



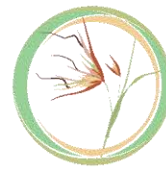
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Nuclear- Powered Submarine Construction Yard

**Terrestrial Flora and Fauna
Requirements Analysis**



DOCUMENT SPECIFICATION

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ACKNOWLEDGEMENT OF COUNTRY

Succession Ecology acknowledges and pays respect to the past, present and future Traditional Custodians and Elders of this nation and the continuation of cultural, spiritual and educational practices of Aboriginal and Torres Strait Islander peoples.



LIST OF ABBREVIATIONS

ANI	Australian Naval Infrastructure
ASA	Australian Submarine Agency
CP	Conservation Park
DEW	Department for Environment and Water
EAAF	East Asian-Australasian Flyway
EIS	Environmental Impact Statement
EPA	Environment Protection Agency (SA)
EPBC	Environment Protection and Biodiversity Conservation Act (Commonwealth legislation)
EPP	Environment Protection Policy
TEMP	Terrestrial Environment Management Plan
TFFRA	Terrestrial Flora and Fauna Requirements Analysis
IBRA	Interim Biogeographical Regionalisation of Australia
IMP	Integrated Pest Management Plan
LSA	Landscape South Australia Act (SA legislation)
NP	National Park
NPW	National Parks and Wildlife Act (SA legislation)
NPWS	National Parks and Wildlife Service
NVA	Native Vegetation Act (SA legislation)
NVC	Native Vegetation Council
PDI	Planning, Development and Infrastructure Act (SA legislation)
PIRSA	Primary Industries and Regions South Australia
TEC	Threatened Ecological Community
WoNS	Weeds of National Significance



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1 LIMITATIONS AND ASSUMPTIONS

Three issues limit the inferences that can be drawn from this report:

1. No design was available at the time that this report was completed.
2. The 2024 Management Plan for the Adelaide Dolphin Sanctuary is currently in draft form.
3. Several technical assessments were in draft form at the time this report was completed.



2 INTRODUCTION

2.1 Background

Succession Ecology Pty Ltd was engaged by URPS on behalf of Australian Naval Infrastructure (ANI) to prepare a Terrestrial and Marine Flora and Fauna Ecological Report to support the Environmental Impact Statement (EIS) for the Nuclear-powered Submarine Construction Yard (SCY) (the Development). To further support the EIS, this Terrestrial Flora and Fauna Requirements Analysis (TFFRA) has been prepared. This TFFRA describes the potential impacts on significant terrestrial native flora and fauna that the Development may impose, and how those impacts will be managed and mitigated.

2.2 Objectives

The objectives of the TFFRA are to:

- Address the following specific State Planning Commission Assessment Requirements:
 - Describe the location, extent, condition and significance of native vegetation, including listed threatened flora species and ecological communities in the Development's environs, and identify those that may need to be cleared or disturbed during construction and / or maintenance.
 - Describe the Development activities with the potential to impact on native vegetation and listed threatened flora species and ecological communities and provide an assessment of how those impacts will be avoided, mitigated, or offset.
 - Outline measures to mitigate effects on native vegetation by addressing the mitigation hierarchy, including any compensatory activities in already degraded areas and use of existing easements. Refer to guidelines produced by the Native Vegetation Council and outline the likely effectiveness of any mitigation measures adopted during both construction and maintenance.
 - Describe the location, extent, condition and significance of native fauna populations (including aquatic and subterranean fauna such as stygofauna) and listed threatened and migratory fauna species in the Development's environs and identify those that are likely to be disturbed during construction and / or maintenance.
 - Describe the Development activities with the potential to impact on native fauna species and listed threatened and migratory fauna species and habitats and provide an assessment of how those impacts will be avoided or mitigated.
 - Identify all potential sources of light pollution from the construction and operation of the proposed Development. Describe their impacts on native fauna, including nocturnal species, and how these impacts will be managed.
 - Detail appropriate buffer distances that would be required between the proposed Development and threatened species, including feeding areas, nesting sites and roosting sites, and the Mutton Cove Conservation Reserve more specifically.
- Describe the construction activities that underlie a need for flora and fauna management.
- Identify the relevant legislative and regulatory requirements.
- Define the flora and fauna risk mitigation and management methods to be applied on the subject site. Provide a framework to ensure that impacts to flora and fauna are mitigated.
- Provide a resource to develop management measures and practices to ensure the implementation of mitigation actions.
- Outline a monitoring program with appropriate indicators for assessing impacts on flora and fauna.
- Outline a corrective action plan to address any incidents of non-compliance with mitigation actions.



The TFFRA is intended to be a dynamic document, which can be updated as the design progresses. More specifically, this TFFRA is a document that supports the development, design, and approvals process. It is not intended to provide guidance to on-site staff regarding the management of environmental risks. A Terrestrial Environmental Management Plan (TEMP) will be required to serve that purpose. It is anticipated that the future TEMP will form a subplan to the CEMP. It is also expected that at least some text from this TFFRA will be used in the TEMP.

2.3 Description of the Development and the Subject Site

The Australian Submarine Agency (ASA) was established in July 2023 to safely and securely acquire, construct, deliver, technically govern, sustain and dispose of Australia's conventionally armed nuclear-powered submarine capability for Australia.

ANI, the owner and manager of the existing Osborne Naval Shipyard, is proposing the Development of adjacent land to construct a new, purpose-built, secure, SCY. The SCY will provide a facility for the construction of the submarines by a third-party ship builder, for delivery to ASA.

The Minister for Planning declared the SCY as an Impact Assessed Development under section 108 (1)(c) of the *Planning, Development and Infrastructure Act 2016 (PDI Act)*, which requires the preparation of an Environmental Impact Statement. The Government Gazette Notice that declared the Nuclear-powered SCY as an Impact Assessed Development described the scope of the Development as follows:

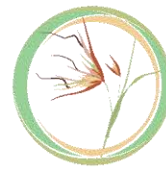
Development for the purposes of establishing and operating a nuclear-powered Submarine Construction Yard at Osborne (being on the land and coastal waters specified in Table 1 and Figure 1, including:

(a) Development associated with the construction and operation of a submarine construction yard, including

(i) facilities associated with maritime construction works in respect of submarines for defence of the Commonwealth, including:

- i. the processing of raw steel and other products to manufacture submarine components;
- ii. general steel processing including cutting, forming, welding and non-destructive evaluation;
- iii. general and specialist machining in support of fabrication and outfitting;
- iv. outfitting of submarine sections and other structures with welded components such as submarine decks and fixed pipework;
- v. outfitting units and other structures with electrical, mechanical and piping components;
- vi. assembly, testing, commissioning and services installation in support of combat system integration;
- vii. manufacture of pipe and electrical components;
- viii. assembly, testing and commissioning of the nuclear propulsion system (but excluding the manufacture of the reactor power module);
- ix. assembly, construction and commissioning of submarines;
- x. on-site system testing, commissioning and set-to-work activities; and
- xi. mechanical, hydraulic and electrical conveyance for the purpose of moving submarine components and submarine launch activities;

(ii) the storage or warehousing of chemicals or chemical products, including appropriate bunding/hardstand,



- (iii) facilities and works associated with abrasive blasting and surface coating of submarines;
- (iv) wet basin, wharf and related support facilities including any associated works (including dredging for the purposes of construction and operation of vessel berths but excluding dredging for the purposes of deepening the Port River Channel);
- (v) truck loading and unloading facilities, access and egress;
- (vi) ancillary infrastructure, including guard houses, car parking, warehousing, office accommodation, health centre, data centre and general information and communication technology services, sleeping quarters, and general amenities including training facilities and other staff and visitor support facilities, security, and access;
- (vii) temporary construction compound and laydown areas; and
- (viii) temporary protected storage of waste, including low-level radioactive waste;

(b) Development associated with any change in the use of land and coastal waters associated with any Development within the ambit of the preceding paragraphs;

(c) Development associated with the construction, installation or provision of any or all of the following infrastructure, facilities and services:

- (i) stormwater;
- (ii) water supply;
- (iii) power supply;
- (iv) telecommunications; and
- (v) wastewater treatment or disposal

in each case, associated with any Development within the ambit of the preceding paragraphs;

d) Development (including Development undertaken on land or coastal waters in the State, inclusive but not limited to the land and coastal waters specified in Table 1 and Figure 1) associated with any excavation or filling of land associated with any Development within the ambit of the preceding paragraphs;

(e) Development (including Development undertaken on land or coastal waters in the State, inclusive but not limited to the land and coastal waters specified in Table 1 and Figure 1) associated with the division of land associated with any Development within the ambit of the preceding paragraphs; and

(f) any related or ancillary Development (including Development undertaken on land or coastal waters in the State, inclusive but not limited to the land and coastal waters specified in Table 1 and Figure 1) associated with any Development within the ambit of the preceding paragraphs;

but excluding:

- (i) the relocation of existing electricity transmission lines, substation and gas pipelines;
- (ii) works and activities associated with existing port and harbour operations; and
- (iii) works associated with the construction and alteration of a road on Lot 103 DP82690, Lot 110 DP118046, Lot 777 DP87145, QP7 DP74306, Lot 208 DP 64682, Lot 801 DP76925 and Lot 601 DP121984.

Fabrication buildings will be of a significant scale, up to 50 metres in height and 200 metres in length.



The SCY subject site is located on the north-eastern side of the Lefevre Peninsula in Port Adelaide, South Australia. It encompasses the following Certificate of Titles shown in Table 1, Figure 1 and Figure 2.

Table 1: SCY Subject Site Certificate of Titles

CT6191/179	CT6191/180	CT6191/181	CT6191/182	CT6268/862	CT6236/388
CT6262/182	CT6289/763	CT6088/174	CT6088/171	CT6088/170	CT6088/177
CT6282/172	CT6088/175	CT6282/178	CT5858/214	CT5855/133	CT5856/14
CT6088/188	CT6088/186	CT6088/185	CT6088/184	CT6088/183	CT6231/17
CT6231/5	CT6282/169	CT6088/193	CT6088/190	CT6088/189	CT 6191/178
CT6191/176	CT6060/497	CT6282/175			

Hereafter, the Development will be referred to as the Nuclear-Powered Submarine Construction Yard (SCY) or the Development. When describing the area, the Development will be referred to as the 'subject site'. Where delineation is required, the subject site will be referred to as the 'land-based portion of the subject site' and/or the 'marine-based portion of the subject site'.

