Onslow Generation Expansion & Decarbonisation - Native Vegetation Clearing Permit

Supporting Document

December 2024

HORIZON POWER

Contents

1 Introduction

1.1 Project Context

Regional Power Corporation, trading as (T/A) Horizon Power, is a Western Australian (WA) Government Trading Enterprise (GTE) and the state's regional and remote energy provider. Horizon Power operates under the *Electricity Corporations Act 2005* and is governed by a Board of Directors accountable to the Minister for Energy.

Horizon Power is proposing to install additional electricity infrastructure in Onslow with the aim to further decarbonise the system and cater to an increasing future load. A new renewable energy facility is proposed to be installed on Part of Reserve 19291, Lot 330 On Deposited Plan 402361 (the Project). Two options are being considered for the connection infrastructure, connection to existing underground cables that run from Onslow Power Station to Onslow Substation, or additional underground connection cables installed adjacent to the current connection cables.

The Project will include the installation of the following:

- approximately 16MW of new solar PV panels
- approximately 63.3MW of new battery storage
- PV and battery inverters
- a minimum of 7 transformers
- a new 33kV switchboard
- access tracks and fire breaks
- low voltage underground cabling between assets
- 4 x 33kV cables to connect to the network.

The final design and footprint required for the Project will be determined once geotechnical surveys are undertaken. Geotechnical surveys will be conducted for the solar facility and require temporary clearing up to 1.11 ha of native vegetation. This will allow for geotechnical testing, including incidental clearing (driving over and parking on native vegetation) for vehicle / machinery access to test sites. An additional 0.55 ha of temporary clearing will be required for the laydown area for construction. Geotechnical surveys are not required for the connection corridor as it runs along existing infrastructure.

The construction of the Project will require the permanent clearing of up to 49.5 ha in total. This will allow for the generation of approximately 16 megawatts (MW) of solar infrastructure, a connection corridor and access tracks and fire breaks. Specific detail of the proposed clearing is provided in **Section 3** of this document.

A Native Vegetation Clearing Permit (NVCP) will be required from the Department of Water and Environmental Regulation (DWER).

1.2 Scope and Purpose

This document has been prepared to support a Native Vegetation Clearing Permit (NVCP) application form for the Project. Specifically, this document provides further detail regarding the proposed activities (**Section 2**) and related clearing (**Section 3**).

To support environmental approvals for the Project, ecological surveys were undertaken by AECOM (2024) (**Attachment** A:). The results of this survey, as relevant to the proposed clearing, are summarised in **Section 4** of this document and have been taken into account when avoiding and mitigating the Project's environmental impacts (**Section 5**).

An assessment of the 10 Clearing Principles as outlined in '*A guide to the assessment of applications to clear native vegetation*' (DER, 2014) has also been undertaken and is presented **Section 8**.

A Construction Environment Management Plan (CEMP) has also been prepared in support of the NVCP Application and is provided in **Attachment B**.

2 Description of the Activity

2.1 Project Location

The Development Envelope (DE) is 162.26 ha and is located near the township of Onslow within the Shire of Ashburton in the Pilbara region. The DE is not within any WA strategic industrial areas. The existing power station is located at Lot 555 on Parcel 74894, and an existing connection cable runs parallel to the site (**Figure 1**).

Table 1 Development Envelope for the Project

Site	Size of Development Envelope (ha)	Development Envelope location	Shire	Neighbouring land uses
Onslow	162.26 ha	Lot 330 on Deposited Plan 402361, Reserve 19291	Shire of Onslow	The neighbouring land uses include conservation, recreation, rural living, district roads and public purposes.
		Lot 886 on Deposited Plan 42083, Reserve 38264		
		Lot 881 on Deposited Plan 402083, Reserve 47957		
		Lot 880 on Deposited Plan 402083, Reserve 51992		
		Lot 882 and Lot 893 on Deposited Plan 402083		
		Lot 282 and Lot 283 on Deposited Plan 219235		
		Vacant Crown Land (ID 12160548)		
		Road Reserves (ID 11788844, 12316985 & 11732962)		

Figure 1 | Development Envelope

N

0 175 350 700 Meters

Scale: 1:20,000

HORIZON POWER

2.2 Activity Overview and Timelines

Geotechnical survey works will be required for the Project and will consist of mainly incidental clearing (driving over and parking on native vegetation) for vehicle / machinery access to test sites.

The Project will consist of the construction of renewable energy infrastructure, generating approximately 16 MW of energy from solar arrays.

Construction is proposed for 2027, pending funding and contractual requirements, with commissioning to follow. A five-year clearing permit is requested to accommodate supplier readiness, procurement of batteries and renewables technology, with clearing undertaken within 3 months of construction.

2.3 Land Access

Horizon will utilise the access conferred by Sections 28 and 49 of the *Energy Operators (Powers) Act 1979* (the Act) for geotechnical investigations and connection infrastructure. Tenure for the proposed solar location is undergoing negotiation, and construction activities for the Project will not commence until the appropriate legal arrangements for tenure are executed.

3 Description of Proposed Clearing

3.1 Proposed Clearing Area

The final design and footprint required for the Project will be determined once geotechnical and heritage surveys are undertaken. All clearing will be conducted within the DE, as described in **Section 2.1**.

An area of up to 51.16 ha within the Development Envelope is required to be cleared for the Project. This area includes both temporary and permanent clearing, as described below.

Permanent mechanical clearing is required for the following:

- Solar facility (including solar panels, switchroom and supporting infrastructure)
- 8 m wide connection corridor (underground)
- Access tracks and fire breaks.

Temporary clearing will also be required for the following:

- Geotechnical investigation for solar facility
- Laydown area.

The construction of the Project will require the permanent clearing of up to 49.5 ha for solar infrastructure, the connection corridor and access tracks (**Table 2**). This will occur within the permanent clearing footprints.

Table 2 Clearing estimated within DE

Site	Proposed clearing	Clearing breakdown
Onslow	51.16 ha	Temporary clearing: 1.66 ha Permanent clearing: 49.5 ha

3.2 Proposed Clearing Method

Temporary clearing is proposed for the geotechnical investigation and laydown area. This will include mechanical removal and driving over vegetation.

Mechanical removal will be undertaken for the infrastructure construction within the permanent clearing footprint.

4 Ecological Survey

To inform the Project, a detailed flora and vegetation assessment along with a basic and targeted fauna assessment was undertaken by AECOM in 2024. The field survey was conducted between 30th April and 3rd May 2024, over an area 164.85 ha. The survey has been appended to this document (**Attachment A**:

Table 3 Summary of Ecological Surveys Relevant to the Survey Area

Survey	Summary of Findings
Onslow Flora, Vegetation, and Fauna Assessment (AECOM, 2024) *IBSA Number: IBSA-2024-0310*	**Survey Dates:** 30 April to 3 May 2024 **Survey Area:** 164.85 ha **Flora / Vegetation Findings:** – A total of 68 flora species were recorded within the Survey Area. Representing 48 genera and 23 families. – Of these species, two were introduced common weed species. No Declared Pests (DP) or Weeds of National Significance (WoNS) were recorded within the Survey Area. – No Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) listed flora were recorded within the survey area. – No Biodiversity Conservation Act 2016 (BC Act) listed flora were recorded within the survey area. – Six vegetation types were recorded within the survey area, not including paddock or cleared areas: • TaEf - Saltbush Shrubland, this community represents riparian/groundwater dependent vegetation, dominated by Tecticornia and Neobassia species (3.59 ha (2.18%)) • EvTdSm - Emergent Eucalyptus victrix Woodland situated slightly higher in the landscape than the nearby saltlake (0.16 ha (0.10%)) • AgTe - Triodia Hummock Grasslands community with isolated shrubs. This community was common throughout the survey area and recorded on undulating terrain (109.46 ha (66.4%)) • GsTe - Grevillea and Acacia Shrubland, situated on deep red sand dunes throughout the landscape (23.93 ha (14.52%)) • SmPr - Drainage Grassland community, situated within low-lying areas that are likely seasonally inundated (2.59 ha (1.57 ha)) • Saltlakes – Natural low-lying areas containing salt lakes (1.29 ha (0.78%)) • Cleared Areas • Paddocks – The condition of the vegetation within the Survey Area ranged from 'Very Good' to 'Completely Degraded' – No ecological communities listed under the EPBC Act were recorded within the survey area. – No ecological communities listed under the BC Act were recorded within the survey area. – Riparian vegetation was recorded within the survey area. **Fauna / Fauna Habitat Findings:** – A total of 40 vertebrate fauna species were recorded within the Survey Area. This includes 27 birds, 6 mammals and 7 reptile species. – Three fauna habitats were recorded within the survey area: • Undulating Dunes and Flats (130.46 ha (79.13%)) • Seasonally Inundated/Intertidal Areas (13.68 ha (8.3%)) • Modified (1.38 ha (0.84%))

Survey	Summary of Findings
	– No EPBC Act listed fauna species were recorded during the survey. – No BC Act listed fauna species were recorded during the survey. – No Priority listed fauna species were recorded during the survey. – Ten conservation listed fauna species are considered likely or possibly occuring within the Survey Area due to suitable habitat and close proximity of previous records, including: • Australian Fairy Tern (*Sternula nereis nereis*) – Vulnerable under the BC Act • Sharp-tailed Sandpiper (*Calidris acuminata*) – Vulnerable under BC Act • Curlew Sandpiper (*Calidris ferruginea*) – Critically Endangered under BC Act • Gull-billed Tern (*Gelochelidon nilotica*) – Migratory under BC Act • Little Curlew (*Numenius minutus*) – Migratory under BC Act • Whimbrel (*Numenius phaeopus*) – Migratory under BC Act • Glossy Ibis (*Plegadis falcinellus*) – Migratory under the BC Act • Grey-tailed Tattler (*Tringa brevipes*) – Migratory under BC Act, Priority 4 by DBCA • Northern Short-tailed Mouse (*Leggadina lakedownensis*) – Priority 4 by DBCA • Maryan's Keeled Slider (*Lerista planiventralis maryani*) – Priority 1 by DBCA

5 Existing Environment

The existing environment is summarised in Table 4.

Table 4 Existing environment

<table>
<tr><th>Environmental value</th><th>Assessment</th></tr>
<tr><td>Vegetation associations, types and condition</td><td>
The project is located within two Pre-European Vegetation Associations, Cape Yannare Coastal Plain Association 676 and 127. More than 95% and 94% respectively of these vegetation associations remains.
<table>
<tr><th>Vegetation association</th><th>Scale</th><th>Pre-European extent (ha)</th><th>Current extent (ha)</th><th>% Remaining</th><th>% of current extent in all DBCA managed land (proportion of current extent)</th></tr>
<tr><td rowspan="4">676</td><td>State: WA</td><td>2,063,413.95</td><td>1,963,881.55</td><td>95.18</td><td>15.44</td></tr>
<tr><td>IBRA Bioregion: Carnarvon</td><td>51,983.51</td><td>51,232.57</td><td>98.56</td><td>29.35</td></tr>
<tr><td>IBRA Subregion: Cape Range</td><td>29,193.60</td><td>28,442.66</td><td>97.43</td><td>15.87</td></tr>
<tr><td>LGA: Shire of Ashburton</td><td>45,155.52</td><td>44,695.18</td><td>98.98</td><td>25.49</td></tr>
<tr><td rowspan="4">127</td><td>State: WA</td><td>737,724.05</td><td>697,871.38</td><td>94.60</td><td>12.30</td></tr>
<tr><td>IBRA Bioregion: Carnarvon</td><td>102,780.91</td><td>101,489.55</td><td>98.74</td><td>1.97</td></tr>
<tr><td>IBRA Subregion: Cape Range</td><td>100,987.52</td><td>99,790.74</td><td>98.81</td><td>0.42</td></tr>
<tr><td>LGA: Shire of Ashburton</td><td>95,314.48</td><td>93,097.98</td><td>97.67</td><td>0.01</td></tr>
</table>
Six native vegetation types were defined and mapped in the DE, not including cleared areas or paddocks (AECOM, 2024). The AECOM (2024) survey report identified vegetation condition ranging from ‘Very Good’ to ‘Completely Degraded’ as follows:
<table>
<tr><th>Vegetation type</th><th>Condition</th><th>Extent (ha) within DE</th><th>Extent (%) within DE</th></tr>
<tr><td rowspan="2">TaEf</td><td>Very Good</td><td>0.46</td><td>0.28%</td></tr>
<tr><td>Completed Degraded</td><td>3.13</td><td>1.93%</td></tr>
<tr><td>EvTdSm</td><td>Very Good</td><td>0.16</td><td>0.1%</td></tr>
<tr><td rowspan="4">AgTe</td><td>Very Good</td><td>95.33</td><td>58.75%</td></tr>
<tr><td>Good</td><td>1.80</td><td>1.11%</td></tr>
<tr><td>Poor</td><td>11.9</td><td>7.33%</td></tr>
<tr><td>Degraded</td><td>0.42</td><td>0.26%</td></tr>
<tr><td rowspan="2">GsTe</td><td>Very Good</td><td>22.86</td><td>14.09%</td></tr>
<tr><td>Degraded</td><td>1.06</td><td>0.65%</td></tr>
<tr><td>SmPr</td><td>Very Good</td><td>0.01</td><td>0.01%</td></tr>
<tr><td>Saltlakes</td><td>Very Good</td><td>1.29</td><td>0.8%</td></tr>
<tr><td colspan="2">Paddock</td><td>4.49</td><td>2.77%</td></tr>
<tr><td colspan="2">Cleared</td><td>19.34</td><td>11.92%</td></tr>
<tr><td colspan="2">Total</td><td>162.26</td><td>100%</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Environmental value</th><th>Assessment</th></tr>
<tr><td>Fauna habitat</td><td>AECOM (2024) identified three broad habitat types within the DE. Fauna habitat and condition is detailed below:
<table>
<tr><th>Fauna habitat</th><th>Condition</th><th>Extent (ha) within DE</th><th>Extent (%) within DE</th></tr>
<tr><td rowspan="4">Undulating Dunes and Flats</td><td>Very Good</td><td>116.99</td><td>72.1%</td></tr>
<tr><td>Good</td><td>0.07</td><td>0.04%</td></tr>
<tr><td>Poor</td><td>11.9</td><td>7.33%</td></tr>
<tr><td>Degraded</td><td>1.48</td><td>0.91%</td></tr>
<tr><td rowspan="4">Seasonally Inundated/Intertidal Areas</td><td>Very Good</td><td>2.97</td><td>1.83%</td></tr>
<tr><td>Good</td><td>1.72</td><td>1.06%</td></tr>
<tr><td>Degraded</td><td>0.16</td><td>0.1%</td></tr>
<tr><td>Completely Degraded</td><td>3.13</td><td>1.93%</td></tr>
<tr><td>Modified</td><td>Very Good</td><td>1.38</td><td>0.85%</td></tr>
<tr><td colspan="2">Cleared</td><td>22.45</td><td>13.84%</td></tr>
<tr><td colspan="2">Total</td><td>162.26</td><td>100%</td></tr>
</table>
All three fauna habitat types extend beyond the DE and are likely to be utilised by a variety of fauna species, including those of conservation significance (AECOM, 2024). The seasonally inundated/tidal areas provides high value habitat for conservation significant fauna including migratory birds, however was in mainly Completely Degraded or Very Good condition, and constituted only 4.9% of the DE.</td></tr>
<tr><td>Significant fauna</td><td>No BC Act listed or DBCA listed fauna were recorded during the survey. Eight conservation significant fauna species are considered highly likely to occur post-survey, due to potentially suitable habitat and close proximity of previous records. These species and their preferred habitat types are discussed below:
<table>
<tr><th>Fauna species</th><th>Conservation status</th><th>Preferred habitat in DE</th></tr>
<tr><td>Sharp-tailed Sandpiper (Calidris acuminata)</td><td>Vulnerable under BC Act</td><td>Seasonally Inundated/Intertidal Areas</td></tr>
<tr><td>Curlew Sandpiper (Calidris ferruginea)</td><td>Critically Endangered under BC Act</td><td>Seasonally Inundated/Intertidal Areas</td></tr>
<tr><td>Australian Fairy Tern (Sternula nereis nereis)</td><td>Vulnerable under the BC Act</td><td>Seasonally Inundated/Intertidal Areas</td></tr>
<tr><td>Gull-billed Tern (Gelochelidon nilotica)</td><td>Migratory under BC Act</td><td>Seasonally Inundated/Intertidal Areas</td></tr>
<tr><td>Little Curlew (Numenius minutus)</td><td>Migratory under BC Act</td><td>Seasonally Inundated/Intertidal Areas</td></tr>
<tr><td>Whimbrel (Numenius phaeopus)</td><td>Migratory under BC Act</td><td>Seasonally Inundated/Intertidal Areas</td></tr>
<tr><td>Glossy Ibis (Plegadis falcinellus)</td><td>Migratory under BC Act</td><td>Seasonally Inundated/Intertidal Areas</td></tr>
<tr><td>Grey-tailed Tattler (Tringa brevipes)</td><td>Migratory under BC Act, Priority 4 by DBCA</td><td>Seasonally Inundated/Intertidal Areas</td></tr>
</table>
Two species, the Northern Short-tailed Mouse (Leggadina lakedownensis) and Maryan's Keeled Slider (Lerista planiventralis maryani), are considered to have suitable habitat within the DE, however, are considered moderately likely to occur due to the failure to detect them during a targeted trapping program (AECOM, 2024). If present within the DE, these species would utilise the Undulating Dunes and Flats habitat.</td></tr>
<tr><td>Significant ecological linkage</td><td>The Project is not part of a significant ecological linkage.</td></tr>
</table>

Environmental value	Assessment
Ecological communities	No State or Federally listed Priority or Threatened Ecological Communities were recorded within the Survey Area by AECOM (2024).
Significant flora	No State or Federally listed flora were recorded within the Survey Area.
Wetlands and/or waterways	No impacts to waterways and no water extraction from a waterway is proposed for the works. No significant wetlands or rivers intersect the DE. However, a mapped salt lake system and non-perennial lakes are within 1 km of the DE, with some surface water features identified during the survey connecting to surrounding features (AECOM, 2024). Surface water identified within the DE represent discrete sections of the individual surface water features, with no direct impact to any single, whole surface water feature.
Water resources	The DE overlaps the Pilbara Groundwater Area and the Ashburton River Surface Water Area (spatial dataset DWER-085 & DWER-082; GoWA, 2022), both of which are Proclaimed under the RIWI Act. No Public Drinking Water Source Areas (PDSWAs) are present within the DE, the closest PDSWA, the Cane River Water Reserve, approximately 24 km east of the DE (spatial dataset DWER-033). The Australian Groundwater Explorer (BoM, 2024) located 21 bores near the DE (within <500 m) with the Perth Groundwater Map identifying groundwater level as 17 – 28 m below ground level (Gov WA, 2017). No impacts are expected with digging being to 4 m depth or less.
Conservation Reserves	No DBCA managed conservation areas occur within 20 km of the DE. The closest DBCA managed area is Thevenard Island Nature Reserve, located approximately 22 km north-west of the DE (spatial dataset DWER-046; GoWA, 2024).
Environmentally Sensitive Areas	No ESAs occur within the DE, with the closest ESA, Direction Island, approximately 14 km north-east of the DE (spatial dataset DWER-046; GoWA, 2024).
Land and soil quality	A review of Acid Sulphate Soil (ASS) risk mapping (spatial dataset DWER-053; GoWA, 2024) indicates the DE is in close proximity (within 20 m) to areas of high to moderate and moderate to low risk, however neither overlaps the DE. Piling up to 9m will be required for earth stakes, however this will involve driving the stakes into the ground with minimal soil movement or exposure to air. A requirement to investigate ASS has been included in the CEMP if the construction methodology should change. No contaminated sites occur within 20 km of the DE (spatial dataset DWER-059; GoWA, 2024). The closest contaminated site (Object ID 658, Contaminated – remediation required) is located on Thevenard Island Nature Reserve.
Environmental heritage	There are no National or World Heritage Areas mapped as overlapping the DE.
Air quality	The proposed works are unlikely to contribute significantly to dust. Dust will be managed during construction in accordance with the CEMP (**Attachment B**). No significant receptors are directly adjacent to the Project and no significant air emissions are expected that would impact the airshed.
Amenity values	The proposed construction is expected to generate typical construction noise, no sensitive receptors are directly adjacent to the DE, therefore no significant noise or vibration impacts are expected. No heritage buildings are present that may be impacted by vibration. The cables for the Project will be located underground and will not impact visual amenity during operation of the Project. The solar facility will be visible, however there are no nearby sensitive receptors.

6 Avoidance, Mitigation and Management Measures

6.1 Avoidance

Initial avoidance and minimisation was undertaken during site selection, including placement of the proposed infrastructure close to existing assets to reduce the clearing associated with the connection corridor. This included avoidance of the Seasonally Inundated/Intertidal fauna habitat (**Figure 2**) and potential to connect to the existing underground cable (pending detailed engineering).

The final design and location of infrastructure within the DE will be informed by engineering site investigations and an Aboriginal cultural heritage survey.

6.2 Mitigation

6.2.1 Geotechnical works

A CEMP has been developed for the Project (**Appendix B**) which lists the specific mitigation and management measures to be applied during construction of the Project. Key management measures include:

- No clearing permitted outside of the DE.
- Clearing will be minimised where possible through placement of assets in existing cleared locations.
- Clearing locations will be demarcated prior to clearing activities.
- Clearing areas are to be checked by an Environmental Specialist or Site Supervisor prior to clearing to ensure no more than 51.16 ha of clearing is undertaken.
- A pre-clearing environmental toolbox will be held so all personnel are aware of their responsibilities under the permit.
- Clearing of native vegetation will be undertaken in a slow, progressive manner in one direction to allow fauna to move away from the clearing area.

6.2.1.1 Restoration of Cleared Areas

Restoration of the temporary cleared areas within the DE, including the geotechnical testing and laydown area will be undertaken, as follows:

- Topsoil will be stockpiled separately to other excavated materials.
- On completion of test pit works, excavated materials will be placed back into test pits. Topsoil from the test pit will be respread over the surface.
- Stockpiled topsoil will be respread over the laydown area after demobilisation
- Recontouring of soil within the test pit and laydown area will be undertaken to prevent compaction.

6.2.2 Project infrastructure

Key management measures detailed in the CEMP for the Project include the following:

- The connection corridor will be positioned to avoid the Seasonally Inundated/Intertidal fauna habitat where possible.
- No clearing permitted outside DE
- Clearing areas are to be checked by an Environmental Specialist or Site Supervisor prior to clearing to ensure no more than 51.16 ha of clearing is undertaken for the Project
- Clearing will be minimised through placement of assets in existing cleared locations where possible, including placement of any new connection cables adjacent to the existing connection cables. No more than 1.36 ha of the Seasonally Inundated/Intertidal Areas habitat type will be cleared for the connection.
- The clearing locations are to be demarcated prior to clearing activities.

6.3 Management

As mentioned in Section 1.2, a CEMP has been developed for the Project which lists the specific mitigation and management measures to be applied during construction of the Project (see Attachment B).

7 Stakeholder Engagement

Engagement with the Buurabalayji Thalanyji Aboriginal Corporation is ongoing, with a Heritage Protection Agreement (HPA) executed in May 2024. An Aboriginal heritage survey has been conducted during September 2024. Horizon Power is also engaging with the Shire of Ashburton and local stakeholders.

8 Assessment Against the 10 Clearing Principles

An assessment against the 10 Clearing Principles outlined by DWER (2014) has been undertaken to support the NVCP application for the Project, as presented in **Table 5**. The assessment found that the proposed clearing of native vegetation for the Project 'may be at variance' for principles (f) & (g) and 'unlikely to be at variance' for the remaining principles.

Table 5 Assessment Against the 10 Clearing Principles

Principle	Assessment	Outcome
(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	Up to 51.16 ha of native vegetation is proposed to be cleared for the Project, of which 1.66 ha is temporary clearing. **Vegetation** The Onslow DE is located in the Carnarvon bioregion and the Cape Range sub-region as described by IBRA. Six vegetation types were identified in the DE by AECOM (2024) survey. These vegetation types are representative of the vegetation associations in the region, with a high proportion of pre-European extent remaining (AECOM, 2024). The AECOM (2024) survey report identified vegetation condition ranging from 'Very Good' to 'Completely Degraded', with the majority of the vegetation within the DE classed as 'Very Good'. No TECs listed under the EPBC Act or BC Act or PECs listed by DBCA were identified in the Onslow DE (AECOM, 2024). **Flora** Sixty eight flora species were recorded, representing 48 genera and 23 families, with flora diversity considered low (AECOM, 2024). Of these species, two were introduced common weed species. None were listed as a Declared Pest or Weeds of National Significance. No Threatened or Priority flora or communities were recorded within the DE. A likelihood of occurrence assessment (AECOM, 2024) identified no Threatened or Priority flora species as likely to occur within the DE. **Fauna and fauna habitat** Three fauna habitats were recorded during the AECOM (2024) survey, including Undulating Dunes and Flats, Seasonally Inundated/Intertidal Areas and Modified. All three fauna habitats extend beyond the DE boundary and are likely to be utilised by a variety of fauna species, including those of conservation significance (AECOM, 2024). A total of 40 vertebrate fauna species were recorded. None of these species are conservation significant. However, the following species are considered to have a high likelihood of occurrence post-survey (AECOM, 2024): – The Australian Fairy Tern (*Sternula nereis nereis*), Vulnerable under the BC Act – the Sharp-tailed Sandpiper (*Calidris acuminata*), Vulnerable under the BC Acs – the Curlew Sandpiper (*Calidris ferruginea*), Critically Endangered under the BC Act – the Gull-billed Tern (*Gelochelidon nilotica*), Migratory under the BC Act – the Little Curlew (*Numenius minutus*), Migratory under the BC Act – the Whimbrel (*Numenius phaeopus*), Migratory under the BC Act – the Glossy Ibis (*Plegadis falcinellus*), Migratory under the BC Act – the Grey-tailed Tattler (*Tringa brevipes*), Migratory under the BC Act, Priority 4 by DBCA A further 20 threatened or migratory species had a moderate likelihood of occurrence within the DE post-survey (AECOM, 2024). Two species, the Northern Short-tailed Mouse (*Leggadina lakedownensis*) and Maryan's Keeled Slider (*Lerista planiventralis maryani*), are considered to have suitable habitat within the DE, however, are considered moderately likely to occur due to the failure to detect them during a targeted trapping program (AECOM, 2024).	Unlikely to be at variance.

	The proposed clearing does not impact on the recorded population of any significant flora or fauna species. Further, the absence of significant flora and PECs/TECs, and the absence of evidence of use by significant fauna species is indicative of a lower biological diversity. This is likely due to past disturbance at the proposed DE. Based on this assessment, it is considered that the DE is unlikely to contain vegetation that represents a high level of biological biodiversity. Therefore, the project is unlikely to be at variance with this clearing principle.	
(b) Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous Western Australia.	Three fauna habitats were identified in the DE by AECOM (2024): 1. Undulating Dunes and Flats: sand dunes and flats, dominated by Triodia and Acacia species 2. Seasonally Inundated/Intertidal Areas: areas which currently contain water or may seasonally 3. Modified: Man-made structures such as rock piles and metal pipes The EPBC Act PMST, DBCA database and NatureMap identified the presence/potential presence of 69 conservation significant fauna species within a 50 km buffer of the DE. Eight were considered to have a high likelihood of occurrence within the DE. A total of 40 vertebrate fauna were recorded during the field survey (AECOM, 2024). None of these species were conservation significant despite targeted trapping programs. However, the following species are considered to have a high likelihood of occurrence post-survey (AECOM, 2024): – The Australian Fairy Tern – the Sharp-tailed Sandpiper – the Curlew Sandpiper – the Gull-billed Tern – the Little Curlew – the Whimbrel – the Glossy Ibis – the Grey-tailed Tattler The Project will involve clearing up to 1.36 ha of potential suitable foraging and/or roosting habitat for the above species, comprised of the Seasonally Inundated/Intertidal Areas habitat type along the connection corridor. This habitat is unlikely to provide suitable breeding habitat for bird species, and was predominantly in Completely Degraded or Very Good condition. This habitat is likely to be suitable for a further 20 threatened or migratory species with a moderate likelihood of occurrence within the DE post-survey (AECOM, 2024). This habitat will only be cleared if the existing cable connection cannot be utilised by the project, and a new cable connection is required. In such an eventuality, the new cable would be laid in the same corridor as the existing cable, approximately 50 cm from the existing cable for safety reasons. The disturbance area for the new cable would be limited to past disturbance areas for existing infrastructure, which was constructed under CPS 4587/2. This habitat is not considered unique to the DE (AECOM, 2024) and represents 4.9% of the DE. Further, 3.29 ha of the 7.98 ha of the Seasonally Inundated/Intertidal Area habitat consists of Completely Degraded or Degraded Vegetation Condition (41%). Clearing up to 1.36 ha of Seasonally Inundated/Intertidal Areas within the DE, represents approximately 0.83% of the DE and 0.01% of potential habitat available within 10 km of the DE. Further, there is evidence of habitat in equal or better condition is available in close proximity to the DE, including mapped salt lakes and non-perennial lakes (AECOM, 2024).	Unlikely to be at variance.

