




LEVEL 1 FLORA & FAUNA SURVEY REPORT FOR BROOME HWY SITE

Gundara Enterprises Pty Ltd



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Executive Summary

Gundara Enterprises Pty Ltd (Gundara) propose to develop a site 8.7 km north-east of Broome township (north-western Western Australia) for the excavation and sale of construction material. The area comprises pindan woodland, an extensive habitat within the bioregion

Desktop analysis identified that one threatened species – Greater Bilby (*Macrotis lagotis*) – and one priority flora species – *Glycine pindanica* – had the potential to occur within the project area. A targeted survey was carried out to determine if either of these species occurred within the project area. The flora and fauna species recorded during fieldwork were consistent with those commonly recorded in pindan country. No threatened or priority species were recorded on the site.

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1 Introduction

1.1 Context

Gundara Enterprises Pty Ltd (Gundara) propose to develop a site 8.7 km north-east of Broome township (north-western Western Australia) for the excavation and sale of construction material. The site covers 18.3 ha and is located approximately (Figure 1) adjacent to an existing borrow pit.

1.2 Purpose

The project will involve vegetation clearing, requiring a clearing permit application with the WA Department of Mines and Petroleum.

For the application to be approved, Gundara is required to undertake a Level 1 ecological assemblage study to determine the likelihood that threatened or priority species exist within the area proposed to be cleared, and to submit a report of the findings.

EcOz Environmental Services was contracted by Gundara to undertake the survey and to compile this report of results

1.3 Scope

The requirements of a level 1 flora and fauna survey are specified in *Guidance Statement 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004a) and *Guidance Statement 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA 2004b), and consists of:

1. A desktop study to gather background information on the target area. This involves a search of all sources of literature, data and map-based information.
2. A reconnaissance survey to:
 - a) Verify the accuracy of the background study.
 - b) Further delineate and characterise the flora, the range of vegetation units, the fauna and the faunal assemblages present in the target area.
 - c) Identify potential impacts.

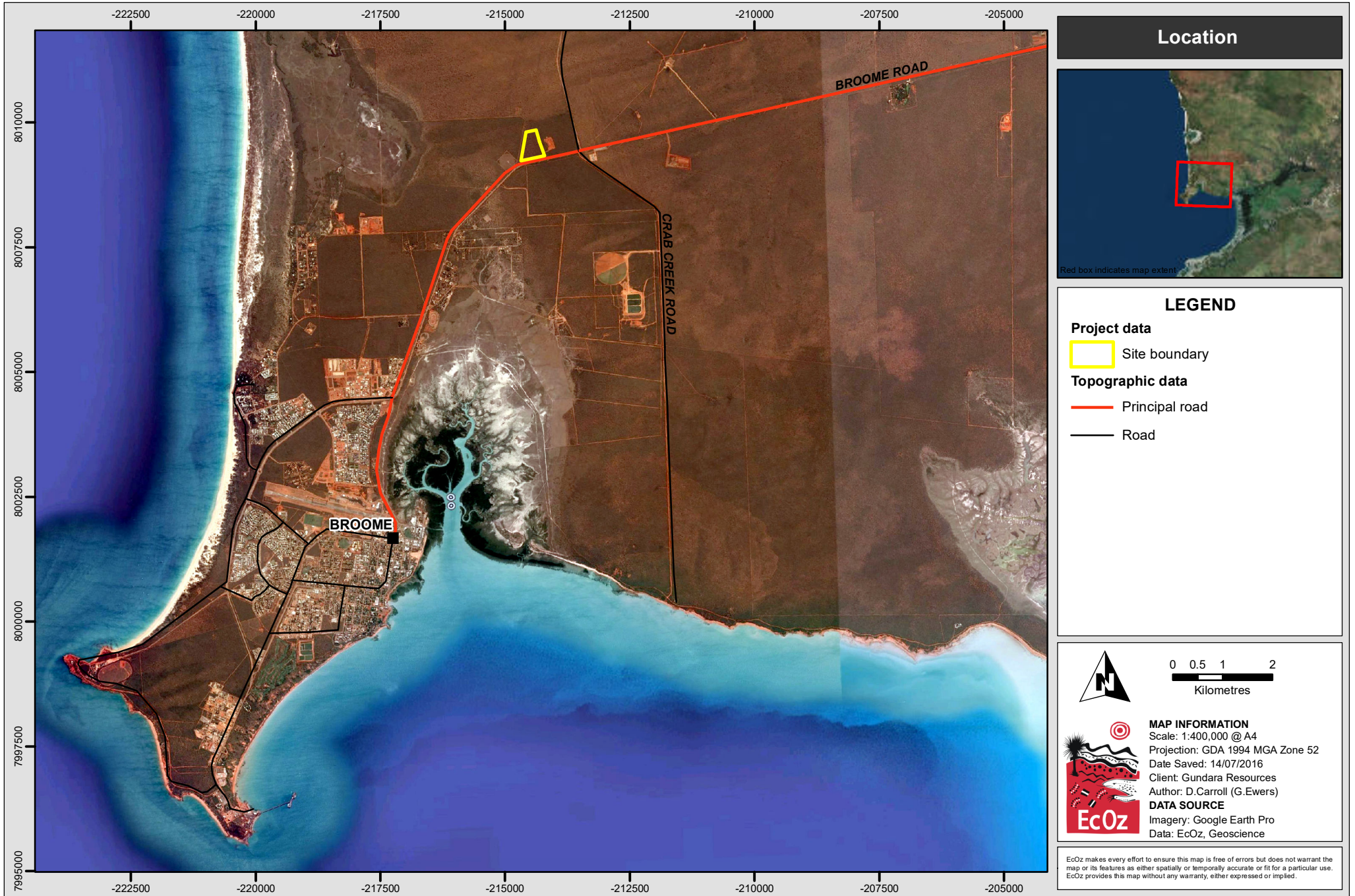
This involves field work in the target area by suitably qualified personnel to undertake selective, low intensity sampling of the flora and fauna, and to produce maps and descriptions of vegetation and habitat.