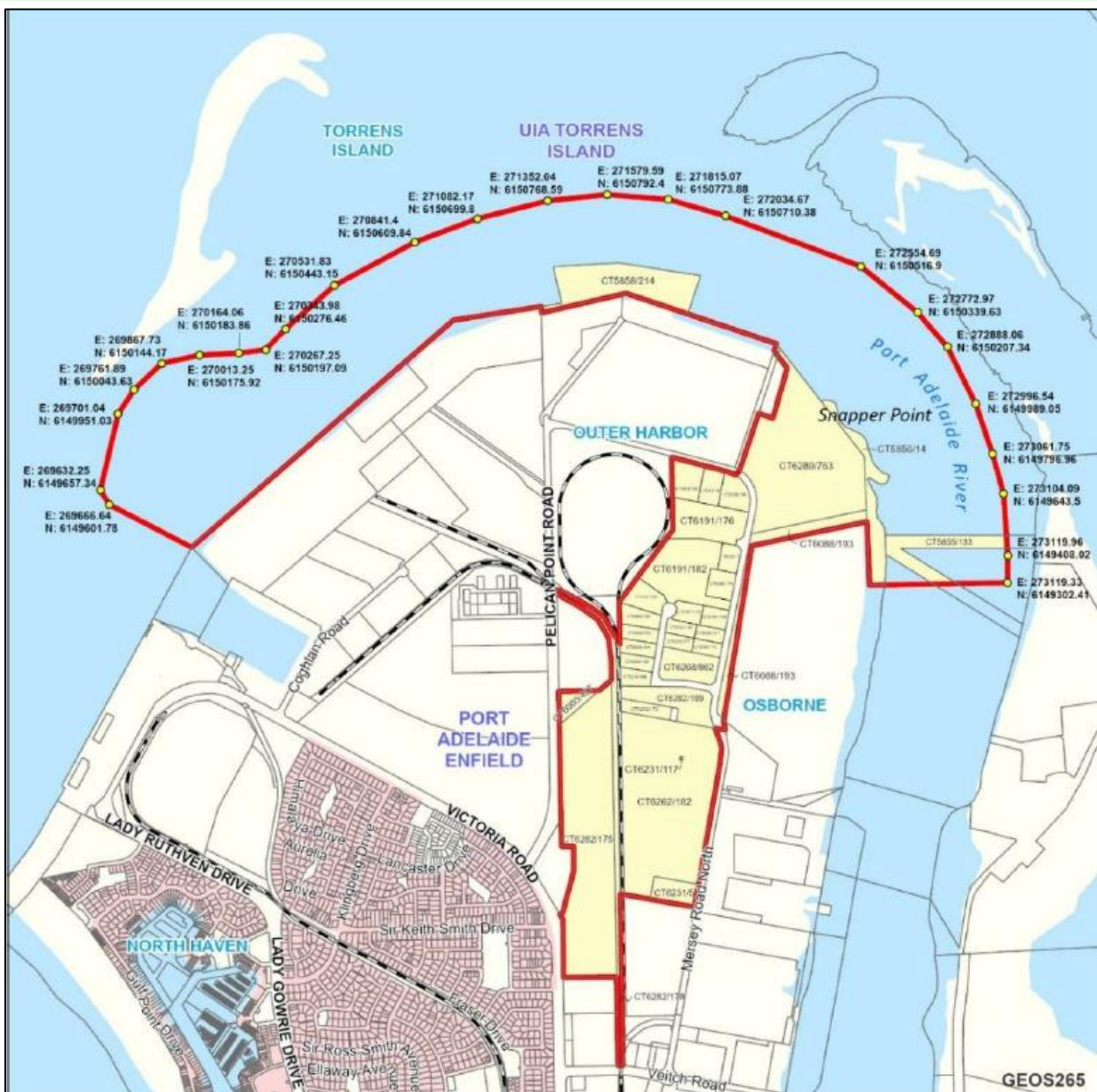


Figure 1: SCY Subject Site (provided to Succession Ecology by URPS 29/04/2024).

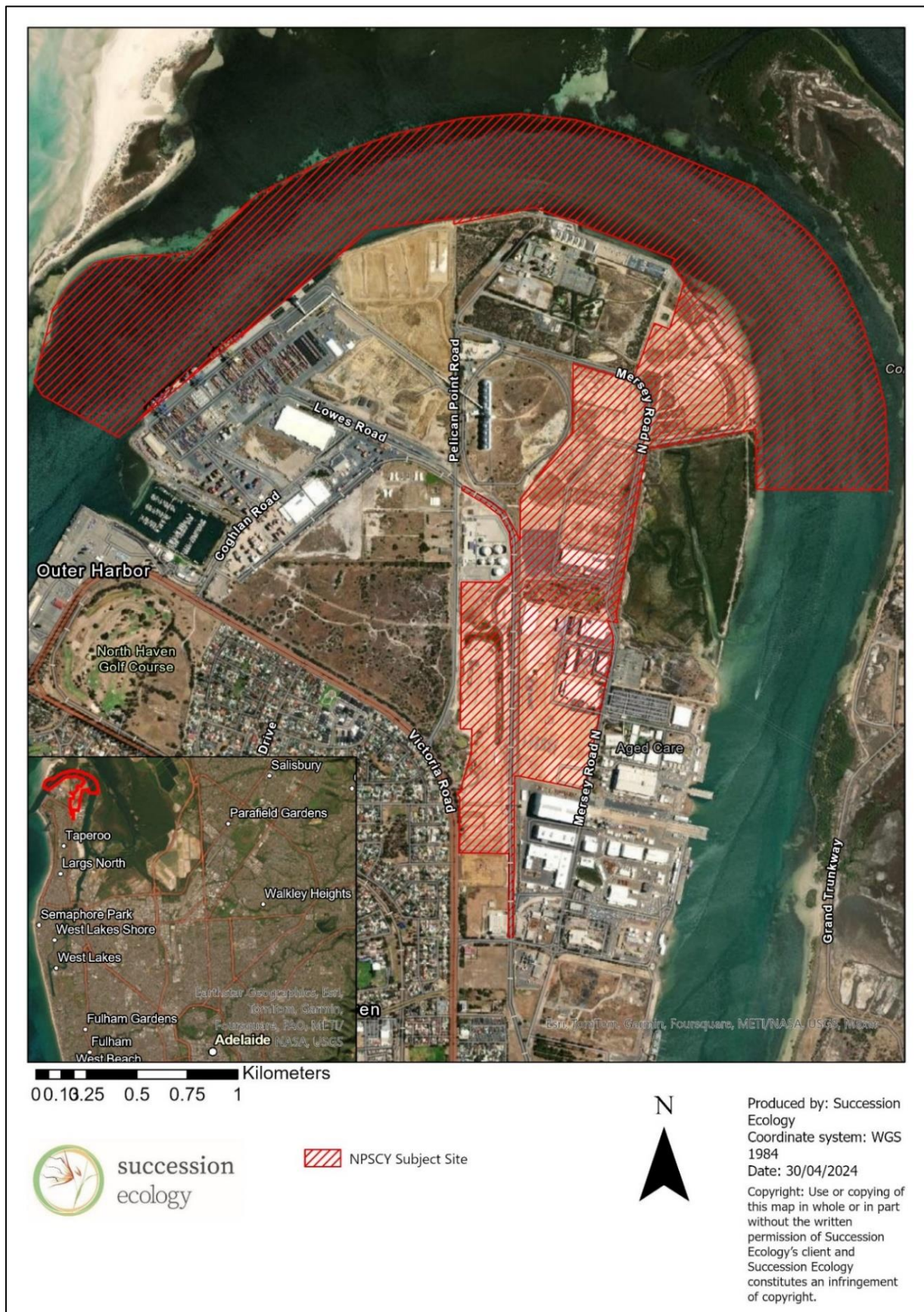


Figure 2: The subject site, highlighted by red hatching.



2.4 Legislation

The Development is subject to various environmental Legislation at the Commonwealth and State levels (Table 2).

Table 2: Relevant Environmental Legislation.

Legislation	Relevance
<p>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth; EPBC Act) and EPBC Regulations 2000</p> <p>Provides a framework for the protection and management of threatened flora, fauna and ecological communities. Any action that significantly impacts these will require a referral under the EPBC Act.</p>	<p>Matters of National Environmental Significance (MNES) and protected species occur within the subject site and must be managed in accordance with the EPBC Act and EPBC Regulations.</p> <p>The Development is subject to a Strategic Assessment under the EPBC Act. The Strategic Assessment will result in a referral decision by the Department for Climate Change, Environment, Energy and Water (DCCEEW), in which conditions (such as management measures) are likely to be placed on the SCY.</p> <p>Note the TFFRA does not form part of the Strategic Assessment. The TFFRA has been prepared to support the Environmental Impact Statement (refer to PDI Act row of this table).</p>
<p>Landscape South Australia Act 2019 (SA; LSA Act) and LSA Regulations 2020</p> <p>Under the LSA Act land holders have the responsibility to manage Declared Plants and animals and prevent land degradation.</p>	<p>Declared Plants and Animals occur within the subject site and therefore must be managed in accordance with the LSA Act and the LSA Regulations.</p>
<p>National Parks and Wildlife Act 1972 (SA; NPW Act) and NPW Regulations 2019; – Provides a framework for the protection, management and conservation of flora and fauna.</p>	<p>Flora and fauna species listed under the NPW Act occur within the subject site and therefore must be managed in accordance with the NPW Act and Regulations.</p>
<p>Native Vegetation Act 1991 (SA; NV Act) and NV Regulations 2017</p> <p>Relevant for the establishment and management of SEB offsets. This process is outlined in this Act and Regulations.</p>	<p>ANI will commit to prepare a Native Vegetation Clearance (NVC) Data Report for prior to clearance of native vegetation. The native vegetation council boundaries only apply to the marine-based portion of the subject site. The land-based portion of the subject site is exempt from the NV Act in accordance Part 1-Preliminary 4 (2b), as it does not fall within the NV Act boundaries.</p>
<p>Planning, Development and Infrastructure Act 2016 (SA; PDI Act) and Planning, Development and Infrastructure (General) Regulations 2017 (PDI Regulations)</p> <p>Governs the development and management of land and buildings, provides a planning system to regulate development within the State, rules with respect to the design, construction and use of buildings, and other initiatives to facilitate the development of infrastructure, facilities and environments.</p>	<p>On 15 February 2024, the Minister for Planning declared that the proposed development of a Nuclear-Powered Submarine Construction Yard (SCY) by proponent Australian Naval Infrastructure at Osborne to be assessed as an Impact Assessed development pursuant to section 108(1)(c) of the PDI Act. The EIS process is the highest level of assessment under the PDI Act and enables the holistic consideration of projects that are considered to be of economic, social or environmental importance to South Australia. The EIS process provides a comprehensive assessment of a development or project proposal and the expected effects on the receiving environment and within the broader context of its setting, which could relate to a local area, region, state or nation. This report addresses the Assessment Requirements issued by the State Planning Commission on 20 May 2024.</p>



2.5 State Planning Commission Assessment Requirements

This document has been prepared to address the State Planning Commission’s Assessment Requirements. URPS provided the Assessment Requirements to Succession Ecology on 22 August 2024 (Table 3).

