	2.0		

Site details			
Site	1616-11	**Position (WGS84)**	POINT Z (115.970486397795 -21.0913053490747 3.60468285158277)
Slope	Negligible	**Topography**	Sand dune
Soil colour	Red-orange	**Soil texture**	None
Rock cover (%)	None	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Scattered mixed *Acacia* over spinifex grassland on a sandy rise on a flood plain with many chenopod shrubs throughout the flood plain.

Habitat	Spinifex grassland
Disturbance	Current operations, vehicle tracks

Vegetation condition	Excellent	**Fire age**	>10
Total veg. Cover (%)	75.0	**Litter distribution**	Spring
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	5.0	**Litter cover (%)**	1.0
Grass cover (%)	30.0		
Herb cover (%)	40.0		

Site details			
Site	1616-10	**Position (WGS84)**	POINT Z (115.927144995866 -21.0815706126159 3.05910873413086)
Slope	Negligible	**Topography**	Sand dune
Soil colour	Light-brown	**Soil texture**	None
Rock cover (%)	None	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	15 Nov 2023	15 Nov 2023
1	Opportunistic sighting	15 Nov 2023	15 Nov 2023
1	Camera trap	15 Nov 2023	15 Nov 2023

Site description - visit 1 (15 Nov 2023)

Mixed *Acacia* and Mesquite over soft spinifex grassland next to mangroves and rocky creek line on a light brown sandy soil with shells and a layer of cobbles on the surface.

Habitat	Mangrove
Disturbance	Current operations, large-scale clearing, vehicle tracks

Vegetation condition	Very Good	**Fire age**	>10
Total veg. Cover (%)	100.0	**Litter distribution**	Under vegetation
Tree cover (%)	30.0	**Litter depth (cm)**	1.0
Shrub cover (%)	10.0	**Litter cover (%)**	2.0
Grass cover (%)	40.0		
Herb cover (%)	20.0		

Site details			
Site	1616-1	**Position (WGS84)**	POINT Z (115.950411079606 -21.1852026180747 8.0013677701354)
Slope	Gentle	**Topography**	Swamp
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	None	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	14 Nov 2023	14 Nov 2023
1	Camera trap	14 Nov 2023	14 Nov 2023

Site description - visit 1 (14 Nov 2023)

Large palm trees and *Eucalyptus* spp. Over mixed *Acacia* and *Hakea* over Buffel grass and some soft spinifex nearby a seasonal waterhole on a clay loam red brown plain.

Habitat	Waterhole		
Disturbance	Evidence of feral animals, grazing-low		
Vegetation condition	Good	**Fire age**	>5
Total veg. Cover (%)	61.0	**Litter distribution**	Transported
Tree cover (%)	10.0	**Litter depth (cm)**	1.0
Shrub cover (%)	30.0	**Litter cover (%)**	1.0
Grass cover (%)	20.0		
Herb cover (%)	1.0		

Site details			
Site	1561-6	**Position (WGS84)**	POINT Z (115.96998721372 -21.2092998158384 16.7692189595522)
Slope	Negligible	**Topography**	Plain
Soil colour	Black, brown	**Soil texture**	Sandy clay
Rock cover (%)	None	**Rock type**	Quartz, granite - rocks,ferrous - ironstone

Sample and effort summary

Visit	Sample method	Date start	Date stop
1	Site description	08 Feb 2023	08 Feb 2023
1	Opportunistic sighting	08 Feb 2023	08 Feb 2023

Site description - visit 1 (08 Feb 2023)

Spinifex grassland surrounding cleared runway with *Acacia inaequilatera* over Salam over small Spinifex and tussock grasses. Substrate is black-brown sandy clay with ironstone, granite, and quartz.

Habitat	Infrastructure
Disturbance	Current operations, evidence of feral animals ,livestock tracks, vehicle tracks

Vegetation condition	Good	**Fire age**	Moderate (>5 years)
Total veg. Cover (%)	75.0	**Litter distribution**	Under vegetation
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	10.0	**Litter cover (%)**	20.0
Grass cover (%)	50.0		
Herb cover (%)	10.0		

Site details			
Site	1561-5	**Position (WGS84)**	POINT Z (115.95355466019 -21.2112478539545 12.5619468688965)
Slope	Negligible	**Topography**	Plain
Soil colour	Black, brown	**Soil texture**	Sandy clay
Rock cover (%)	None	**Rock type**	Ferrous - ironstone, quartz,granite - rocks

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	08 Feb 2023	08 Feb 2023
1	Opportunistic sighting	08 Feb 2023	08 Feb 2023

Site description - visit 1 (08 Feb 2023)

Scattered spinifex shrubland of *Acacia inaequilatera* over *Triodia longiceps*, *Triodia wiseana* and tussock grasses that are up to 0.5m over iron stone granite and quartz.