	Two species, the Northern Short-tailed Mouse (*Leggadina lakedownensis*) and Maryan's Keeled Slider (*Lerista planiventralis maryani*), are considered to have suitable habitat within the DE, however, are considered moderately likely to occur due to the failure to detect them during a targeted trapping program (AECOM, 2024). The Northern Short-tailed Mouse prefers sandy soils on cracking clays in Western Australia (Van Dyck & Strahan, 2008). The Maryan's Keeled Slider typically occupies hummock grasslands, open health, open scrub, oviparous, tall shrublands (Storr, 1991). If present within the DE both species would utilise the Undulating Dunes and Flats habitat. There is 130.44 ha of this habitat within the DE (representing 80.38% of the DE). The DE may provide some value as an ecological linkage to the coast and surrounding surface water features for migratory species, however, there is similar suitable alternative habitat surrounding the DE, including mapped saline coastal flats less than 1 km from the DE (AECOM, 2024). Fragmentation it not anticipated to result from this clearing, considering the availability of surrounding habitat and small scale of clearing. This habitat is not considered to be limited within the surrounding region. Based on the above information and small scale of clearing of the intertidal mudflat habitat type, it is considered the proposed clearing is unlikely to be at variance to this principle.	
(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	No flora species listed as Threatened under the BC Act or EPBC Act were recorded in the DE during the AECOM (2024) survey. Additionally, no Threatened flora are considered likely to occur within the DE. The proposed clearing of native vegetation for the Project is therefore unlikely to be at variance with this principle.	Unlikely to be at variance.
(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.	No TECs listed under the EPBC Act or BC Act were identified within the DE during the AECOM (2024) field survey or by the desktop assessment. As no vegetation within the DE is representative of any TEC, the Project is not likely to be at variance to this Principle.	Unlikely to be at variance.
(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.	The project is located within two Pre-European Vegetation Associations, Cape Yannare Coastal Plain Association 676 and 127. More than 95% and 94% respectively of these vegetation associations remain. The percentages of each vegetation association remaining within the region are all more than the 30% threshold. The Project is therefore not at variance with this principle.	Not at variance.
(f) Native vegetation should not be cleared if it is growing in or in association with a watercourse or wetland.	No watercourses were identified as intersecting the DE during the desktop assessment. However, multiple saline coastal flats and non-perennial lakes are mapped within 1 km of the DE. An inspection of aerial imagery, indicates the mapped salt lakes and non-perennial lakes likely extend to directly adjacent to the DE, confirmed during the field survey (AECOM, 2024). The 2024 AECOM field survey identified one small area of Drainage Grassland (vegetation type SmPr) in the DE, comprising 0.01 ha. Of this, only 0.05 ha would be cleared for cable installation, and only if the project is unable to connect to existing cable infrastructure for the site. AECOM (2024) also identified six native vegetation types, four of which are representative of vegetation growing in, or in association with, inundation or surface water at the DE, including:	May be at variance.

	– TaEf – Saltbush Shrubland. This community represents riparian/groundwater dependent vegetation, dominated by Tecticornia and Neobassia species. – EvTdSm – Emergent Eucalyptus victrix Woodland situated slightly higher in the landscape than the nearby salt lake. – SmPr – Drainage Grassland community, situated within low-lying areas that are likely seasonally inundated. – Salt Lakes – Natural low-lying areas containing salt lakes. The DE Area does not intersect any wetlands of international importance (RAMSAR) or Nationally Important Wetlands. The Project may be at variance to this principle due to the presence of vegetation growing in association 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.	The soils within the DE are part of the Western Coastlands and Coastal Dunes. The Western Coastlands are described as coastal wave-dominated deposits on beaches, beach ridges, barrier bars and lagoons, and back-beach dunes, coastal cliffs and other erosional features. The Coastal Dunes are described as beach sand, sand dunes, coastal dunes, beaches, and beach ridges; calcareous and siliceous, locally shelly and/or cemented (beach rock). Soils of this nature have high permeability and are well draining and therefore are unlikely to contribute to offsite/ on-site run-off or erosion. The AECOM (2024) survey identified that the majority of the DE contains red, large grained, sandy dune topsoil. This sand is unlikely to pose a risk of water and/or wind erosion or contribute to runoff, considering the minimal elevation of the DE dunes. Additionally, waterlogging is unlikely due to the well structured and well draining nature of these soils. Finer, silty clay/clay loam sediment, documented as fringing the salt lake and drainage features are comparatively more prone to erosion and foster inundation. Additionally, waterlogging is more likely in these sediments due to the nature of these soils and evidence of inundation at the site. These soils are associated with the SmPr vegetation type, however, this area has been mostly excluded from the DE with only 0.01 ha to be cleared (see **Figure 2**). The 0.01 ha to be cleared constitutes only 0.01% of the DE. The DE is not mapped as having a risk of Acid Sulfate Soils (ASS) within 2 m of the surface. Dewatering is not required for the Project. There is evidence of periodic inundation within parts of the DE, suggesting vegetation in these regions are well adapted to waterlogging and high salinity. Removal of vegetation may cause some a minor increase in salinity or inundation. Considering the current high levels of salinity and evidence of seasonal inundation, this is unlikely to cause appreciable land degradation to the remaining vegetation and areas already adapted to this natural process. The majority of the DE is not at risk of erosion. While clearing and construction poses a risk of wind and water erosion to a small percent of the DE, this can be appropriately managed with standard erosion controls (e.g. only clearing immediately prior to construction, soil stabilisation methods) as part of a management plan. The proposed clearing has the potential to cause land degradation, although unlikely and on a small scale. Therefore, the Project may be at variance with this clearing principle.	May be at variance.
(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.	The proposed clearing area is not within any mapped conservation areas. No ESAs occur within the DE, with the closest ESA, Direction Island, approximately 14 km north-east of the DE (spatial dataset DWER-046; GoWA, 2024). No impacts are expected to Direction Island. As such the Project is not at variance to this principle.	Not at variance.

(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.	The DE overlaps the Pilbara Groundwater Area and the Pilbara Surface Water Area (GoWA, 2022), both of which are proclaimed under the RIWI Act. It is not expected that the Project will require dewatering or groundwater abstraction within the DEs. Potential impacts to surface water quality from erosion / sedimentation / hydrocarbons will be managed. Clearing within the DE is unlikely to cause deterioration in the quality of surface or underground water, therefore the proposal is unlikely to be at variance to this principle.	Unlikely to be at variance.
(j)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the intensity of flooding.	The nearest BoM weather station with comprehensive data collection and recent historic climate data is the Onslow Airport (Station 005017), approximately 700 m east of the DE. Median annual rainfall is 303 mm with March recording the highest monthly median (68 mm) (BoM, 2024). The scale of the DE and clearing required is not likely to have an impact on the flood regimes or increase intensity of flooding in the region. It is expected that the hydrological regimes of these landforms will be maintained through design and therefore unlikely to incur flooding. Additionally, given the over 95% pre-European vegetation remaining, the proposed clearing is not expected to increase the risk of flooding in the region. Standard management measures for construction will be in place to mitigate against / manage erosion and associated environmental aspects. Therefore, the proposed clearing of native vegetation for the Project is not considered to be at variance with this principle.	Unlikely to be at variance.

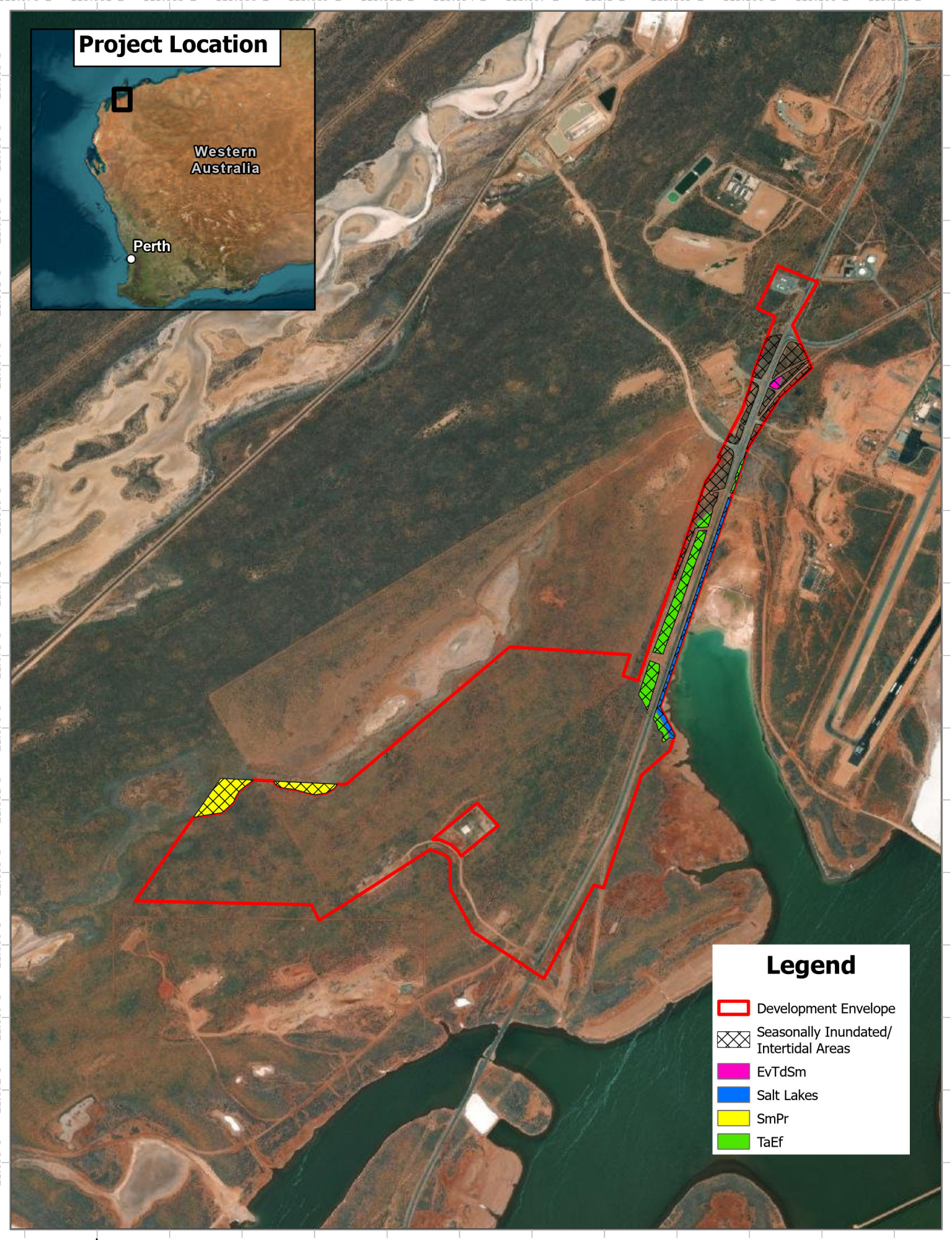

Figure 2 | Environmental Constraints

HORIZON POWER

9 Other matters

9.1 Land Planning

The Project will be considered Public Works and is expected to be exempt from development approval under Section 6 of the *Planning and Development Act 2005*, however, due regard is required with respect to:

- The purpose and intent of any planning scheme that has effect in the locality where, and at the time when, the right is exercised;
- The orderly and proper planning, and the preservation of the amenity, of that locality at that time; and
- Any advice provided by the responsible authority in the course of the consultation required.

Horizon Power has been engaging with the Shire of Ashburton regarding the project.

9.2 Other approvals

In considering a clearing matter under section 51O of the *Environmental Protection Act 1986* (EP Act), the DWER CEO shall have regard to any planning instrument and other relevant matters when making decisions as to clearing permits. 'Other matters' are not defined in the EP Act, and consequently are any matters the CEO considers relevant. Other matters are generally environmental issues not directly within the scope of the clearing principles, but within the object and principles of the Act. Other approvals that may apply to this Project are detailed in **Table 6**.

Table 6 Assessment of other approvals relevant to the Project

Other approvals	Assessment
Referral to Environmental Protection Authority	Due to the small scale of the project clearing in a remote location, it is considered likely that all environmental impacts can be managed under Part V of the EP Act and referral to the EPA is not considered necessary.
Referral to Department of Climate Change, Energy, the Environment and Water (DCCEEW)	*Threatened flora, fauna and ecological communities* No conservation significant flora species were recorded within the DE. No TECs were recorded in the DE or within 20 km. 37 Threatened fauna species were identified by PMST within 20 km of the DE. Of these, the following 4 Threatened fauna species are considered highly likely to occur within the DE: • Sharp-tailed Sandpiper (*Calidris acuminata*), Vulnerable and Migratory (Marine) under the EPBC Act, • Curlew Sandpiper (*Calidris ferruginea*), Critically Endangered and Migratory (Marine) under the EPBC Act, • Grey Plover (*Pluvialis squatarola*), Vulnerable and Migratory (Marine) under the EPBC Act, and • Australian Fairy Tern (*Sternula nereis nereis*), Vulnerable under the EPBC Act. Habitat critical to the survival of the Australian Fairy Tern includes suitable habitat where the species is known or likely to breed or forage within their distribution map (DAWE, 2020). As the habitat within the DE is suitable foraging habitat, the 7.98 ha of Seasonally Inundated/Intertidal area within the DE is considered habitat critical to the survival of the Australian Fairy Tern. Further, a known Biologically Important Area for Australian Fairy Tern breeding is located within 20 km of the DE on Thevenard Island. Habitat critical to the survival of the Sharp-tailed Sandpiper includes areas necessary for activities such as foraging, breeding, roosting or dispersal (DCCEEW, 2024). As the habitat within the DE is suitable foraging and roosting habitat, the 7.98 ha of Seasonally Inundated/Intertidal area within the DE is considered habitat critical to the survival of the Sharp-tailed Sandpiper. However, 3.29 ha of the 7.98 ha of the Seasonally Inundated/Intertidal Area habitat consists of Completely Degraded or Degraded vegetation condition (41%). With only 4.69 ha in Good or better condition. Given that the project will clear less than 1.36 ha of potential suitable foraging and/or roosting habitat for the above species, referral to DCCEEW is not considered to be required. *Migratory fauna* 9 migratory species were recorded within 20 km of the DE. Species identified as Threatened are outlined above and excluded here, the following 6 Migratory species are considered highly likely to occur within the DE:

Other approvals	Assessment
	• Gull-billed Tern (*Gelochelidon nilotica*), Migratory (Marine) under the EPBC Act, • Little Curlew (*Numenius minutus*), Migratory (Marine) under the EPBC Act • Whimbrel (*Numenius phaeopus*), Migratory (Marine) under the EPBC Act • Osprey (*Pandion haliaetus*), Migratory (Marine) under the EPBC Act, • Glossy Ibis (*Plegadis falcinellus*), Migratory (Marine) under the EPBC Act • Grey-tailed Tattler (*Tringa brevipes*), Migratory (Marine) under the EPBC Act. These species have a wide-ranging habitat and no significant impacts are expected. *National heritage* No National or World Heritage places overlap the DE or are within 20 km of the DE. *Wetlands of international importance* No Ramsar Wetlands overlap the DE or are within 20 km of the DE.
Works Approval or Licence under EP Act	No works approvals or licences are required for the Project.
Groundwater or surface water licence under the Rights in Water and Irrigation Act 1914	No surface or groundwater abstraction is proposed. No approvals under the RIWI Act will be required for the project.
Notice of Intent to Clear system under the Soil and Land Conservation Act 1945	Not Applicable.
State and municipal heritage	A search of the inHerit database and the DPLH-006 dataset shows the DE does not overlap any State or municipal heritage.
Native title	The DE is located on land where native title has been determined not to exist (Federal Court No. WAD6113/1998, National Native Title Tribunal No. WCD2008/013).
Aboriginal Sites of Significance under the Aboriginal Heritage Act 1972	A search of the Aboriginal Cultural Heritage Inquiry System shows that the DE intersects a Registered Aboriginal site. Engagement with the Buurabalayji Thalanyji Aboriginal Corporation is ongoing, with a Heritage Protection Agreement (HPA) executed in May 2024. An Aboriginal heritage survey was conducted in late 2024. The Project will avoid any Aboriginal Cultural Heritage places to prevent impacts to heritage values. Horizon Power has an Aboriginal Cultural Heritage Management Policy, that details our commitment to *avoid impacting on Aboriginal Cultural Heritage whenever and wherever possible*. A Heritage Protection Plan will be developed based on commitments in the HPA and outcomes from the heritage survey to ensure impact on any known Aboriginal Heritage in the area is avoided and appropriate management measures are implemented (e.g. heritage monitors for ground disturbing works) to ensure remaining heritage risks are suitably mitigated.

10 References

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Clearing Regulations – ESAs (DWER-046)

Contaminated Sites Database (DWER-059)

DBCA Legislated Lands and Waters (DBCA-011)

DBCA Statewide Vegetation Statistics

Heritage Council WA - Local Heritage Survey (DPLH-008)

Heritage Council WA - State Register (DPLH-006)

Pre-European Vegetation (DPIRD-006)

Public Drinking Water Source Areas (DWER-033)

Soil landscape land quality - Zones (DPIRD-017)

Soil Landscape Mapping - Best Available (DPIRD-027)

RIWI Act, Groundwater Areas (DWER-034)

RIWI Act Surface Water and Irrigation District (DWER-037)

RIWI Act, Rivers (DWER-036)

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Attachment A: Onslow Flora, Vegetation and Fauna Assessment (AECOM, 2024)

Prepared for
Horizon Power
ABN: 57 955 011 697

Onslow Flora, Vegetation, and Fauna Assessment

12-Jul-2024
Doc No. 60728891_B

Onslow Flora, Vegetation, and Fauna Assessment

Client: Horizon Power

ABN: 57 955 011 697

Prepared by

AECOM Australia Pty Ltd
Whadjuk Nyoongar Country, Level 15, Alluvion Building, 58 Mounts Bay Road, Perth WA 6000, GPO Box B59, Perth WA 6849, Australia
T +61 1800 868 654 www.aecom.com
ABN 20 093 846 925

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Quality Information

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Date	12-Jul-2024
Originator	C. House & F. De Wit
Checker/s	
Verifier/s	Floora De Wit

Revision History

Rev	Revision Date	Details	Approved	
			Name/Position	Signature
A	14-Apr-2024	Draft for Internal Review	M. Clunies-Ross Principal Zoologist/Environmental Scientist	
B	17-June-2024	Draft for Client Review	M. Clunies-Ross Principal Zoologist/Environmental Scientist	
0	12-Jul-2024	Final for Issue	Floora De Wit Associate Director – Natural Resources	

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Executive Summary

Horizon Power engaged AECOM to conduct ecological surveys of a defined area located west of the town of Onslow. Surveys were completed in May 2024, and included a single-phase fauna, flora and vegetation survey. The assessments were conducted by botanist Floora De Wit, environmental scientist Madeline Wallington, and zoologists Cassandra House and Hannah Spanswick. A summary of the results is presented below:

- vegetation in the survey area was homogenous with the surrounding area, comprising of a Saltbush Shrubland, *Eucalyptus victrix* Woodland, a Triodia Hummock Grassland, a Grevillea and Acacia Shrubland, and a Drainage Grassland community
- no PEC or TECs were recorded, none were considered likely to occur
- condition was mostly Very Good (87%) with some areas considered Degraded where historical clearing or proximity to infrastructure has led to an absence of native species
- flora species diversity was low. This could be attributed to the below-average rainfall, previous grazing land use, and/or homogeneity of the area
- no Threatened or Priority flora species were recorded, and two introduced species were recorded: **Cenchrus ciliaris* and **Aerva javanica*
- forty fauna species were observed including six mammals, seven reptiles, and 27 birds; with no conservation significant fauna species recorded
- three fauna habitats were mapped, representing suitable habitat for 12 conservation significant fauna species, including:
    - the Sharp-tailed Sandpiper (*Calidris acuminata*), listed as Vulnerable under the *Environment Protection, Biodiversity and Conservation Act 1999* (EPBC Act) and *Biodiversity Conservation Act 2016* (BC Act), Migratory and Marine under the EPBC Act,
    - the Curlew Sandpiper (*Calidris ferruginea*), listed as Critically Endangered under the EPBC and BC Acts, Migratory and Marine under the EPBC Act,
    - the Gull-billed Tern (*Gelochelidon nilotica*), listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act,
    - the Little Curlew (*Numenius minutus*), listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act,
    - the Whimbrel (*Numenius phaeopus*), listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act,
    - the Osprey (*Pandion haliaetus*), listed as Migratory and Marine under the EPBC Act,
    - the Glossy Ibis (*Plegadis falcinellus*), listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act,
    - the Grey Plover (*Pluvialis squatarola*), listed as Vulnerable, Migratory and Marine under the EPBC Act,
    - the Grey-tailed Tattler (*Tringa brevipes*), listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act, Priority 4 by the Department of Biodiversity, Conservation and Attractions (DBCA),
    - the Australian Fairy Tern (*Sternula nereis nereis*), listed as Vulnerable under the EPBC and BC Acts,
    - the Northern Short-tailed Mouse (*Leggadina lakedownensis*), listed as a Priority 4 by DBCA,
    - Maryan's Keeled Slider (*Lerista planiventralis maryani*), listed as a Priority 1 by DBCA.

The survey was undertaken with no significant limitations identified that may influence the outcome of the project.

1.0 Introduction

1.1 Background

Horizon Power provides quality, safe and reliable power to more than 100,000 residents and 9,000 businesses across regional Western Australia. To meet increasing demand, Horizon Power is proposing to install additional renewable energy infrastructure in the regional town of Onslow.

Horizon Power has engaged AECOM to undertake a detailed flora and vegetation assessment along with a basic and targeted fauna assessment, in the township of Onslow. Clearing of native vegetation will likely be required for the solar infrastructure and network connection, as well as access tracks, additional infrastructure and other operational and maintenance related activities. The clearing area is expected to be less than the survey area, totalling approximately 50 ha.

In addition to the ecological surveys, a desktop assessment will be undertaken to establish the existing environment and to identify environmental constraints likely to occur based on habitat preferences and past records. The flora, vegetation, and fauna surveys will inform and support environmental approvals required to facilitate the development of this project. This report presents the results of a desktop assessment and ecological surveys.

1.2 Location

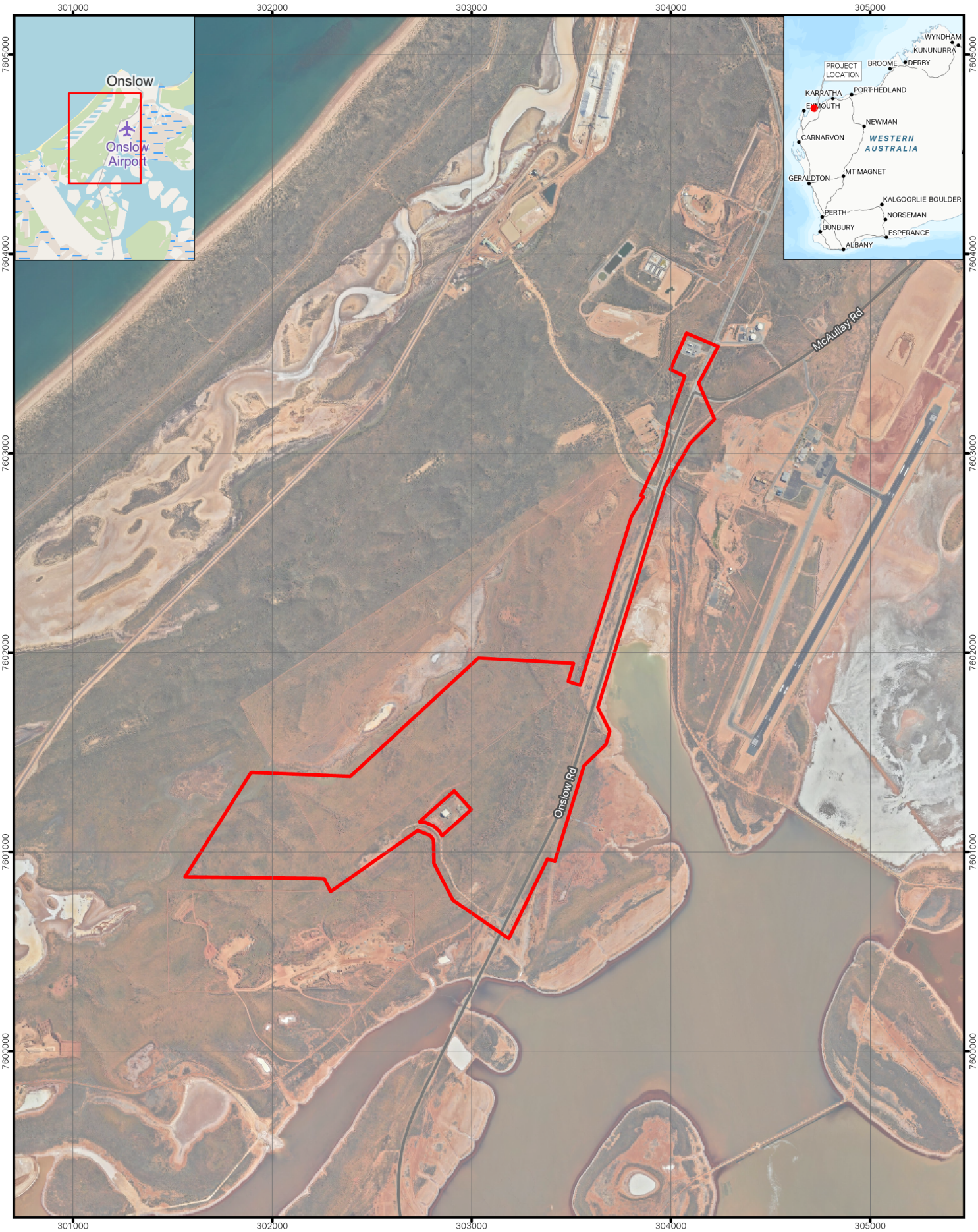
The survey area is located within the township of Onslow in the Pilbara region of Western Australia, adjacent to Onslow Airport (Figure 1). The survey area is approximately 164.41 hectares and is approximately 4 km from the centre of the coastal Onslow town. In addition, it is approximately 11.5 km east-northeast of the Chevron LNG Wheatstone Project.

1.3 Objectives

The objective of the ecological assessment is to undertake a detailed and targeted flora and vegetation survey and a basic and targeted fauna survey. This will aid in informing environmental approvals required for any clearing of native vegetation and facilitate development of the project.

The objectives are as follows:

- a desktop assessment to assess any environmental constraints and species likely to occur within the proposed area to inform flora and fauna survey efforts
- complete flora, vegetation and fauna surveys
- produce a standalone technical report and an IBSA-compliant spatial data package.



AECOM Delivering a better world

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DATE MODIFIED	30 MAY 2024	**APPROVED BY**	F. DE WIT

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LEGEND

Survey Area

Survey Area

HORIZON POWER

ONSLOW FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 1

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2.0 Existing Environment

2.1 Climate

The survey area is located in the township of Onslow which experiences a semi-arid climate. Semi-arid climates can be characterised by regions that receive less precipitation than the possible evapotranspiration rates. Semi-arid climates are considered to be an intermediate between deserts and humid climates and are characterised by hot and dry (sometimes exceptionally hot) summers, and cold winters. Cold semi-arid climates can have major temperature changes between night and day of up to 20 ^{0}C.

The closest meteorological station to the survey area with extensive data is Onslow Airport (Station 005017), which is located approximately 700 m east of the survey area. The highest temperatures are experienced during the summer months with the highest, average maximum temperature of 36.5 ^{0}C and the lowest, average minimum temperature of 22.5 ^{0}C. The winter months have an average maximum temperature of 26.3 ^{0}C and an average minimum temperature of 13.7^{0}C. Onslow Airport receives an average annual rainfall of 303.4 mm with the majority of rainfall occurring between February to June (Bureau of Meteorology (BOM), 2024) (Figure 2).