1.4 Ecological context

The site occurs within a flat, red sand plain known as 'pindan' which is common in the region. There are no creeks or waterbodies within, or close to, the proposed site. Inspection of aerial imagery and local knowledge of the area suggests that vegetation at the site is likely to be an open woodland type:

- Upper layer of *Eucalyptus tectifica*, *Corymbia flavescens* and *Corymbia dampieri*
- Mid layer of *Acacia tumida* and *Acacia eriopoda*
- Sparse ground layer of *Chrysopogon fallax* and *Triodia bitextura*.

This vegetation type is widespread across the Dampier Peninsula.



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Figure 1. Map of the location of the Broome Pindan Project

2 Methodology

2.1 Desktop survey

Desktop surveys were undertaken using the following databases:

- EPBC Act Protected Matters Search Tool (<http://www.environment.gov.au/epbc/pmst/index.html>)
- DEC FloraBase (<http://florabase.dec.wa.gov.au/>)
- DEC NatureMap (<http://naturemap.dec.wa.gov.au/default.aspx>)
- Atlas of Living Australia (<http://www.ala.org>)

Flora and fauna data requests were submitted by Gundara to the WA Department of Parks and Wildlife in January 2015. In response, fauna data was provided for a 5 km radial area, and flora data was provided for a 50 km radial area of the project area (based on central co-ordinates 17°53'11" S, 122°16'04" E). In addition, the EPBC Protected Matters Search Tool (5 km radial area from central co-ordinates) was accessed by EcOz on 19 July 2016 to determine if any federally-listed threatened species should be included in the likelihood of occurrence assessment.

The likelihood of occurrence for each species was determined using the criteria listed below. Habitat requirements for each species were compared against habitat knowledge of the project area.

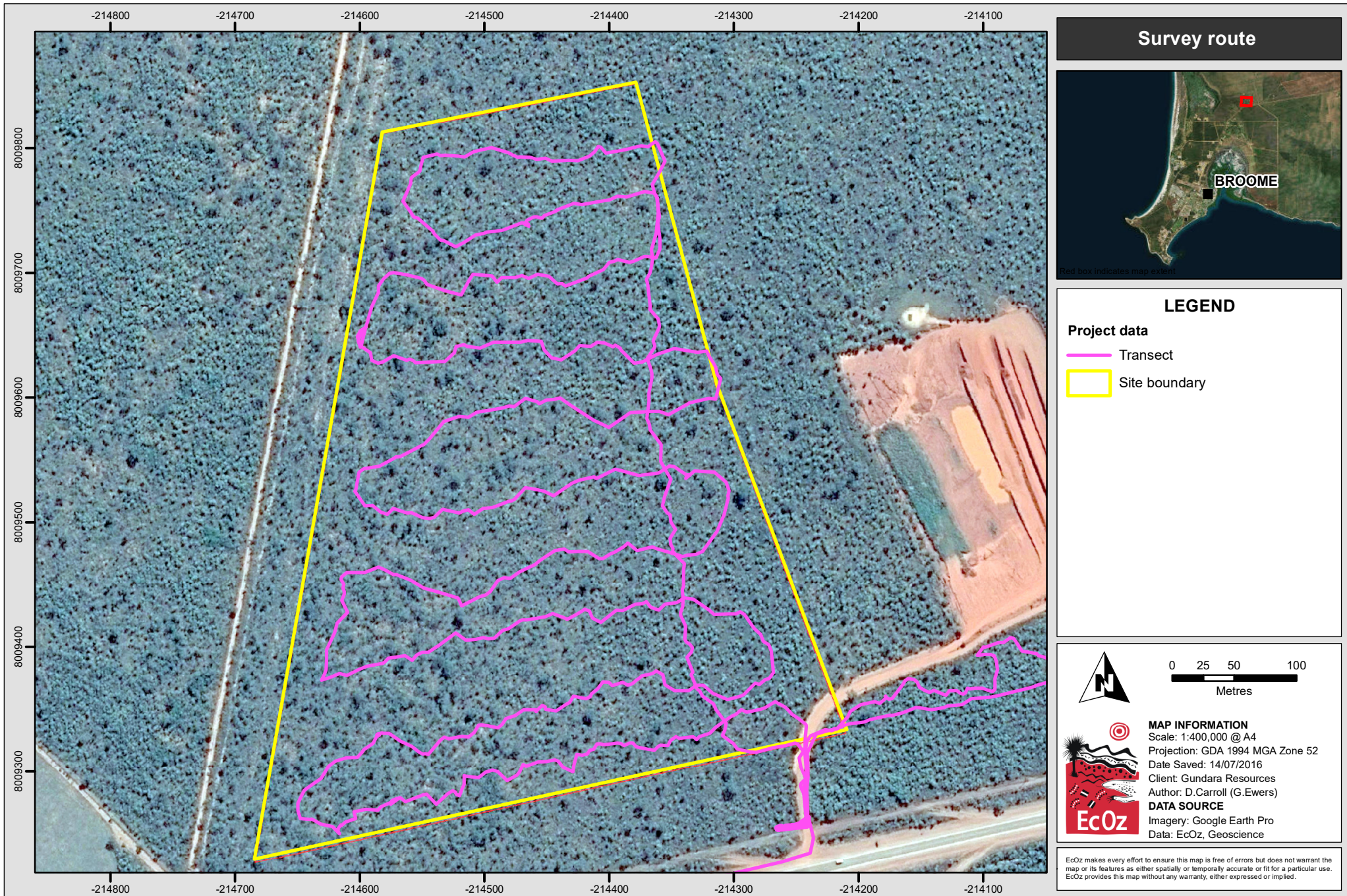
- Likely – core habitat for the species occurs within the project area.
- May – habitat information is deficient for the species, or the project area does not display core habitat for the species but may be utilised by the species on occasion.
- Unlikely – there is no suitable habitat for the species within project area.