Table 3: The State Planning Commission’s Assessment Requirements that are addressed in this TFFRA. The remainder of BE1, BE2, and BE3 are addressed in Succession Ecology’s 2024 “Nuclear-powered Submarine Construction Yard Terrestrial and Marine Flora and Fauna Ecological Report”, and Succession Ecology’s 2024 Nuclear-Powered Submarine Construction Yard Biosecurity Report.

Objective	Assessment Requirement	Section
BE3 / Terrestrial Flora and Fauna / Detailed		
To ensure that the development avoids or minimises adverse effects on biodiversity, threatened and protected terrestrial and aquatic flora and fauna species, their ecological communities and habitat.	Describe the location, extent, condition and significance of native vegetation, including listed threatened flora species and ecological communities in the Development’s environs, and identify those that may need to be cleared or disturbed during construction and / or maintenance.	3.2, 5.2 and 5.3
	Describe the Development activities with the potential to impact on native vegetation and listed threatened flora species and ecological communities and provide an assessment of how those impacts will be avoided, mitigated, or offset.	5.1, 5.2 and 5.3
	Outline measures to mitigate effects on native vegetation by addressing the mitigation hierarchy, including any compensatory activities in already degraded areas and use of existing easements. Refer to guidelines produced by the Native Vegetation Council and outline the likely effectiveness of any mitigation measures adopted during both construction and maintenance.	5.1, 5.2 and 5.3
	Describe the location, extent, condition and significance of native fauna populations (including aquatic and subterranean fauna such as stygofauna) and listed threatened and migratory fauna species in the Development's environs and identify those that are likely to be disturbed during construction and / or maintenance.	6.1
	Describe the Development activities with the potential to impact on native fauna species and listed threatened and migratory fauna species and habitats and provide an assessment of how those impacts will be avoided or mitigated.	6.1 and 6.2
	Identify all potential sources of light pollution from the construction and operation of the proposed Development. Describe their impacts on native fauna, including nocturnal species, and how these impacts will be managed.	6.1 and 6.2
	Detail appropriate buffer distances that would be required between the proposed Development and threatened species, including feeding areas, nesting sites and roosting sites, and the Mutton Cove Conservation Reserve more specifically.	6.1 and 6.1



3 ENVIRONMENTAL CONTEXT

3.1 General

The subject site is located on the Lefevre Peninsula, South Australia. The Lefevre Peninsula is a highly industrialised area. The Osborne Naval Shipyard (ONS), Quantem Fuel Terminal, Pelican Point Power Station, Snapper Point Power Station, Viterra Outer Harbour, Port Adelaide Passenger Terminal, and Flinders Port Adelaide Container Terminal cover a large portion of the peninsula. Other land uses include residential dwellings in North Haven, Mutton Cove Conservation Reserve, Outer Harbor Railway Station Reserve, Falie Reserve and North Haven Marina. Biodiversity Park occurs directly south of the subject site.

The marine-based portion of the subject site occurs within the Port River. The river supports industrial, recreational, historical and ecological uses and values. Primarily, the Port River is used as a major shipping channel in SA and supports the existing ONS shipyard. The river contains several historic shipwrecks and forms part of the Gulf St Vincent and the Adelaide Dolphin Sanctuary (ADS). Torrens Island Conservation Park and the Adelaide International Bird Sanctuary National Park - Winaityinaityi Pangkara are located within the wider landscape. The subject site is within the boundaries of the City Port Adelaide Enfield (PAE) Council and the Green Adelaide Landscape management region.

The subject site occurs with the IBRA Association of Parham, Eyre Yorke Block Region and Subregion St Vincent (Table 4).

Table 4: Eyre Yorke Block Region Description

Feature	Description
Land type	Erosional, Depositional or Volcanic
Landscape	Dunefield
Landform	Low limestone dune ridges: small granitic islands with dunes
Geology	Ripon Calcrete; Loveday Soil in aeolian sand sheets, dune sand, red soils (terra rossa)
Soil	Sands soils of minimal pedologic Development, Brown calcareous earths, Brown sand soils, Shallow red brown sandy soils, Sandy soils with yellow clayey mottled subsoil.
Vegetation	Mallee Woodland and Shrubland
Climate	E2: Mediterranean climate, but with drier cooler winters and less growth than E1.

3.2 Vegetation and Habitat

3.2.1 Vegetation Associations

Field surveys were conducted by Succession Ecology on May 15, June 19, July 11, and July 18, 2023, to identify environmental risks associated with the proposed Development. The assessments addressed native vegetation, amenity plantings, Regulated and Significant trees, Declared Plants, as well as fauna and the habitat value of vegetation and trees at the subject site and Torrens Island.

Succession Ecology identified a variety of terrestrial vegetation associations within and surrounding the subject site. As identified in section 3.1, much of the subject site is dominated by industrial land uses. However, there are pockets of remnant vegetation scattered throughout the subject site, which provide some suitable habitat for fauna species. Much of the subject site is heavily degraded with by the incursion of Declared Plants and past human activities. Out of the 14 terrestrial vegetation associations surveyed by



Succession Ecology, three occur within the subject site (VA1, VA2b and VA4) (Table 5 and Figure 3). Mangrove woodlands and the Subtropical and Temperate Coastal Saltmarsh Threatened Ecological Community do not occur within the subject site.

Table 5: Vegetation types identified within and surrounding the subject site and their broad description.

Vegetation Type	Description
VA1: Degraded chenopod shrubland	This vegetation is dominated by chenopod species, including <i>Atriplex</i> and <i>Maireana</i> species. The vegetation is heavily degraded by an incursion of Declared Plants and human activities.
VA2a: Subtropical and Temperate Coastal Saltmarsh Threatened Ecological Community	This vegetation is dominated by samphire species including Brown-head Glasswort (<i>Tecticornia indica</i>) and Beaded Glasswort (<i>Sarcocornia quinqueflora</i>). Coastal chenopod species are also present. There are few weed species.
VA2b: Degraded samphire shrubland ± sedges, rushes and chenopod species	This vegetation is dominated by samphire species. Several coastal chenopod species are also present, whilst some sedge and rush species are present within Falie Reserve. Additionally, Creeping Boobialla occurs in this vegetation. The vegetation is heavily degraded by an incursion of Declared Plants and past human activities.
VA2c Samphire Shrubland	This vegetation is dominated by samphire species including Brown-head Glasswort (<i>Tecticornia indica</i>) and Beaded Glasswort (<i>Sarcocornia quinqueflora</i>). Coastal chenopod species are also present. There are few weed species. This VA did not meet the criteria for the TEC due to it being cut off from tidal influence.
VA3: Planted exotic trees with weedy understorey	This area consists mostly of planted exotic trees with a weedy understorey. There are several remnant native species present, including <i>Acacia</i> and chenopod species.
VA4: Planted <i>Melaleuca lanceolata</i> and <i>Myoporum insulare</i> shrubland	These plantings consist of species that are endemic to the area, including Dryland Tea-tree (<i>Melaleuca lanceolata</i>), Common Boobialla (<i>Myoporum insulare</i>) and chenopod species. Scattered regeneration of native species occurs within the understorey.
VA5: Planted <i>Eucalyptus</i> species	A row of <i>Eucalyptus</i> species is planted along the northern fence of the Pelican Point Power Station.
VA6: Mixed native plantings	A mix of planted <i>Eucalyptus</i> species, Cypress Pine (<i>Callitris gracilis</i>), Drooping She-oak (<i>Allocasuarina verticillata</i>), Dryland Tea-tree and <i>Acacia</i> species with a predominantly weedy understorey.
VA7: Mangrove	Dense forest of Grey Mangrove (<i>Avicennia marina</i> ssp. <i>marina</i>). Few other species grow in this community.
VA8: <i>Callitris gracilis</i> Woodland	Cypress Pine over a mix of native and weedy understorey.
VA9: <i>Acacia</i> Shrubland	Golden Wattle (<i>Acacia pycnantha</i>) and Umbrella Bush (<i>Acacia ligulata</i>) over Coast Spinifex (<i>Spinifex hirsutus</i>) and chenopod species.
VA10: Planted exotic and native trees	Plantings of native species, such as Scarlet Bottlebrush (<i>Callistemon rugulosa</i>) and exotic species such as Aleppo Pines (<i>Pinus halepensis</i>) and Norfolk Island Pine (<i>Araucaria heterophylla</i>). Remnant native <i>Eucalyptus</i> species are present in the



Vegetation Type	Description
	northern half of the area. The understorey consists of a mix of native and introduced species.
VA11: Mixed <i>Eucalyptus</i> open woodland	South Australian Blue Gum (<i>Eucalyptus leucoxylon</i>) and River Red Gum (<i>Eucalyptus camaldulensis</i>) over Golden Wattle and Sea-berry Saltbush (<i>Rhagodia candolleana</i> ssp. <i>candolleana</i>). There is a large amount of weedy grass present in the understorey.
VA12: Exotic Grassland with scattered native and exotic shrubs	A predominantly exotic grassland, dominated by Tall Wheat-grass (<i>Thinopyrum elongatum</i>), Couch (<i>Cynodon dactylon</i>) and Fleabane (<i>Conyza bonariensis</i>). Scattered exotic and native shrubs occur within the VA.