A total of 71.6 mm of rainfall was recorded in the last 12 months preceding the survey (May 2023 to April 2024). This represents a 76% decrease from the mean annual rainfall typically received during this time. The lack of rainfall was evident in the number of dead / senesced plants including *Trichodesma zeylanicum*, Malvaceae spp., and the common **Cenchrus ciliaris* weed that is usually prolific in disturbed areas here. No annual species were recorded during the survey despite extensive search effort. The reduced rainfall is a potential limiting factor for identifying significant flora species with an annual life cycle, such as *Helichrysum oligochaetum* (P1) which was given a moderate likelihood of occurrence prior to the survey. This likelihood has been amended to ‘low’ post-survey.

Minimum temperatures have deviated from the mean minimum temperatures, with a slightly colder May, June, and July in 2023 and January in 2024. Maximum temperatures have varied greatly, with seven of the 12 months preceding the survey higher than the mean maximum temperatures, the greatest deviation occurring in October 2023 of 5.6°C. Four months were below average for maximum temperatures, including June 2023 and from December 2023 to February 2024.

The cooler temperatures and reduced rainfall may have impacted the abundance and activity levels of reptile, bird and small mammal species. Reptiles are known to be less active during cooler periods, with the optimum period for activity within the Eremaean region (semi-arid climate) ranging between September to April (Environmental Protection Authority, 2020; Thompson & Thompson, 2005). Small mammal species and granivore birds, particularly in arid and semi-arid regions, are influenced by rainfall patterns. Increased rainfall contributes to an increase in food source abundance such as seeds and insects which in turn, is linked to an increased granivore bird and small mammal population (Cooper, Teale, & Kendrick, 2006; How, Milewski, Keighery, & Dell, 1992; How & Dell, 2004).

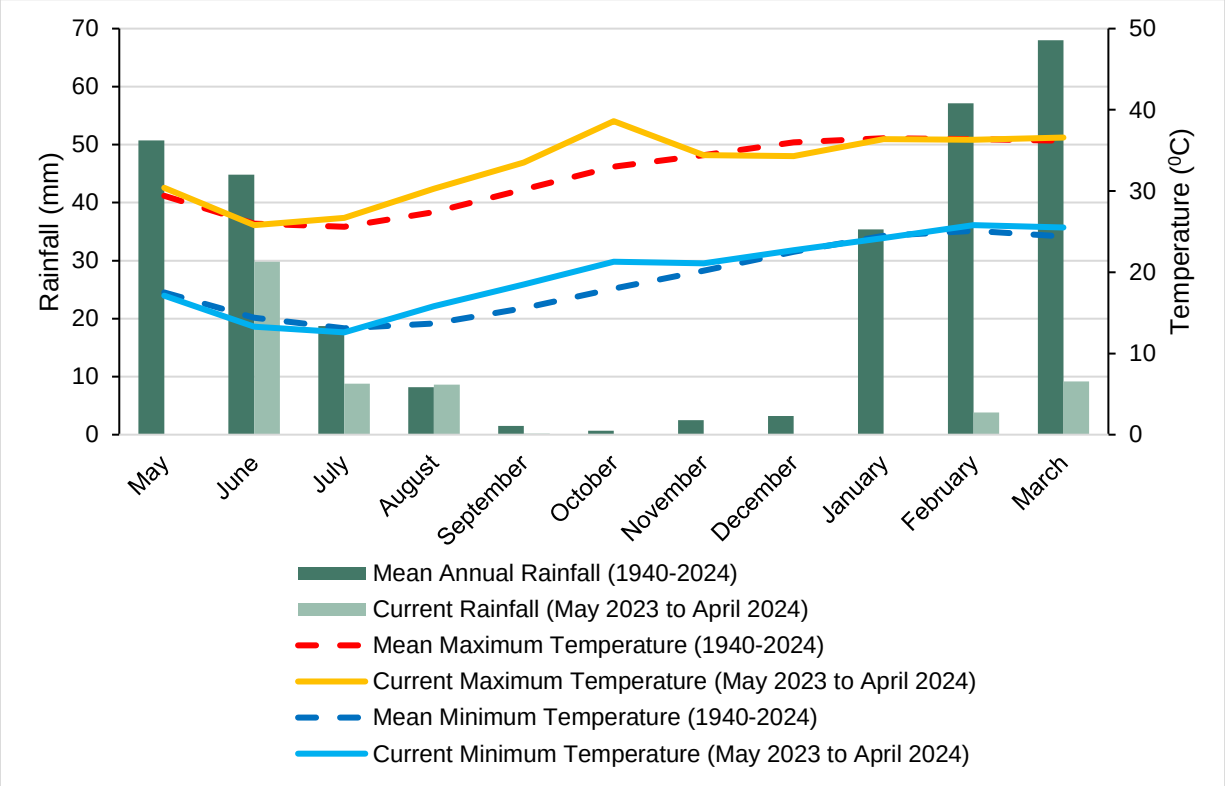


Figure 2 Long-term and current climate data for Onslow Airport (BoM 2024)

2.2 IBRA Regions

The largest regional vegetation classification system recognised by the Environmental Protection Authority (EPA) is the Interim Biogeographic Regionalisation for Australia (IBRA). The IBRA regions provide the planning framework for the systematic development of a comprehensive, adequate, and representative (CAR) national reserve system (DoEE, 2012). There are 89 recognised IBRA regions across Australia that have been identified based on climate, geology, landforms, and characteristic vegetation fauna (DoEE, 2012; IBRA7, 2012).

The survey area lies within the Carnarvon IBRA region, specifically the Cape Range subregion, described by Kendrick & Mau (2002). It forms part of the northern area of the Carnarvon bioregion, and is characterised by:

> "Rugged tertiary limestone ranges and extensive areas of red aeolian dunefield, Quaternary coastal beach dunes and mud flats. *Acacia* shrublands over *Triodia* on limestone (*Acacia stuartii* or *A. bivenosa*) and red dunefields, *Triodia* hummock grasslands with sparse *Eucalyptus* trees and shrubs on the Cape Range. Extensive hummock grasslands (*Triodia*) on the Cape Range and eastern dune-fields. Tidal mudflats of sheltered embayments of Exmouth Gulf support extensive mangroves. Beach dunes with Spinifex communities. An extensive mosaic of saline alluvial plains with samphire and saltbush low shrublands along the eastern hinterland of Exmouth Gulf. Islands of the Muiron, Barrow, Lowendal and Montebello groups are limestone-based. Climate is arid, semi-desert to subtropical climate, with variable summer and winter rainfall. Cyclonic activity can be significant, and cyclonic systems may affect the coast and hinterland annually.

2.3 Vegetation

There are two Pre-European Beard (1975) vegetation association mapped within the survey area comprising of the Cape Yannare Coastal Plain Association 676 and Cape Yannare Coastal Plain Association 127 (Table 1; Figure 3).

Table 1 Pre-European vegetation associations (Beard 1975) extent within the survey area (rounded to nearest whole number) including percentage of pre-European extent remaining ((Government of Western Australia, 2018)).

Association Description		State	Carnarvon IBRA Region	Shire of Ashburton
Cape Yannare Coastal Plain Association 676; *Tecticornia* spp. communities in saline areas	Pre-European Extent	2,063,414 ha	51,984 ha	45,156 ha
	Current Extent	1,963,882 ha	51,233 ha	44,695 ha
	% Remaining	95.18%	98.56%	98.98%
Cape Yannare Coastal Plain Association 127	Pre-European Extent	737,724 ha	102,781 ha	95,314 ha
	Current Extent	697,871 ha	101,490 ha	93, 098 ha
	% Remaining	94.6%	98.74%	97.67%

2.4 Geology and Soils

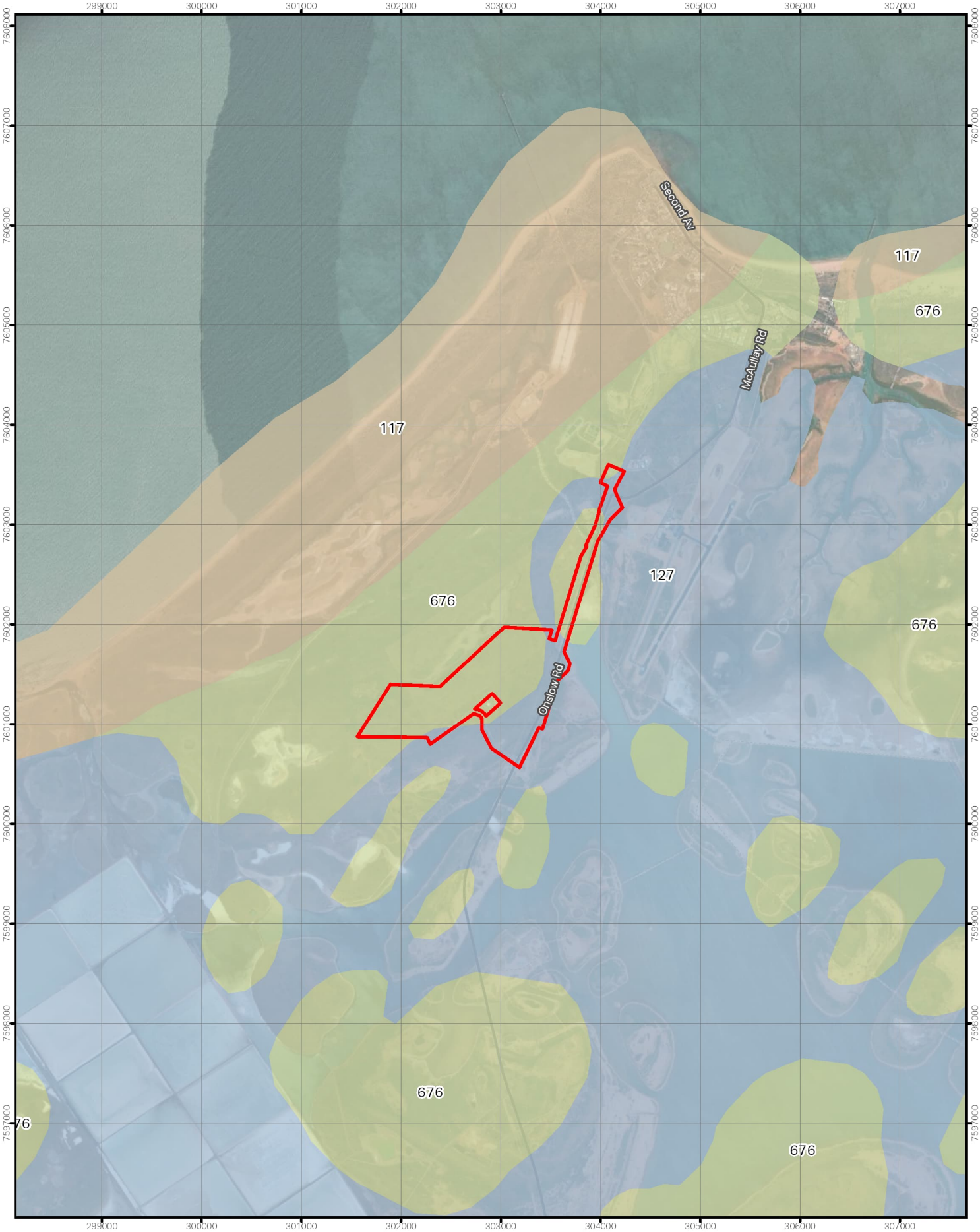
The survey area lies in the Exmouth Province within the Onslow Plain Zone (Tille, 2006). This area is characterised by coastal mudflats with some sandplains and costal dunes, on coastal deposits over Cretaceous sedimentary rocks of the Carnarvon Basin (Tille, 2006). This area is comprised of red deep sands, red/brown non-cracking clays, Salt lake soils, and bare mudflats with samphire and spinifex/tussock grasslands and some mangroves (Tille, 2006).

The Dune System land system encompasses the survey area and is described as ‘supporting soft spinifex and minor hard spinifex grasslands’ (DPIRD, 2022) (Figure 4).

2.5 Reserves and Environmentally Sensitive Areas

There are no Environmentally Sensitive Areas (ESA) occurring within the survey area (Figure 5). The closest ESAs to the survey area are the Thevenard Island Nature Reserve which is an offshore island approximately 23km to the north-west and Cane River Conservation Park which is inland, approximately 55km to the south-east.

Three reserves are found overlapping the survey area. One reserve is managed by the Department of Planning, Lands and Heritage (DPLH) and the Shire of Ashburton. Additionally, a wastewater treatment reserve is managed by the Water Corporation and a power substation managed by Horizon Power.



AECOM Delivering a better world

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DATE MODIFIED	17 JUN 2024	**APPROVED BY**	F. DE WIT

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GDA2020 MGA ZONE 50

DATA SOURCES Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2010)
Service Layer Credits: World Imagery: Maxar

LEGEND

- Survey Area
- Pre-European Vegetation (DPIRD-006)
  - 117: Grass-steppe,Hummock grassland *Triodia* spp.
  - 127: Tidal mud flat
  - 676: Samphire, *Tecticornia* spp. communities in saline areas

Pre-European Vegetation

HORIZON POWER

ONSLOW FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 3

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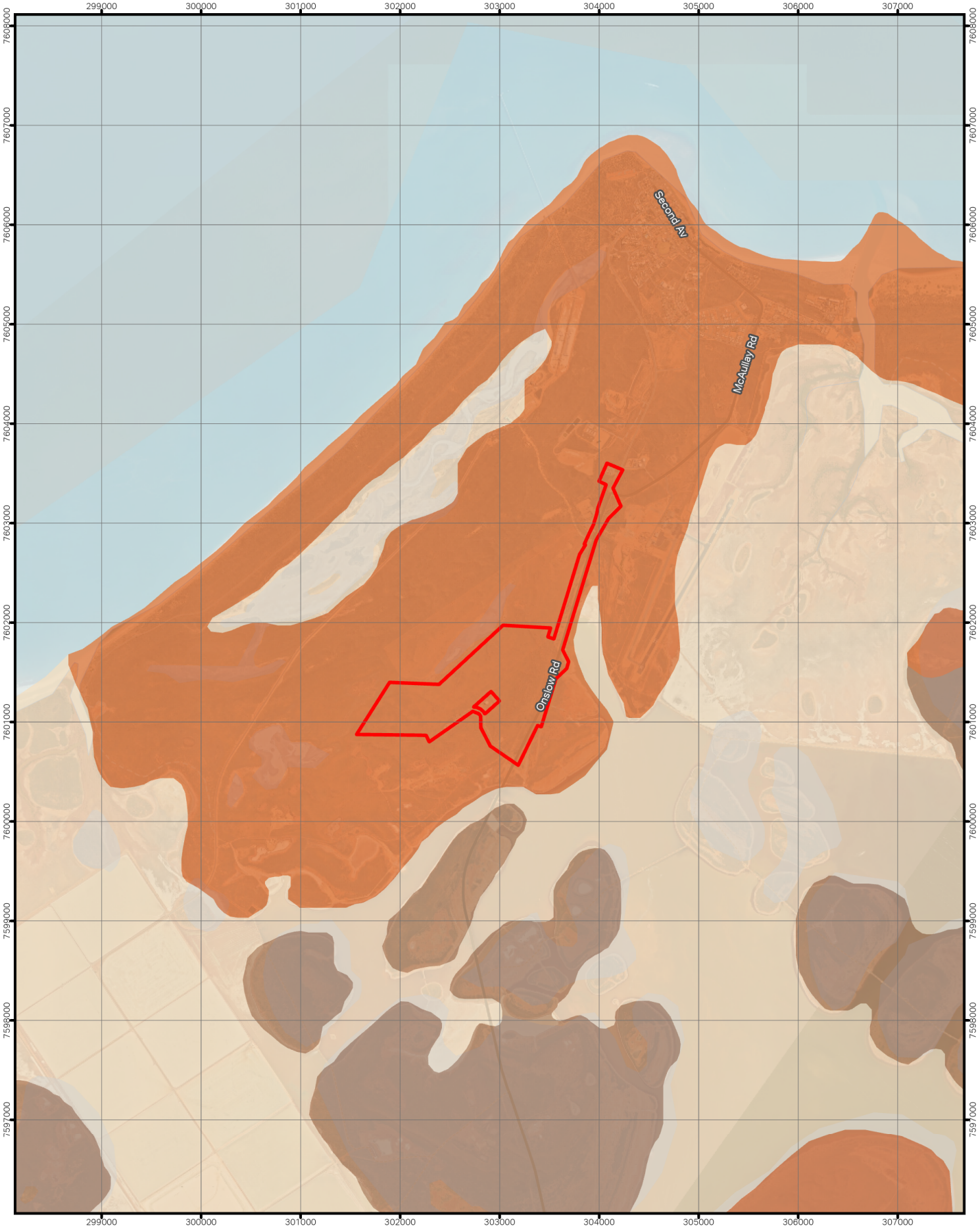

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DATE MODIFIED	30 MAY 2024	**APPROVED BY**	F. DE WIT

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LEGEND

- Survey Area
- Soil Landscape Mapping - Best Available (DPIRD-027)
- Dune system: Dune fields supporting soft spinifex and minor hard spinifex grasslands
- Littoral system: Bare coastal mudflats (unvegetated), samphire flats, sandy islands, coastal dunes and beaches, supporting samphire low shrublands, sparse acacia shrublands and mangrove forests
- Onslow system: Undulating sandplains, dunes and level clay plains supporting soft spinifex grasslands and minor tussock grasslands

Soils

HORIZON POWER

ONSLOW FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 4

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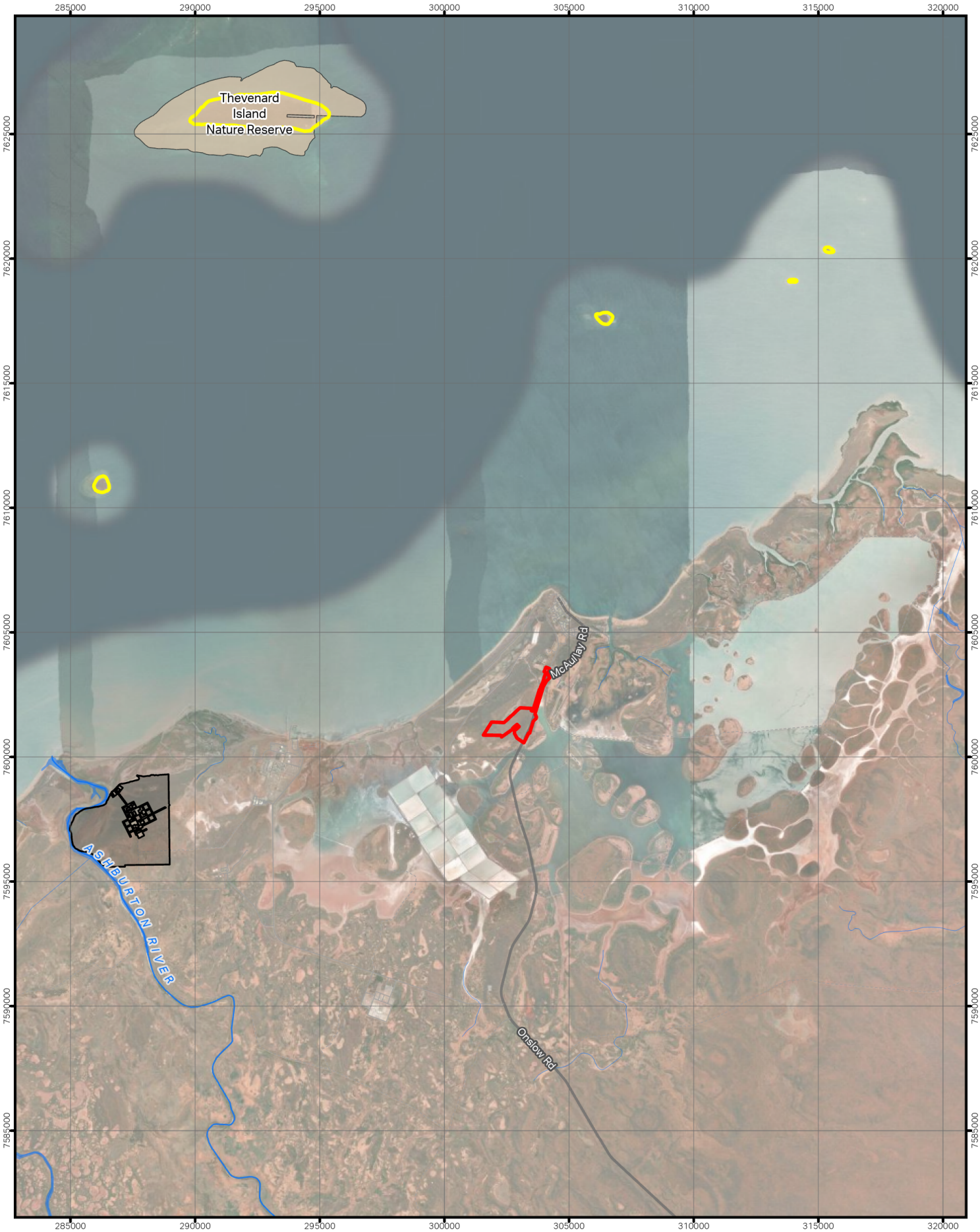

AECOM Delivering a better world

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LEGEND

- Survey Area
- DBCA - Legislated Lands and Waters (DBCA-011)
- Nature Reserve
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)
- A-Class Reserves (LGATE-227)

Reserves and Environmentally Sensitive Area

HORIZON POWER

ONSLOW FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 5

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3.0 Previous Surveys

Three ecological surveys relevant to this project have been undertaken between 2017 and 2023. The author, date, title and significant findings are detailed in Table 2.

Table 2 Previous surveys conducted in the vicinity of the survey area.

Author	Title and Short Description	Significant Findings
GHD (2023)	Fauna Survey for Onslow Project Basic Fauna survey, near to the survey area.	No EPBC Act or BC Act listed Threatened fauna or Priority listed fauna by the DBCA were recorded during the survey. One Marine overfly listed species under the EPBC Act, the Rainbow Bee-eater (*Merops ornatus*), was recorded. No evidence of Northern Quoll activity was recorded.
Eco Logical Australia (2021)	Onslow Rare Earth Plant Detailed Fauna Assessment Detailed fauna assessment, near to the survey area.	No conservation significant fauna listed under the EPBC Act or BC Act, or by the DBCA were found in the survey area.
Phoenix Environmental Services (2017)	Flora and vegetation survey and terrestrial fauna survey for the Pilbara Regional Waste Management Facility Flora, vegetation and fauna survey, near to the survey area.	No Threatened or Priority listed fauna under the EPBC Act or BC Act were found in the survey area. The listed Migratory species Rainbow Bee-eater (*Merops ornatus*), was recorded twice. No Threatened flora listed under the EPBC Act or BC Act was recorded. Two Priority Flora were recorded in the survey area, being *Abutilon* sp. Pritzelianum (P1) and *Triumfetta echinata* (P3). No TEC or PEC were found in the survey area.

4.0 Conservation Codes

4.1 Flora and Fauna

Species at risk of extinction are recognised at a Commonwealth level under the EPBC Act and are categorised as outlined in Table 3.

Table 3 Categories of Species Listed under Schedule 179 of the EPBC Act

Code	Category
Ex	**Extinct Taxa** which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
ExW	**Extinct in the Wild Taxa** which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE	**Critically Endangered Taxa** which at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E	**Endangered Taxa** which is not critically endangered, and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
V	**Vulnerable Taxa** which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	**Conservation Dependent Taxa** which at a particular time if, at that time: the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered the following subparagraphs are satisfied: the species is a species of fish the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long-term survival in nature are maximised the plan of management is in force under a law of the Commonwealth or of a State or Territory cessation of the plan of management would adversely affect the conservation status of the species.
Mi	The EPBC Act also requires the compilation of a list of **Migratory Species** that are recognised under international treaties including the: Japan Australia Migratory Bird Agreement 1981 (JAMBA) China Australia Migratory Bird Agreement 1998 (CAMBA) Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA) Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals). All migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as a MNES under the EPBC Act.
Ma	**Marine**. Species established under s248 of the EPBC Act.

Flora and fauna species that are considered Threatened and need to be specially protected because they are under identifiable threat of extinction are listed under the BC Act. These categories are defined in Table 4.

Table 4 Conservation Codes for WA Flora and Fauna Listed Under the BC Act (DBCA, 2019)

Code	Category
CR	**Critically Endangered Species** Threatened species considered to be facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines. Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.
EN	**Endangered Species** Threatened species considered to be facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines. Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.
VU	**Vulnerable Species** Threatened species considered to be facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines. Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.
EX	**Extinct Species** Species which have been adequately searched for and there is no reasonable doubt that the last individual has died, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).
MI	**Migratory species** Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.
CD	**Species of special conservation interest (conservation dependent fauna)** Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).
OS	**Other specially protected species** Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Species that have not yet been adequately surveyed to warrant being listed under the BC Act, or are otherwise data deficient, are added to a Priority List as Priority 1, 2 or 3 by the State Minister for Environment. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are listed as Priority 4. Categories and definitions of Priority Flora and Fauna species are provided Table 5.

Table 5 Conservation Codes for WA Flora and Fauna as Listed by DBCA and Endorsed by the Minister for Environment

Code	Category
P1	**Priority One – Poorly Known Species** Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g., agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	**Priority Two – Poorly Known Species** Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g., national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	**Priority Three – Poorly Known Species** Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	**Priority Four – Rare, Near Threatened and other species in need of monitoring** Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

4.2 Vegetation Communities

Threatened Ecological Communities (TECs) are naturally occurring biological assemblages that occur in a particular type of habitat and that may be subject to processes that threaten to destroy or significantly modify the assemblage across its range. TECs are listed by both State and Commonwealth legislation.

Communities can be classified as TECs under the EPBC Act. Categories of EPBC Act listed TECs are described in Table 6.

Table 6 Categories of TECs that are Listed Under the EPBC Act

Code	Category
CE	**Critically Endangered** If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
E	**Endangered** If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
V	**Vulnerable** If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

Vegetation communities in Western Australia are listed as TECs under the BC Act in one of four categories including Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable. These categories are defined in Table 7. Possible TECs that do not meet survey criteria or are not adequately defined are listed as Priority Ecological Communities (PECs) under Priorities 1, 2 and 3. Ecological communities that are adequately known and are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. Conservation dependent communities are classified as Priority 5. PECs are endorsed by the Minister for Environment and are described in Table 8.

DBCA requires that all Priority and Threatened ecological communities are considered during environmental impact assessments and clearing permit applications.

Table 7 Conservation Codes for State Listed Ecological Communities

Code	Category
PD	*Presumed Totally Destroyed*
CR	*Critically Endangered*
EN	*Endangered*
VU	*Vulnerable*

Table 8 Categories for Priority Ecological Communities

Code	Category
P1	**Priority One**: poorly known ecological communities
P2	**Priority Two**: poorly known ecological communities
P3	**Priority Three**: poorly known ecological communities
P4	**Priority Four**: ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list.

Significant flora and vegetation units need to take into account a number of other features other than statutory listings in accordance with the Flora and Vegetation Environmental Factor Guideline (EPA, 2016). These include the following:

- Restricted distribution.
- Degree of historical impact from threatening processes.
- A role as a refuge.
- Providing an important function required to maintain ecological integrity of a significant ecosystem.

5.0 Methodology

The ecological assessments included a desktop assessment, field survey and a reporting component.

5.1 Desktop Assessment

A desktop assessment was undertaken prior to completing the field surveys. The objective was to determine the existing environment and to identify significant environmental values that are likely to be present in the survey area such as threatened and priority flora, fauna, and vegetation communities. This information informed the field survey sample plan.

The desktop assessment utilised the following sources:

- Department of Biodiversity, Conservation and Attractions (DBCA) Threatened Species and Communities database including Threatened Priority flora and communities with 50 km buffer.
- Protected Matters Search Tool (PMST) with a 50km buffer (DCCEEW, 2024).
- Previous surveys outlined in Section 3.0.
- Atlas of Living Australia database
- Dandjoo online database.

Significant flora species likelihood of occurrence was assessed systematically using a point-based system which considers proximity (within 20 km) and date of known records (last 20 years), and habitat suitability (Table 9).

Significant fauna species likelihood of occurrence was assessed systematically using a point-based system that considers proximity (within 20 km) and date of known records (last 20 years) as well as habitat suitability (Table 10).

The likelihood of significant ecological communities occurring depends on the presence of suitable landforms, land systems, known occurrences and distance of known occurrences.

Table 9 Categories of likelihood for significant flora species

Likelihood of Occurrence	Definition
Known	Species is known to occur in the survey area.
High	There are records nearby and suitable habitat for the species is known or likely to be present within the survey area including ‘core’ habitat. Records are from within 20 years.
Moderate	There are records nearby (<15km) and suitable habitat is likely to be present but there are no records from the last 20 years.
Low	No more than two favourable attributes are present from: known from within 15 km, suitable habitat may be present, and/or there are records from the last 20 years. No core habitat is present.
Negligible	No suitable or core habitat is present.