2.2 Field surveys

A field survey was conducted in June 2016 to further refine the likelihood of occurrence of species identified during the desktop study. The field survey was undertaken in accordance with the requirements for a level 1 flora survey (EPA 2004a and 2004b).

An ecologist surveyed the proposed project area searching for evidence (burrows, diggings or prints) of Greater Bilby. All incidental fauna species present were also recorded. Approximately 4 km was traversed during the survey (see Figure 2).

A vegetation survey was carried out at the same time as the fauna survey, with major vegetation communities identified. A targeted survey was carried out to identify the potential occurrence of priority flora species – *Glycine pindanica* – a prostrate or scrambling perennial.



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Figure 2. Map of survey route and waypoints within site boundary

3 Results

3.1 Desktop survey

The analysis of datasets resulted in 12 threatened species (10 fauna, 2 flora) and an additional 27 priority species (1 fauna, 26 flora) (refer to Table 1), which were assessed for likelihood of occurrence. A summary of results is provided in Table 1, with the full assessment provided in Appendix A (flora) and Appendix B (fauna).

- One threatened fauna species had an occurrence probability ranking of 'likely' – Greater Bilby (*Macrotis lagotis*) which is listed as Vulnerable under the EPBC Act (Federal) and the *Wildlife Conservation Act* (WA). This species has been recorded nearby in similar habitat, and could potentially be impacted if active burrows are disturbed by land clearing.
- One priority fauna species had an occurrence probability ranking of 'likely' – Australian Bustard (*Ardeotis australis*) which is listed as priority 3 species under the *Wildlife Conservation Act* (WA) and is not federally listed. However, this is a highly mobile species and is unlikely to use or depend on the project area for breeding purposes.
- The remaining fauna species have an occurrence probability ranking of 'may' or 'unlikely'.
- One priority flora species had an occurrence probability ranking of 'likely' – *Glycine pindanica* – as the site falls within its distribution and has a suitable soil type (red earth soils).
- Twelve flora species had an occurrence probability ranking of 'may' because preferred habitat for these plants is not well known (therefore cannot be discounted as unlikely). These are all priority species; none are threatened species.
- The remaining flora species had an occurrence probability ranking of 'unlikely'.

Table 1. Significant species likelihood of occurrence assessment results for Broome Pindan Project

Species name	EPBC Act status	WC Act status	
		Threatened	Priority
FAUNA			
Likely			
Australian Bustard (<i>Ardeotis australis</i>)	-	-	4
Greater Bilby (<i>Macrotis lagotis</i>)	VU	VU	-
May			
Princess Parrot (<i>Polytelis alexandrae</i>)	VU	-	4
Unlikely			
All listed shorebirds	CR/EN	VU/NL	-
False Water Mouse (<i>Xeromys myoides</i>)	VU	-	-
Red Goshawk (<i>Erythrotriorchis radiatus</i>)	VU	VU	-
Gouldian Finch (<i>Erythrura gouldiae</i>)	EN	-	4
Australian Painted Snipe (<i>Rostratula australis</i>)	EN	EN	-
Masked Owl (<i>Tyto novaehollandiae kimberli</i>)	VU	-	1
Bare-rumped Sheath-tail Bat (<i>Saccolaimus s. nudicluniatu</i>)	CR	-	-
Airlie Island Ctenotus (<i>Ctenotus angusticeps</i>)	VU	VU	-
FLORA			
Likely			
<i>Glycine pindanica</i>	-	-	3
May			
<i>Acacia monticola x tumida var. kulparrn</i>	-	-	3
<i>Aphyllodium glossocarpum</i>	-	-	3
<i>Bonamia oblongifolia</i>	-	-	1
<i>Eriachne sp. Dampier Peninsula</i> (K.F. Kenneally 5946)	-	-	3
<i>Jacquemontia sp. Broome</i> (A.A. Mitchell 3028)	-	-	1
<i>Polymeria distigma</i>	-	-	3
<i>Polymeria sp. Broome</i> (K.F. Kenneally 9759)	-	-	1
<i>Pterocaulon intermedium</i>	-	-	3
<i>Tephrosia andrewii</i>	-	-	1
<i>Triodia acutispicula</i>	-	-	3
<i>Triodia caelestialis</i>	-	-	3
Unlikely			
<i>Aphyllodium parvifolium</i>	-	-	1
<i>Corymbia paractia</i>	-	-	1
<i>Croton aridus</i>	-	-	3
<i>Decaisnina signata subsp. cardiophylla</i>	-	-	1
<i>Fuirena incrassata</i>	-	-	3
<i>Gomphrena pusilla</i>	-	-	2
<i>Goodenia bynesii</i>	-	-	3
<i>Hibiscus kenneallyi</i>	-	-	3
<i>Fringed Keraudrenia</i> (<i>Keraudrenia exastia</i>)	CR	VU	-
<i>Keraudrenia katatona</i>	-	-	3
<i>Lophostemon grandiflorus subsp. grandiflorus</i>	-	-	3
<i>Nicotiana heterantha</i>	-	-	1
<i>Pandanus spiralis var. flammeus</i>	-	EN	-
<i>Pittosporum moluccanum</i>	-	-	4
<i>Schoenus punctatus</i>	-	-	3
<i>Tetragonia coronata</i>	-	-	3
<i>Thespidium basiflorum</i>	-	-	-