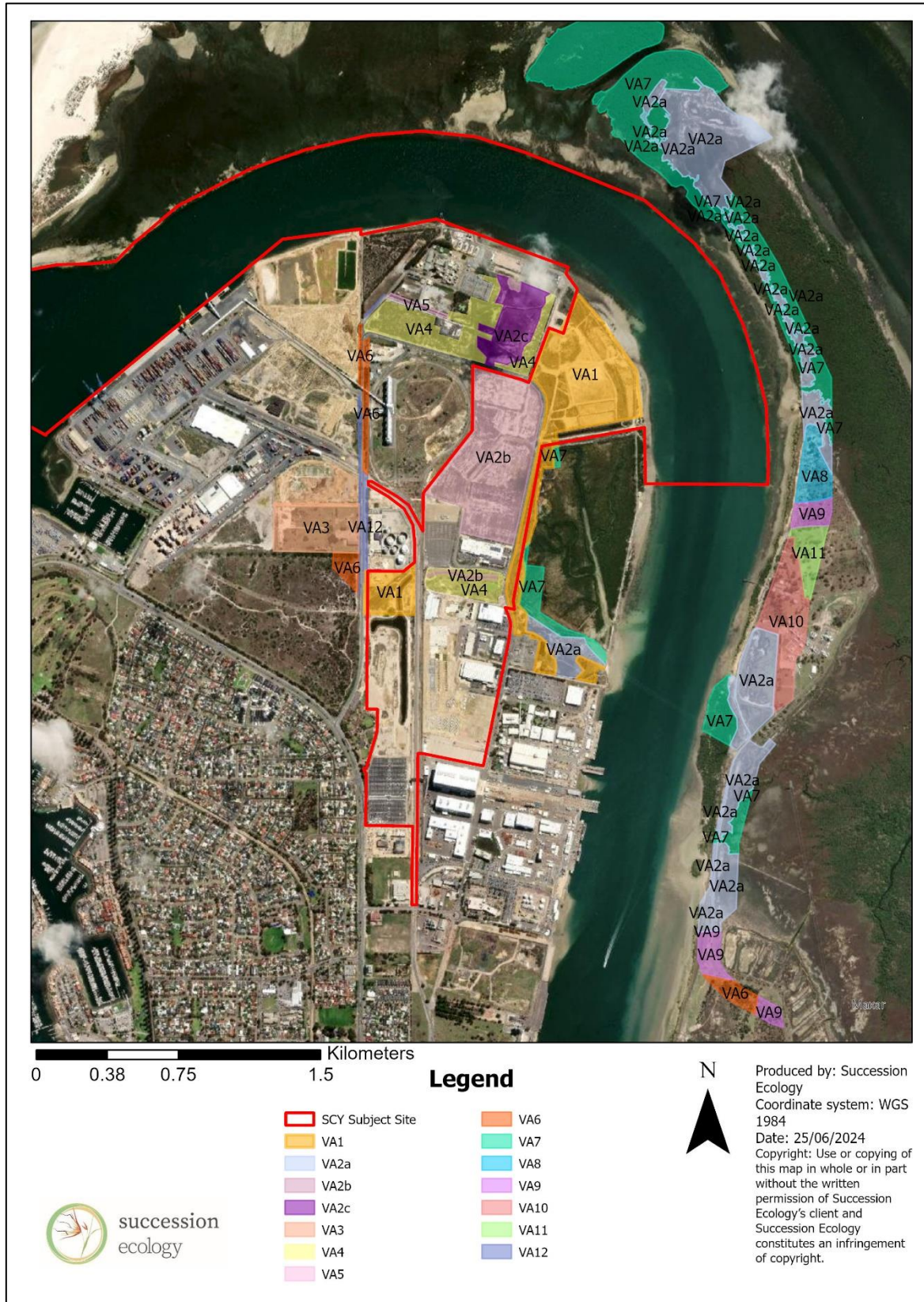
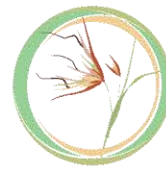


Figure 3: Vegetation Associations within and adjacent to the subject site.



3.2.2 Threatened Flora Species

No threatened flora under the *EPBC Act* was observed during the field surveys. One species, which is listed as Rare under the *NPW Act*, was observed within VA2b (*Myoporum parvifolium*) (Figure 4). Because the plants were observed in areas that lie outside the jurisdiction of the *NV Act*, they are not protected under the *NV Act*. Nevertheless, they are protected under the *NPW Act*. Although flora species listed under the *NPW Act* do not require approval to be removed, treating them with delicacy is advised.



Figure 4: Creeping Boobialla (*Myoporum parvifolium*), listed as Rare under the *NPW Act*, was observed by Succession Ecology during field surveys of the Subject site.



3.3 Introduced Flora

The subject site is heavily degraded by the incursion of Declared Plants and past human activities (Figure 5). The species that are of greatest concern are Declared Plants, as they pose a significant threat to primary industries, natural environments, and public safety (PIRSA 2022). Landowners have a legislative requirement under the *Landscape South Australia Act (LSA Act)* to manage Declared Plants in accordance with the Declared Plant Policies. A total of 11 species of Declared Plants were identified across the subject site. Of these, three are also listed as Weeds of National Significance (WoNS) (Table 6). WoNS are plants that have been identified as national threats due to their invasiveness, economic and environmental impacts.

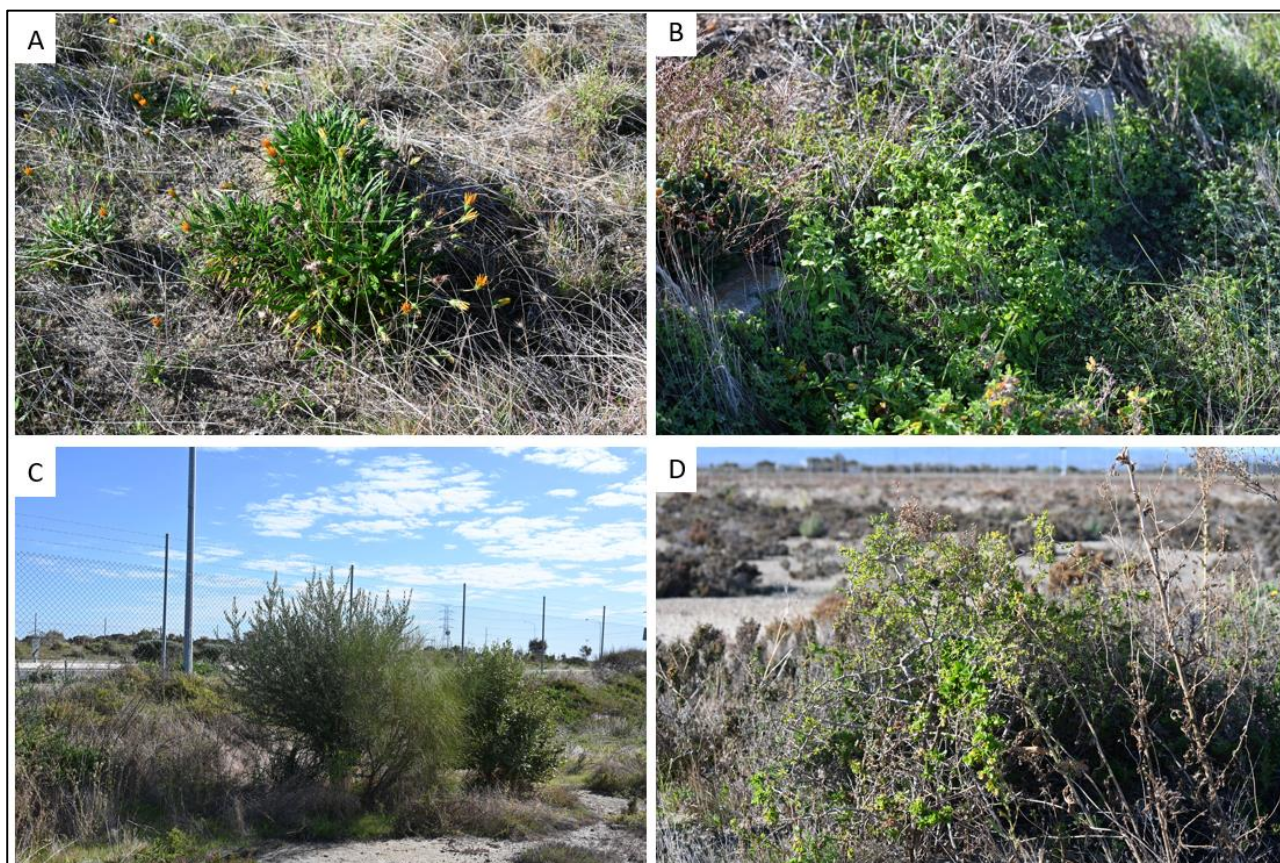


Figure 5: Declared Plants observed by Succession Ecology during ecological surveys. A: *Gazania* (*Gazania* spp.); B: Bridal Creeper (*Asparagus asparagoides*); C: European Olive (*Olea europaea*) and Swamp Oak (*Casuarina glauca*); and D: African Boxthorn (*Lycium ferocissimum*).

Table 6: A summary of Declared Plant species identified within the vegetation association at the subject site.

Declared Plant Species	Common Name	VA
<i>Asparagus asparagoides</i> (WoNS)	Bridal Creeper	1, 4, subject site
<i>Casuarina glauca</i>	Swamp Oak	1, 2b, subject site
<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i>	Boneseed	Subject site
<i>Cynara cardunculus</i>	Artichoke Thistle	1, 2b, subject site
<i>Euphorbia terracina</i>	False Caper	1, 2b, 4, subject site
<i>Gazania</i> sp.	Gazania	2b, 4, subject site



Declared Plant Species	Common Name	VA
<i>Juncus acutus</i>	Spiny Rush	2b, subject site
<i>Lycium ferocissimum</i> (WoNS)	African Boxthorn	1, 2b, 4, subject site
<i>Olea europaea</i>	European Olive	1, 4, subject site
<i>Retama raetam</i>	White Weeping Broom	Subject site
<i>Ulex europaeus</i> (WoNS)	Gorse	Subject site



3.4 Fauna

Succession Ecology undertook several field surveys for opportunistic sighting of fauna (2023) and the Australian Submarine Agency, as part of the *EPBC Act* Strategic Assessment for the Submarine Construction Yard, undertook targeted migratory bird surveys (Australian Submarine Agency 2024). Succession Ecology only observed fauna within the subject site. In contrast, the Australian Submarine Agency observed fauna within the subject site and at reference locations (Table 7 and Figure 6).

Table 7: Targeted Migratory Bird Survey Locations (Australian Submarine Agency).