Table 10 Categories of Likelihood of Occurrence for Fauna Species

Likelihood of Occurrence	Score	Definition
Known	5	Species is known to occur in the survey area.
High (Likely)	3,4	Not known to occur in the survey area but there are records within close proximity of the survey area AND/OR recent records and suitable habitat for the species is known to be, or likely to be, present within the survey area.
Moderate (Possible)	2,3	Not known to occur within the survey area but there are records in close proximity of the survey area and recent records and suitable habitat for the species is known to be, or likely to be present within the survey area. OR Not known to occur within the survey area but suitable habitat for the species is known to be, or likely to be present within the survey area.
Low (Unlikely)	1,2	Not known to occur within the survey area but there are records in close proximity OR recent records and suitable habitat for the species may be present (marginal habitat).
Negligible (Suitable Habitat not Present)	0, 1,	Despite records in close proximity or recent records, no suitable habitat is present within the survey area, therefore the likelihood of the species occurring there is negligible.

5.2 Flora and Vegetation

A flora and vegetation survey was carried out utilising the methods outlined in the EPA Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016). The survey was undertaken by:

- Floora De Wit (collection permit FB62000137), PGDip (Environmental Management and Impact Assessment), BSc (Environmental Biology), 17+ years' experience.
- Cassandra House (collection permit FB62000118-2), MSc (Conservation Biology), BSc (Conservation Biology), 7+ years' experience.

The field survey was undertaken between 30 April and 3 May 2024. The survey used a combination of non-permanent quadrats, transects, relevés, and observation points to define the floristic values of the site. Quadrats and relevés were 20 x 20 m in size in accordance with the Technical Guide. Data collected from sample sites included the presence of plant species, their cover abundance, structural composition of vegetation, physical environment, and presence/absence of disturbance.

Each quadrat and relevé was given a unique site number, and the following parameters were recorded:

- Date
- Location using hand-held GPS (accuracy of 5 m)
- Sample site type (quadrat/relevé and size)
- Photograph (northwest corner)
- Soil details (type, colour, moisture)
- Landform
- Vegetation condition using the Trudgen (1988) scale and description of disturbance
- Fire history
- Comprehensive species list
  - Estimated height
  - Estimated percentage cover (for trees both percentage within the quadrat and within the community was recorded to enable better description of vegetation community).

5.2.1 Targeted Flora Searches

Targeted flora searches were undertaken for conservation significant species that were considered highly likely to occur. Prior to the commencement of the field survey, all species were reviewed, and a field guide booklet was constructed. The field guide contained all available information and photographs for the tentative identification of Threatened and Priority flora in the field.

The survey area was traversed on foot using meandering traverses. All species that were considered to be Threatened or a Priority flora species, were photographed, the location was marked with a hand-held GPS and a sample was taken. Where more than one individual was present in the location, a count was taken. Collected samples were submitted to the WA Herbarium for formal identification.

5.3 Basic Fauna Survey

A basic fauna survey was undertaken concurrently with the detailed flora and vegetation survey. Carrying out the two surveys simultaneously allowed consistent and clear mapping of the fauna habitats and vegetation communities.

The fauna survey predominantly focused on mapping of fauna habitats to define the structure, complexity and continuity of the habitat present, and document the presence and abundance of habitat features. Additionally, the fauna survey involved assessing for possible presence of conservation significant fauna, and direct or indirect observations of fauna species present.

All observations were made during daylight hours between 0700 and 1800.

5.3.1 Targeted Fauna Survey

A targeted fauna survey was undertaken to assess the usage of the habitat within the survey area for conservation significant fauna. The project area is within the known distribution of the Northern Quoll *Dasyurus hallucatus* (Endangered under the EPBC and BC Acts), Maryan's Keeled Slider *Lerista planiventralis maryani* (Priority 1) and Northern Short-tailed Mouse *Leggadina lakedownensis* (Priority 4). Any potential habitat identified for these three species was targeted to verify whether the species may be present and/or utilise the project area.

To target the Northern Quoll, ten motion sensor cameras with non-consumable lures were used. Bait (sardines) was placed inside a tea-infuser and fastened to a star picket approximately 30cm above the ground and a minimum of 2 m in front of the camera trap. Ant granules were mixed into the sand around the base of the bait station to deter ant visitation and avoid deterring any target species. The camera traps used were no-glow and did not use flash in order to reduce disturbance on fauna. Sites chosen to locate cameras considered factors such as sun trajectory, windy conditions, nearby suitable shelter, potential water sources and areas that may be utilised whilst transiting between different habitats.

Dry pitfall traps were used to target Northern Short-tailed Mouse *Leggadina lakedownensis* (P4) and Maryan's Keeled Slider *Lerista planiventralis maryani* (P1). The dry pitfall trapping program was conducted in accordance with the DBCA Standard Operating Procedure (SOP): Dry Pitfall Traps for Live Capture of Terrestrial Vertebrates (DBCA, 2023).

Approved 20L buckets were used for trapping, with buckets buried to appear flush to ground level and a drift fence installed above the bucket. Pitfall traps contained sand for invertebrate burrowing, egg cartons for shelter, styrofoam for floats and leaf litter for exposure protection. Trap lids were modified to restrict the opening size to <15 cm in width, in order to minimize the risk of predation by larger predatory fauna species such as the Northern Quoll, cats or goannas.

As the project aimed to target the diurnal/nocturnal Maryan's Keeled Slider and the nocturnal Northern Short-tailed Mouse, a modified schedule for trapping was established. Traps were open both during the day and overnight. This meant that the traps were checked first thing in the morning (approximately 0600 – 0900), a maximum of three (3) hours after sunrise (as per the SOP: Dry Pitfall Traps for Live Capture of Terrestrial Vertebrates) (DBCA, 2023). Traps were reset, before being checked again in the late morning-early afternoon (1100 to 1300) to target reptiles. The traps were then closed for the late afternoon period before being reset in the evening (1700-1800) to allow for nocturnal mammal capture. This process was repeated daily for seven days and nights.

Ants were deterred when observed or considered likely to become an issue through the use of a small amount of surface insecticide.

Handling of fauna was conducted in accordance with the SOP: Hand restraint of wildlife (DBCA, 2023). Removal of animals from pitfalls was conducted as quickly and efficiently as possible to reduce animal stress. Identification and relevant biometrics were recorded on digital trapping datasheets. Photographic records were also taken to facilitate minimal handling time as no animals were retained for off-site identification.

No adverse events occurred, including injuries, predation or trap deaths.

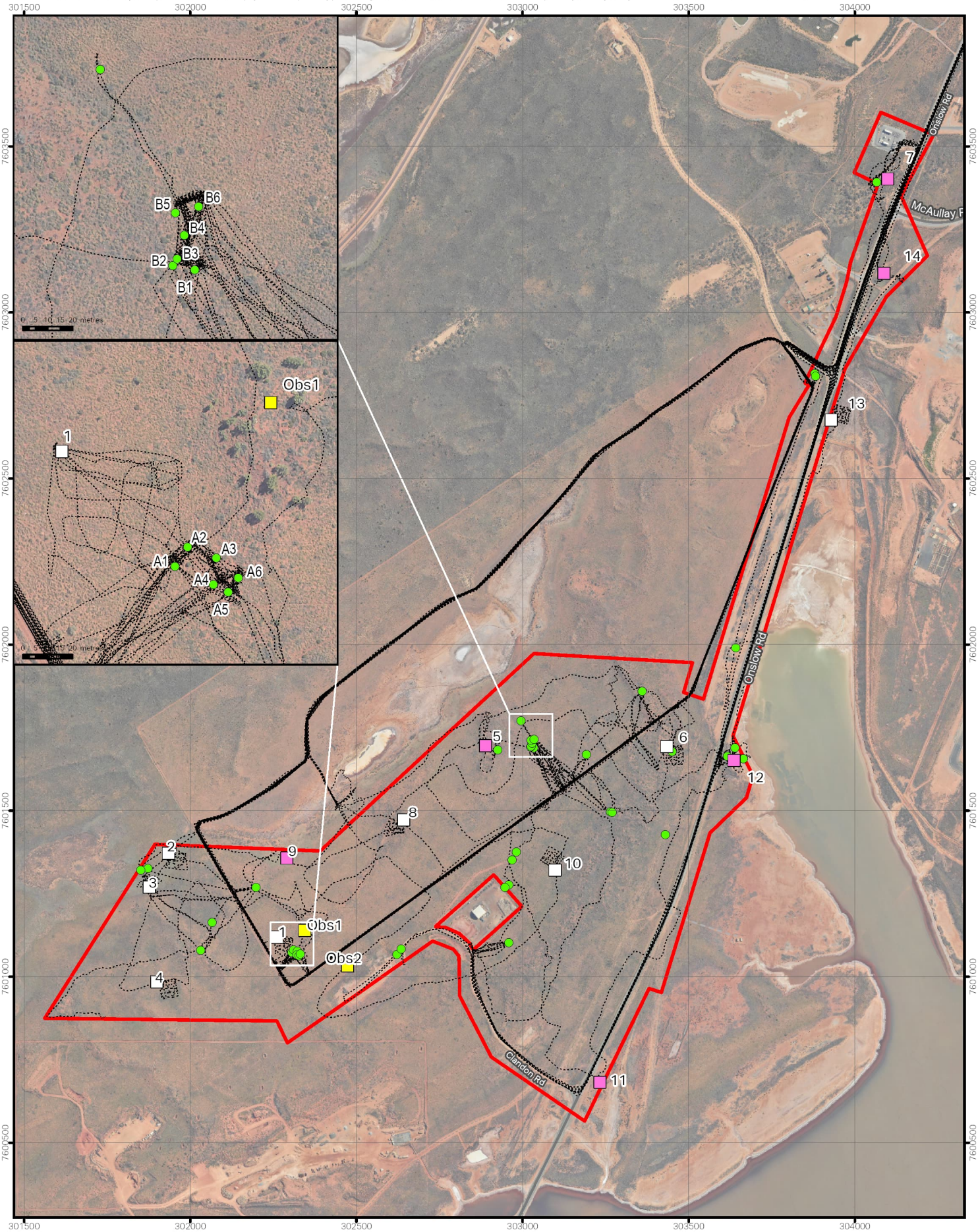
5.4 Survey Limitations

No significant limitations were identified that may influence the outcome of the field survey. Seven limitations were considered as defined in the EPA Technical Guide (2016). These are detailed in Table 11.

Table 11 Limitations Considered for Ecological Assessment

Limitation	Flora and Vegetation	Fauna
Availability of contextual information on the region	**Nil** Contextual information was derived from publicly available datasets for pre-European vegetation mapping, geology, landforms and climate. DBCA database searches were obtained to inform desktop studies, combined with publicly available data and three reports described in Section 3.0.	**Nil** Contextual information was derived from publicly available datasets for pre-European vegetation mapping, geology, landforms and climate. DBCA database searches were obtained to inform desktop studies, combined with publicly available data and multiple reports described in Section 3.0.
Competency/experience of consultant conducting survey	**Nil** The flora and vegetation assessment was conducted by Floora de Wit (17+ years' experience). Floora has the necessary 5+ years' experience as outlined in the EPA Technical Guide.	**Nil** The survey was conducted by Ecologist Cassandra House (7+ years' experience) and Hannah Spanswick (5+ years' experience).
Proportion of flora/fauna identified, recorded and/or collected (based on sampling, timing, and intensity)	**Nil** All flora species encountered in quadrats and during targeted searches (i.e., opportunistic) were either collected or recorded. The entire survey area was traversed on foot walking meandering traverses. Vegetation communities were represented by a minimum of three sites comprising quadrats and relevés. Some communities including the Acacia Shrublands and Chenopod Shrublands were better represented by meandering relevés to ensure all flora species representative of the community were included. Quadrats were 50x50 m, larger than the recommended 30x30 m for the Carnarvon IBRA region. The low diversity meant larger quadrat size would better capture the vegetation community.	**Minor** The fauna survey search effort was distributed effectively to provide a representative assessment of fauna species and available habitats across the survey area. The survey areas were traversed on foot covering the entire area which is an ideal method for habitat assessment (EPA, 2020) The targeted survey occurred in May, which is outside the optimum survey period recommended for reptiles in the Eremaean climatic region (September-April). This means that the detection rate could be lower for reptile species, as their activity rate will have begun to decline. Without comparative surveys in the ideal detection period, it is uncertain whether this has affected the results of the survey. Mammal species do not have an optimum survey period within the Eremaean climatic region defined in the EPA terrestrial fauna survey technical guidance. The guidance states, however, that mammal population cycles often relate to rainfall. Due to the lack of rainfall that the survey area has

Limitation	Flora and Vegetation	Fauna
		experienced in the preceding 12 months, it is likely that mammal and also bird numbers are low.
Completion (is further work needed)	**Nil** The survey was completed with a search effort that was distributed effectively to provide a representative assessment of vegetation and target flora species present. The survey effort is presented in Figure 6.	**Minor** The effort required to fulfill the requirements of a basic fauna survey was met. Survey effort is presented in Figure 6. The targeted fauna survey partially met the requirements to determine usage of the survey area by Northern Short-tailed Mouse *Leggadina lakedownensis* and Maryan's Keeled Slider *Lerista planiventralis maryani*. This relates to the seasonal timing of the survey and preceding climatic conditions, detailed in the table below.
Remoteness and/or access problems	**Nil** The entire survey area was accessible on foot.	**Nil** The entire survey area was accessible on foot.
Timing, weather, season, cycle	**Minor** The survey was undertaken within the 'ideal survey season' in accordance with the EPA (2016) Technical Guidance. The survey was undertaken following 12 months of below average rainfall. No annual species were recorded, and many perennial species were unhealthy, dying or dead. The reduced rainfall is a potential limiting factor for identifying significant flora species with an annual life cycle, such as *Helichrysum oligochaetum* (P1) which was given a 'moderate' likelihood of occurrence prior to the survey. This likelihood has been amended to 'low' post-survey.	**Minor** The survey was conducted during a period of reasonable weather in April and May. The basic fauna survey was limited to one period for the year and only during daylight hours, which could limit the species recorded. No spot lighting surveys were conducted. However, this meets the objective of a basic fauna survey (EPA, 2020). The targeted survey occurred in May, which is outside the optimum survey period recommended for reptiles in the Eremaean climatic region (September-April). This means that the detection rate would be lower for reptile species, as their activity rate will have begun to decline. Mammal species do not have an optimum survey period within the Eremaean climatic region defined in the EPA terrestrial fauna survey technical guidance. The guidance states that peaks in mammal population cycles often relates to rainfall. Due to the lack of rainfall that the survey area has experienced in the preceding 12 months, it is likely that mammal and bird numbers are low.
Disturbances (e.g., fire flood, accidental human intervention) which affected results of the survey	**Nil** No disturbances were observed that would influence the outcome of the survey.	**Nil** No disturbances were observed that would influence the outcome of the survey.



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metres

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GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- Tracklogs
- Fauna Habitat Sample Sites
- Pitfall Trap Locations

Flora Sample Sites

- Quadrat
- Relevé
- Other

Survey Effort

HORIZON POWER

ONSLOW FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **6**

A4 size

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6.0 Desktop Results

6.1 Threatened and Priority Ecological Communities

No Threatened Ecological Communities (TECs) listed under the EPBC Act or BC Act are known to occur within the survey area. Three Priority Ecological Communities (PECs), listed by DBCA, have been mapped within 75km of the survey area. These are described below in Table 12 and displayed in Figure 7.

Table 12 Priority Ecological Communities known to occur within 75 km of the survey area.

Community Name and Description	Cons. Status[1]	Distance from Survey Area (km)	Likelihood
Tanpool Land System A highly restricted land system that occurs between Pannawonica and Onslow. Consists of stony plains and low ridges of sandstone and other sedimentary rocks supporting hard spinifex grasslands and snakewood shrublands	P1	50.89	Unlikely to occur. Survey area does not occur on the Tanpool Land System.
Subterranean invertebrate community of pisolitic hills in the Pilbara A series of isolated low undulating hills occur in the state's Pilbara region. The troglofauna are being identified as having very short-range distributions.	P1	70.67	Unlikely to occur. Survey area does not occur on this community.
Coastal dune tussock grassland dominated by *Whiteochloa airoides* Tussock grassland of *Whiteochloa airoides* occurs on the landward side of foredunes, hind dunes or remnant dunes with white or pinkish white medium sands with marine fragments. There may be occasional *Spinifex longifolius* tussock or *Triodia epactia* hummock grasses and scattered low shrubs of *Olearia dampierii* subsp. *dampierii*, *Scaevola spinescens*, *S. cunninghamii*, *Trianthema turgidifolia* and *Corchorus* species (*C. walcottii, C. laniflorus*).	P3	26.49	Unlikely to occur. Survey area does not occur on this community.

1. DBCA conservation code P Priority flora

6.2 Significant Flora Species

A total of 23 Threatened and Priority flora species were identified in the desktop assessment as potentially occurring in the survey area (Figure 7). Of these, one species is listed as Vulnerable under the EPBC Act. The remaining 22 species are Priority species under the BC Act or listed by DBCA.

Based on the desktop assessment, it has been determined that one flora species of conservation significance has a high likelihood of occurring in the survey area, with eight species of conservation significance having a moderate likelihood of occurring in the survey area (Table 13). The remaining 20 species have a low or negligible likelihood of occurring in the survey area (Appendix A).

Table 13 Desktop Flora Results of Conservation Significant Flora with a 'high' or 'moderate' likelihood of occurrence.

Species	Conservation Code[1]	Habitat	Distance from Survey Area (km)
High			
Abutilon sp. Pritzelianum (S. van Leeuwen 5095)	P3	Recorded previously on sandplain with orange, brown sandy loam (WAH, 2023).	21.96
Moderate			
Abutilon sp. Onslow (F. Smith s.n. 10/9/61)	P3	Associated with sand plains in grassland of *Triodia lanigera* with an overstorey of *Acacia xiphophylla* (DPAW & Rio Tinto, 2015). Associated with flat plains and flood plains with red soils (DBCA data).	17.43
Carpobrotus sp. Thevenard Island (M. White 050)	P3	Coarse white sand. Dune tops, disturbed areas.	92.42
Corchorus congener	P3	Associated with sand and red sandy loam with limestone, on sand dunes and plains. Distributed from Exmouth to Karratha.	55
Eremophila forrestii subsp. *viridis*	P3	Recorded previously in red sand dunes, steep rocky gullies, and hardpan dune swales.	10.65
Helichrysum oligochaetum	P1	Depressions and floodplains in clay soils.	68.93
Indigofera roseola	P1	Recorded on red sand dune.	82.52
Lepidium biplicatum	P3	Coastal regions.	74.09
Triumfetta echinata	P3	Red sandy soils, sand dunes.	10.01

1. DBCA conservation code P Priority

6.3 Significant Fauna Species

A total of 69 Threatened, Priority, and Migratory fauna species were identified from the desktop assessment as potentially occurring in the survey area (Figure 7).

A review of habitat and spatial data determined that 13 species have a high likelihood of occurring in the survey area. These species and their habitat are detailed in Table 14.

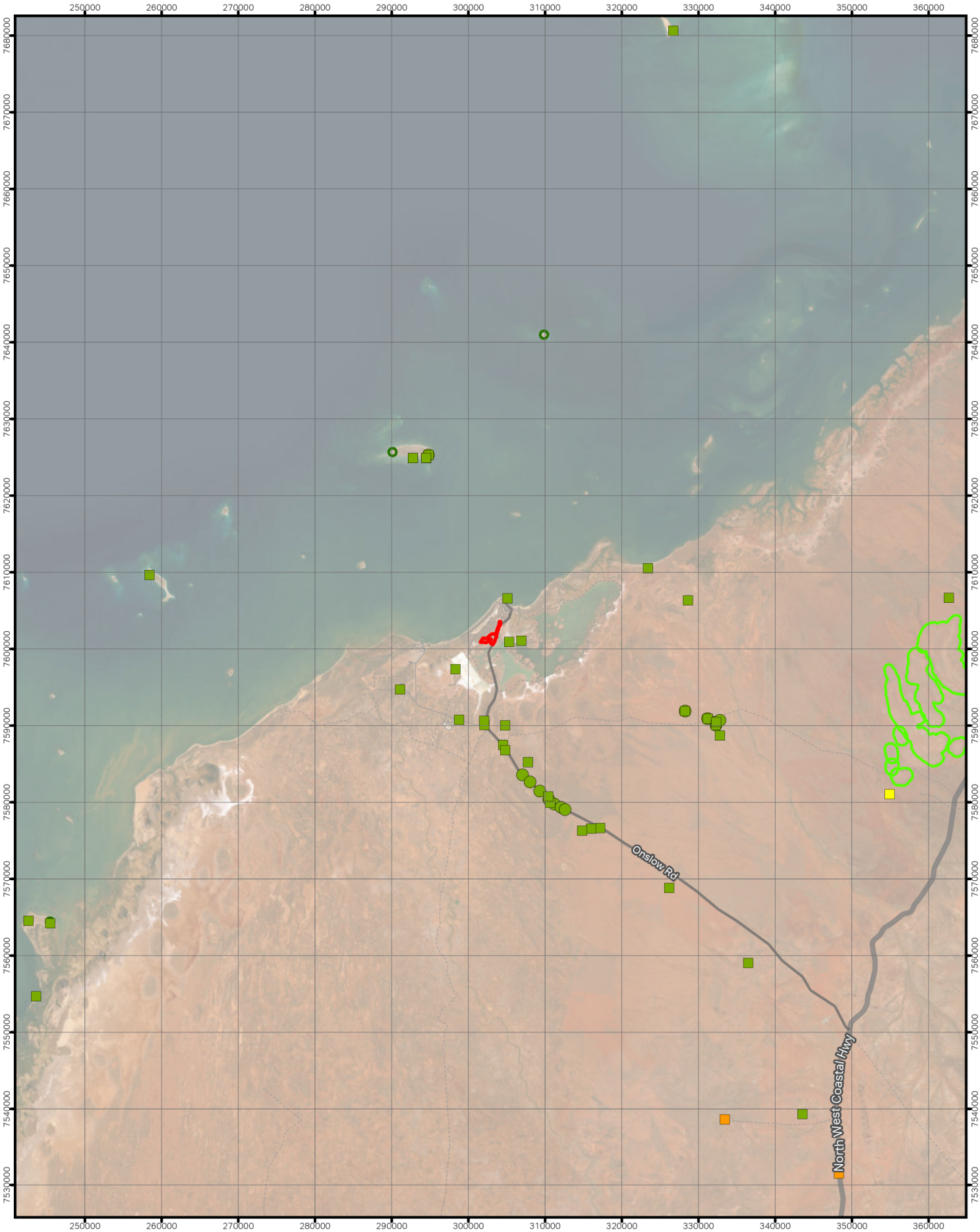
Additionally, 21 species were identified as having a moderate likelihood of occurrence, while 23 species are considered to have a low likelihood of occurring and the remaining 13 species have a negligible likelihood of occurring. A comprehensive desktop species list, associated habitat and likelihood assessment is provided in Appendix B.

Table 14 Desktop Fauna Results of Conservation Significant Fauna with a 'high' likelihood of occurrence.

Taxon	Common Name	Conservation Code		Habitat	Distance from Survey Area (km)
		EPBC Act[1]	BC Act/DBCA[2]		
Calidris acuminata	Sharp-tailed Sandpiper	V & MI & MA	VU	Occurs along muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DCCEEW, 2023).	0.35
Calidris ferruginea	Curlew Sandpiper	CE & MI & MA	CR & IA	Intertidal mudflats in sheltered coastal areas and inland around ephemeral and permanent lakes, dams, waterholes and bore drains with bare edges of mud and sand (DCCEEW, 2023).	2.08
Gelochelidon nilotica	Gull-billed Tern	MI & MA	IA	Shallow wetlands, including coastal or inland lakes, swamps and lagoons, sheltered bays and estuaries (DCCEEW, 2023).	0.35
Numenius minutus	Little Curlew	MI & MA	IA	Dry grassplains, floodplains, margins of drying swamps, tidal mudflats, crops and sewage ponds (Knight, Pizzey, & Pizzey S, 2012).	2.58
Numenius phaeopus	Whimbrel	MI & MA	IA	Along the Australian coast, inhabiting estuaries, mangroves, tidal flats, flooded paddocks, and bare grasslands (Knight, Pizzey, & Pizzey S, 2012)	1.05
Pandion haliaetus	Osprey	MI & MA	P4	Littoral and coastal habitats, terrestrial wetlands of tropical and temperate Australia, and offshore islands. Atypical habitats include heath, woodland or forest (DCCEEW, 2023).	6.14
Plegadis falcinellus	Glossy Ibis	MI & MA	P1	Well vegetated wetlands, wet pastures, floodwaters, brackish wetlands and mudflats (Knight, Pizzey, & Pizzey S, 2012).	3.14
Pluvialis squatarola	Grey Plover	V & MI & MA	IA	Coastal, marine shores, inlets, estuaries and lagoons with large tidal mudflats or sandflats, sandy beaches and rocky coasts. It is occasionally found inland (Birdlife Australia, 2024).	0.35
Sternula nereis nereis	Australian Fairy Tern	V	IA	It is most common in Western Australia, found on coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons, favouring both fresh and saline wetlands and near-coastal terrestrial wetlands, including lakes and salt-ponds (Birdlife Australia, 2024).	2.69

Taxon	Common Name	Conservation Code		Habitat	Distance from Survey Area (km)
		EPBC Act[1]	BC Act/DBCA[2]		
Tringa brevipes	Grey-tailed tattler	MI & MA	N/A	Sheltered coasts with reefs and rock platforms or intertidal mudflats, embayments, estuaries and coastal lagoons (particularly those fringed with mangroves) (Higgins & & Davies, 1996).	0.42
Leggadina lakedownensis	Lakeland Downs Short-tailed Mouse, Northern Short-tailed Mouse		P4	Known to occur on sandy soils and cracking clays in Western Australia, and tropical tussock grasslands or woodlands in Queensland. On Thevenard Island, occupies Acacia shrublands and low shrubs on deep sandy soils (Van Dyck & Strahan, 2008).	6.15
Lerista planiventralis maryani	Maryan's Keeled Slider		P1	Fossorial, hummock grassland, open heath, open scrub, oviparous, tall shrubland (Storr, A new subspecies of Lerista planiventralis (Lacertilia: Scincidae) from Western Australia, 1991).	3.14

1. EPBC Act Listing: V Vulnerable,
2. Priority Species List: P Priority, IA Internation Agreement/Migratory



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GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- TECPEC / Communities
  - Priority 1
  - Priority 3
- Threatened and Priority Flora database (TPFL)
  - P3
- WA Herbarium database (WAHERB)
  - P1
  - P2
  - P3

Desktop Significant Flora and Community Results

HORIZON POWER

ONSLOW FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure

7a

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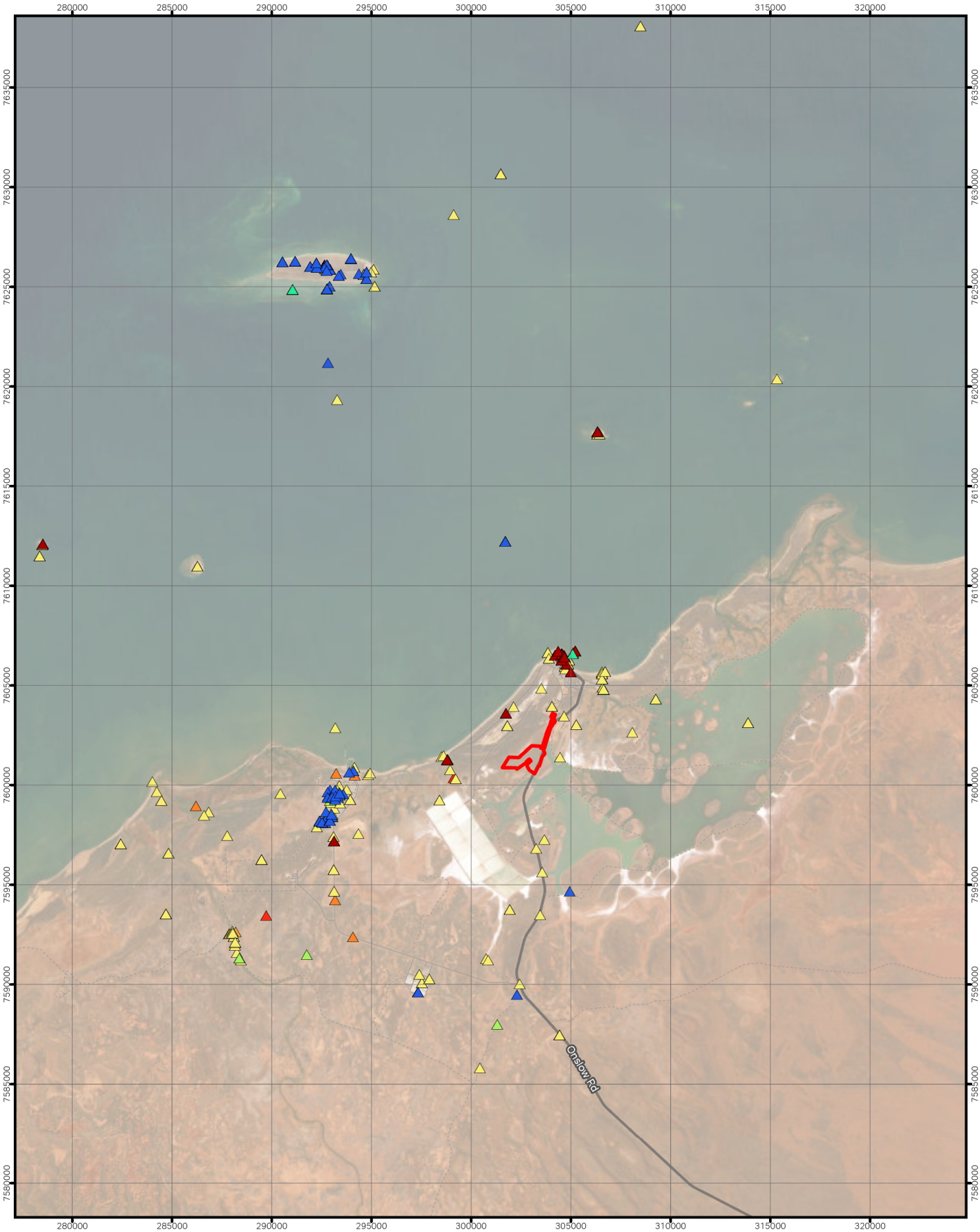

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GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- Threatened Fauna database (DBCA)
  - Critically Endangered
  - Endangered
  - Vulnerable
  - Migratory Species
  - MI & P4
  - Specially Protected
  - Priority 1
  - Priority 4

Desktop Significant Fauna Results

HORIZON POWER

ONSLOW FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7b

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7.0 Field Survey Results

7.1 Vegetation

7.1.1 Vegetation Communities

Six native vegetation communities were defined and mapped in the survey area. This included:

- TaEf (3.59 ha) - Saltbush Shrubland. This community represents riparian/groundwater dependent vegetation, dominated by *Tecticornia* and *Neobassia* species.
- EvTdSm (0.16 ha) - Emergent *Eucalyptus victrix* Woodland situated slightly higher in the landscape than the nearby saltlake.
- AgTe (109.46 ha) – Triodia Hummock Grasslands community with isolated shrubs. This community was common throughout the survey area and recorded on undulating terrain.
- GsTe (23.93 ha) - Grevillea and Acacia Shrubland, situated on deep red sand dunes throughout the landscape.
- SmPr (2.59 ha) – Drainage Grassland community, situated within low-lying areas that are likely seasonally inundated.
- Salt Lakes (1.29 ha) - Natural low-lying areas containing salt lakes.