CR = critically endangered; **EN** = endangered; **VU** = vulnerable; **SP**: specially protected

Status key **Priority 1 to 3** = poorly known species; **Priority 4** = rare, near threatened and other species in need of monitoring; **Priority 5** = conservation-dependent species.

3.2 Field survey

3.2.1 Fauna

A field survey was conducted in June 2016. Nineteen fauna species were identified and recorded (Table 2). The ecologist noted that:

- **Birds** were common, with 18 species recorded.
- **Mammals** – Macropod signs were recorded, including scats and diggings. These signs were attributed to the Agile Wallabies (*Macropus agilis*) which are common throughout mixed pindan woodland.
- **Reptiles** – no reptiles were found during the survey.
- There were no signs of **introduced species** during the survey.

Table 2. Species identified during field survey

Species	Number
Agile Wallaby	Scats and diggings
Peaceful Dove	1
Australian Owlet-nightjar	1
Blue-winged Kookaburra	1
Red-winged Parrot	2
Red-collared Lorikeet	4
Variiegated Fairy-wren	2
Red-backed Fairy-wren	4
Brown Honeyeater	7
White-throated Honeyeater	5
Black-chinned Honeyeater	1
Little Friarbird	2
Striated Pardalote	3
Weebill	1
White-throated Gerygone	2
Grey-crowned Babbler	8
Pied Butcherbird	2
Grey Shrike-thrush	1
Rufous Whistler	1

3.2.2 Flora

Three vegetation associations were identified within the survey area at the following waypoints (refer to Figure 2 for waypoint locations):

- **Waypoint 26:** Open canopy cover of *Bauhinia cunninghamii*, *Brachychiton diversifolius*, *Corymbia flavescens*, *Corymbia greeniana* over an open mid-layer of *Acacia eriapoda*, *Acacia tumida*, *Flueggea virosa*, *Grevillea pyramidalis*, *Grewia breviflora*, *Grewia retusifolia* *Hakea arborescens*. The ground-layer consisted of *Chrysopogon pallidus*, *Triodia sp.*
- **Waypoint 27:** Open canopy cover of *Brachychiton diversifolius*, *Corymbia flavescens*, *Corymbia greeniana* over an open mid-layer of *Acacia eriapoda*, *Acacia tumida*, *Hakea arborescens*, *Grevillea pyramidalis*. The ground-layer consisted of *Arastida holathera*, *Chrysopogon pallidus*, *Triodia sp.*
- **Waypoint 28:** Open canopy cover of *Brachychiton diversifolius*, *Corymbia flavescens*, *Corymbia zygophylla* over an open mid-layer of *Acacia eriapoda*, *Grevillea pyramidalis*, *Persoonia falcate*. The ground-layer consisted of open *Arastida holathera*, *Chrysopogon pallidus*, *Triodia sp.*

Photographs of each location are shown in Figure 3 to Figure 5.

3.2.3 Threatened and priority species

No evidence of threatened or priority fauna species were observed during the field survey. No burrows, diggings or other signs of the Greater Bilby were found during the survey.

No evidence of threatened or priority flora species were observed during the field survey. No specimens of *Glycine pindanica* were recorded.

3.3 Conclusion

The surveyed area comprises pindan woodland, an extensive habitat within the bioregion. The flora and fauna species recorded during field work are consistent with those commonly recorded in pindan country. No threatened or priority species were recorded on the site.



Figure 3. Photographs of typical vegetation at Waypoint 26



Figure 4. Photographs of typical vegetation at Waypoint 27



Figure 5. Photographs of typical vegetation at Waypoint 28

4 Assessment of vegetation clearing principles

Clearing applications are assessed against ten principles for clearing native vegetation outlined in Schedule 5 of the *Environmental Protection Act*. An assessment has been performed based on the desktop study and field survey – see Table 3. There are no 'Uncompliant' principles associated with the project.