Targeted Migratory Bird Survey Locations	Relevance to subject site
Port Adelaide River shoreline subject site – at the interface of the Strategic Assessment area and the Port Adelaide River	<ul style="list-style-type: none"> • Within the subject site: Strategic Assessment Area reference sites) • Contains migratory species habitat
Swale drain subject site – the constructed stormwater drain along the northern boundary of Mutton Cove Nature Reserve.	
Mutton Cove inlet site – the area to the north of the existing Osborne Naval Shipyard where tides enter Mutton Cove Conservation Reserve through the breached seawall.	<ul style="list-style-type: none"> • Adjacent the subject site • Lefevre Peninsula reference site – site likely to be used by the same fauna populations that utilise the Strategic Assessment Area survey sites.
Falie Reserve detention basin subject site	<ul style="list-style-type: none"> • Within the subject site • Lefevre Peninsula reference site – site likely to be used by the same populations that utilise the Strategic Assessment Area survey sites.
Eight reference sites within the region, including St. Kilda Beach, Port Gawler foreshore, Port Gawler swale drain, Thompson Beach shoreline, Thompson Beach North, estuary, Middle Beach, Torrens Island mangrove foreshore, Bird Island Conservation Area.	<ul style="list-style-type: none"> • Adjacent or within the wider locality to the subject site • Eight reference sites within the region.

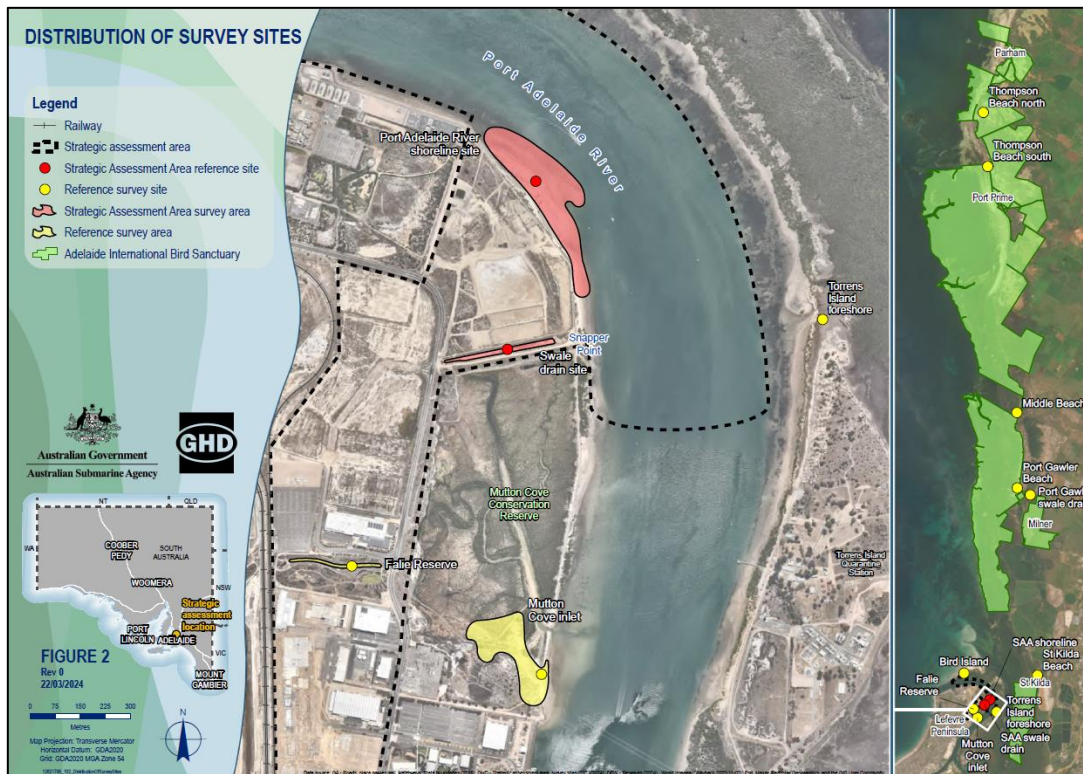


Figure 6: Migratory bird survey locations (Australian Submarine Agency 2024).

Protected species under the EPBC Act / NPW Act

A total of 46 species were observed during the targeted migratory bird surveys, of which 11 species were listed as migratory. Seven of the migratory species were recorded in the Strategic Assessment Survey Area. Migratory bird species that have been recorded within the Strategic Assessment Survey Area or reference sites are summarised in Table 8 (Australian Submarine Agency 2024). An additional two migratory species were observed within reference sites (Table 8) (Australian Submarine Agency 2024). In addition to migratory birds protected under the EPBC Act, Table 9 further details EPBC Act / NPW Act non-migratory fauna species observed within the subject site, reference sites or have suitable habitat present.



Table 8: Migratory species were observed from within the Strategic Assessment Area and reference sites (Australian Submarine Agency 2024).

Species name	Common name	EPBC Act Status	Presence in targeted field surveys	
			Strategic Assessment Survey Area	Reference Sites
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi	X	X
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	V, Mi	X	X
<i>Calidris alba</i>	Sanderling	Mi		X
<i>Calidris ruficollis</i>	Red-necked Stint	Mi	X	X
<i>Hydroprogne (Sterna) caspia</i>	Caspian Tern	Mi	X	X
<i>Pluvialis squatarola</i>	Grey Plover	V, Mi		X
<i>Thalasseus bergii</i>	Greater Crested Tern	Mi	X	X
<i>Tringa nebularia</i>	Common Greenshank	E, Mi	X	X
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Mi	X	X

Table 9: Species listed under the EPBC Act or NPW Act that are relevant to the Development.

Species (Common Name)	Conservation Status	Description and Occurrence
Observed Within Subject Site		
<i>Actitis hypoleucos</i> (Common Sandpiper)	EPBC Act: Mi NPW Act: R	A migratory species that breeds in the Northern Hemisphere. The species shows a preference for pebbly, sandy or rocky margins of fast-flowing rivers, as well as small ponds, pools and dams, clear freshwater lake shores, sheltered sea coasts with rocky or sandy beaches, tidal creeks and estuaries and often forages in patches of dry meadow. (Australian Museum 2020). Four individuals were observed within subject site utilising the intertidal flat within the survey area (Australian Submarine Agency 2024).
<i>Calidris acuminata</i> (Sharp-tailed Sandpiper)	EPBC Act: VU, Mi, Ma	Spends the non-breeding season in Australia and is widespread in both inland and coastal locations and in both freshwater and saline habitats. In Australasia, prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans, and hypersaline salt lakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgeland and other ephemeral wetlands, but leave when they dry (DCCEEW 2016). A total of 333 observations were made within the coastal swale drain / wetland during the migratory season, mostly in flocks of up to 30-50



Species (Common Name)	Conservation Status	Description and Occurrence
		individuals (Australian Submarine Agency 2024). The species utilised the site for foraging, roosting and sheltering.
<i>Calidris ruficollis</i> (Red-necked Stint)	EPBC Act: Mi, Ma	A migratory shorebird, mostly found in coastal areas, including in sheltered inlets, bays, lagoons, and estuaries with intertidal mudflats, often near spits, islets, and banks and, sometimes, on protected sandy or coralline shores. Occasionally recorded on exposed or ocean beaches, and sometimes on stony or rocky shores, reefs, or shoals. They also occur in saltworks and sewage farms, saltmarsh, ephemeral or permanent shallow wetlands near the coast or inland, including lagoons, lakes, swamps, riverbanks, waterholes, bore drains, dams, soaks, and pools in salt flats. They sometimes use flooded paddocks, damp grasslands, or even dry gibber plains with little or no perennial vegetation (DCCEEW 2023a). Four individuals were observed within subject site utilising the coastal swale drain / wetland within the survey area (Australian Submarine Agency 2024).
<i>Haematopus longirostris</i> (Pied Oystercatcher)	NPW Act: R	Prefers mudflats, sandbanks and sandy ocean beaches and is less common along rocky or shingle coastlines. Although rarely recorded far from the coast, it may occasionally be found in estuarine mudflats and short pasture (Birdlife Australia 2022). A total of 146 observations were recorded along the Strategic Assessment Area shoreline (Australian Submarine Agency 2024).
<i>Haematopus fuliginosa</i> (Sooty Oystercatcher)	NPW Act: R	Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries (DEH 2022). Bird Island, 2 km from the subject site, provides important habitat for this species. A total of 189 observations were recorded along the Strategic Assessment Area shoreline (Australian Submarine Agency 2024).
<i>Hydroprogne (Sterna) caspia</i> (Caspian Tern)	EPBC Act: Mi	Mostly found in sheltered coastal embayments (harbours, lagoons, inlets, bays, estuaries, and river deltas) and those with sandy or muddy margins are preferred. They also occur on near-coastal or inland terrestrial wetlands that are either fresh or saline, especially lakes (including ephemeral lakes), waterholes, reservoirs, rivers, and creeks. They also use artificial wetlands, including reservoirs, sewage ponds and saltworks. In offshore areas the species prefers sheltered situations, particularly near islands, and is rarely seen beyond reefs (DCCEEW n.d.). A total of 26 observations of the species were made in the intertidal zone of the subject site, with 4-8 individuals present at any one time (Australian Submarine Agency 2024).
<i>Neophema elegans</i> (Elegant Parrot)	NPW Act: R	Utilises a wide range of open habitats, including grasslands, shrublands, mallee, woodlands and thickets, bluebush plains, heathlands, saltmarsh, and farmland (Birdlife Australia 2021). This species was observed at three locations across the subject site during a baseline survey.
<i>Pelecanus conspicillatus</i> (Australian Pelican)	EPBC Act: Ma	This species is not threatened and is common in the region. It has been observed on multiple occasions within the subject site during the baseline and targeted shorebird surveys.