Descriptions are provided in Table 15 and mapped in Figure 8. The relationship between relevés and quadrat data is presented in Plate 1. Two outliers were identified, Q07 and R14. Q07 was located in a disturbed area of vegetation close to infrastructure, whilst R14 was located in a small and isolated patch of remnant eucalyptus woodland.

Areas lacking native vegetation are represented by Paddocks (4.49 ha) and Cleared (19.34 ha). For the purposes of this report, Salt Lakes are considered representative of a native vegetation community, despite lacking plant cover. Paddocks, Cleared and Salt Lakes have not been included in Table 15 due to their lack of native vegetation. Native vegetation is mapped for 141.02 ha.

Table 15 Vegetation community descriptions, richness, extent and photograph

Description	Additional Information	Photograph
AgTe Hummock Grasslands *Acacia gregorii, Diplopeltis eriocarpa* and *Pimelea ammocharis* isolated clumps of shrubs over *Triodia epactia* hummock grassland. This community occurred on red sands in undulating terrain, predominantly in dune swales. Limestone rocks occurred sporadically on the surface.	Survey effort: Q01, Q04, Q10 Extent: 109.46 Native species richness: 27 Weed species richness: 1	
SmPr Drainage Grassland *Sporobolus mitchellii, Triodia epactia* and *?Sorghum plumosum* grassland over *Pluchea rubeliflora, Stemodia* sp. Onslow and *Stemodia* sp. indet sparse forbland. This community occurred on red sandy soil, with occurrences of clay and loam. The terrain for this community was flat or lower slopes, with no rocks or outcrops present.	Survey effort: Q02, Q03, R09, Extent: 2.59 ha Native species richness: 14	

Description	Additional Information	Photograph
GsTe Grevillea and Acacia Shrubland *Grevillea stenobotrya, Acacia ancistrocarpa* and *Trichodesma zeylanicum* open shrubland over *Triodia epactia* open hummock grassland This shrubland community was situated on deep red sand dunes throughout the survey area. Harder patches of soil dominated by clay occur infrequently.	Survey effort: R05, Q06, R07, Q08 Extent: 23.93 ha Native species richness: 27 Weed species richness: 2	
TaEf Saltbush Shrubland *Tecticornia ?auriculata, Neobassia astrocarpa* and *Salsola australis* open shrubland over *Eragrostis falcata* sparse tussock grassland. This community was located in low-lying flats within the landscape, on red silty sand or sandy clay.	Survey effort: R11, R12, Q13 Extent: 3.59 ha Species richness: 5	

Description	Additional Information	Photograph
EvTdSm Eucalyptus Woodland *Eucalyptus victrix* open woodland over *Threlkeldia diffusa, Myoporum montanum* and *Acacia ancistrocarpa* open shrubland over *Sporobolus mitchellii*, **Cenchrus ciliaris* and *Eragrostis falcata* open tussock grassland. The community is located on low-lying flats, on red sand with some clay incursions.	Survey effort: R14 Extent: 0.16 ha Native species richness: 18 Weed species richness: 2	

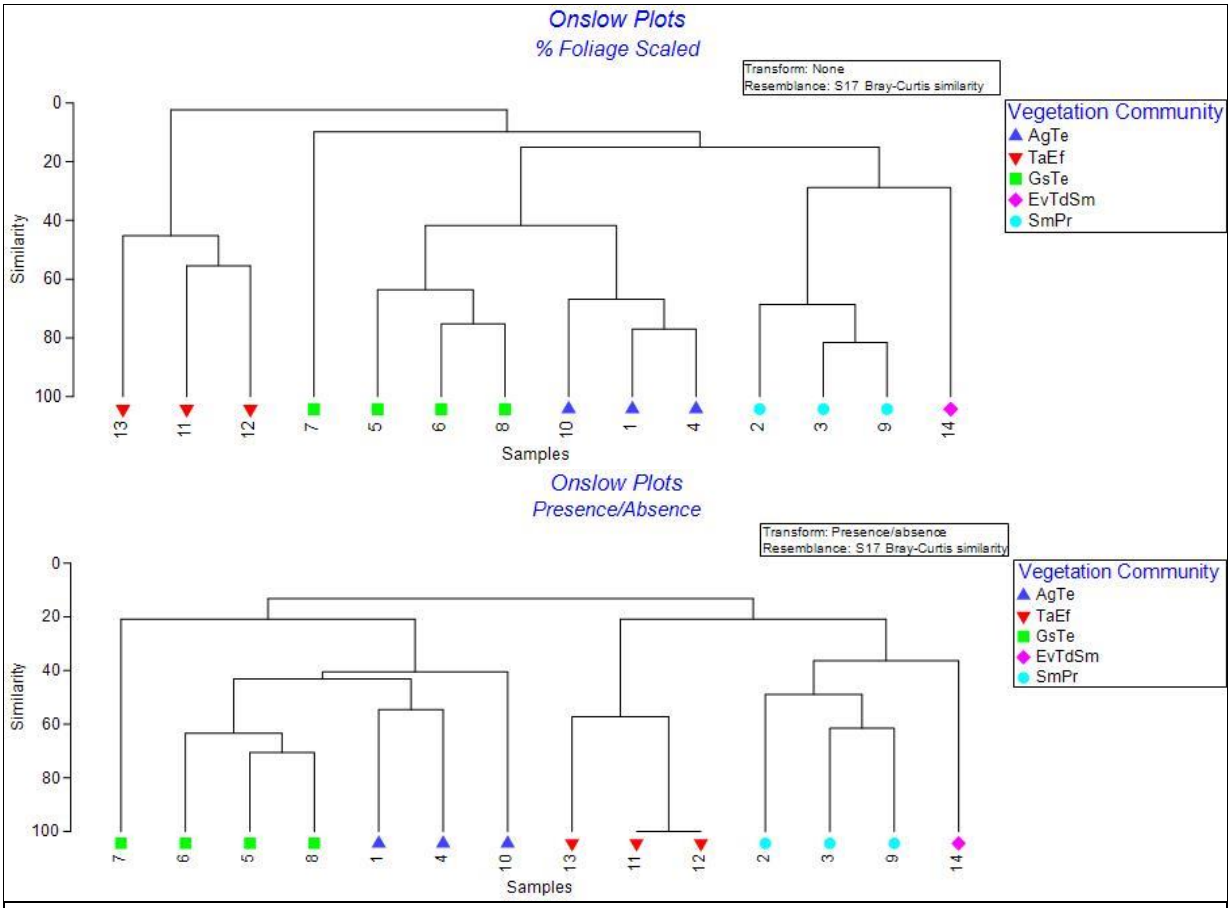
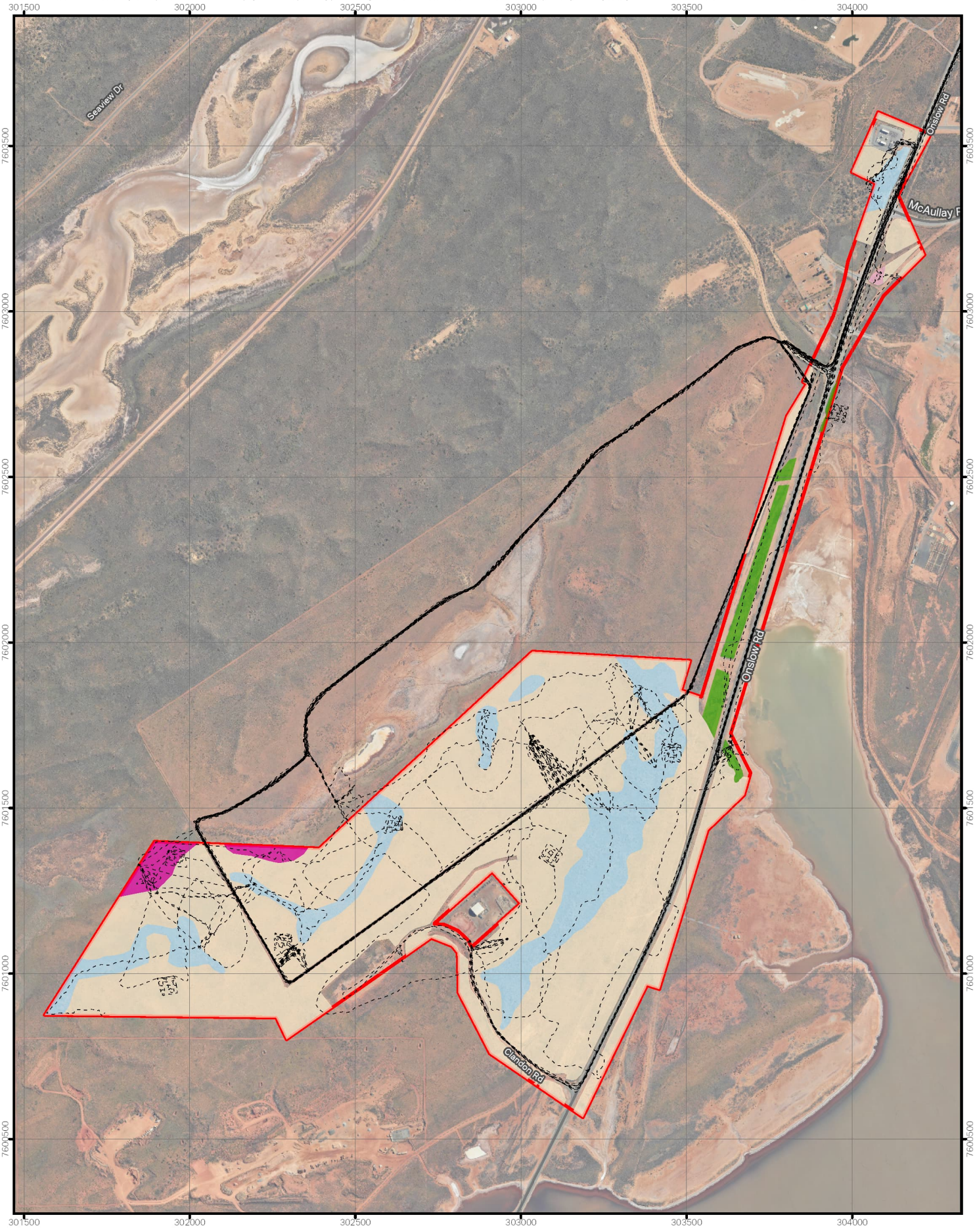


Plate 1 Dendrograms of site data



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GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- Tracklog
- Vegetation Community
  - AgTe
  - EvTdSm
  - GsTe
  - SmPr
  - TaEf

Vegetation Communities

HORIZON POWER

ONSLOW FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 8

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7.1.2 Vegetation Condition

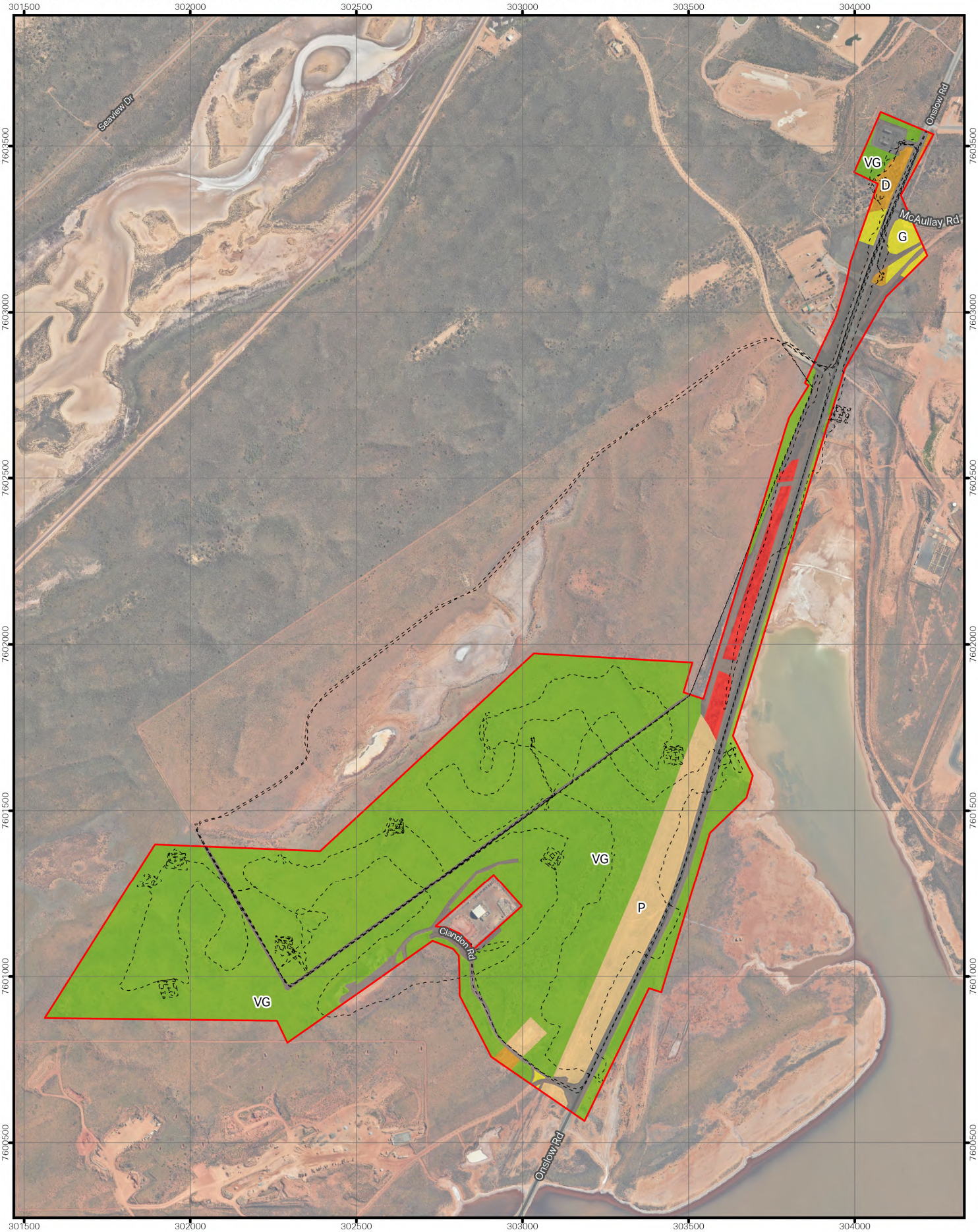
Vegetation condition varied from Very Good to Completely Degraded. Roadside clearing, weed invasion and a long history of horse tenure have reduced vegetation condition. Onslow has also been very dry during the twelve months preceding the survey which has contributed to the reduced biodiversity and death of many perennial species.

Vegetation condition extent is presented in Table 16 and mapped in Figure 9.

Table 16 Vegetation condition extent

Condition	Extent (ha)	Proportion of Area (%)
Very Good	123.93	87
Good	1.80	1
Poor	11.90	8
Degraded	1.65	1
Completely Degraded	3.13	2
Total	**142.40**	**100**
Cleared	22.45	

Plate 2 Degraded roadside vegetation



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metres

GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- Tracklog

Vegetation Condition

- Very Good
- Good
- Poor
- Degraded
- Completely Degraded
- Cleared

Vegetation Condition

HORIZON POWER

ONSLOW FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 9

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7.2 Flora

A total of 68 flora species were recorded and confirmed to occur in the survey area. These represent 48 genera and 23 families. Of these species, two were introduced common weed species. None were listed as Declared Pest on the BAM Act or Weeds of National Significance list.

No flora species listed as Threatened under the EPBC Act or BC Act were recorded. No species listed as Priority by DBCA were recorded.

The comprehensive list of vascular flora species recorded and representative communities in which they occur in are presented in Appendix C. Quantitative data recorded from individual sample sites is presented in Appendix D.

7.3 Fauna Species

7.3.1 Fauna Inventory

A total of 40 vertebrate fauna species were recorded during the field survey. This comprised of 27 bird, six mammal and seven reptile species. A complete inventory of fauna species recorded within the survey area is provided in Table 17.

Table 17 Fauna observations within the survey area

Class	Scientific Name	Common Name	Observation Method
Mammal	*Sminthopsis youngsoni*	Lesser Hairy-footed Dunnart	Trap B3
Mammal	*Notomys alexis*	Spinifex Hopping Mouse	Tracks
Mammal	*Osphranter robustus erubescens*	Euro	Tracks and remains
Mammal	*Equus caballus*	Horse	Seen, scat, tracks, skeletal remains
Mammal	*Felis catus*	Feral Cat	Trap CT-R4, tracks
Mammal	*Vulpes vulpes*	Red Fox	Trap CT-T1, tracks, scat
Bird	*Anthus australis*	Australian Pipit	Seen and heard
Bird	*Falco longipennis*	Australian hobby	Seen and heard
Bird	*Coracina novaehollandiae*	Black-faced Cuckooshrike	Seen and heard
Bird	*Artamus cinereus*	Black-faced Woodswallow	Seen and heard
Bird	*Elanus axillaris*	Black-shouldered Kite	Seen and heard
Bird	*Accipiter fasciatus*	Brown Goshawk	Seen and heard
Bird	*Cincloramphus cruralis*	Brown Songlark	Seen and heard
Bird	*Melopsittacus undulatus*	Budgerigar	Seen and heard
Bird	*Ocyphaps lophotes*	Crested Pigeon	Seen and heard
Bird	*Mirafra javanica*	Horsfield's Bush Lark	Seen and heard
Bird	*Cacatua sanguinea*	Little Corella	Seen and heard
Bird	*Corvus bennetti*	Little Crow	Seen and heard
Bird	*Hieraaetus morphnoides*	Little Eagle	Seen and heard
Bird	*Gymnorhina tibicen*	Australian Magpie	Seen and heard
Bird	*Grallina cyanoleuca*	Magpie-lark	Seen and heard

Class	Scientific Name	Common Name	Observation Method
Bird	*Falco cenchroides*	Australian Kestrel (Nankeen Kestrel)	Seen and heard
Bird	*Amytornis textilis*	Thick-billed Grasswren	Seen and heard
Bird	*Corvus orru*	Torresian Crow	Seen and heard
Bird	*Petrochelidon nigricans*	Tree Martin	Seen and heard
Bird	*Aquila audax*	Wedge-tailed Eagle	Seen and heard
Bird	*Haliastur sphenurus*	Whistling kite	Seen and heard
Bird	*Artamus leucorynchus*	White-breasted Woodswallow	Seen and heard
Bird	*Malurus leucopterus*	White-winged Fairywren	Seen and heard
Bird	*Ptilotula penicillata*	White-plumed Honeyeater	Seen and heard
Bird	*Poodytes carteri*	Spinifexbird	Seen and heard
Bird	*Taeniopygia castanotis*	Australian Zebra Finch	Seen and heard
Bird	*Gavicalis virescens*	Singing Honeyeater	Seen and heard
Reptile	*Pseudechis australis*	Mulga Snake	Seen
Reptile	*Ctenophorus isolepis*	Central Military Dragon	Seen
Reptile	*Ctenotus hanloni*	Nimble Ctenotus	Seen, Trap A1
Reptile	*Ctenotus iapetus*	North-West Cape Ctenotus	Trap A1
Reptile	*Heteronotia binoei*	Bynoe's Gecko	Trap A6
Reptile	*Lerista bipes*	Western Two-toed Slider	Traps B1, B2, B3, B4, B5, B6, A2, A3, A4, A6
Reptile	*Nephrurus levis*	Smooth Knob-tailed Gecko	Trap B4

7.3.2 Conservation Significant Fauna Species

No conservation significant fauna listed under the EPBC Act or BC Act, or listed by DBCA were observed during the survey. Conservation significant fauna identified in the desktop assessment with the potential to occur post-survey based on habitat suitability includes:

- Northern Short-tailed Mouse, *Leggadina lakedownensis* (P4)
- Maryan's Keeled Slider, *Lerista planiventralis maryani* (P1)
- 27 Migratory birds (Including six Vulnerable species and two Critically Endangered species).

Areas of suitable habitat for these species within the survey area is discussed in Section 8.4.

7.3.3 Introduced Species

Three introduced species were recorded:

- The Feral Cat, *Felis catus*, which is listed as a Declared Pest (s22(2)) under the BAM Act.
- The Red Fox, *Vulpes vulpes,* which is listed as a Declared Pest (s22(2)) under the BAM Act.
- The Domestic Horse, *Equus caballus*, which is listed as Permitted (s11) under the BAM Act.

7.4 Fauna Habitat

Three main fauna habitats were found throughout the survey area, including Undulating Dunes and Flats (130.46 ha, 90%), Seasonally Inundated/Intertidal Areas (13.68 ha, 9%), and Modified (1.38 ha, 1%). The most dominant habitat type was Undulating Dunes, followed by Seasonally Inundated/Intertidal Areas. Fauna habitat types are described in detail below and mapped in Figure 10.

7.4.1 Undulating Dunes and Flats

The Undulating Dunes and Flats habitat type consists of sandy dunes and swales with scattered shrubs (primarily Acacia, Grevillea and Hakea) over spinifex (Plate 3). The soil type was dominated by deep red sands with sandy loam occurring in interdune swales.

Habitat features include an increased presence of larger shrubs (>1m in height) on dunes, with termite mounds found on the harder sandy loam soils. Some areas presented with a greater percentage of clay on the surface and scattered areas of surface limestone rocks, most often within the swales.

Termite mounds found throughout this habitat type provide shelter for reptile and mammal species, as well as perching locations for birds (Plate 4). Small shrubs and logs (>10cm diameter) were common, with grass abundant throughout.

Plate 3 Undulating dunes and flats fauna habitat

Plate 4 Termite mounds within the survey area

7.4.2 Seasonally Inundated/Intertidal Areas

This fauna habitat included both permanently and seasonally inundated areas. Vegetation varied, ranging from no vegetation to *Triodia* spp. as well as samphires and chenopods. One small area also contained *Eucalyptus victrix,* a tree which is commonly observed growing on floodplains, creeklines and rivers within the Onslow region (Plate 5). The soil type includes areas of softer fine clay loam as well as areas of harder silty clay pans with a high surface presence of salt. Areas of saltlake were filled with water at the time of the survey with chenopods located around the edge (Plate 6).

Microhabitat features such as large logs are limited in their abundance, attributed to a lack of dense tall vegetation. Coarse litter is sparse, whilst fine leaf litter is common and bare ground is abundant throughout.

Plate 5 Eucalyptus within the survey area

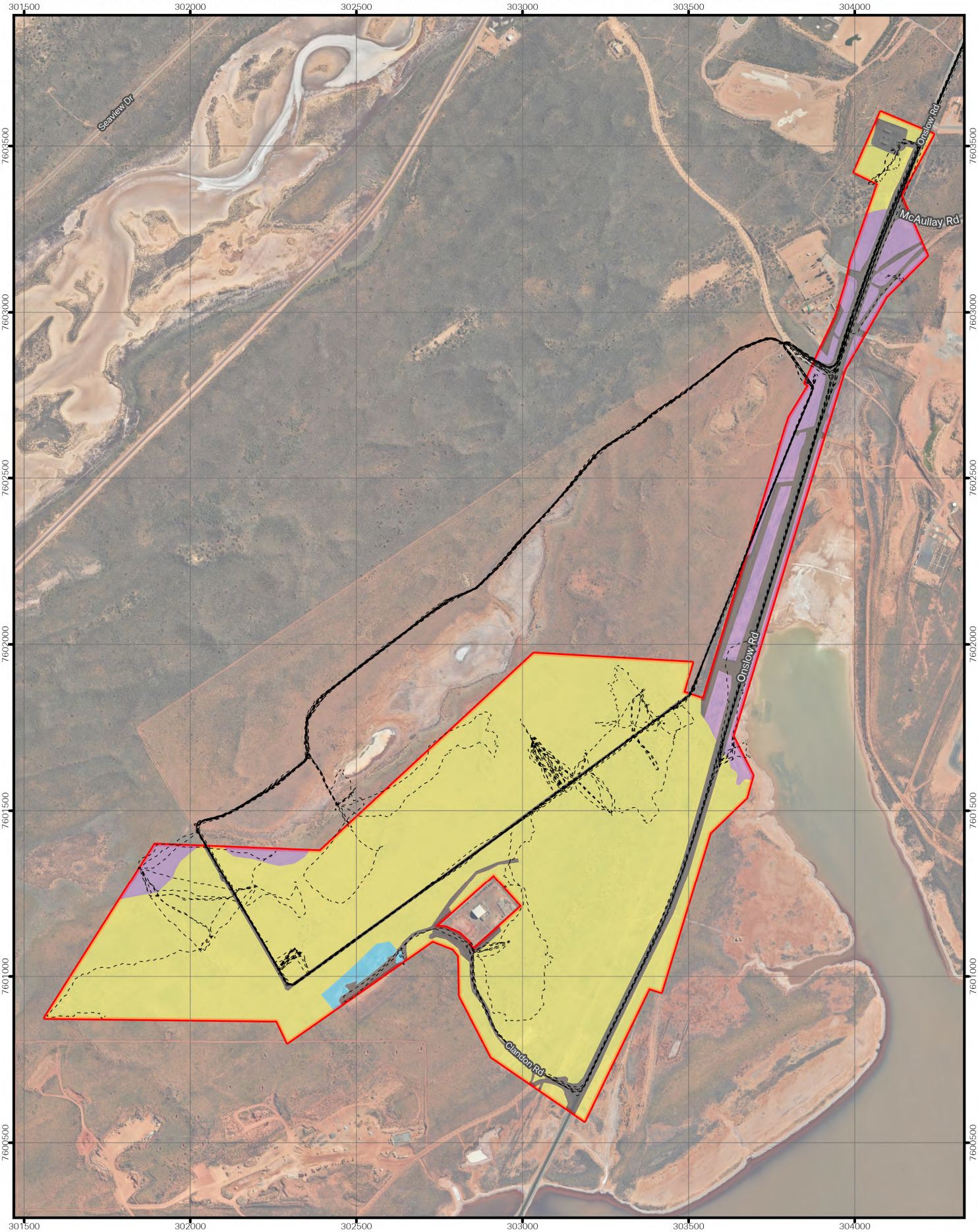
Plate 6 Salt lakes within the survey area

7.4.3 Modified

The Modified fauna habitat consists of man-made structures that may provide suitable shelter for many species. The habitat occurred within one small section of the survey area, near the waste facility. It included a large rock pile, stacked metal pipes and wood piles (Plate 7).