Table 3. Assessment of proposal against the EP Act vegetation clearing principles

Vegetation Clearing Principle	Assessment
(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	<u>Compliant</u> The vegetation community is common and widespread across the Dampier Peninsula. It is considered to have a high level of biological diversity.
(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	<u>Compliant</u> No evidence of the Greater Bilby or any other priority species were found within the project boundary.
(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	<u>Compliant</u> There is no evidence that rare flora exists at this site.
(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.	<u>Compliant</u> This area is not part of a threatened ecological community
(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	<u>Compliant</u> The Pindan vegetation type in this area has not been extensively cleared
(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	<u>Compliant</u> This area is not associated with a watercourse or wetland
(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	<u>Compliant</u> The clearing of this area will not cause appreciable land degradation as long as mitigation measures are put in place (i.e. Erosion Sediment Control Plans).
(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	<u>Compliant</u> There are no conservation areas adjacent or nearby the site proposed to be cleared. The site is located in an expansive vegetation type and will therefore not result in habitat fragmentation. It is also adjacent to a current main road (Broome Road).
(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	<u>Compliant</u> Clearing of this small area will not likely have an impact on groundwater. There are no surface water features onsite, and erosion abatement structures will be installed within cleared areas to prevent impact to down slope areas.
(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	<u>Compliant</u> The clearing of this area will not cause or exacerbate flooding.

5 References

Environmental Protection Authority, 2004a, *Guidance Statement 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia*.

Environmental Protection Authority, 2004b, *Guidance Statement 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia*.

Appendix A Likelihood of occurrence assessment for significant flora species

WA listing (WC Act)	<ul style="list-style-type: none"> • CR = critically endangered; EN = endangered; VU = vulnerable; T = threatened • Priority 1 to 3 = poorly known species; Priority 4 = Rare, Near Threatened and other species in need of monitoring; Priority 5 = Conservation dependent species.
Federal listing (EPBC Act)	<ul style="list-style-type: none"> • EX = extinct; CR = critically endangered; EN = endangered; VU = vulnerable; NL = not listed
Data source	<ul style="list-style-type: none"> • EPBC = EPBC Protected Matters Search Tool; TPFL = WA Parks & Wildlife <i>Threatened (declared rare) and Priority Flora</i> database; WAHERB = <i>Western Australian Herbarium</i> database; TP_LIST = WA Parks & Wildlife <i>Threatened and Priority Flora List</i>.
Likelihood of occurrence criteria	<ul style="list-style-type: none"> • Likely = Suitable habitat within project area • May = Habitat information is deficient for the species, or the project area does not display core habitat for the species but may be utilised by the species periodically. • Unlikely = No suitable habitat within project area.
Limitations:	<ul style="list-style-type: none"> • This likelihood of occurrence assessment is primarily based on desktop interpretations by zoologists/botanists. No site visit was performed to refine habitat/species occurrence. Results from this assessment provides valuable information in terms of what species should be targeted or considered during future survey work or mining operations.

Name	Details	Likelihood of occurrence ranking
<i>Acacia monticola x tumida</i> var. <i>kulparn</i>	WA Conservation Code: Priority 3 EPBC status: NL Data source: TP_List & WAHERB Core habitat: Unknown / no description available Distribution: Broome, Derby-West Kimberley Number of records (50 km search area): 1,9	<u>MAY</u> Habitat not known
<i>Aphyllodium glossocarpum</i>	WA Conservation Code: Priority 3 EPBC status: NL Data source: WAHERB Core habitat: Unknown / no description available Distribution: Broome, Wyndham-East Kimberley Number of records (50 km search area): 1	<u>MAY</u> Habitat not known
<i>Aphyllodium parvifolium</i>	WA Conservation Code: Priority 1 EPBC status: NL Data source: TP_List & WAHERB Core habitat: Sandhills Distribution: Broome Number of records (50 km search area): 1,1	<u>UNLIKELY</u> Suitable habitat not present
<i>Bonamia oblongifolia</i>	WA Conservation Code: Priority 1 EPBC status: NL Data source: WAHERB Core habitat: Unknown / no description available Distribution: Broome Number of records (50 km search area): 2	<u>MAY</u> Habitat not known