Species (Common Name)	Conservation Status	Description and Occurrence
<i>Threskiornis molucca</i> (Australian White Ibis)	EPBC Act: Ma	This species is not threatened and is common in the region. It has been observed on multiple occasions within the subject site during the baseline and targeted shorebird surveys.
<i>Tringa nebularia</i> (Common Greenshank)	EPBC Act: EN, Mi	Inhabits wetlands, mudflats, and channels. It occurs in areas situated near or among mangroves or other sparse, emergent or fringing vegetation such as sedges or saltmarsh, and occasionally feeds amongst seagrass beds (DCCEEW 2023b). The species was observed both within the intertidal flat (one individual) as well as the coastal swale drain / wetland (seven observations of one or two individuals) within the subject site.
<i>Tringa stagnatilis</i> (Marsh Sandpiper)	EPBC Act: Mi	Found in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and inland lakes (DCCEEW 2023c). Four observations of this species were made within the Mutton Cove Mangrove Inlet (Australian Submarine Agency 2024).
<i>Thalasseus bergii</i> (Greater Crested Tern)	EPBC Act: Mi	This species is not threatened and is common in the region. It was observed on multiple occasions within the subject site during the baseline and targeted shorebird surveys (Australian Submarine Agency 2024).
<i>Threskiornis molucca</i> (Australian White Ibis)	EPBC Act: Ma	This species is not threatened and is common in the region. It was observed on multiple occasions within the subject site during the baseline and targeted shorebird surveys (Australian Submarine Agency 2024).
<i>Himantopus himantopus</i> (Black-winged Stilt)	EPBC Act: Ma	This species is not threatened and is common in the region. It was observed on multiple occasions within the subject site during the baseline and targeted shorebird surveys (Australian Submarine Agency 2024).
<i>Anthus australis</i> (Australian Pipit)	EPBC Act: Ma	This species is not threatened and is common in the region. It was observed on multiple occasions within the subject site during the baseline and targeted shorebird surveys (Australian Submarine Agency 2024).
Observed at Reference Sites		
<i>Calidris alba</i> (Sanderling)	EPBC Act: Mi	Almost always found on the coast, mostly on open sandy beaches exposed to open sea-swell, and on exposed sandbars and spits and shingle banks where they forage in the wave-wash zone amongst rotting seaweed. They may also occur on beaches that may contain wave-washed rocky outcrops. Less often, the species occurs on more sheltered sandy shorelines of estuaries, inlets, and harbours. Rarely, they are recorded in near-coastal wetlands, such as lagoons, hypersaline lakes, salt ponds, and samphire flats (DCCEEW 2023d). Although it was not identified in the subject site, suitable habitat is present.v



Species (Common Name)	Conservation Status	Description and Occurrence
<i>Pluvialis squatarola</i> (Grey Plover)	EPBC Act: VU, Mi	Occurs almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes. The species is also very occasionally recorded further inland, where they occur around wetlands or salt-lakes (DCCEEW 2024). Although it was not identified in the subject site, suitable habitat is present.
Species with Known Occurrences and Habitat Preferences		
<i>Acanthiza iredalei rosinae</i> (Samphire Thornbill, Slender-billed Thornbill (Gulf St Vincent))	EPBC Act: VU NPW Act: V	Mainly restricted to chenopod shrublands, particularly samphire dominated by shrubby glasswort (<i>Tecticornia arbuscula</i>), on narrow coastal saline mudflats usually within 20 m of a tidal channel or saline lake. It forages in dense, tall samphire, but occasionally forages from the surface of mud and among smaller samphire, and in grey mangrove (<i>Avicennia marina</i>) adjacent to samphire shrublands (DCCEEW 2015). The subject site contains this species' preferred vegetation only in low densities, thereby providing low-value potential habitat.
<i>Anhinga novaehollandiae novaehollandiae</i> (Australasian Darter)	NPW Act: R	Found in wetlands and sheltered coastal waters, mainly in the tropics and sub-tropics. In South Australia, it is most often seen inland around permanent or temporary water bodies. Prefers smooth, open waters for feeding, with tree trunks and branches for drying. Can sometimes be seen in calm seas near the shore (iNaturalist 2022). Suitable habitat is present within the subject site for the species.
<i>Haliaeetus leucogaster</i> (White-bellied Sea Eagle)	NPW Act: E	White-bellied Sea-Eagles are normally seen perched high in a tree or soaring over waterways and adjacent land (Birdlife Australia n.d.). Suitable foraging habitat is present within the marine-based portion of the subject site. Natural perching habitat is absent, as there are no tall trees in the subject site.
<p>EPBC Act: Mi - Migratory, Ma - Marine, CR - Critically Endangered, EN - Endangered, VU - Vulnerable NPW Act: E - Endangered, V - Vulnerable, R - Rare.</p>		



3.4.1 Habitat within the Subject Site for Bird Species

Suitable habitat for threatened /migratory species occurs throughout the subject site, some of which have sightings of threatened / migratory birds (Figure 7and Figure 8).

Intertidal Flat / Coastline

The intertidal flat refers to the ecosystem found on marine shorelines, where organisms living on the shore survive the changes between low and high tide. Although this area is moderately disturbed, the quality of habitat is good and considered suitable habitat for migratory birds. This intertidal flat/coastline provides foraging, resting and sheltering resources for migratory birds. Furthermore, this area's productive soft sediments provide habitat for a range of marine fauna including bivalves, polychaetes, crabs and other burrowing intertidal species that have high food value for shorebirds.

Coastal swale drains (Snapper Point and Falie Reserve)

Swale drains are shallow, vegetated channels, primarily designed for conveying water longitudinally through a drainage pathway. While these areas are moderately disturbed and constructed, the quality of habitat is good when inundated. It is considered migratory bird habitat.

No threatened species were observed using this habitat within Falie Reserve. Nevertheless, these areas are also considered to provide habitat for:

- *Neophema elegans* (Elegant Parrot), *NPW Act: R*
- *Neophema petrophila* (Rock Parrot), *NPW Act: R*; and
- *Acanthiza iredalei rosinae* (Slender-billed Thornbill - Gulf St Vincent, *EPBC Act: VU, NPW Act: V*).

The most high-risk areas within the subject site for potential disturbance to migratory birds are the intertidal Flat / Coastline near Snapper Point and the Coastal Swale drains (constructed wetland) (Australian Submarine Agency 2024).

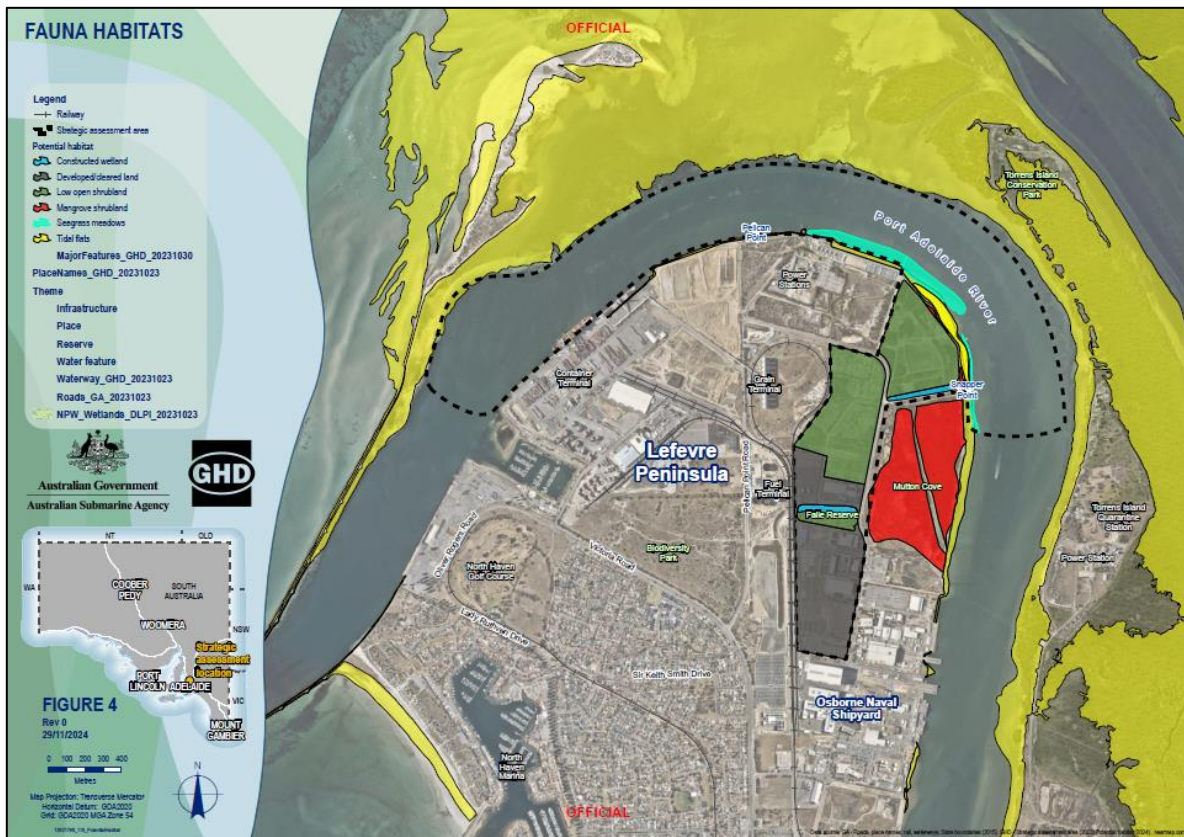
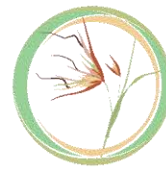


Figure 7: Migratory bird habitat within and adjacent to the subject site (Australian Submarine Agency 2024).



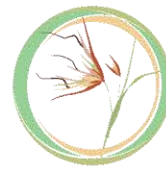
Figure 8: Threatened / migratory bird species sightings (Australian Submarine Agency 2024).



3.4.2 *Habitat in the wider locality for Bird Species*

The reference sites surveyed provide important shorebird and seabird habitat. In particular, Bird Island / Section Bank (approximately 2 km north west of subject site) and the Outer Harbor revetment. Bird Island was formed along the northern revetment (originally completed in 1913) from dredged clay and sand spoil placed in 1976 and extended in 1997 (Australian Submarine Agency 2024). The Island now contains intertidal flat habitat and estuarine on different areas of the island. Coast saltbush and samphire have colonised the higher points of the island, while mangroves have established within more protected areas (Australian Submarine Agency 2024). The Island supports a variety of bird species including the Sooty Oystercatcher (*Haematopus fuliginosus*), Red-necked Stint (*Calidris ruficollis*), Sharp-tailed Sandpiper (*Calidris acuminata*) and the Far Eastern Curlew (*Numenius madagascariensis*). The Australian Fairy Tern (*Sternula nereis nereis*) has a well-established breeding population at Bird Island.

The Development will not overlap with the Bird Island / Section Bank or the Outer Harbor revetment. As such there will not be direct impacts to this area and indirect impacts are likely to be minor.