Habitat	Spinifex grassland
Disturbance	None

Vegetation condition	Good	**Fire age**	Moderate (>5 years)
Total veg. Cover (%)	75.0	**Litter distribution**	None
Tree cover (%)	10.0	**Litter depth (cm)**	1.0
Shrub cover (%)	15.0	**Litter cover (%)**	20.0
Grass cover (%)	40.0		
Herb cover (%)	10.0		

Site details			
Site	1561-4	**Position (WGS84)**	POINT Z (116.0887351 -21.1577354 0)
Slope	Gentle	**Topography**	River
Soil colour	Grey	**Soil texture**	Rocks
Rock cover (%)	100	**Rock type**	Granite - rocks

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	19 Jan 2024	19 Jan 2024

Site description - visit 1 (19 Jan 2024)

Large drainage line splitting into a floodplain. Lined with large *Eucalyptus* trees that may be used by flocks of Galah and Corella.

Habitat	Riparian zone
Disturbance	None

Vegetation condition	Good	**Fire age**	None
Total veg. Cover (%)	82.0	**Litter distribution**	None
Tree cover (%)	20.0	**Litter depth (cm)**	None
Shrub cover (%)	2.0	**Litter cover (%)**	None
Grass cover (%)	60.0		
Herb cover (%)	0.0		

Site details			
Site	1561-3	**Position (WGS84)**	POINT Z (116.0157549 -21.1865929 0)
Slope	Negligible	**Topography**	Plain
Soil colour	Red-brown	**Soil texture**	Clay loam
Rock cover (%)	0	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	19 Jan 2024	19 Jan 2024
1	Opportunistic sighting	19 Jan 2024	19 Jan 2024

Site description - visit 1 (19 Jan 2024)

Occasional eucalyptus over Mesquite and mixed shrubs over spinifex grassland on red brown clay loam plain. Small pond located nearby being used by birds.

Habitat	Spinifex grassland
Disturbance	Current operations, exploration (drill pads and access tracks),large-scale clearing, vehicle tracks

Vegetation condition	Good	**Fire age**	>10
Total veg. Cover (%)	98.0	**Litter distribution**	Under vegetation
Tree cover (%)	2.0	**Litter depth (cm)**	1.0
Shrub cover (%)	15.0	**Litter cover (%)**	1.0
Grass cover (%)	80.0		
Herb cover (%)	1.0		

Site details			
Site	1561-2	**Position (WGS84)**	POINT Z (115.9107129 -21.1988049 0)
Slope	Negligible	**Topography**	Mudflat
Soil colour	Red-brown	**Soil texture**	Loamy sand
Rock cover (%)	0	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	19 Jan 2024	19 Jan 2024
1	Opportunistic sighting	19 Jan 2024	19 Jan 2024

Site description - visit 1 (19 Jan 2024)

Open expanse of mudflats for the evaporation ponds. No water present and the substrate is very dry and dusty. Small island behind with dead Mesquite over spinifex and mixed shrubs.

Habitat	Intertidal mudflat
Disturbance	Current operations, excavation, large-scale clearing

Vegetation condition	Poor	**Fire age**	>10
Total veg. Cover (%)	40.0	**Litter distribution**	None
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	5.0	**Litter cover (%)**	1.0
Grass cover (%)	30.0		
Herb cover (%)	5.0		

Site details			
Site	1561-1	**Position (WGS84)**	POINT Z (115.9209289 -21.2059154 0)
Slope	Negligible	**Topography**	Plain
Soil colour	Red-brown, orange	**Soil texture**	Clay loam
Rock cover (%)	0	**Rock type**	None

Sample and effort summary			
Visit	**Sample method**	**Date start**	**Date stop**
1	Site description	19 Jan 2024	19 Jan 2024

Site description - visit 1 (19 Jan 2024)

Mesquite over spinifex grasses on a red brown clay loam plain. Large area of mudflats nearby, however completely dry and unlikely to be wet until the ponds are in use. Also a yard in use behind the waterbody.