Name	Details	Likelihood of occurrence ranking
<i>Corymbia paractia</i>	WA Conservation Code: Priority 1 EPBC status: NL Data source: TP_List & WAHERB Core habitat: In transition zone between coastal beach dunes & red pindan soils Distribution: Broome Number of records (50 km search area): 1,16	<u>UNLIKELY</u> Suitable habitat not present
<i>Croton aridus</i>	WA Conservation Code: Priority 3 EPBC status: NL Data source: TP_List Core habitat: Sandplains ridges and spinifex sandplains on deep red sand pindal soil. Distribution: Broome, East Pilbara Number of records (50 km search area): 1	<u>UNLIKELY</u> Suitable habitat not present
<i>Decaisnina signata subsp. cardiophylla</i>	WA Conservation Code: Priority 1 EPBC status: NL Data source: TP_List Core habitat: Hemi-parasite of <i>Banksia dentata</i> Distribution: Wyndham-East Kimberley Number of records (50 km search area): 1	<u>UNLIKELY</u> Host plant has never been recorded in the region
<i>Eriachne</i> sp. Dampier Peninsula (K.F. Kenneally 5946)	WA Conservation Code: Priority 3 EPBC status: NL Data source: WAHERB Core habitat: Unknown / no description available Distribution: Broome, Derby-West Kimberley Number of records (50 km search area): 15	<u>MAY</u> Habitat not known
<i>Fuirena incrassata</i>	WA Conservation Code: Priority 3 EPBC status: NL Data source: TPFL & WAHERB Core habitat: Swamps, creek beds, claypans, semi-saline lakes Distribution: Broome, East Pilbara, Wyndham-East Kimberley Number of records (50 km search area): 1,1	<u>UNLIKELY</u> Suitable habitat not present
<i>Glycine pindanica</i>	WA Conservation Code: Priority 3 EPBC status: NL Data source: TPFL, TP_List & WAHERB Core habitat: Pindan soils (red earth) Distribution: Broome Number of records (50 km search area): 5,1,14	<u>LIKELY</u> Habitat is present, within distribution and suitable soils are present
<i>Gomphrena pusilla</i>	WA Conservation Code: Priority 2 EPBC status: NL Data source: TPFL & WAHERB Core habitat: Behind foredunes on fine beach sand on with limestone Distribution: Broome, Port Hedland Number of records (50 km search area): 1,10	<u>UNLIKELY</u> Suitable habitat not present

Name	Details	Likelihood of occurrence ranking
<i>Goodenia byrnesii</i>	<p>WA Conservation Code: Priority 3 EPBC status: NL Data source: TPFL, TP_List & WAHERB Core habitat: Sandy edges of creeks Distribution: Broome, Derby-West Kimberley, Wyndham-East Kimberley Number of records (50 km search area): 1,1,1</p>	<p><u>UNLIKELY</u> Suitable habitat not present</p>
<i>Hibiscus kenneallyi</i>	<p>WA Conservation Code: Priority 3 EPBC status: NL Data source: TPFL Core habitat: Rock crevices and cliff tops on coastal soils Distribution: Derby-West Kimberley, Wyndham-East Kimberley Number of records (50 km search area): 1</p>	<p><u>UNLIKELY</u> Suitable habitat not present</p>
<i>Jacquemontia</i> sp. Broome (A.A. Mitchell 3028)	<p>WA Conservation Code: Priority 1 EPBC status: NL Data source: WAHERB Core habitat: Unknown / no description available Distribution: Broome Number of records (50 km search area): 3</p>	<p><u>MAY</u> Habitat not known</p>
Fringed Keraudrenia (<i>Keraudrenia exastia</i>)	<p>WA Conservation Code: VU EPBC status: CR Data source: EPBC, TPFL, TP_List & WAHERB Core habitat: Coastal sites, relict desert dune swale Distribution: Broome Number of records (50 km search area): 1,1,15</p>	<p><u>UNLIKELY</u> Suitable habitat not present</p>
<i>Keraudrenia katatona</i>	<p>WA Conservation Code: Priority 3 EPBC status: NL Data source: TPFL, TP_List & WAHERB Core habitat: Desert dunes in pindan Distribution: Broome, Derby-West Kimberley Number of records (50 km search area): 1,1,2</p>	<p><u>UNLIKELY</u> Suitable habitat not present</p>
<i>Lophostemon grandiflorus</i> subsp. <i>grandiflorus</i>	<p>WA Conservation Code: Priority 3 EPBC status: NL Data source: WAHERB Core habitat: Damp habitats Distribution: Broome, Wyndham-East Kimberley Number of records (50 km search area): 2</p>	<p><u>UNLIKELY</u> Suitable habitat not present</p>
<i>Nicotiana heterantha</i>	<p>WA Conservation Code: Priority 1 EPBC status: NL Data source: TPFL, TP_List & WAHERB Core habitat: Seasonally wet flats on black clay Distribution: Ashburton, Broome, East Pilbara, Roebourne Number of records (50 km search area): 4,1,7</p>	<p><u>UNLIKELY</u> Suitable habitat not present</p>
<i>Pandanus spiralis</i> var. <i>flammeus</i>	<p>WA Conservation Code: EN EPBC status: NL Data source: TP_List Core habitat: Around springs on white clay Distribution: Unknown / no description available. Number of records (50 km search area): 1</p>	<p><u>UNLIKELY</u> Suitable habitat not present</p>