These structures may provide shelter suitable for animals such as small reptiles and mammals. The surrounding area is mostly cleared, with some small shrubs and grasses present.

Plate 7 Man-made structures within the modified fauna habitat



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LEGEND

- Survey Area
- Tracklog

Fauna Habitat

- Modified
- Seasonally Inundated/ Intertidal Areas
- Undulating Dunes and Flats
- Cleared

Fauna Habitat

HORIZON POWER

ONSLOW FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 10

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8.0 Discussion

8.1 Vegetation

The survey area comprised 164.85 ha including 141.02 ha of native vegetation, 4.49 ha of disturbed vegetation and 19.34 ha of cleared / hardstand areas. The area encompassed old cattle station infrastructure such as tracks and fences, a waste facility, and a buried powerline. Other disturbances included drainage management for the main road into Onslow, and altered drainage associated with the road and adjacent saltlake system. Near the waste facility were signs of test pits which indicates historical disturbance throughout.

The current land use is largely untended native vegetation, although a single horse was placed in the paddock before the end of the survey. The area was historically grazed with plenty of evidence observed, including old scat piles, horse skeletons and tracks. Common pasture weeds were observed in low numbers. Based on these observations, the majority of the survey area was considered in Very Good condition.

Landforms were undulating terrain with red sand dune systems. One shallow ephemeral drainage line intersects the northwestern edge of the survey area, a Drainage Grassland community extending for 2.59 ha (SmPr). The system drains into a larger saltlake outside the survey area.

One Saltbush Shrubland (TaEf) was recorded in isolated occurrences, totalling 3.59 ha. Most occurrences represent the edge of saltlake systems and were disturbed by infrastructure. Diversity in this vegetation community was low, possibly due to low rainfall and/or disturbance.

The Triodia Hummock Grassland (AgTe) was prolific on the undulating sandy flats, with a total of 109.46 ha. This community comprises scattered perennial shrubs with Triodia and supported sporadic large termite mounds. Limestone was evident on the surface at a few locations. This did not affect the floristic composition.

Sand dune systems were scattered throughout and were characterised by a Grevillea and Acacia Shrubland (GsTe) with groundcover dominated by Triodia grasses and extending for 23.93 ha. Generally, the bare ground percent was higher than the adjacent Triodia Grasslands.

A small and isolated Eucalyptus Woodland community (EvTdSm) was identified along the north-eastern edge of the survey area. It extends for 0.16 ha and is in Degraded condition due to its isolation and high level of disturbance.

8.2 Flora

Flora diversity in the survey area was low, totalling only 68 species. This was attributed to the poor weather conditions and the homogeneity of landforms present. The saltlake systems were disturbed to some extent, further exacerbating weed incursion and low diversity.

Two weed species were recorded. Their abundance could be higher if rainfall had been more favourable. It is expected that **Cenchrus ciliaris* and **Aerva javanica* would flourish in disturbed areas near infrastructure.

Two significant flora species had a ‘high’ likelihood of occurring based on presence of suitable habitat, proximity of known records, and the dates of those records. Both species have been reduced to having a low likelihood, described below.

The Priority 3 species *Eremophila forrestii* subsp. *viridis* is associated with red sands and sandy loams. There is a record just over 10 km from the survey area dated 2011. This species is a perennial species that would have been detectable during the survey yet was not recorded.

The Priority 3 species *Triumfetta echinata* is associated with red sandy soils, sand dunes (WAH, 1998). There is a record 10 km from the survey area dated 2009. This species was targeted during the survey, particularly on the red sand dune systems in the survey area. Several Malvaceae species were sampled. All were confirmed to represent locally common species. The Priority 3 species was therefore reduced to having a low likelihood of occurring.

8.3 Fauna Habitat

A total of three distinct fauna habitats were mapped across the survey area, totalling 145.51 ha. These habitats were categorised to reflect altering conditions, complexities, and habitat values. The habitats were refined into the following categories:

- Undulating Dunes and Flats: sand dunes and flats, dominated by Triodia and Acacia species.
- Seasonally Inundated/Intertidal Areas: areas which currently contain water or may seasonally flood
- Modified: Man-made structures such as rock piles and metal pipes.

All three fauna habitat types extend beyond the survey area boundary and are likely to be utilised by a variety of fauna species, including those of conservation significance. Conservation significant species which may occur in the survey area are discussed below in Section 8.4.

8.4 Conservation Significant Fauna Species

A total of 40 fauna species were identified within the survey area, however, none of these species were listed as Threatened or Priority. This comprised of 27 bird, six mammal and seven reptile species. A post survey likelihood assessment was conducted on the 69 threatened species identified as potentially occurring within the survey area. A significant proportion of the species identified in the desktop assessment were classified as Marine and Migratory species under the EPBC Act due to the proximity to the coast and Thevenard Island known migratory bird breeding and roosting locations. Those species that are considered to have a high likelihood of occurrence post survey are discussed.

8.4.1 Marine and Migratory Birds

Migratory birds travel to Australia as part of the East Asian-Australasian Flyway (EAAF). The EAAF stretches from Russia and Alaska, southwards through East Asia, and to Australia and New Zealand. The habitat in Onslow is suitable for many of the migratory waterbirds and is located in an area which would be utilised as a non-breeding staging area. These areas provide an opportunity to rest, forage, and rebuild energy before continuing the remainder of their journey to the breeding grounds in the northern hemisphere (DCCEEW, 2023).

The survey was not completed during the ideal season (September to March) to capture potential flyway populations of migratory birds in the area (EPA, 2020). Therefore, the absence of sightings of migratory birds is considered a limitation of the survey and not the absence of the species or suitable habitat within the survey area. This limitation has been factored into the post survey likelihood of all marine and migratory birds.

A total of nine birds listed as Marine and Migratory under the EPBC Act are considered to have a high post survey likelihood of occurrence. These include:

- the Sharp-tailed Sandpiper *Calidris acuminata*, listed as Vulnerable under the EPBC and BC Acts, Migratory and Marine under the EPBC Act,
- the Curlew Sandpiper *Calidris ferruginea*, listed as Critically Endangered under the EPBC and BC Acts, Migratory and Marine under the EPBC Act,
- the Gull-billed Tern *Gelochelidon nilotica*, listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act,
- the Little Curlew *Numenius minutus*, listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act,
- the Whimbrel *Numenius phaeopus*, listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act,
- the Osprey *Pandion haliaetus*, listed as Migratory and Marine under the EPBC Act,
- the Glossy Ibis *Plegadis falcinellus*, listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act,

- the Grey Plover *Pluvialis squatarola*, listed as Vulnerable, Migratory and Marine under the EPBC Act,
- the Grey-tailed Tattler *Tringa brevipes*, listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act, Priority 4 by DBCA,

The Australian Fairy Tern *Sternula nereis nereis* is listed as Vulnerable under the EPBC and BC Act. This species may migrate within southern Western Australia; however, it is known to be more sedentary in northern Western Australia. Preferred habitat for this species includes estuarine habitat, wetlands, and beaches. Nesting occurs in low vegetation, on sandy soil in proximity to water (DSEWPAC, 2011; Garnett, Szabo, & Dutson, 2011). The edges of the saltlake system are suitable habitat for this species.

Most of the species listed above have been recorded within approximately 3 km of the survey area, and within the last 10 years, indicating that fly-over and utilisation of the survey area may occur. The limited number of recent records in proximity to the survey area is likely representative of the transitory nature of the species, rather than habitat suitability.

Migratory shorebirds and waterbirds may occur across a range of habitats throughout Australia, including wetlands, coasts, salt pans, estuaries, rivers, lakes, and mudflats (Eco Logical Australia, 2021). The Seasonally Inundated/ Intertidal Areas (13.68 ha, 8.30%) fauna habitat contains suitable areas for migratory waterbirds including salt lakes, claypans and creeklines. Sections of the vegetation communities mapped within the survey area are also indicative of floodplains, as evident by the presence of *Sporobolus mitchellii*., as well as samphires and chenopods. One small area also contained *Eucalyptus victrix*, known to prefer creeklines and seasonally flooded areas. The presence of softer fine clay loam as well as areas of harder silty clay pans with a high surface presence of salt, also indicate the presence of a saline environment that is likely seasonally inundated. The survey area is in proximity to the coast (approximately 2.2 km south) and is surrounded by similar suitable habitat representing good habitat continuity. Due to the presence of suitable habitat, migratory waterbird species have retained their high likelihood of occurrence within the survey area.

8.4.2 Terrestrial Fauna

The Northern Quoll *Dasyurus hallucatus*, listed as Endangered under both the EPBC and BC Acts, was not identified during the survey. This is despite the use of baited camera traps which attracted other mammal predatory species such as feral cats and foxes. Shelter within the survey area, such as rocky outcrops and large termite mounds for this species was limited, and no tracks or scats were observed. The post-survey likelihood of this species has been therefore downgraded to low.

The Northern Short-tailed Mouse *Leggadina lakedownensis* is listed as a Priority 4 species by DBCA. The species is known to the area with 298 records mapped within a 50 km buffer of the survey area. The closest record is a specimen from 2003, located approximately 6 km to the south of the survey area. Fifty-six (56) of the most recent records represent records from a fauna survey on Thevenard Island. The Northern Short-tailed Mouse is known to occur on sandy soils and cracking clay substrates in Western Australia (Van Dyke & Strahan, 2008). The fauna habitat, Undulating Dunes and Flats (132.28 ha, 90%), includes suitable habitat for the species and the known distribution for the species encompasses the survey area.

The trapping program undertaken by AECOM in 2024 did not record the Northern Short-tailed Mouse species within the survey area. Mammal species do not have an optimum survey period within the Eremaean climatic region defined in the EPA terrestrial fauna survey technical guidance. The guidance states, however, that mammal population cycles often relate to rainfall in arid and semi-arid regions. This relates to changes in availability of food resources, such as seeds and insects, which in turn, is linked to an increased small mammal population (Cooper, Teale, & Kendrick, 2006; How, Milewski, Keighery, & Dell, 1992). Due to the lack of rainfall that the survey area has experienced in the preceding 12 months, it is possible that the species numbers are low. Repeated trapping surveys of the area, particularly following periods of rainfall may yield different results. Therefore, despite the absence of the species during the trapping program, suitable habitat for the species persists in the survey area and the post likelihood assessment has been amended from high to moderate.

Maryan's Keeled Slider *Lerista planiventralis maryani* is listed as a Priority 1 species by DBCA. There is one WAM vouchered record of the species from 1990, located approximately 3 km to the north of the survey area. The species is known from fossorial, hummock grassland, open heath, open scrub, oviparous, tall shrubland (Storr, 1991). The fauna habitat Undulating Dunes and Flats (132.28 ha, 90%) would represent suitable habitat for the species. The disturbance of the survey area and proximity to the town, industry and agriculture may also impact the species utilisation of the area.

The trapping program undertaken by AECOM in 2024 did not record this species within the survey area. The targeted fauna survey occurred in May, which is marginally outside the optimum survey period recommended for reptiles in the Eremaean climatic region (September-April). This means that the detection rate may be lower for reptile species, as their activity rate may have begun to decline, as reptiles are known to be less active during cooler seasonal periods (Thompson & Thompson, 2005; EPA, 2020; How & Dell, 2004). Therefore, despite the absence of the species during the trapping program, suitable habitat for the species persists in the survey area and the post likelihood assessment has been amended from high to moderate.

9.0 Conclusion

Horizon Power engaged AECOM to conduct ecological surveys of a defined area located west of the town of Onslow. Surveys were completed in May 2024, and included a single-phase fauna, flora and vegetation survey. The assessments were conducted by botanist Floora De Wit, environmental scientist Madeline Wallington, and zoologists Cassandra House and Hannah Spanswick. A summary of the results is presented below:

- two pre-European vegetation associations occur in the survey area. Neither of these are below the 30% remaining threshold set by the Environment Protection Authority (EPA).
- vegetation in the survey area was homogenous with the surrounding area, comprising of a Saltbush Shrubland, *Eucalyptus victrix* Woodland, a Triodia Hummock Grassland, a Grevillea and Acacia Shrubland, and a Drainage Grassland community
- no PEC or TEC were recorded, none were likely to occur
- condition was mostly Very Good (87%) with some areas considered Degraded where historical clearing or proximity to infrastructure has led to an absence of native species
- flora species diversity was low. This could be attributed to the below-average rainfall, previous grazing land use, and/or homogeneity of the area
- no Threatened or Priority flora species were recorded, and two introduced species were recorded: **Cenchrus ciliaris* and **Aerva javanica*
- forty fauna species were observed with the dominant class consisting of birds (27 species) and including six mammals, seven reptiles, with no conservation significant fauna species recorded
- three fauna habitats were mapped, representing suitable habitat for 12 conservation significant fauna species, including:
    - the Sharp-tailed Sandpiper (*Calidris acuminata*), listed as Vulnerable under the EPBC and BC Acts, Migratory and Marine under the EPBC Act,
    - the Curlew Sandpiper (*Calidris ferruginea*), listed as Critically Endangered under the EPBC and BC Acts, Migratory and Marine under the EPBC Act,
    - the Gull-billed Tern (*Gelochelidon nilotica*), listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act,
    - the Little Curlew (*Numenius minutus*), listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act,
    - the Whimbrel (*Numenius phaeopus*), listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act,
    - the Osprey (*Pandion haliaetus*), listed as Migratory and Marine under the EPBC Act,
    - the Glossy Ibis (*Plegadis falcinellus*), listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act,
    - the Grey Plover (*Pluvialis squatarola*), listed as Vulnerable, Migratory and Marine under the EPBC Act,
    - the Grey-tailed Tattler (*Tringa brevipes*), listed as Migratory and Marine under the EPBC Act, Migratory under the BC Act, Priority 4 by DBCA,
    - the Australian Fairy Tern (*Sternula nereis nereis*), listed as Vulnerable under the EPBC and BC Acts,
    - the Northern Short-tailed Mouse (*Leggadina lakedownensis*), listed as a Priority 4 by DBCA,
    - Maryan's Keeled Slider (*Lerista planiventralis maryani*), listed as a Priority 1 by DBCA.

The survey was undertaken with no significant limitations identified that may influence the outcome of the project.

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Appendix A

Flora Desktop Assessment Results

Appendix A Flora Desktop Assessment

Taxon	Habitat	Cons. Code		Distance (km)		Date		Max Date	PMST	Likelihood Assessment					Total Score	Pre-survey Likelihood	Post-survey Likelihood
		EPBC	BC Act / DBCA	WA HERB	TPFL	WA HERB	TPFL			Recorded in Survey Area	Known Occurrence <5km	Recent Record <20 years	Known within LGA	Habitat Suitability (0,1,2)			
Abutilon sp. Onslow (F. Smith s.n. 10/9/61)	Associated with sand plains in grassland of *Triodia lanigera* with an overstorey of *Acacia xiphophylla (DPAW & Rio Tinto, 2015).* Associated with flat plains and flood plains with red soils (DBCA data).			21.96	17.43	2021	2021	2021		0	0	1	1	1	3	Moderate	Negligible. No suitable habitat.
Abutilon sp. Pritzelianum (S. van Leeuwen 5095)	Recorded in isolated low *Corymbia hamersleyana* and/or C. *zygophylla* mallee over isolated mixed shrubs over low *Triodia basedowi* i hummock grassland in red sandy clay on sandplain.		P3	3.22		2018		2018		0	1	1	1	2	5	High	Negligible. No suitable habitat.
Calandrinia sp. Cape Range (F. Obbens FO 10/18)	Recorded on Barrow Island and the Exmouth cape in coastal situations. Associated with hummock grasses (DBCA data).			92.42		1993		1993		0	0	0	1	0	1	Negligible	Negligible. No suitable habitat.
Carpobrotus sp. Thevenard Island (M. White 050)	Coarse white sand. Dune tops, disturbed areas.		P3	23.36	23.59	1990	1990	1990		0	0	0	1	2	3	Moderate	Negligible. No suitable habitat.
Corchorus congener	Occurs in sand and red sandy loam with limestone, on sand dunes and plains. Distributed from Exmouth to Karratha.		P3	67.02		2016		2016		0	0	1	1	2	4	Moderate	Low. Not recorded, perennial species.
Corynotheca flexuosissima	Coastal situations (except in Northern Territory). Occurs on red or white sand and limestone. Coastal sand dunes.			3.14		2000		2000		0	1	0	1	0	2	Negligible	Negligible. No suitable habitat.
Cucumis sp. Barrow Island (D.W. Goodall 1264)	Recorded from hummock grasslands and on limestone outcrops (DPAW & Rio Tinto, 2015). Generally restricted to Barrow Island.			89.01	96.32	2010	1964	2010		0	0	1	1	0	2	Negligible	Negligible. No suitable habitat.
Eleocharis papillosa	The species (also known as the dwarf desert spike rush), occurs in ephemeral (temporary) wetlands, predominantly freshwater and semi-saline swamps (one record is from the edge of an ephemeral riverine waterhole). Specifically in Western Australia, it is known fromred clay over granite, open clay flats. Claypans. The species only appears after inundation. It has been recorded growing in the open and under shrubs and in plant communities dominated by *Eucalyptus coolabah* (Coolabah), *Halosarcia sp.* (Samphire), *Chenopodium auricomum* (Northern Bluebush) and *Eragrostis* spp. including *E. australasica* (Swamp Canegrass). During dry times, populations of Eleocharis papillosa persist as soil-stored seed or soil-stored root tubers (DEWHA, 2008, TSSC, 2010).	V	P3	12.16		2011		2011		0	0	1	1	0	2	Negligible	Negligible. No suitable habitat.
Eragrostis crateriformis	Clayey loam or clay. Creek banks, depressions.		P3	95.45		1937		1937		0	0	0	1	0	1	Negligible	Negligible. No suitable habitat.
Eremophila forrestii subsp. *capensis*	Brown rocky soils, limestone. Ridges			95.36		1900		1900		0	0	0	0	1	1	Negligible	Negligible. No suitable habitat.
Eremophila forrestii subsp. *viridis*	Associated with red sands and sandy loams. Recorded in variety of situations including red sand dunes, steep rocky gullies, and hardpan dune swales.			10.50		2011		2011		0	0	1	1	2	4	Moderate	Low. Not recorded, perennial species.
Euphorbia inappendiculata var. *inappendiculata*	Cracking clays, associated with tussock grassland.		P2	55.19		2021		2021		0	0	1	1	0	2	Negligible	Negligible. No suitable habitat.
Goodenia obscurata	Occurs on floodplains or low rocky ridges, growing in red-brown sandy clay or lateritic loam over banded ironstone. Associated with low open woodland of Acacia over Triodia, or open shrubland with a sparse overstorey of *Corymbia hamersleyana* and *Hakea chordophylla* over Triodia		P3	85.14		2004		2004		0	0	1	1	0	2	Negligible	Negligible. No suitable habitat.
Helichrysum oligochaetum	Depressions and floodplains in clay soils.		P1	68.93		1992		1992		0	0	0	1	2	3	Moderate	Low. Not recorded, annual species.
Indigofera roseola	Recorded on red sand dune.			82.52		2006		2006		0	0	1	1	2	4	Moderate	Low. Not recorded, perennial species.
Lepidium biplicatum	Coastal regions.		P3	74.09		2015		2015		0	0	1	1	1	3	Moderate	Low. Not recorded, perennial species.
Lysiandra fuernrohrii	Scarce information. Recorded behind foredunes. Appears to be restricted to coastal situations.			95.77		1960		1960		0	0	0	0	1	1	Negligible	Negligible. No suitable habitat.
Minuria tridens	Dwarf virgate shrub, 0.25-0.35 m high. Fl. white-blue, Sep. Roadsides, dolomite, limestone and calcrete impregnated sandstone hills, rises and ranges.		P1	87.20		2021		2021		0	0	1	0	0	1	Negligible	Negligible. No suitable habitat.
Ptilotus mollis	Stony hills and screes.		P4	85.98		2011		2011		0	0	1	1	0	2	Negligible	Negligible. No suitable habitat.
Rhynchosia bungarensis	Rock piles, gorges, river beds, alluvial soils in shrubland.		P4	87.57		2013		2013		0	0	1	1	0	2	Negligible	Negligible. No suitable habitat.
Solanum pycnotrichum	Scattered occurrence near the west coast of WA. On rocky sites, often drainage lines, with siltstone or banded ironstone in shrubland.		P2	96.30		2011		2011		0	0	1	1	0	2	Negligible	Negligible. No suitable habitat.
Stackhousia clementii	Grows in skeletal soils and sandstone hills. Species recorded across the Eremaean Province.		P3	1.73		2018		2018		0	1	1	1	0	3	Negligible	Negligible. No suitable habitat.
Triumfetta echinata	Red sandy soils, sand dunes.			10.01		2009		2009		0	0	1	1	2	4	Moderate	Low. Not recorded, perennial species.

Appendix B

Fauna Desktop Assessment Results

Type	Taxon	Common Name	Habitat	Cons. Code		Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood
				BC Act / DBCA	EPBC Act										
Bird	*Actitis hypoleucos*	Common Sandpiper	Wide range of coastal wetlands, around muddy margins or rocky shores, some inland wetlands and rarely on mudflats (DCCEEW, 2023)	IA	MI & MA	2018	61	1.57	Known	0	1	1	0	2	Low
Bird	*Anous stolidus*	Common Noddy	Blue-water seas, usually far from the mainland from northern seas south to Lancelin Island (Birdlife, 2020)(Johnstone & Storr, 1998).	IA	MI & MA	1991	1	37.87	May	0	0	0	0	0	Negligible
Bird	*Apus pacificus*	Fork-tailed Swift	Over inland plains, sometimes above foothills or in coastal areas (DCCEEW, 2023).	IA	MI & MA	2015	12	2.88	Likely	0	1	1	1	3	Moderate
Bird	*Ardenna carneipes*	Flesh-footed Shearwater	Subtropics over continental shelves and occasionally inshore waters (DCCEEW, 2023).	VU & IA	MI & MA				May	0	0	0	1	1	Low
Bird	*Ardenna pacifica*	Wedge-tailed Shearwater	Tropical and subtropical waters (DCCEEW, 2023).		MI & MA	2017	175	2.92	Known	0	1	1	0	2	Low
Bird	*Ardenna tenuirostris*	Short-tailed Shearwater	The Short-tailed Shearwater is found in coastal waters. In summer months, it is the most common shearwater along the south and south-east coasts of Australia (BirdLife Australia, 2023).		MI & MA	2021	4	7.81		0	1	1	1	3	Moderate
Bird	*Arenaria interpres*	Ruddy Turnstone	Coastal regions with exposed rock coast lines or coral reefs (DCCEEW, 2023).	IA	V & MI & MA	2017	72	2.56		0	1	1	0	2	Low
Bird	*Calidris acuminata*	Sharp-tailed Sandpiper	Occurs along muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DCCEEW, 2023).	VU	V & MI & MA	2011	10	0.35	Known	0	1	1	2	4	High
Bird	*Calidris alba*	Sanderling	Restricted to the coast, mostly on open sandy beaches exposed to open sea-swell, exposed sandbars and spits, and shingle banks (DCCEEW, 2023).	IA	MI & MA	2018	54	2.70		0	1	1	0	2	Low
Bird	*Calidris canutus*	Red Knot	Intertidal mudflats, sandflats and sandy beaches of sheltered coasts (DCCEEW, 2023).	EN & IA	V & MI & MA	1987	2	15.49	May	0	1	0	0	1	Negligible
Bird	*Calidris ferruginea*	Curlew Sandpiper	Intertidal mudflats in sheltered coastal areas and inland around ephemeral and permanent lakes, dams, waterholes and bore drains with bare edges of mud and sand (DCCEEW, 2023).	CR & IA	CE & MI & MA	2017	5	2.08	Known	0	1	1	2	4	High
Bird	*Calidris melanotos*	Pectoral Sandpiper	Occupies shallow, fresh waters often containing low grass or other small herbs, swamp margins, flooded pastures and saltmarshes (Knight, Pizzey & Pizzey, S, 2012; DCCEEW, 2023).	IA	MI & MA	2015	3	13.15	Likely	0	1	1	1	3	Moderate
Bird	*Calidris ruficollis*	Red-necked Stint	Coastal sheltered areas and exposed or open beaches, sometimes on stony or rocky shores, reefs or shoals (DCCEEW, 2023).	IA	MI & MA	2018	62	0.35		0	1	1	1	3	Moderate
Bird	*Calidris tenuirostris*	Great Knot	Sheltered coastal habitats with large intertidal mudflats or sandflats (DCCEEW, 2023).	CR & IA	V & MI & MA	2019	6	3.13		0	1	1	1	3	Moderate
Bird	*Calonectris leucomelas*	Streaked Shearwater	Common and widespread around much of the northern coast of Australia, rarely ventures inland (Knight, Pizzey & Pizzey, S, 2012)	IA	MI & MA				Likely	0	0	0	0	0	Negligible
Bird	*Charadrius leschenaultii*	Greater Sand Plover, Large Sand Plover	Beaches, tidal mudflats, reefs, dunes and is seldom observed far inland (Knight, Pizzey & Pizzey, S, 2012).	VU & IA	V & MI & MA	2017	86	1.05	Known	0	1	1	1	3	Moderate
Bird	*Charadrius mongolus*	Lesser Sand Plover	Open intertidal flats of sheltered bays, lagoons or estuaries (Knight, Pizzey & Pizzey, S, 2012).	EN & IA	E & MI & MA	2018	16	2.43		0	1	1	1	3	Moderate
Bird	*Charadrius veredus*	Oriental Plover	Coastal and northern inland Australia, ploughed land, bare claypans, margins of coastal margins and open plains (Knight, Pizzey & Pizzey, S, 2012).	IA	MI & MA	2015	4	11.21	May	0	1	1	1	3	Moderate
Bird	*Chlidonias leucopterus*	White-winged Black Tern, White-winged Tern	Fresh, brackish or saline, and coastal or subcoastal wetlands. They rarely occur on inland wetlands in Australia (DCCEEW, 2023).	IA	MI & MA	2016	8	2.58		0	1	1	1	3	Moderate
Bird	*Elanus scriptus*	Letter-winged kite	Open country and grasslands throughout arid and semi-arid regions. Will disperse to high rainfall and coastal regions when food is abundent (BirdLife, 2024).	P4		1979	1	8.94		0	1	0	1	2	Low
Bird	*Erythrotriorchis radiatus*	Red Goshawk	The Red Goshawk occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia (Marchant & Higgins 1993). Riverine forests are also used frequently. Such habitats typically support high bird numbers and biodiversity, especially medium to large species which the goshawk requires for prey. The Red Goshawk 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 (Aumann & Baker-Gabb 1991; Debus & Czechura 1988).	VU	E				May	0	0	0	0	0	Negligible
Bird	*Falco hypoleucos*	Grey Falcon	Timbered lowland plains, including acacia shrublands (particularly with tree-lined watercourses), tussock grassland and open woodland (TSSC, 2020).	VU	V				Likely	0	0	0	0	0	Negligible
Bird	*Falco peregrinus*	Peregrine Falcon	Rainforests, arid zones and coastal to alpine areas (BirdLife, 2024).	OS		2017	5	8.80		0	1	1	0	2	Low
Bird	*Fregata ariel*	Lesser Frigatebird, Least Frigatebird	The Lesser Frigatebird breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes, and even on bare ground. It feeds mainly on fish (especially flying-fish) and squid, but also on seabird eggs and chicks, carrion and fish scraps	IA	MI & MA	2021	2	7.81	Likely	0	1	1	0	2	Low
Bird	*Gelochelidon nilotica*	Gull-billed Tern	Shallow wetlands, including coastal or inland lakes, swamps and lagoons,sheltered bays and estuaries (DCCEEW, 2023).	IA	MI & MA	2018	10	0.35		0	1	1	2	4	High
Bird	*Glareola maldivarum*	Oriental Pratincole	Open plains, floodplains or short grassland (including farmland), often occurring near terrestrial wetlands, and occurring along the coast. The species does not breed in Australia (DCCEEW, 2023).	IA	MI & MA	2017	4	7.08	May	0	1	1	1	3	Moderate
Bird	*Hirundo rustica*	Barn Swallow	Widespread throughout northern Australia during the summer months in open country, agricultural land, especially near water, railyards and towns (Knight, Pizzey & Pizzey, S, 2012).	IA	MI & MA	2015	10	2.59	May	0	1	1	1	3	Moderate
Bird	*Hydroprogne caspia*	Caspian Tern	The Caspian Tern is found in sheltered coastal embayments and those with sandy or muddy margins (DCCEEW, 2023).	IA	MI & MA	2018	137	1.05	Known	0	1	1	1	3	Moderate
Bird	*Limnodromus semipalmatus*	Asian Dowitcher	Coast of north western Australia (Knight, Pizzey & Pizzey, S, 2012), including tidal mudflats, beaches, commercial salt fields and sewage ponds. It is sometimes found in inland (DCCEEW, 2023).	IA	V & MI & MA				May	0	0	0	2	2	Moderate
Bird	*Limosa lapponica*	Bar-tailed Godwit	Widespread around the coast of Western Australia from Eyre to Derby (DoE, 2015).	IA	MI & MA	2019	90	1.05	Known	0	1	1	1	3	Moderate