Habitat	Waterhole
Disturbance	Current operations, exploration (drill pads and access tracks), large-scale clearing,litter,vehicle tracks

Vegetation condition	Good	**Fire age**	>10
Total veg. Cover (%)	27.0	**Litter distribution**	Under vegetation
Tree cover (%)	0.0	**Litter depth (cm)**	1.0
Shrub cover (%)	5.0	**Litter cover (%)**	1.0
Grass cover (%)	20.0		
Herb cover (%)	2.0		

Appendix 3 Vertebrate fauna records from desktop review

Family	Species	Common name	Status	Introduced	Source				
					EPBC PMST	Naturemap	Phoenix Database	DBCA TFA	Birdlife
Birds (113)									
Accipitridae	*Accipiter fasciatus*	Brown Goshawk					•		
	Circus approximans	Swamp Harrier					•		
	Circus assimilis	Spotted Harrier					•		
	Erythrotriorchis radiatus	Red Goshawk	VU (EPBC & BC Acts)		•				
	Haliaeetus leucogaster	White-bellied Sea-Eagle					•		
	Haliastur indus	Brahminy Kite					•		
	Haliastur sphenurus	Whistling Kite				•	•		
	Milvus migrans	Black Kite				•			
Acrocephalidae	*Acrocephalus australis*	Australian Reed Warbler				•			
Alaudidae	*Mirafra javanica*	Horsfield's Bushlark				•			
Alcedinidae	*Dacelo leachii*	Blue-winged Kookaburra				•			
	Todiramphus sanctus	Sacred Kingfisher				•	•		
Anatidae	*Anas gracilis*	Grey Teal				•	•		
	Anas superciliosa	Pacific Black Duck				•	•		
	Aythya australis	Hardhead				•			
	Chenonetta jubata	Australian Wood Duck				•			
	Dendrocygna eytoni	Plumed Whistling Duck				•			
	Tadorna tadornoides	Australian Shelduck				•			
Anhingidae	*Anhinga novaehollandiae*	Australasian Darter				•	•		

Family	Species	Common name	Status	Introduced	Source				
					EPBC PMST	Naturemap	Phoenix Database	DBCA TFA	Birdlife
Apodidae	*Apus pacificus*	Fork-tailed Swift	Mig. (EPBC & BC Acts)		•				
Ardeidae	*Ardea alba*	Great Egret				•	•		
	Ardea pacifica	White-necked Heron					•		
	Butorides striata	Striated Heron					•		
	Egretta garzetta	Little Egret					•		
	Egretta novaehollandiae	White-faced Heron				•	•		•
	Egretta sacra	Eastern Reef Egret					•		
	Nycticorax caledonicus	Rufous Night Heron					•		
Artamidae	*Artamus leucorynchus*	White-breasted Woodswallow					•		
	Cracticus nigrogularis	Pied Butcherbird				•			
Burhinidae	*Esacus magnirostris*	Beach Stone-curlew					•		
Cacatuidae	*Cacatua sanguinea*	Little Corella				•	•		
	Eolophus roseicapilla	Galah				•	•		
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike				•	•		
Charadriidae	*Charadrius leschenaultii*	Greater Sand Plover	VU/Mig./VU (EPBC Act; BC Act)				•		
	Charadrius ruficapillus	Red-capped Plover					•		
	Charadrius veredus	Oriental Plover	Mig. (EPBC & BC Acts)				•		
	Elseyornis melanops	Black-fronted Dotterel				•			•
	Erythrogonys cinctus	Red-kneed Dotterel				•			
	Pluvialis fulva	Pacific Golden Plover	Mig. (EPBC & BC Acts)				•		
	Vanellus tricolor	Banded Lapwing					•		
Columbidae	*Geopelia cuneata*	Diamond Dove				•			

Family	Species	Common name	Status	Introduced	Source				
					EPBC PMST	Naturemap	Phoenix Database	DBCA TFA	Birdlife
	Geopelia striata placida	Peaceful Dove				•	•		
	Geophaps plumifera	Spinifex Pigeon				•			
	Ocyphaps lophotes	Crested Pigeon				•	•		
Corvidae	*Corvus orru*	Torresian Crow					•		
Estrildidae	*Emblema pictum*	Painted Finch				•			
	Taeniopygia castanotis	Zebra Finch				•			
Fregatidae	*Fregata ariel*	Lesser Frigatebird, Least Frigatebird	Mig. (EPBC & BC Acts)		•				
Glareolidae	*Glareola maldivarum*	Oriental Pratincole	Mig. (EPBC & BC Acts)			•	•	•	
Haematopodidae	*Haematopus fuliginosus*	Sooty Oystercatcher					•		
	Haematopus longirostris	Pied Oystercatcher					•		
Laridae	*Anous stolidus*	Common Noddy	Mig. (EPBC & BC Acts)		•				
	Chlidonias hybrida	Whiskered Tern					•		
	Chlidonias leucopterus	White-winged Black Tern	Mig. (EPBC & BC Acts)				•		
	Chroicocephalus novaehollandiae	Silver Gull					•		
	Gelochelidon nilotica	Gull-billed Tern	Mig. (BC Act)				•		
	Hydroprogne caspia	Caspian Tern	Mig. (EPBC & BC Acts)				•		
	Sterna hirundo	Common Tern	Mig. (EPBC & BC Acts)				•		
	Sternula albifrons	Little Tern	Mig. (EPBC & BC Acts)				•		
	Sternula nereis nereis	Fairy Tern	VU (EPBC & BC Acts)		•				
	Thalasseus bengalensis	Lesser Crested Tern					•		
	Thalasseus bergii	Crested Tern	Mig. (EPBC & BC Acts)				•		
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark				•			