Name	Details	Likelihood of occurrence ranking
<i>Pittosporum moluccanum</i>	WA Conservation Code: Priority 4 EPBC status: NL Data source: TPFL, TP_List & WAHERB Core habitat: White sand dunes Distribution: Broome, Wyndham-East Kimberley Number of records (50 km search area): 1,1,10	<u>UNLIKELY</u> Suitable habitat not present
<i>Polymeria distigma</i>	WA Conservation Code: Priority 3 EPBC status: NL Data source: WAHERB Core habitat: Sandy soils Distribution: Ashburton, Broome, Derby-West Kimberley, Halls Creek, Port Hedland Number of records (50 km search area): 1	<u>MAY</u> Habitat is present, low number of records for area reduces probability of occurring at the site
<i>Polymeria</i> sp. Broome (K.F. Kenneally 9759)	WA Conservation Code: Priority 1 EPBC status: NL Data source: WAHERB Core habitat: Unknown / no description available Distribution: Broome, Wyndham-East Kimberley Number of records (50 km search area): 1	<u>MAY</u> Habitat not known
<i>Pterocaulon intermedium</i>	WA Conservation Code: Priority 3 EPBC status: NL Data source: TPFL, TP_List & WAHERB Core habitat: Unknown / no description available Distribution: Broome, Derby-West Kimberley, Port Hedland, Wyndham-East Kimberley Number of records (50 km search area): 1,1,2	<u>MAY</u> Habitat not known
<i>Schoenus punctatus</i>	WA Conservation Code: Priority 3 EPBC status: NL Data source: TP_List Core habitat: Watercourses Distribution: Broome, Derby-West Kimberley, Roebourne, Wyndham-East Kimberley Number of records (50 km search area): 1	<u>UNLIKELY</u> Suitable habitat not present
<i>Tephrosia andrewii</i>	WA Conservation Code: Priority 1 EPBC status: NL Data source: TP_List Core habitat: Unknown / no description available Distribution: Broome Number of records (50 km search area): 1	<u>MAY</u> Habitat not known
<i>Tetragonia coronata</i>	WA Conservation Code: Priority 3 EPBC status: NL Data source: TP_List & WAHERB Core habitat: Red clay loam on calcrete outcrops Distribution: Broome, Carnarvon, Murchison, Shark Bay Number of records (50 km search area): 1,1	<u>UNLIKELY</u> Suitable habitat not present

Name	Details	Likelihood of occurrence ranking
<i>Thespidium basiflorum</i>	WA Conservation Code: Priority 1 EPBC status: NL Data source: WAHERB Core habitat: Sandy soils along creeks Distribution: Broome Number of records (50 km search area): 2	<u>UNLIKELY</u> Suitable habitat not present
<i>Triodia acutispicula</i>	WA Conservation Code: Priority 3 EPBC status: NL Data source: WAHERB Core habitat: Sandy soils on pindan Distribution: Broome, Derby-West Kimberley, Wyndham-East Kimberley Number of records (50 km search area): 1	<u>MAY</u> Habitat is present, low number of records for area reduces probability of occurring at the site
<i>Triodia caelestialis</i>	WA Conservation Code: Priority 3 EPBC status: NL Data source: WAHERB Core habitat: Unknown / no description available Distribution: Broome, Derby-West Kimberley Number of records (50 km search area): 2	<u>MAY</u> Habitat not known

Appendix B Likelihood of occurrence assessment for significant fauna species

WA listing (WC Act)	<ul style="list-style-type: none"> • CR = critically endangered; EN = endangered; VU = vulnerable; T = threatened • Priority 1 to 3 = poorly known species; Priority 4 = Rare, Near Threatened and other species in need of monitoring; Priority 5 = Conservation dependent species.
Federal listing (EPBC Act)	<ul style="list-style-type: none"> • EX = extinct; CR = critically endangered; EN = endangered; VU = vulnerable; NL = not listed
Data source	<ul style="list-style-type: none"> • EPBC = EPBC Protected Matters Search Tool; TPFL = WA Parks & Wildlife <i>Threatened (declared rare) and Priority Flora</i> database; WAHERB = <i>Western Australian Herbarium</i> database; TP_LIST = WA Parks & Wildlife <i>Threatened and Priority Flora List</i>.
Likelihood of occurrence criteria	<ul style="list-style-type: none"> • Likely = Suitable habitat within project area • May = Habitat information is deficient for the species, or the project area does not display core habitat for the species but may be utilised by the species periodically. • Unlikely = No suitable habitat within project area.
Limitations:	<ul style="list-style-type: none"> • This likelihood of occurrence assessment is primarily based on desktop interpretations by zoologists/botanists. No site visit was performed to refine habitat/species occurrence. Results from this assessment provides valuable information in terms of what species should be targeted or considered during future survey work or mining operations.

The following shorebirds are listed in one of more of the database searches are possibly occurring on the site.

- Curlew Sandpiper (*Calidris ferruginea*)
- Great Knot (*Calidris tenuirostris*)
- Red Knot (*Calidris canutus*)
- Bar-tailed Godwit (*Limosa lapponica*)
- Greater Sand Plover (*Charadrius leschenaultii*)
- Lesser Sand Plover (*Charadrius mongolus*)
- Eastern Curlew (*Numenius madagascariensis*)

False Water Mouse (*Xeromys myoides*) is also listed as such.

Because the project area is Pindan woodland approximately 8 km from the nearest suitable habitat for these species, their likelihood of occurrence is 'none' and they are not considered further.