Type	Taxon	Common Name	Habitat	Cons. Code		Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood
				BC Act / DBCA	EPBC Act										
Bird	*Limosa lapponica menzbieri*	Northern Siberian Bar-tailed Godwit	Coastal habitat, including large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Higgins & Davies, 1996).	CR	E	1901	2	3.14	Known	0	1	0	1	2	Low
Bird	*Limosa limosa*	Black-tailed Godwit	Coastal habitat including sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats (DCCEEW, 2023)	IA	E & MI & MA	1978	2	18.40		0	1	0	1	2	Low
Bird	*Macronectes giganteus*	Southern Giant-Petrel	The Southern Giant-Petrel occurs over subantarctic waters in summer near its breeding islands in the Atlantic and Indian Oceans, in subantarctic to southern subtropical waters on the Argentinean continental shelf and off New Zealand and the cold eastern boundary current off South America. In winter, it is common off South America, South Africa, Australia and New Zealand. It occurs in both pelagic and inshore waters. It is attracted to land at sewage outfalls and scavenges ashore (Marchant & Higgins 1993).	IA	E & MI & MA				May	0	0	0	0	0	Negligible
Bird	*Motacilla cinerea*	Grey Wagtail	Found across a wide variety of wetlands, watercourses and on the banks of lakes and marshes (DCCEEW, 2023).	IA	MI & MA				May	0	0	0	1	1	Low
Bird	*Motacilla flava*	Yellow Wagtail	Open country near water, such as wet meadows (DCCEEW, 2023).	IA	MI & MA				May	0	0	0	1	1	Low
Bird	*Numenius madagascariensis*	Eastern Curlew	Intertidal mudflats. The southern most important international site in Western Australia is Eighty Mile Beach (Bamford et al., 2008).	CR & IA	CE & MI & MA	2019	25	1.57	Known	0	1	1	1	3	Moderate
Bird	*Numenius minutus*	Little Curlew	Dry grassplains, floodplains, margins of drying swamps, tidal mudflats, crops and sewage ponds (Knight, Pizzey & Pizzey, S, 2012).	IA	MI & MA	2016	2	0.35		0	1	1	2	4	High
Bird	*Numenius phaeopus*	Whimbrel	Along the Australian coast, inhabiting estuaries, mangroves, tidal flats, flooded paddocks, and bare grasslands (Knight, Pizzey & Pizzey, S, 2012)	IA	MI & MA	2018	44	2.70		0	1	1	2	4	High
Bird	*Oceanites oceanicus*	Wilson's Storm Petrel	Shelf waters in south west Western Australia in late Autumn (Knight, Pizzey & Pizzey, S, 2012).	IA	MI & MA	2013	1	2.72		0	1	1	0	2	Low
Bird	*Onychoprion anaethetus*	Bridled Tern	Vegetated coral cays, rocky continental islands and rock stack. They and forage in offshore, continental shelf waters and is rarely recorded along mainland coasts (Knight, Pizzey & Pizzey, S, 2012).	IA	MI & MA	2014	17	18.32	Known	0	1	1	0	2	Low
Bird	*Pandion haliaetus*	Osprey	Littoral and coastal habitats, terrestrial wetlands of tropical and temperate Australia, and offshore islands. Atypical habitats include heath, woodland or forest (DCCEEW, 2023).		MI & MA	2019	143	0.42	Known	0	1	1	2	4	High
Bird	*Pezoporus occidentalis*	Night Parrot	Wiluna district of central Western Australia, and the Lake Gregory area of northern Western Australia (Olsen, 2018), in spinifex grasslands and/or chenopod shrublands (Garnett et al., 2011).	CR	E				May	0	0	0	1	1	Low
Bird	*Phaethon lepturus*	White-tailed Tropicbird	Nests on coastal and inland cliffs on the main islands		MI & MA				May	0	0	0	0	0	Negligible
Bird	*Phaethon rubricauda westralis*	Red-tailed Tropicbird (indian ocean)	Coastal bird found from Broome to Esperance. The subspecies has a wide range across eastern Indian Ocean when not breeding (Willacy et al. 2021); current breeding areas occur on the following islands: Christmas Island, Cocos (Keeling) Islands, Rowely Shoals and Ashmore Reef.		E				May	0	0	0	0	0	Negligible
Bird	*Plegadis falcinellus*	Glossy Ibis	Well vegetated wetlands, wet pastures, floodwaters, brackish wetlands and mudflats (Knight, Pizzey & Pizzey, S, 2012).	IA	MI & MA	2015	3	12.93		0	1	1	2	4	High
Bird	*Pluvialis fulva*	Pacific Golden Plover	Coastal habitats, found occassionally around inland wetlands (DCCEEW, 2023).		MI & MA	1991	6	25.13		0	0	0	1	1	Low
Bird	*Pluvialis squatarola*	Grey Plover	Coastal, marine shores, inlets, estuaries and lagoons with large tidal mudflats or sandflats, sandy beachesand rocky coasts. It is occasionally found inland (Birdlife Australia, 2024).		V & MI & MA	2015	19	2.08		0	1	1	2	4	High
Bird	*Rostratula australis*	Australian Painted Snipe	Shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (DCCEEW, 2023).	EN	MI & MA				May	0	0	0	1	1	Low
Bird	*Sterna dougallii*	Roseate Tern	Coastal and marine areas of subtropoical and tropical seas, inhabiting rocky and sandy beaches, coral reefs, sand bars and offshore islands. Rarely on inshore waters (DCCEEW, 2023).		MI & MA	2016	37	2.70	Likely	0	1	1	0	2	Low
Bird	*Sterna hirundo*	Common Tern	Common on the eastern coast of the continent. In WA, the species is rarely recorded south of 30° S (DoE, 2015).		MI & MA	2017	41	2.70		0	1	1	0	2	Low
Bird	*Sternula albifrons*	Little Tern	Sheltered coastal environments including lagoons, estuaries, ridges or inlets, especially those with exposed sandbanks or open gently sloping sandy beaches (DCCEEW, 2023).		MI & MA	2018	30	1.57	May	0	1	1	1	3	Moderate
Bird	*Sternula nereis nereis*	Australian Fairy Tern	It is most common in Western Australia, found on coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons, favouring both fresh and saline wetlands and near-coastal terrestial wetlands, including lakes and salt-ponds. (BirdLife Australia, 2024)	VU	V	2017	35	3.21	Known	0	1	1	2	4	High
Bird	*Sula leucogaster*	Brown Booby	The Brown Booby uses both marine and terrestrial habitat. The species occurs in, but is not restricted to, tropical waters of all major oceans, often staying close to breeding islands. The species is known to approach mainland coastlines more than other boobies and has been recorded in coastal waters, harbours and estuaries and near offshore islands but seldom flying over land (Marchant & Higgins 1993).		MI & MA	2008	5	25.23		0	0	1	0	1	Negligible
Bird	*Thalassarche carteri*	Indian Yellow-nosed Albatross	Subtropical and warmer subantarctic waters, foraging mostly in the southern Indian Ocean, particually off the coast of southern Western Australia, as far north as Shark Bay (Marchant & Higgins, 1993, Weimerskirch et al., 1986).	VU	V & MI & MA				May	0	0	0	0	0	Negligible
Bird	*Thalasseus bergii*	Crested Tern	A strictly coastal species. Occasional records in the arid interior of Australia (BirdLife Australia, 2024).	IA	MI & MA	2017	50	0.79	Known	0	1	1	1	3	Moderate
Bird	*Tringa brevipes*	Grey-tailed tattler	Sheltered coasts with reefs and rock platforms or intertidal mudflats, embayments, estuaries and coastal lagoons (particularly those fringed with mangroves) (Higgins and Davies, 1996).	IA & P4	MI & MA	2018	76	2.08		0	1	1	2	4	High

Type	Taxon	Common Name	Habitat	Cons. Code		Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood
				BC Act / DBCA	EPBC Act										
Bird	*Tringa glareola*	Wood Sandpiper	Common in Northern Australia, a casual visitor to southern parts, occuping wetland margins, saltmarshes and sewage ponds (Knight, Pizzey & Pizzey, S, 2012).	IA	MI & MA	2008	1	9.21		0	1	1	1	3	Moderate
Bird	*Tringa nebularia*	Common Greenshank	Inland wetlands and sheltered coastal habitats In shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as sedges or saltmarsh (DCCEEW, 2023).	IA	E & MI & MA	2019	37	1.94	Likely	0	1	1	1	3	Moderate
Bird	*Xenus cinereus*	Terek Sandpiper	Primarily coastal distribution, more commoly norther and eastern Australia. Some have been recorded inland and between Bunbury and the mouth of the Moore River (DoE, 2015).	IA	V & MI & MA	1992	4	25.13		0	0	0	1	1	Low
Mammal	*Dasyurus hallucatus*	Northern Quoll	The Pilbara and further north through to the Kimberley (DSEWPaC, 2011b). The species occupies rocky areas, deserts, eucalypt forests and woodlands, hummock grass (Plechtrachne spp.), basalt hills, mesas, high and low plateaux, lower slopes, occasional tor fields and stony plains supporting spinifex grasslands (Braithwaite & Griffiths 1994; Van Vreeswyk et al. 2004).	EN	E	2017	5	2.82	Known	0	1	1	1	3	Moderate
Mammal	*Leggadina lakedownensis*	Lakeland Downs Short-tailed Mouse, Northern Short-tailed Mouse	Known to occur on sandy soils and cracking clays in Western Australia, and tropical tussock grasslands or woodlands in Queensland. On Thevenard Island, occupies Acacia shrublands and low shrubs on deep sandy soils (Van Dyke & Strahan, 2008).	P4		2017	298	6.15		0	1	1	2	4	High
Mammal	*Macroderma gigas*	Ghost Bat	Northern Australia, inhabiting arid Pilbara to tropical savanna woodlands and rainforests rainforest, monsoon and vine thicket, open woodlands and arid areas and reside in caves, rock crevices and disused mine adits (DoE 2016).	VU	V				Likely	0	0	0	0	0	Negligible
Mammal	*Ozimops cobourgianus*	Northern Coastal Free-tailed Bat	Ozimops cobourgianus is found at coastal regions, up to one hundred kilometres inland. They are found at Shark Bay in the north of the west coast, and known from populations along the northern coast to the border of the Northern Territory and Queensland. They are known to occupy tree hollows of the mangrove species Avicennia marina, but no other types of roost site are known (ALA, 2024).	P1		2000	3	24.95		0	0	0	0	0	Negligible
Mammal	*Pseudomys chapmani*	Western Pebble-mound Mouse	Pebbly soils in arid tussock grassland and acacia woodland og Western Australia, in hummock grasslands, *Triodia basedowii* , Acacia spp. and Ptilotus. It is associated with erroding sands and can be found in the Pilbara region in areas of rocky hummock grassland with little or no soil and an overstorey of Acacia spp. (Burbidge 2016).	P4		2005	1	11.11		0	1	1	1	3	Moderate
Mammal	*Rhinonicteris aurantia (Pilbara form)*	Pilbara Leaf-nosed Bat	The Pilbara Leaf-nosed Bat roosts during the day in caves and mine adits (horizontal tunnels) with stable, warm and humid microclimates because of its poor ability to maintain its heat and water balance. Although caves are common in the ironstone terrain and some other landscapes of the Pilbara, most are essentially shallow overhangs, or are not sufficiently deep to support warm, humid microclimates. As a result, the roosting opportunity and area of occupancy of the Pilbara Leaf-nosed Bat is restricted to a very small area (DCCEEW, 2024).	VU	V				May	0	0	0	0	0	Negligible
Reptile	*Crocodylus porosus*	Saltwater Crocodile	In Western Australia the species is found in most major river systems of the Kimberley, including the Ord, Patrick, Forrest, Durack, King, Pentecost, Prince Regent, Lawley, Mitchell, Hunter, Roe and Glenelg Rivers. It is also found in Parrys Creek. There have also been isolated records in rivers of the Pilbara region, around Derby near Broome and as far south as Carnarvon on the mid-west coast (DEC 2009a).		MI & MA	2014	2	2.94		0	1	1	0	2	Low
Reptile	*Ctenotus angusticeps*	Northwestern Coastal Ctenotus, Airlie Island Ctenotus	The Airlie Island Ctenotus is known from approximately 12 locations in north-west WA: Airlie Island (offshore from Onslow), Thangoo Station (Roebuck Bay), Pretty Pool and Wedgefield (Port Hedland), Redbank (Port Hedland), Finucane Island (Port Hedland), Beebingarra Creek, Roebuck (Crab Creek), Cape Keraudren (Pardoo), Port Smith (Lagrange), Willie Creek (Broome), Boodarie Station and Karratha (Biologic 2012; Sadlier 1993; Storr 1988). Prior to 2012, only three locations were recorded: Airlie Island, Thangoo Station and Port Hedland (Biologic 2012; TSSC 2012bb). Although knowledge of the species range has improved, populations are fragmented, the habitat in which it occurs is unique and fragmented within the landscape, and populations are not known to occur in any protected reserve on the mainland (Maryan et al. 2013).	P3		2018	42	36.72		0	0	1	1	2	Low
Reptile	*Lerista planiventralis maryani*	Maryan's Keeled Slider	Fossorial, hummock grassland, open heath, open scrub, oviparous, tall shrubland (Storr, 1991).	P1		1990	1	3.14		0	1	0	2	3	High
Reptile	*Liasis olivaceus barroni*	Pilbara Olive Python	The Olive Python (Pilbara subspecies) prefers escarpments, gorges and water holes in the ranges of the Pilbara region (Pearson 1993; Wilson & Swan 2003).	VU	V	2012	1	15.71		0	1	1	0	2	Low

Appendix C

Flora Species List by Site and Community Matrix

Appendix C - Flora Community Matrix

Family	Weed	Taxon	AgTe			EvTdSm	GsTe				SmPr			TaEf			Opp
			1	4	10	14	5	6	7	8	2	3	9	11	12	13	
Amaranthaceae																	
	*	*Aerva javanica*				X			X								
		Ptilotus axillaris															X
		Ptilotus exaltatus															X
Asteraceae																	
		Olearia sp indet								X							
		Pluchea rubelliflora				X					X	X	X				
		Pterocaulon sphacelatum	X	X													
		Streptoglossa adscendens				X											
		Streptoglossa macrocephala	X														
Boraginaceae																	
		Euploca ?pachyphylla						X									X
		Trichodesma zeylanicum		X	X		X		X	X							
Brassicaceae																	
		Lepidium platypetalum	X														
Chenopodiaceae																	
		Neobassia astrocarpa				X						X	X	X	X		
		Rhagodia preissii subsp *obovata*				X											
		Salsola australis	X	X	X	X	X	X		X	X		X	X	X		
		Tecticornia ?auriculata											X	X	X	X	
		Tecticornia halocnemoides subsp *tenuis*														X	
		Threlkeldia diffusa			X	X											
Convolvulaceae																	
		Bonamia erecta	X				X			X							
		Bonamia linearis	X	X			X										
Euphorbiaceae							X										X
		Euphorbia myrtoides					X										X
Fabaceae																	
	*	*Stylosanthes hamata*															X
		?Sorghum plumosum									X						
		Acacia ancistrocarpa				X	X		X	X							
		Acacia bivenosa			X	X											
		Acacia gregorii	X	X	X												
		Acacia sclerosperma subsp *sclerosperma*	X														
		Acacia stellaticeps			X		X	X		X							
		Acacia synchronicia		X							X						
		Acacia tetragonopylla				X											X
		Acacia victoriae				X											
		Crotalaria cunninghamii subsp *sturtii*					X	X									X
		Indigofera boviperda subsp *boviperda*															X
		Indigofera monophylla		X					X								
		Senna artemisioides subsp. *oligophylla*				X											X
		Senna glutinosa subsp x *luerssenii*															X
		Tephrosia rosea var *clementii*					X										
Frankeniaceae																	
		Frankenia ambita											X				
Goodeniaceae																	
		Scaevola sericophylla	X	X			X	X		X							
		Scaevola sp indet			X			X		X							
		Scaevola spinescens				X											
Gyrostemonaceae																	
		Gyrostemon ramulosus					X										
Lamiaceae																	
		Quoya loxocarpa		X													X
		Quoya paniculata															X
Lauraceae																	
		Cassytha racemosa	X	X	X		X	X		X	X						
Malvaceae																	
		?Hannafordia sp indet															X
		Abutilon lepidium															X
		Gossypium australe															X
		Hibiscus brachychlaenus								X							
		Lawrencia viridigrisea											X				
		Sida spinosa					X			X							X
Myrtaceae																	
		Eucalyptus victrix				X											
		Verticordia forrestii															X
Plantaginaceae																	
		Stemodia sp indet		X		X					X	X	X				
		Stemodia sp. Onslow (A.A. Mitchell 76/148)									X						
Poaceae																	
	*	*Cenchrus ciliaris*				X	X	X	X	X							
		Cenchrus ?ciliaris	X														
		Eragrostis falcata	X			X		X						X	X	X	
		Sporobolus mitchellii				X					X	X	X				
		Sporobolus sp indet	X														
		Triodia epactia	X	X	X	X	X	X		X	X	X					
Proteaceae																	
		Grevillea stenobotrya					X	X									X
		Hakea ?sp indet	X								X						
		Hakea stenophylla subsp *stenophylla*		X	X												
Sapindaceae																	
		Diplopeltis eriocarpa	X	X			X										
Scrophulariaceae																	
		Myoporum montanum				X											
Solanaceae																	
		Solanum cleistogamum	X				X	X	X	X							
Surianaceae																	
		Stylobasium spathulatum							X								X
Thymelaeaceae																	
		Pimelea ammocharis	X	X			X	X		X							X

Appendix D

Site Data

D R A F T

Appendix D – Site Data

Site No: 1	Date:5/1/2024	Longitude: 115.088795	Latitude: -21.682292

Type: Quadrat
Soil Types: Red sand
Size: 50x50 m
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Very Good
Condition Notes: horses, historical grazing
Landform: Undulating, between dunes
Fire: 10+ years
Disturbance: Horses
Vegetation Type: AgTe: *Acacia gregorii*, *Diplopeltis eriocarpa* and *Pimelea ammocharis* isolated clumps of shrubs over *Triodia epactia* hummock grassland

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Triodia epactia	40	60	resinous
		Hakea ?sp indet	150	0.01	
		Pimelea ammocharis	30	0.1	FdW240501-2
		Scaevola sericophylla	20	0.02	FdW240501-3

D R A F T

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Diplopeltis eriocarpa	20	0.1	FdW240501-4
		Pterocaulon sphacelatum	10	0.01	
		Cassytha racemosa	0	0.1	FdW240501-6
		Solanum cleistogamum	20	0.01	
	*	*Cenchrus ?ciliaris*	50	0.01	FdW240501-7
		Bonamia erecta	20	0.01	FdW240501-8
		Acacia gregorii	30	1	FdW240501-9
		Eragrostis falcata	20	0.01	sterile
		Salsola australis	30	0.01	dead
		Streptoglossa macrocephala	30	0.01	FdW240501-12
		Bonamia linearis	5	0.02	FdW240501-11, several
		Acacia sclerosperma subsp *sclerosperma*	50	0.01	FdW240501-13
		Sporobolus sp indet	30	0.01	FdW240501-10
		Lepidium platypetalum	30	0.01	dead

D R A F T

Appendix D – Site Data

Site No: 10	Date:5/3/2024	Longitude: 115.096907	Latitude: -21.680563

Type: Quadrat
Soil Types: Red sand
Size: 50x50 m
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Very Good
Condition Notes: Triodia on flats/ dune swale
Landform: Flats, swale
Fire: 10+ years
Disturbance: Test pits
Vegetation Type: AgTe: *Acacia gregorii, Diplopeltis eriocarpa* and *Pimelea ammocharis* isolated clumps of shrubs over *Triodia epactia* hummock grassland

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Triodia epactia	50	70	
		Acacia stellaticeps	50	0.2	
		Cassytha racemosa	0	2	
		Threlkeldia diffusa	80	0.01	
		Trichodesma zeylanicum	50	0.01	

D R A F T

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Acacia gregorii	30	0.02	
		Scaevola sp indet	30	0.02	too few characters present to identify
		Hakea stenophylla subsp *stenophylla*	100	0.5	
		Acacia bivenosa	50	0.05	
		Salsola australis	30	0.01	

D R A F T

Appendix D – Site Data

Site No: 11	Date:5/3/2024	Longitude: 115.0981369	Latitude: -21.6863470

Type: Relevé
Soil Types: Red sand clay
Size: -
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Good
Condition Notes: Saline chenopods
Landform: Edge of saltpan, winterwet. Disturbed, clearing
Fire: 10+ years
Disturbance: Roadside, clearing
Vegetation Type: TaEf: *Tecticornia ?auriculata*, *Neobassia astrocarpa* and *Salsola australis* open shrubland over *Eragrostis falcata* sparse tussock grassland

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Tecticornia ?auriculata	50	10	
		Salsola australis	30	0.1	
		Neobassia astrocarpa	20	0.1	
		Eragrostis falcata	10	0.1	

D R A F T

Appendix D – Site Data

Site No: 12	Date:5/3/2024	Longitude: 115.102148	Latitude: -21.6776440

Type: Relevé
Soil Types: Red with salt silt sand
Size: 100x25 m
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Degraded
Condition Notes: Chenopods, cleared, altered hyrdro
Landform: Saltlake
Fire: 10+ years
Disturbance: Roadside, clearing
Vegetation Type: TaEf: *Tecticornia ?auriculata, Neobassia astrocarpa* and *Salsola australis* open shrubland over *Eragrostis falcata* sparse tussock grassland

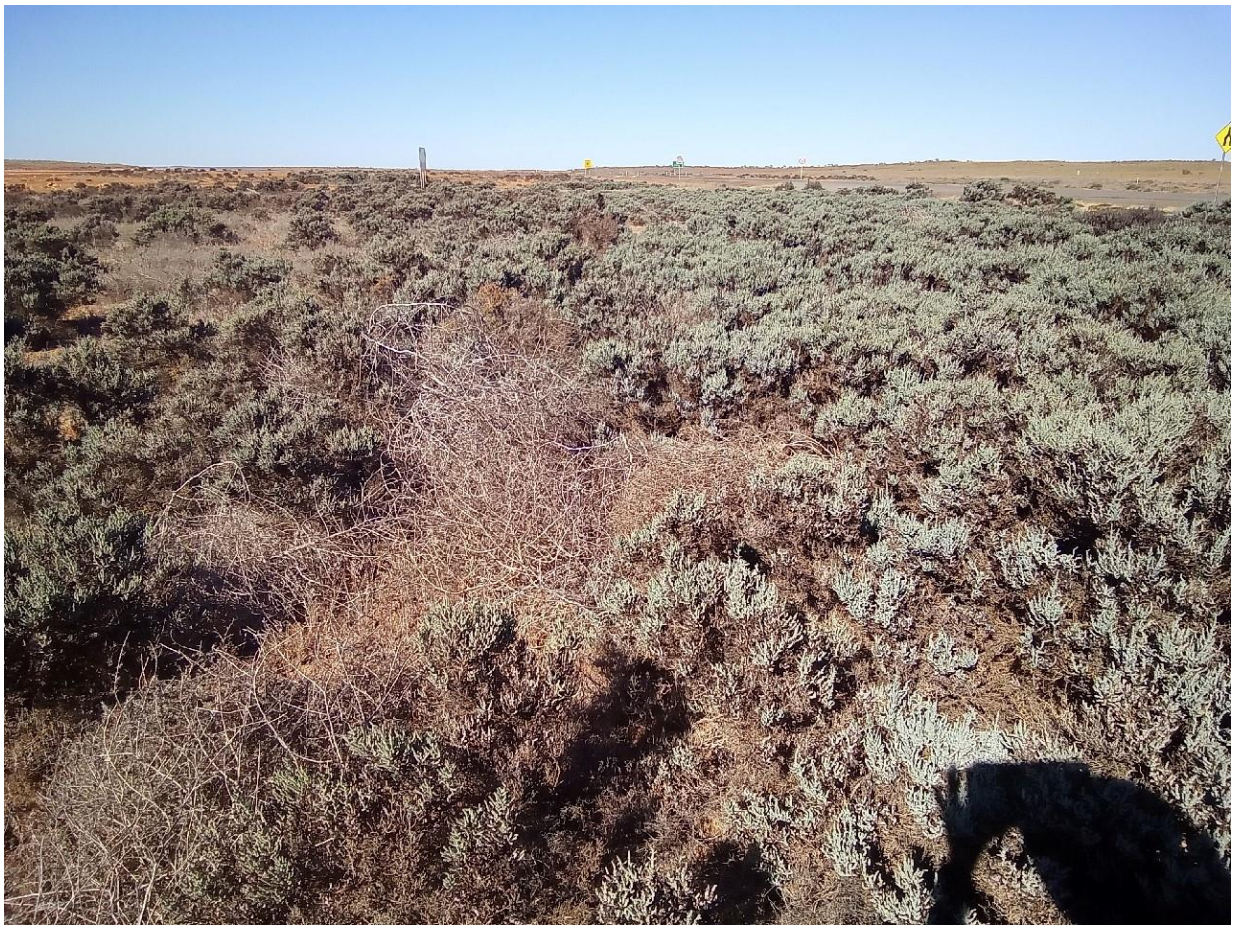
Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Tecticornia ?auriculata	80	8	
		Salsola australis	50	2	dead
		Neobassia astrocarpa	20	1	dead
		Eragrostis falcata	10	15	

D R A F T

Appendix D – Site Data

Site No: 13	Date:5/4/2024	Longitude: 115.105097	Latitude: -21.6684170

Type: Quadrat
Soil Types: Red clay sand wet
Size: 50x50 m
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Good
Condition Notes: Saltbush on low flats
Landform: Altered drainage, some weeds, low lying plain
Fire: 10+ years
Disturbance: None
Vegetation Type: TaEf: *Tecticornia ?auriculata, Neobassia astrocarpa* and *Salsola australis* open shrubland over *Eragrostis falcata* sparse tussock grassland



Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Tecticornia ?auriculata	80	30	
		Eragrostis falcata	30	10	
		Tecticornia halocnemoides subsp *tenuis*	15	60	FdW240504-51

D R A F T

Appendix D – Site Data

Site No: 14	Date:5/4/2024	Longitude: 115.1066820	Latitude: -21.664448

Type: Relevé
Soil Types: Red sand
Size: -
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Degraded
Condition Notes: Euc victrix on flats
Landform: Flats, weeds, cleared
Fire: 10+ years
Disturbance: Clearing
Vegetation Type: EvTdSm: *Eucalyptus victrix* open woodland over *Threlkeldia diffusa, Myoporum montanum* and *Acacia ancistrocarpa* open shrubland over *Sporobolus mitchellii*, **Cenchrus ciliaris* and i open tussock grassland

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Eucalyptus victrix	700	15	
	*	*Cenchrus ciliaris*	50	20	
		Threlkeldia diffusa	80	15	
		Myoporum montanum	200	0.5	FdW240504-52