Family	Species	Common name	Status	Introduced	Source				
					EPBC PMST	Naturemap	Phoenix Database	DBCA TFA	Birdlife
	Poodytes carteri	Spinifex-bird					•		
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren					•		
Meliphagidae	*Epthianura tricolor*	Crimson Chat				•			
	Manorina flavigula	Yellow-throated Miner				•			
	Ptilotula penicillata	White-plumed Honeyeater				•	•		
Meropidae	*Merops ornatus*	Rainbow Bee-eater				•	•	•	
Monarchidae	*Grallina cyanoleuca*	Magpie-lark				•			
Motacillidae	*Anthus australis*	Australian Pipit					•		
	Motacilla cinerea	Grey Wagtail	Mig. (EPBC & BC Acts)		•				
	Motacilla flava	Yellow Wagtail	Mig. (EPBC & BC Acts)		•				
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush					•		
	Pachycephala lanioides	White-breasted Whistler					•		
Pandionidae	*Pandion haliaetus*	Osprey	Mig. (EPBC & BC Acts)			•	•		•
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican				•	•		
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant				•			•
	Phalacrocorax sulcirostris	Little Black Cormorant				•			•
Podargidae	*Podargus strigoides*	Tawny Frogmouth				•			
Podicipedidae	*Tachybaptus novaehollandiae*	Australasian Grebe				•			
Procellariidae	*Calonectris leucomelas*	Streaked Shearwater	Mig. (EPBC & BC Acts)		•				
	Macronectes giganteus	Southern Giant Petrel	EN/Mig./Mig. (EPBC Act; BC Act)		•				
Psittaculidae	*Pezoporus occidentalis*	Night Parrot	EN/CR (EPBC Act; BC Act)		•				

Family	Species	Common name	Status	Introduced	Source				
					EPBC PMST	Naturemap	Phoenix Database	DBCA TFA	Birdlife
Rallidae	*Fulica atra*	Eurasian Coot				•			
Recurvirostridae	*Cladorhynchus leucocephalus*	Banded Stilt					•		
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail				•			
	Rhipidura phasiana	Mangrove Grey Fantail					•		
Rostratulidae	*Rostratula australis*	Australian Painted Snipe	EN (EPBC & BC Acts)		•				
Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	Mig. (EPBC & BC Acts)				•		
	Arenaria interpres	Ruddy Turnstone	Mig. (EPBC & BC Acts)				•		
	Calidris acuminata	Sharp-tailed Sandpiper	Mig. (EPBC & BC Acts)			•			
	Calidris alba	Sanderling	Mig. (EPBC & BC Acts)				•		
	Calidris canutus	Red Knot	EN/Mig./EN (EPBC Act; BC Act)				•		
	Calidris ferruginea	Curlew Sandpiper	CR/Mig./CR (EPBC Act; BC Act)				•		
	Calidris ruficollis	Red-necked Stint	Mig. (EPBC & BC Acts)				•		
	Calidris tenuirostris	Great Knot	CR/Mig./CR (EPBC Act; BC Act)				•		
	Limnodromus semipalmatus	Asian Dowitcher	Mig. (EPBC & BC Acts)						
	Limosa lapponica	Bar-tailed Godwit	Mig. (EPBC & BC Acts)				•		
	Limosa lapponica menzbieri	Bar-tailed Godwit (northern Siberian)	CR/Mig./VU/Mig. (EPBC Act; BC Act)		•				
	Numenius madagascariensis	Eastern Curlew	CR/Mig./CR (EPBC Act; BC Act)				•		
	Numenius phaeopus	Whimbrel	Mig. (EPBC & BC Acts)				•		
	Tringa brevipes	Grey-tailed Tattler	Mig. EPBC and BC Acts; P4 DBCA list				•		
	Tringa glareola	Wood Sandpiper	Mig. (EPBC & BC Acts)			•			