Name	Details	Likelihood of occurrence ranking
Australian Bustard (<i>Ardeotis australis</i>)	<p>WA Conservation Code: Priority 4</p> <p>EPBC status: NL</p> <p>Data source: TPFL</p> <p>Core habitat: This species occurs in relatively open country with a preference for grasslands (Ziembicki 2007).</p> <p>Distribution: The Australian Bustard is widespread across northern Australia and is often encountered in the Pilbara region (Western Wildlife 2014).</p> <p>Number of records within 5 km of site: 1</p>	<p><u>LIKELY</u></p> <p>The project area contains suitable habitat for the species.</p>
Red Goshawk (<i>Erythrotriorchis radiatus</i>)	<p>WA Conservation Code: VU</p> <p>EPBC status: VU</p> <p>Data source: EPBC</p> <p>Core habitat: Prefers tall open eucalypt forest and riparian areas. Nests in large trees, frequently the tallest and most massive in a tall stand, and nest trees are invariably within one km of permanent water</p>	<p><u>UNLIKELY</u></p> <p>Suitable habitat for the species does not occur in the project area.</p>

Name	Details	Likelihood of occurrence ranking
	(Debus et al.1988; Aumann et al. 1991). Distribution: Occurs across much of the northern Australia, from the Kimberley to south-eastern Queensland. Number of records within 5 km of site: 0	
Gouldian Finch (<i>Erythrura gouldiae</i>)	WA Conservation Code: Priority 4 EPBC status: EN Data source: EPBC Core habitat: Prefers annual and perennial grasses (especially Sorghum), a nearby source of surface water and, in the breeding season, unburnt hollow-bearing Eucalyptus trees (especially <i>E. tintinnans</i> , <i>E. brevifolia</i> and <i>E. leucophloia</i>) (Tidemann 1996; Higgins et al. 2006). Distribution: Sparsely distributed across northern Australia from the Kimberley to north-central Queensland (Dostine 1998; Franklin 1999; Barrett et al. 2003). Number of records within 5 km of site: 0	UNLIKELY Suitable habitat for the species does not occur in the project area.
Princess Parrot (<i>Polytelis alexandrae</i>)	WA Conservation Code: Priority 4 EPBC status: VU Data source: EPBC Core habitat: Occurs in swales between sand dunes with a shrub layer of vegetation and scattered trees (Pavey 2006a). Distribution: Confined to arid regions of Western Australia, the Northern Territory, and South Australia (Barrett et al. 2003; Blakers et al. 1984; Higgins 1999). Number of records within 5 km of site: 0	MAY Habitat is present, nomadic nature of this species and no proximate records reduces probability of occurring at the site
Australian Painted Snipe (<i>Rostratula australis</i>)	WA Conservation Code: EN EPBC status: EN Data source: EPBC Core habitat: Inhabits fringes of permanent and temporary wetlands, swamps and inundated grasslands (Taylor et al. 2007). Distribution: This species is nomadic and scattered across Australia with no predictable occurrence (Rogers 2001). Number of records within 5 km of site: 0	UNLIKELY Suitable habitat for the species does not occur in the project area.
Masked Owl (<i>Tyto novaehollandiae kimberli</i>)	WA Conservation Code: Priority 1 EPBC status: VU Data source: EPBC Core habitat: Occurs mainly in eucalypt tall open forests (especially those dominated by <i>Eucalyptus miniata</i> and <i>E. tetradonta</i>), but also roosts in monsoon rainforests, and forages in more open vegetation types, including grasslands (Woinarski & Ward 2012). Distribution: The distribution is poorly known and suggest that three subpopulations exist; Kimberly, Northern Territory and Cape York (Woinarski & Ward 2012; Garnett et al. 2011). Number of records within 5 km of site: 0	UNLIKELY Suitable habitat for the species does not occur in the project area.
Greater Bilby (<i>Macrotis lagotis</i>)	WA Conservation Code: VU EPBC status: VU Data source: EPBC & TPFL Core habitat: Found in hummock grasslands on sandy soils with a preference for drainage lines (Southgate 1990). Distribution: Historically this species was widespread in arid Australia. In Western Australia populations occur in the Gibson Desert, south-western Kimberley, inland areas of the Pilbara and northern Great Sandy Desert (Pavey 2006). Number of records within 5 km of site: 4	LIKELY The project area contains suitable habitat for the species. There are recent proximate records.
Bare-rumped	WA Conservation Code: NL	UNLIKELY

Name	Details	Likelihood of occurrence ranking
Sheathtail Bat (<i>Saccolaimus saccolaimus nudicluniatus</i>)	<p>EPBC status: CR</p> <p>Data source: EPBC</p> <p>Core habitat: This species occurs in a range of woodlands with large hollow bearing trees.</p> <p>Distribution: Widely distributes from India through south-eastern Asia to the Solomon Islands, and including north-eastern Queensland and the Northern Territory. The north-eastern Australian population is described as the subspecies <i>S. s. nudicluniatus</i> (Milne & Woinarski 2006).</p> <p>Number of records within 5 km of site: 0</p>	Suitable habitat for the species does not occur in the project area.
Airlie Island Ctenotus (<i>Ctenotus angusticeps</i>)	<p>WA Conservation Code: VU</p> <p>EPBC status: VU</p> <p>Data source: EPBC</p> <p>Core habitat: Occurs within the landward fringe of saltmarsh communities and intertidal zones of mangroves (Biologic 2012).</p> <p>Distribution: Known from twelve locations in north-west WA – Airlie Island, Thangoo Station, Pretty Pool and Wedgefield, Redbank, Finucane Island, Bebingarra Creek, Roebuck, Cape Keraudren, Port Smith, Willie Creek, Bodarrie Station and Karratha (Biologic 2012).</p> <p>Number of records within 5 km of site: 0</p>	<p><u>UNLIKELY</u></p> <p>Suitable habitat for the species does not occur in the project area.</p>

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