D R A F T

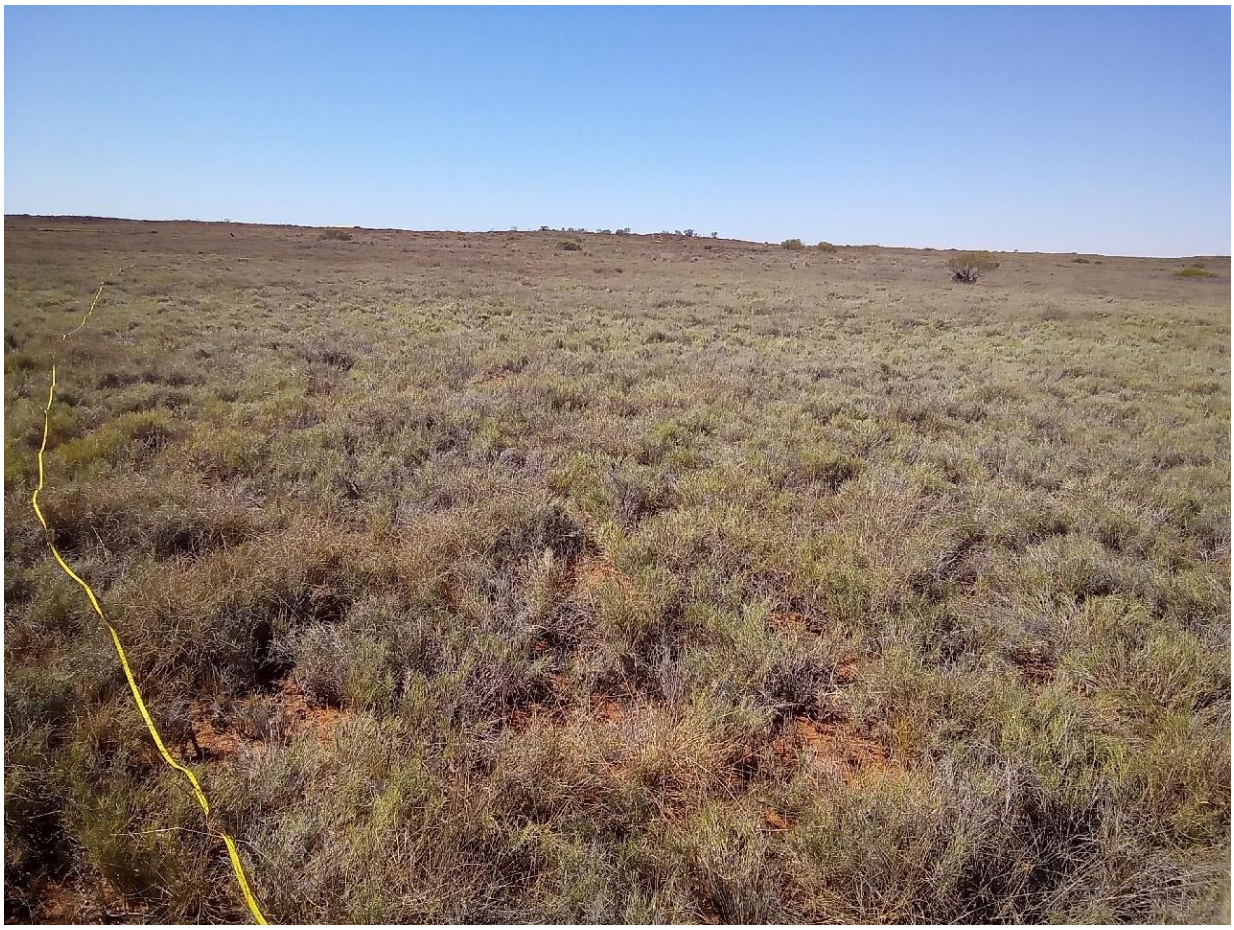
Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Senna artemisioides subsp. *oligophylla*	30	0.01	
		Salsola australis	30	0.1	
	*	*Aerva javanica*	20	0.01	
		Stemodia sp indet	20	0.5	
		Pluchea rubelliflora	20	1	
		Streptoglossa adscendens	20	0.01	FdW240504-53
		Acacia tetragonopylla	200	0.05	
		Triodia epactia	50	0.02	
		Sporobolus mitchellii	30	20	
		Acacia ancistrocarpa	100	0.5	
		Rhagodia preissii subsp *obovata*	80	0.01	FdW240504-54
		Eragrostis falcata	30	2	
		Acacia bivenosa	80	0.01	
		Scaevola spinescens	80	0.01	
		Neobassia astrocarpa	10	0.01	
		Acacia victoriae	30	0.01	FdW240504-55

D R A F T

Appendix D – Site Data

Site No: 2	Date:5/2/2024	Longitude: 115.085672	Latitude: -21.6799770

Type: Quadrat
Soil Types: red sand fine compact
Size: 50x50m
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Excellent
Condition Notes: Tussock grassesi drainage
Landform: Drainage, low lying flat
Fire: 10+ years
Disturbance: -
Vegetation Type: NaSm: *Neobassia astrocarpa, Salsola australis* and *Acacia synchronicia* sparse shrubland over *Sporobolus mitchellii* closed tussock grassland



Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Acacia synchronicia	200	0.1	
		?Sorghum plumosum	70	0.01	FdW240502-23
		Triodia epactia	50	15	FdW240502-22
		Hakea ?sp indet	40	0.01	
		Sporobolus mitchellii	30	75	FdW240502-21

D R A F T

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Pluchea rubelliflora	20	1	FdW240502-20
		Pluchea rubelliflora			FdW240502-24
		Stemodia sp indet	20	0.1	FdW240502-26
		Salsola australis	20	0.01	
		Stemodia sp. Onslow (A.A. Mitchell 76/148)	20	0.01	FdW240502-25
		Cassytha racemosa	0	0.5	

D R A F T

Appendix D – Site Data

Site No: 3	Date:5/2/2024	Longitude: 115.085098	Latitude: -21.680888

Type: Quadrat
Soil Types: Red sand w some clay
Size: 50x50m
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Excellent
Condition Notes: Grassland low lying
Landform: Drainage lower slope
Fire: 10+ years
Disturbance: -
Vegetation Type: NaSm: *Neobassia astrocarpa, Salsola australis* and *Acacia synchronicia* sparse shrubland over *Sporobolus mitchellii* closed tussock grassland

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Sporobolus mitchellii	90	5	
		Triodia epactia	8	2	
		Pluchea rubelliflora	0.5	0.1	
		Stemodia sp indet	0.1	0.1	
		Neobassia astrocarpa	0.01	0.1	FdW240502-27

D R A F T

Appendix D – Site Data

Site No: 4	Date:5/2/2024	Longitude: 115.085285	Latitude: -21.683467

Type: Quadrat
Soil Types: Red sand
Size: 50x50m
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Excellent
Condition Notes: Triodia on undulating terrain
Landform: Undulating flats, some small dunes
Fire: 10+ years
Disturbance: -
Vegetation Type: AgTe: *Acacia gregorii, Diplopeltis eriocarpa* and *Pimelea ammocharis* isolated clumps of shrubs over *Triodia epactia* hummock grassland

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Triodia epactia	40	60	FdW240502-28
		Diplopeltis eriocarpa	30	20	
		Acacia gregorii	30	1	
		Bonamia linearis	5	0.02	

D R A F T

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Cassytha racemosa	0	0.5	
		Salsola australis	30	0.01	
		Pimelea ammocharis	20	0.02	
		Trichodesma zeylanicum	50	0.01	
		Scaevola sericophylla	30	0.01	
		Indigofera monophylla	10	0.02	
		Pterocaulon sphacelatum	5	0.01	
		Acacia synchronicia	20	0.01	
		Quoya loxocarpa	30	0.02	
		Stemodia sp indet	20	0.01	
		Hakea stenophylla subsp *stenophylla*			FdW240502-29. Conver infered

D R A F T

Appendix D – Site Data

Site No: 5	Date:5/2/2024	Longitude: 115.094928	Latitude: -21.6771619

Type: Relevé
Soil Types: Red sand
Size: Releve, approx 250m^2
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Very Good
Condition Notes: Triodia and shrubs on sand dune
Landform: Sand dune
Fire: 10+ years
Disturbance: Horses
Vegetation Type: GsTe: *Grevillea stenobotrya, Acacia ancistrocarpa* and *Trichodesma zeylanicum* open shrubland over *Triodia epactia* open hummock grassland

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Triodia epactia	30	40	
		Trichodesma zeylanicum	100	2	
		Crotalaria cunninghamii subsp *sturtii*	200	0.2	
		Scaevola sericophylla	50	2	

D R A F T

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Sida spinosa	30	0.01	FdW240502-35
		Solanum cleistogamum	10	0.01	FdW240502-37
		Cassytha racemosa	0	0.1	
		Pimelea ammocharis	50	0.02	
		Salsola australis	50	0.01	
		Tephrosia rosea var *clementii*	20	0.02	FdW240502-34
	*	*Cenchrus ciliaris*	20	0.01	
		Bonamia erecta	30	0.02	
		Acacia ancistrocarpa	250	1	
		Diplopeltis eriocarpa	20	0.01	
		Euphorbia myrtoides	20	0.01	
		Acacia stellaticeps	50	3	FdW240502-36
		Grevillea stenobotrya	200	0.5	
		Bonamia linearis	5	0.01	
		Gyrostemon ramulosus	200	0.1	FdW240502-38

D R A F T

Appendix D – Site Data

Site No: 6	Date:5/2/2024	Longitude: 115.1002	Latitude: -21.6772449

Type: Quadrat
Soil Types: Red sand some clay, hard patches
Size: 50x50m
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Excellent
Condition Notes: Sand dune shrub
Landform: Sand dune system
Fire: 10+ years
Disturbance: -
Vegetation Type: GsTe: *Grevillea stenobotrya, Acacia ancistrocarpa* and *Trichodesma zeylanicum* open shrubland over *Triodia epactia* open hummock grassland

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Scaevola sp indet	30	0.01	FdW240502-40
		Pimelea ammocharis	80	1	
		Triodia epactia	50	40	
		Acacia stellaticeps	70	15	
		Grevillea stenobotrya	300	6	

D R A F T

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Cassytha racemosa	0	0.2	
		Scaevola sericophylla	30	10	FdW240502-41
		Solanum cleistogamum	20	0.02	
		Euploca ?pachyphylla	10	0.01	
		Crotalaria cunninghamii subsp *sturtii*	200	0.01	
	*	*Cenchrus ciliaris*	30	4	
		Eragrostis falcata	20	0.01	
		Salsola australis	30	0.01	

D R A F T

Appendix D – Site Data

Site No: 7	Date:5/2/2024	Longitude: 115.106821	Latitude: -21.6618859

Type: Relevé
Soil Types: Red sand
Size: -
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Good
Condition Notes: Ancistrocarpa over cenchrus
Landform: Buried powerlines swale
Disturbance: Clearing, weed invasion, drainage
Fire: 10+ years

Vegetation Type: AaCc: *Acacia ancistrocarpa, Trichodesma zeylanicum* and *Stylobasium spathulatum* open shrubland over **Cenchrus ciliaris* isolated clumps of tussock grasses

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
	*	*Cenchrus ciliaris*	30	5	
		Acacia ancistrocarpa	300	8	
	*	*Aerva javanica*	50	0.1	
		Trichodesma zeylanicum	100	2	

D R A F T

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Solanum cleistogamum	30	0.01	
		Stylobasium spathulatum	100	0.1	
		Indigofera monophylla	20	0.01	

D R A F T

Appendix D – Site Data

Site No: 8	Date:5/3/2024	Longitude: 115.092522	Latitude: -21.6791480

Type: Quadrat
Soil Types: Red sand
Size: 50x50m
Effort: 1 person 30 mins
Outcrops: None
Litter:
Vegetation Condition: Very Good
Condition Notes: shrub and triodia on dune system. q size adapted to dune
Landform: Dune system
Fire: 10+ years
Disturbance: Horses, low level weeds
Vegetation Type: GsTe: *Grevillea stenobotrya, Acacia ancistrocarpa* and *Trichodesma zeylanicum* open shrubland over *Triodia epactia* open hummock grassland

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Hibiscus brachychlaenus	200	1	
		Triodia epactia	30	30	
		Trichodesma zeylanicum	200	5	
		Acacia stellaticeps	50	15	

D R A F T

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
	*	*Cenchrus ciliaris*	20	2	
		Scaevola sericophylla	50	8	
		Sida spinosa	100	0.01	
		Salsola australis	30	0.02	
		Cassytha racemosa	0	0.01	
		Acacia ancistrocarpa	220	0.5	
		Scaevola sp indet	20	0.01	
		Solanum cleistogamum	50	0.02	
		Bonamia erecta	20	0.02	
		Pimelea ammocharis	50	0.01	
		Olearia sp indet	50	0.01	FdW240503-43

D R A F T

Appendix D – Site Data

Site No: 9	**Date**:5/3/2024	**Longitude**: 115.089108	**Latitude**: -21.680149
Type: Relevé		**Soil Types**: Red sand loam soft	
Size: -		**Effort**: 1 person 30 mins	
Outcrops: None		**Litter**:	
Vegetation Condition: Very Good		**Condition Notes**: Couch triodia lowlying	
Landform: Drainage, lower slope		**Fire**: 10+ years	
Disturbance:			
Vegetation Type: NaSm: *Neobassia astrocarpa, Salsola australis* and *Acacia synchronicia* sparse shrubland over *Sporobolus mitchellii* closed tussock grassland			

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Tecticornia ?auriculata	50	0.05	FdW240503-47
		Frankenia ambita	30	0.1	
		Lawrencia viridigrisea	30	0.02	FdW240503-48
		Sporobolus mitchellii	20	80	
		Neobassia astrocarpa	20	0.1	

D R A F T

Cons. Status	Weed	Taxon	Height (cm)	Foliage (%)	Comments
		Stemodia sp indet	20	0.02	
		Salsola australis	20	0.01	
		Pluchea rubelliflora	20	0.5	

About AECOM

AECOM is the world's trusted infrastructure consulting firm, delivering professional services throughout the project lifecycle – from advisory, planning, design and engineering to program and construction management. On projects spanning transportation, buildings, water, new energy and the environment, our public- and private-sector clients trust us to solve their most complex challenges. Our teams are driven by a common purpose to deliver a better world through our unrivaled technical and digital expertise, a culture of equity, diversity and inclusion, and a commitment to environmental, social and governance priorities. AECOM is a Fortune 500 firm and its Professional Services business had revenue of $14.1 billion in fiscal year 2024. See how we are delivering sustainable legacies for generations to come at aecom.com and @AECOM.

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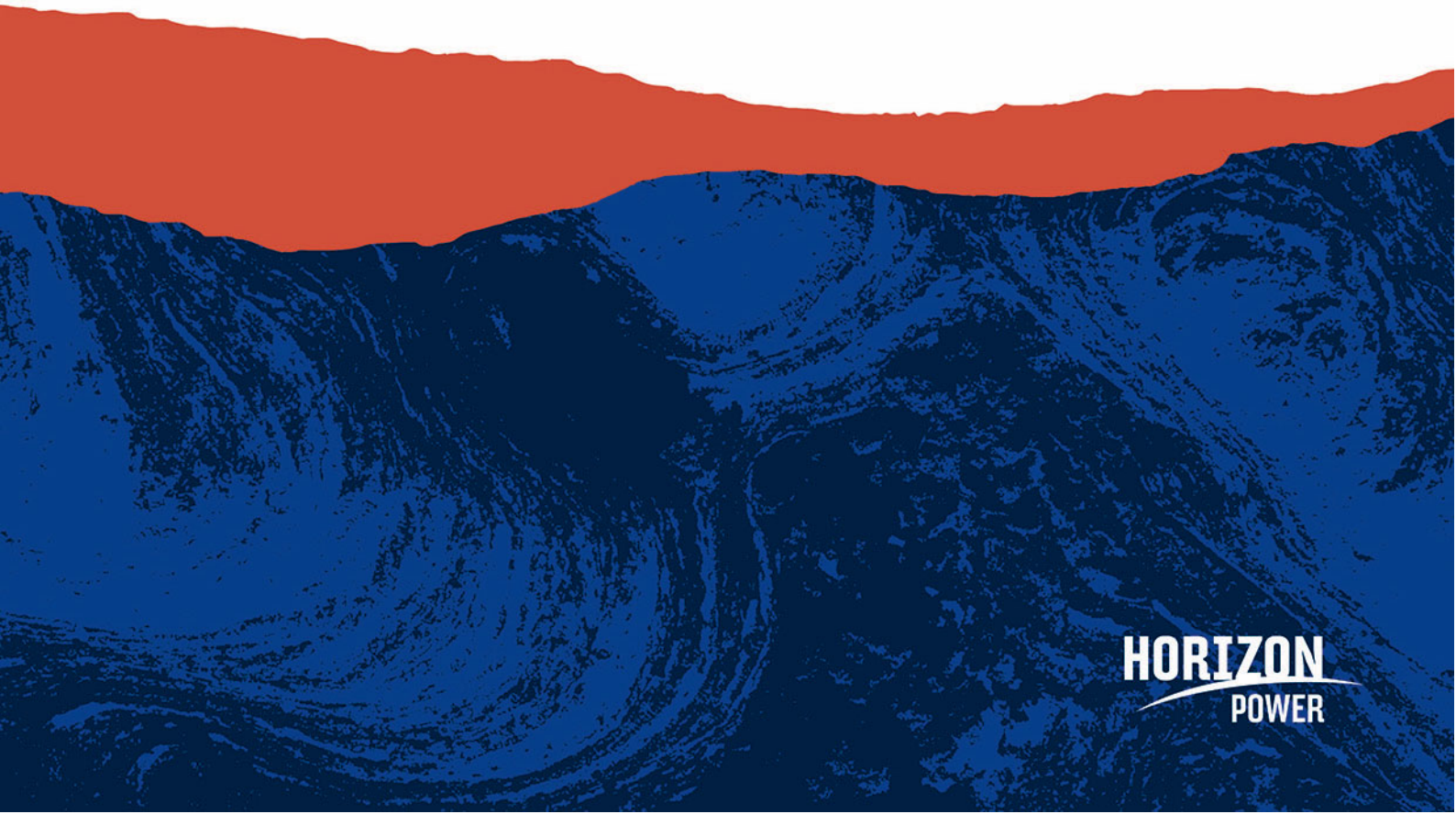
Attachment B: Construction Environmental Management Plan

PUBLIC

Onslow Generation Expansion & Decarbonisation - Native Vegetation Clearing Permit

Construction Environmental Management Plan

July 2024



Contents

1 Introduction

1.1 Project Context and Scope

Regional Power Corporation, trading as (T/A) Horizon Power, is a Western Australian (WA) Government Trading Enterprise (GTE) and the state's regional and remote energy provider. Horizon Power operates under the *Electricity Corporations Act 2005* and is governed by a Board of Directors accountable to the Minister for Energy.

Horizon Power is proposing to install additional electricity infrastructure in Onslow with the aim to further decarbonise the system and cater to an increasing future load. A new renewable energy facility is proposed to be installed on Part of Reserve 19291, Lot 330 On Deposited Plan 402361 (the Project). Two options are being considered for the connection infrastructure, connection to existing underground cables that run from Onslow Power Station to Onslow Substation, or additional underground connection cables installed adjacent to the current connection cables.

The Project will include the installation of the following:

- approximately 16MW of new solar PV panels
- approximately 63.3MW of new battery storage
- PV and battery inverters
- a minimum of 7 transformers
- a new 33kV switchboard
- access tracks and fire breaks
- low voltage underground cabling between assets
- 4 x 33kV cables to connect to the network.

The final design and footprint required for the Project will be determined once geotechnical and heritage surveys are undertaken. Geotechnical surveys will be conducted for the solar facility and require temporary clearing up to 1.11 ha of native vegetation. This will allow for geotechnical testing, including incidental clearing (driving over and parking on native vegetation) for vehicle / machinery access to test sites Geotechnical surveys are not required for the connection corridor as it runs along existing infrastructure. An additional 0.55 ha of temporary clearing will be required for the laydown area for construction.

The construction of the Project will require the permanent clearing of up to 49.5 ha in total. This will allow for the generation of approximately 16 megawatts (MW) of solar infrastructure, a connection corridor and access tracks and fire breaks.

A Native Vegetation Clearing Permit (NVCP) will be required from the Department of Water and Environmental Regulation (DWER).

1.2 Scope and purpose

This Construction Environmental Management Plan (CEMP) has been developed to outline environmental management measures to be implemented by Horizon Power and its contractors during the construction of the Project. This includes, but is not limited to, measures to manage dust, erosion and spread of weeds during clearing of native vegetation.

Figure 1 | Development Envelope

N

0 175 350 700 Meters

Scale: 1:20,000

HORIZON POWER

2 Description of the Activity

2.1 Activity Overview

Geotechnical survey works will be required for the Project and will consist of mainly incidental clearing (driving over and parking on native vegetation) for vehicle / machinery access to test sites.

The Project will consist of the construction of renewable infrastructure generating approximately 16 MW of energy from solar arrays.

2.2 Clearing of Native Vegetation

The proposed clearing will occur within the Development Envelope (Figure 1) which is 162.26 ha in size. No more than 51.16 ha of clearing is proposed, as shown in Table 1.

The geotechnical surveys will require the temporary clearing of up to 1.11 ha of native vegetation. The proposed clearing will be mainly incidental clearing (driving over and parking on native vegetation) for vehicle / machinery access to test sites for the geotechnical survey works. An additional 0.55 ha of temporary clearing will be required for a laydown area.

The construction of the Project will require the permanent clearing of up to 49.5 ha for solar infrastructure, the connection corridor, access tracks and fire breaks. Clearing of native vegetation will primarily be undertaken by mechanical methods. Some clearing may occur within the Development Envelope as incidental clearing through vehicle and machinery movements.

Clearing of native vegetation within the DE will only be undertaken as specified by the Clearing Permit, including the extent and method of clearing to be undertaken and any specific management measures outlined in the permit conditions.

Table 1 Clearing estimated within the DE

Site	Proposed clearing	Clearing breakdown
Onslow	51.16 ha	– Temporary clearing: 1.66 ha – Permanent clearing: 49.5 ha

3 Management Measures

The management measures listed in Table 2 will be implemented during geotechnical investigations and construction of this Project. Clearing of native vegetation will occur as per the conditions in the NVCP issued by DWER.

Table 2 Management Measures to be Implemented During Geotechnical Investigations and Construction

Aspect	Management Measure
Geotechnical works	
Extent of Clearing	– No clearing is permitted outside the DE (Figure 1) – Where possible, pre-existing access tracks will be used and vehicles and machinery will exit the DE along the same route used for access. – Clearing will be minimised where possible through placement of geotechnical tests in existing cleared locations where possible. – Mechanical clearing for the development of formal access tracks is not proposed during geotechnical works. – Works will be undertaken systematically to minimise re-run and compaction of access tracks. – No more than 1.1 ha of clearing will be undertaken for the geotechnical survey. – A pre-clearing toolbox will be held so all staff are aware of their responsibilities under the clearing permit. –

Aspect	Management Measure
Flora and vegetation	– Areas that are degraded, sparsely vegetated and/or previously cleared will be used preferentially for laydown and access tracks. – Mechanically cleared areas will be restored, as follows: • Topsoil will be stockpiled separately to other excavated materials. • On completion of test pit works, excavated materials will be placed back into the test pits. Topsoil from the test pit will then be respread over the surface. • Recontouring of soil within the test pit and laydown areas will be undertaken to prevent compaction. – The clearing area allows for driving over vegetation to access geotechnical sites. Driving on vegetation will be kept to the minimum required to perform the works. – Movement of vehicles and machinery will be in convoy along access tracks/ routes and will not go into adjacent vegetation.
Fauna	– Clearing of native vegetation will be undertaken in a slow, progressive manner in one direction to allow fauna to move away from the clearing area. – Construction personnel will not touch, feed or otherwise directly interact with fauna. – Vehicle and machinery speeds within the DE will be restricted to reduce the likelihood of fauna strike.
Weeds	– All vehicles and machinery will arrive clean on site. – Movement of vehicles and machinery will be restricted to the DE or established tracks and roads.
Soils and erosion	– Standard construction measures regarding erosion and sediment control will be implemented during construction works. – Only clearing immediately prior to construction and use of soil stabilisation methods – Designated access tracks will be applied to prevent additional disturbance.
Dust	– Standard construction dust control and mitigation measures will be implemented during clearing. This may include the use of a water trucks, or similar. – Ground disturbance and clearing of vegetation will be restricted during high winds if dust cannot be adequately controlled. – Reduced vehicle speed limits will be applied in areas of unconsolidated soil. – Use of defined routes for machinery/ vehicles travelling on unsealed roads.
Noise	– The contractor will comply with the Environmental Protection (Noise) Regulations 1997 – Complaints regarding noise will be recorded and investigated by Horizon Power.
Waste	– Rubbish will be disposed of in appropriate containers and all waste will be removed from the site.
Contamination	– Works are to immediately cease if hydrocarbons affected soil are seen or smelled, or if suspected asbestos containing materials are uncovered during works. – Works may recommence once the contamination status has been determined and the contamination is addressed.
Hydrocarbons and chemicals	– Hydrocarbons and chemicals will be appropriately managed on site to prevent spills, including maintaining equipment in good working order in accordance with manufacturers specifications. – No refuelling will be undertaken within 50 m of a waterway, drain or drainage line. – Refuelling will be undertaken on hardstand or using catch trays only. Uncontrolled refuelling is not permitted. – Hydrocarbons will be appropriately stored at least 50 m away from drainage lines, waterways, wetlands or soaks, and stored in an appropriate bunded container. – Chemicals will be appropriately stored to prevent leaks or overflow.
Heritage	– Should aboriginal cultural heritage materials be uncovered during construction works, works are to stop immediately within 20 m of the find. The Contractor is to contact the Horizon Project Manager and an incident will be raised. The area will be cordoned off and no access permitted to the area by people until the incident is investigated and resolved.

Aspect	Management Measure
Construction	
Extent of Clearing	– No clearing is permitted outside the DE (Figure 1) – Clearing will be minimised where possible through placement of assets and access tracks in existing cleared locations where possible. – The clearing locations are to be demarcated prior to clearing activities. – Clearing areas are to be checked by an Environmental Specialist or Site Supervisor prior to clearing to ensure no more than 51.16 ha of clearing is undertaken for the Project – A pre-clearing toolbox will be held so all staff are aware of their responsibilities under the permit.
Flora and vegetation	– Areas that are degraded, sparsely vegetated and/or previously cleared will be used preferentially for laydown and access tracks. – Trees and tall shrubs will be avoided in the selection of access routes and laydown areas, where possible.
Fauna	– Clearing of native vegetation will be undertaken in a slow, progressive manner in one direction to allow fauna to move away from the clearing area. – Construction personnel will not touch, feed or otherwise directly interact with fauna. – Vehicle and machinery speeds within the DE will be restricted to reduce the likelihood of fauna strike. – No more than 1.36 ha of clearing of Seasonally Inundated/Intertidal Areas habitat type is permitted.
Weeds	– The Contractor will ensure that no weed-affected soil, mulch, fill or other material is brought into the DE. – Vehicles and machinery will arrive clean, and weed control will be undertaken at the site post-construction as required. – Movement of vehicles and machinery will be restricted to the DE or established tracks and roads.
Erosion and soils	– Standard construction measures regarding erosion and sediment control will be implemented during construction works. – Designated access tracks will be applied to prevent additional disturbance. – ASS investigations will be undertaken if digging is required below 3m depth, as part of geotechnical investigations in accordance with the *Identification and investigation of acid sulfate soils and acidic landscapes* (DER, 2015a[1]).
Dust	– Standard construction dust control and mitigation measures will be implemented during clearing. This may include the use of a water trucks, or similar. – Ground disturbance and clearing of vegetation will be restricted during high winds if dust cannot be adequately controlled. – Reduced vehicle speed limits will be applied in areas of unconsolidated soil.
Noise	– The contractor will comply with the Environmental Protection (Noise) Regulations 1997 – Complaints regarding noise will be recorded and investigated by Horizon Power.
Waste	– Rubbish will be disposed of in appropriate containers and all waste will be removed from the site.
Hydrocarbons and chemicals	– Hydrocarbons and chemicals will be appropriately managed on site to prevent spills, including maintaining equipment in good working order in accordance with manufacturers specifications. – No refuelling will be undertaken within 50 m of a waterway, drain or drainage line. – Refuelling will be undertaken on hardstand or using catch trays only. Uncontrolled refuelling is not permitted. – Hydrocarbons will be appropriately stored at least 50 m away from drainage lines, waterways, wetlands or soaks, and stored in an appropriate bunded container.

[1] Department of Environment Regulation 2015a, Identification and investigation of acid sulfate soils and acidic landscapes, State of Western Australia, March 2015, Perth, Western Australia

Aspect	Management Measure
	– Chemicals will be appropriately stored to prevent leaks or overflow.
Heritage	– Should aboriginal cultural heritage materials be uncovered during construction works, works are to stop immediately within 20 m of the find. The Contractor is to contact the Horizon Project Manager and an incident will be raised. The area will be cordoned off and no access permitted to the area by people until the incident is investigated and resolved.