Family	Species	Common name	Status	Introduced	Source				
					EPBC PMST	Naturemap	Phoenix Database	DBCA TFA	Birdlife
	Tringa nebularia	Common Greenshank	Mig. (EPBC & BC Acts)				•		
	Xenus cinereus	Terek Sandpiper	Mig. (EPBC & BC Acts)				•		
Falconidae	*Falco berigora*	Brown Falcon				•			
	Falco cenchroides	Australian Kestrel					•		
	Falco hypoleucos	Grey Falcon	VU (BC Act)				•		
	Falco longipennis	Australian Hobby					•		
Phaethontidae	*Phaethon rubricauda westralis*	Indian Ocean Red-tailed Tropicbird	EN/P4 (EPBC Act; BC Act)		•				
Tytonidae	*Tyto javanica*	Barn Owl					•		
Zosteropidae	*Zosterops luteus*	Yellow white-eye					•		
Mammals (11)									
Canidae	*Vulpes vulpes*	Red Fox			•		•		
Dasyuridae	*Dasyurus hallucatus*	Northern Quoll	EN (EPBC & BC Acts)			•		•	
	Ningaui timealeyi	Pilbara Ningaui				•			
	Sminthopsis macroura	Stripe-faced Dunnart				•			
Felidae	*Felis catus*	Cat			•	•			
Macropodidae	*Osphranter rufus*	Red Kangaroo					•		
Megadermatidae	*Macroderma gigas*	Ghost Bat	VU (EPBC & BC Acts)		•				
Molossidae	*Ozimops cobourgianus*	Northern Coastal Free-tailed Bat	(P1 DBCA list)				•		
Muridae	*Mus musculus*	House Mouse			•	•			
Bovidae	*Bos taurus*	European Cattle			•		•		
Rhynonicteridae	*Rhinonicteris aurantia (Pilbara)*	Pilbara Leaf-nosed Bat	VU (EPBC & BC Acts)				•		
Reptiles (35)									

Family	Species	Common name	Status	Introduced	Source				
					EPBC PMST	Naturemap	Phoenix Database	DBCA TFA	Birdlife
Agamidae	*Ctenophorus caudicinctus*	Ring-tailed Dragon				•			
	Ctenophorus reticulatus	Western Netted Dragon				•			
	Tympanocryptis cephalus	Pebble Dragon				•			
Carphodactylidae	*Nephrurus cinctus*	Northern Banded knob-tailed Gecko				•			
Diplodactylidae	*Diplodactylus conspicillatus*	Fat-tailed Gecko				•			
	Diplodactylus galaxias	Northern Pilbara Beak-faced Gecko				•			
	Demansia reticulata	Reticulated Whipsnake				•			
	Furina ornata	Moon Snake				•			
	Pseudonaja mengdeni	Western Brown Snake				•			
	Suta fasciata	Rosen's Snake				•			
	Suta punctata	Spotted Snake				•			
Gekkonidae	*Gehyra punctata*	Spotted Dtella					•		
	Gehyra variegata	Variegated Dtella				•			
	Heteronotia binoei	Bynoe's Gecko				•			
Pygopodidae	*Delma nasuta*	Sharp-snouted Delma				•			
	Delma pax	Peaceful Delma				•			
	Lialis burtonis	Burton's Legless Lizard				•			
	Pygopus nigriceps	Western Hooded Scaly-Foot				•			
Pythonidae	*Antaresia childreni*	Children's Python				•			
	Liasis olivaceus barroni	Pilbara Olive Python	VU (EPBC & BC Acts)		•				
Scincidae	*Ctenotus grandis*	Grand Ctenotus				•			
	Ctenotus hanloni	Nimble Ctenotus				•			

Family	Species	Common name	Status	Introduced	Source				
					EPBC PMST	Naturemap	Phoenix Database	DBCA TFA	Birdlife
	Ctenotus helenae	Clay-soil Ctenotus				•			
	Ctenotus pantherinus	Leopard Ctenotus				•			
	Ctenotus rubicundus	Ruddy Ctenotus				•			
	Ctenotus saxatilis	Rock Ctenotus				•			
	Cyclodomorphus melanops	Slender Blue-tongue				•			
	Morethia ruficauda	Lined Firetail Skink					•		
	Notoscincus butleri	Lined soil-crevice Skink (Dampier)	P4 (DBCA list)				•		
	Tiliqua multifasciata	Central Blue-tongue				•			
	Tiliqua occipitalis	Western Blue-tongue				•			
Typhlopidae	*Anilios ammodytes*	Sand-diving Blind Snake				•			
Varanidae	*Varanus acanthurus*	Spiny-tailed Monitor				•			
	Varanus giganteus	Perentie				•			
	Varanus panoptes	Yellow-spotted Monitor				•