4 OVERVIEW OF IMPACTS AND MITIGATIONS

The environmental impacts, risks and threats of the Development can be managed via the implementation of mitigation actions. The mitigation actions required for this Development will be implemented using a mitigation hierarchy (Figure 8). This hierarchy underpins legislative requirements set out by *Native Vegetation Regulations 2017* (Department for Environment and Water n.d.) It involves:

- **Avoid:** All efforts must be taken to avoid impacts to native vegetation and biodiversity.
- **Minimise:** If impacts cannot be avoided, measures must be taken to minimise the duration, intensity, and extent of impacts on native vegetation and biodiversity to the fullest extent possible through change of design and alternative, lower-impact methods for the proposed task or activity.
- **Rehabilitate:** If there are remaining impacts on native vegetation or biodiversity, then measures should be taken to rehabilitate or restore any adverse effects that cannot be avoided or minimised.
- **Offset:** After these steps, any adverse impacts on native vegetation or biodiversity that cannot be avoided or minimised must be offset by the achievement of a Significant Environmental Benefit (SEB) that outweighs the impact.

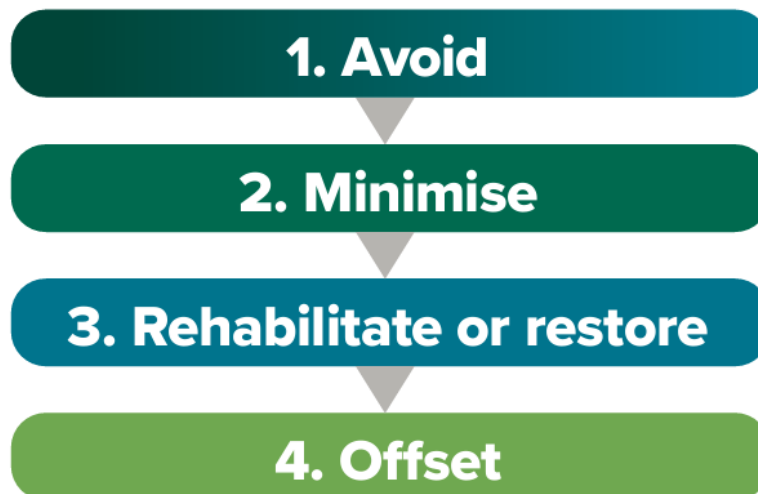


Figure 9: Native Vegetation Council Mitigation Hierarchy (Department for Environment and Water n.d.).

Note that the land-based portion of the subject site is exempt from the *NV Act*. Therefore, the requirement for a Significant Environment Benefit does not apply, and hence, *NV Act* offsets are not considered within the range of possible mitigations for land-based environmental values at the subject site.

Separately, the *EPBC Act* is applicable to the Development and has its own offset framework, which is presented in the *EPBC Act Environmental Offsets Policy 1999*. As part of the Strategic Assessment of the Submarine Construction Yard, an offset based on the *EPBC Act Environmental Offsets Policy 1999* may be applied to the Development.

4.1 Summary of Management Plans

The required management actions are detailed in the proceeding sections and are a legislative requirement for the Development. The recommended management actions, also outlined in the proceeding sections, derive from subordinate legislative instruments (e.g. guidelines) or have been developed by experts to achieve compliance against the relevant Acts and Regulations. These management measures are optional and not enforced under South Australian and/or Commonwealth law. However, they are strongly recommended to assist in achieving compliance under South Australian and Commonwealth legislation.

Many of the recommended management measures are best-practice environmental management and are standard for development and construction projects. It is recommended that they be tailored into relevant environmental management plans and/or management subplans.

Currently the TFFRA provides a series of required and recommended management measures. The TFFRA will need to be revised prior to construction to ensure this document provide clear instruction to on-site staff on how to management the terrestrial environment. Therefore, the TFFRA will be revised to a Terrestrial Environmental Management Plan (TEMP). It is anticipated the future TEMP will form a subplan to the CEMP (Figure 10).

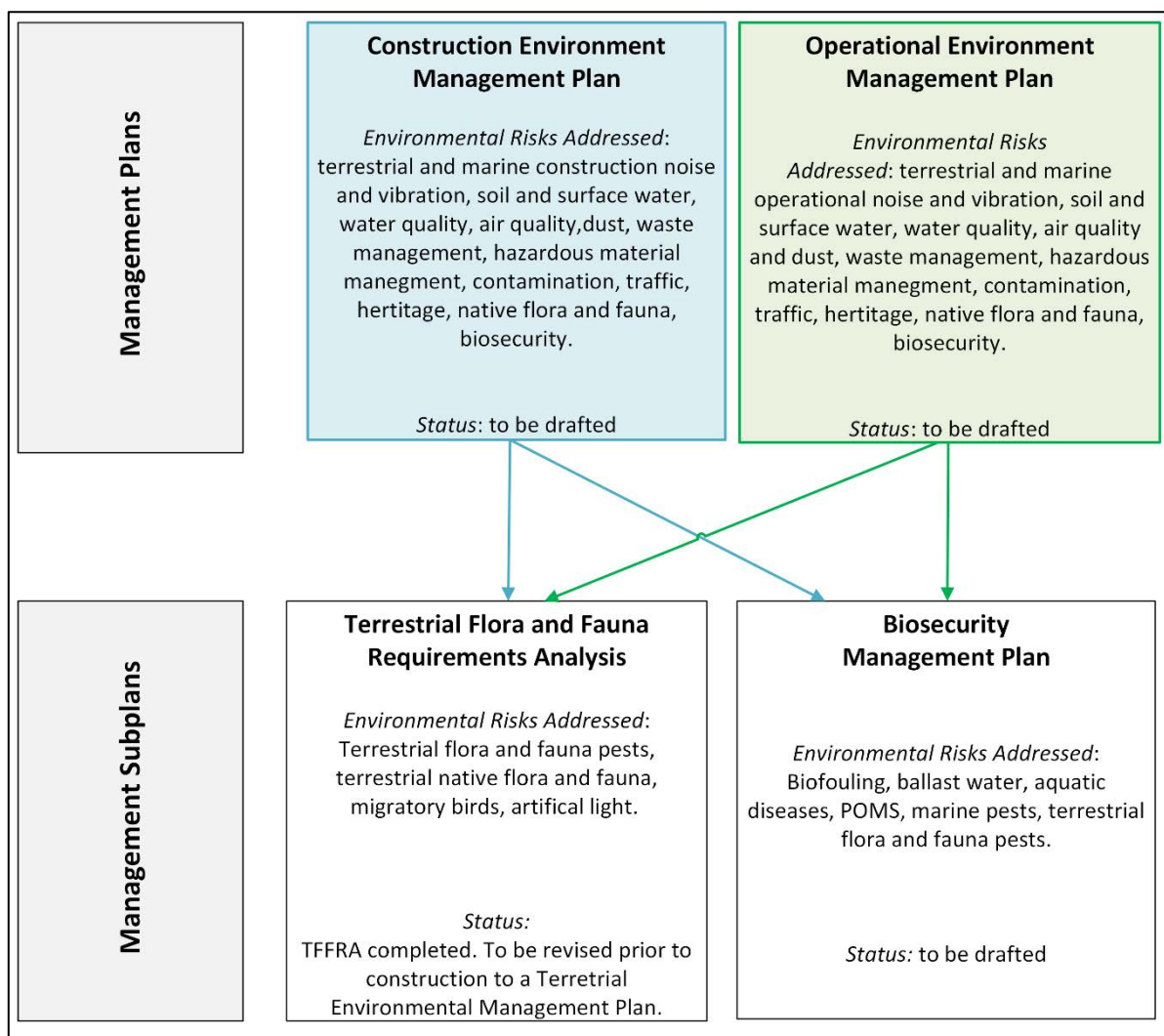
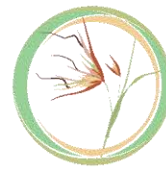


Figure 10: The Development’s proposed Management Plans and their management subplans relating to terrestrial flora and fauna (native and introduced).



5 VEGETATION IMPACTS AND MITIGATION

This section addresses the three assessment requirements that relate to flora:

Assessment Requirement:

- *Describe the location, extent, condition and significance of native vegetation, including listed threatened flora species and ecological communities in the Development's environs, and identify those that may need to be cleared or disturbed during construction and / or maintenance.*
- *Describe the Development activities with the potential to impact on native vegetation and listed threatened flora species and ecological communities and provide an assessment of how those impacts will be avoided, mitigated or offset.*
- *Outline measures to mitigate effects on native vegetation by addressing the mitigation hierarchy, including any compensatory activities in already degraded areas and use of existing easements. Refer to guidelines produced by the Native Vegetation Council and outline the likely effectiveness of any mitigation measures adopted during both construction and maintenance.*

5.1 Description of Native Vegetation

Refer to section 3.2 for a detailed description of native flora found within and adjacent to the subject site.

5.2 Native Vegetation Impacts

The extent of vegetation clearance that will be required within the land-based portion of the subject site is currently unknown. At the time of writing, no concept design for The Project was available. Therefore, the assessment of the impacts on public and private protected areas is based full removal of vegetation. On this basis, a broad assessment of vegetation impacts has been prepared.

Development activities with the potential to impact on terrestrial native vegetation include:

- Establishment of infrastructure, laydowns, stockpiles, and site offices resulting in clearance of native vegetation.

Indirect impacts resulting from construction activities and the removal of vegetation can include:

- Construction dust, which can smother the leaves of vegetation and impact plants' ability to photosynthesize.
- Vegetation assists with stabilising soil and slowing down the rate of water flowing over a site. Removal of vegetation can lead to site erosion. However, once the hardstands are installed, soil erosion will be negligible.
- Vegetation assists in filtering water and the pollution which is contained within the runoff. Removal of vegetation can lead to diminished water quality.
- When vegetation is replaced by impervious surfaces, stormwater runoff increases in magnitude and intensity.
- The removal of vegetation is associated with an increase in pollutant concentrations in water bodies, soil and sediments, or their bioaccumulation.
- Uprooting vegetation can lead to a disturbance of contaminated sediments via disturbance of plant roots and soil; and
- The removal of vegetation reduces competition for resources and facilitates the introduction and spread of terrestrial weed species and vertebrate pests.

5.3 Native Vegetation Mitigation and Management

The following table presents actions to mitigate and manage potential impacts on native vegetation (Table 9).

Table 10: Mitigation management actions for terrestrial native vegetation during the construction phase of the Development. Note that due to the expected nature of the Development, few “Avoidance” mitigations will be feasible to implement. The implementation of incident notification and reporting is recommended to follow the structure outlined in section 8 of this report.

Work limitations	Risk	Management Actions	Performance Criteria	Corrective Action
Native vegetation clearance	Clearance outside of approved footprint. Personnel and contractors do not comply with clearance limitations.	<p>Required: No management actions are required under legislation.</p> <p>Recommended: <u>Minimise</u></p> <ul style="list-style-type: none"> Native vegetation cleared must be restricted to approved areas as per the Development footprint and final design. All clearance, including laydowns, access tracks, and stockpiles must be kept within subject site boundaries. Use only approved clearance areas for vehicle movement. Monitor clearance area to ensure it remains within the subject site boundaries. <p><u>Rehabilitate</u></p> <ul style="list-style-type: none"> Revegetate cleared areas (where design allows) with a diversity of local species, focusing on flora species which provide for threatened fauna and local native fauna. This should be outlined in a Landscape Plan. Revegetation and biodiversity improvement opportunities could be explored off-site, in areas such as Mutton Cove and Biodiversity Park. Revegetation on and off-site should focus on improving biodiversity and address general concepts of a healthy ecosystem (e.g., species diversity, presence of different functional groups such as shrubs, 	No clearance of native vegetation outside of the construction zone.	<ul style="list-style-type: none"> Stop works in that area. Follow the incident notification and reporting procedure. Complete incident reporting and follow-up actions, including reporting the final clearance area.

Work limitations	Risk	Management Actions	Performance Criteria	Corrective Action
		<p>grasses, herbs etc.), as well as specific structural and composition attributes of an ideal 'benchmark state' (i.e., vegetation condition of remnant vegetation within the locality).</p>		
<p>Native vegetation condition</p>	<p>Vegetation is degraded during construction.</p>	<p>Required: No management actions are required under legislation.</p> <p>Recommended: <u>Avoid</u></p> <ul style="list-style-type: none"> No impacts to terrestrial native vegetation unless the area has been marked for removal. Ensure no contaminants or harmful pollutions are released into neighbouring vegetation. <p><u>Minimise</u></p> <ul style="list-style-type: none"> Use water carts for dust suppression. This will assist in minimising dust landing on vegetation. 	<p>The condition and extent of native vegetation is improved and increased. No waste, hazardous materials or other contaminants observed within the retained vegetation communities.</p>	<ul style="list-style-type: none"> Refine waste management or restoration practices to achieve management actions. Stop works in that area. Follow the incident notification and reporting procedure. Complete incident reporting and follow-up actions.



5.4 Impacts resulting from Declared Plants

Declared Plants are weeds that are highly invasive and pose a threat to South Australia's environment and primary industries. Declared Plants are defined under section 185 (1) of the *Landscape Act South Australia 2019* and must be managed accordingly. A variety of widely encountered Declared Plants have been observed on the Subject Site (Table 10). Construction projects have the potential to spread Declared Plants within the site or to surrounding areas. Spread or introduction of Declared Plants and other weed species have potential to displace native plants, support pest species (such as rabbit and foxes) and diminish habitat quality.

Table 11: Declared Plants observed within the subject site, and their potential for negative Impacts.

Declared Plant Species (common name)	Impact
<i>Asparagus asparagoides</i> (Bridal Creeper) (WoNS)	Bridal creeper is a strong competitor. Its dense canopy overshadows native plants and blocks sunlight during the winter growing season, greatly reducing native plant diversity. Its large, tuberous root system competes with native plants for root space and nutrients and limits native species germination. The annual shedding of bridal creeper foliage also increases surface soil nutrient levels, increasing opportunity for secondary weed growth and further native species displacement (Department of Primary Industries and Regions 2022).
<i>Casuarina glauca</i> (Swamp Oak)	Swamp oaks can form dense thickets on a variety of soil types and spread into adjacent native vegetation. Although their rate of spread is slow, they have the potential to reach a high density if uncontrolled. Swamp oak thickets observed in South Australia had excluded most other vegetation, through dense shading and competition for soil moisture. The species has very high annual litter fall rates in comparison to other Australian temperate and subtropical forests, implying a high potential impact on native plants through smothering or possible allelopathy. Tall, dense thickets of swamp oaks substantially slow movement of animals and people but are rarely impenetrable. Water movement through watercourses may be impeded. (Department of Primary Industries and Regions 2022).
<i>Chrysanthemoides monilifera ssp. Monilifera</i> (Boneseed)	Boneseed establishes under the canopy of native vegetation where it reaches high densities in the shrub stratum under 2 m tall. It displaces native species due to its dense growth. Boneseed invades undisturbed native vegetation and is a common weed in some conservation parks. It reduces the integrity of native vegetation and excludes much of the native understorey vegetation (Department of Primary Industries and Regions 2022).
<i>Cynara cardunculus</i> (Artichoke Thistle)	Artichoke Thistle invades natural habitats most commonly in grasslands, open woodlands, as well as roadsides, gardens, waste areas and disturbed sites. It can easily dominate the vegetation in densely infested areas, smothering most desirable ground-dwelling plants (Weeds of Australia n.d.).
<i>Euphorbia terracina</i> (False Caper)	False Caper invades grassland and sandy areas including both agricultural production and native ecosystems. It impacts human and animal health, and reduces native biodiversity (Weeds of Australia n.d.).
<i>Gazania sp.</i> (Gazania)	Gazania competes with dry coastal vegetation, heathland, woodland and grassland, coastal scrub and inland Mallee. It is often found on coastal cliffs, sand dunes, wasteland, stream banks, open grassland and on disturbed soil. In some coastal habitats it can form monoculture groundcovers (Department of Primary Industries and Regions 2022).
<i>Juncus acutus</i> (Spiny Rush)	Spiny Rush is capable of completely covering large areas in both agricultural, disturbed and in some undisturbed environments, preventing regeneration. Once established,



Declared Plant Species (common name)	Impact
	eliminates all other vegetation, makes areas impenetrable because of the sharp spines for larger animals and people (Weeds of Australia n.d.).
<i>Lycium ferocissimum</i> (African Boxthorn) (WoNS)	African Boxthorn usually grows among other shrubs due to seed voiding by perching birds but can grow as a free standing multi-stemmed shrub in open paddocks. It reduces the value of pastoral land and replaces native species in vegetation communities, especially on coastal cliffs, back dunes and along creek lines. It is avoided by livestock, and although it is not toxic the spines may cause physical injury to stock as well as limiting their access to water and pasture; the spiny thickets also provide harbour for rabbits and foxes. Conversely, many small native animals and birds adopt boxthorn as a protective habitat and food source (Department of Primary Industries and Regions 2022).
<i>Olea europaea</i> (European Olive)	Olives are very adept at invading and establishing in new environments to become the dominant plant species and can invade most healthy intact native vegetation, including woodlands, grasslands, and is a major pest plant of grassy woodlands and invade riverine environments. Olives out compete native vegetation reducing both floral and faunal biodiversity and contain volatile oils increasing bushfire risk (Weeds of Australia n.d.).
<i>Retama raetam</i> (White Weeping Broom)	White Weeping Broom has the potential to invade vegetation around communities especially small coastal communities and to spread throughout areas via roadsides (Weeds of Australia n.d.).
<i>Ulex europaeus</i> (Gorse) (WoNS)	Gorse displaces native vegetation and forms dense monocultures. The dense spiny thickets of gorse exclude regeneration, create a fire hazard, and provide cover for rabbits. It does not establish in intact native vegetation, but invades vegetation opened up by bushfires or partial clearing (Department of Primary Industries and Regions 2022).

5.5 Mitigation and Management of Declared Plants

The Development presents an opportunity to reduce the extent and abundance of Declared Plants at the Subject site. The establishment of hardstands and on-going weed management has the potential to reduce their spread and proliferation. The Development additionally provides an opportunity to control Declared Plants and other noxious weed species on site and prevent weeds from spreading into adjacent areas of higher ecological value.

Nevertheless, it is also essential that weed management be implemented as part of the Development. The guidance outlined in this TFFRA relating to weed management can be incorporated the Project's Construction Environmental Management Plan (CEMP). Note the TFFRA does not replace the requirement for a CEMP, nor is it intended to act as a definitive guide for weed management on site.

Weed management strategies to implement during the construction stage may include, where appropriate:

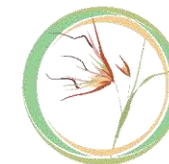
- Correct training and inductions
- Adherence to legislative requirements (*LSA Act*, Declared Plant Policies, *Biosecurity Act*, Biosecurity Policy 2020-2023 (SA))
- Weed Hygiene (wash down bay, dry brushing, vacuuming)
- Source only weed-free raw materials; and
- Weed assessment and monitoring.

The following table presents actions to mitigate and manage potential impacts arising from Declared Plants and other introduced flora species at the Development (Table 11).



Table 12: Mitigation and management actions for introduced flora species during the construction phase of the SCY.

Work limitations	Risk	Management Actions	Performance Criteria	Corrective Actions
Introducing or increasing the spread of Declared Plants and other weed species.	Increased distribution of weeds, with particular focus on high-risk weeds (Declared Plants / WoNs).	<p>Required:</p> <ul style="list-style-type: none"> Where Declared Plants are identified for removal at the subject site, the Development will abide by <i>LSA Act's</i> Declared Plant Policies (PIRSA) and Green Adelaide's specific management actions for Declared Plants. The required permits for managing Declared Plants vary across species and therefore the Declared Plant Policies must be referred to. Declared Plant Policies available from the Department for Primary Industries and Regions South Australia website https://pir.sa.gov.au/biosecurity/weeds/weed_management_programs/plant_policies Declared Plants must be controlled and destroyed in accordance with the <i>LSA Act</i> and Declared Plant Policies before the Development activities are implemented. <p>Recommended: <u>Training and Induction</u></p> <ul style="list-style-type: none"> Induct all site personnel to provide an understanding of relevant weed species issues. Ensure that all contractors are aware of vehicles and plant hygiene requirements. Maintain effective hygiene processes of vehicles, people, equipment coming to the subject site. Where appropriate, utilise prevention and control techniques tailored to the specific weed species. Apply an adaptive management approach for weeds that currently occur within the region but are not yet present within the subject site. Adequate precautions must be taken to ensure that movement of vehicles, equipment and people across subject site do not provide opportunities for the spreading of Declared Plants. It is the responsibility of ANI to prevent the inadvertent movement of Declared Plants in soil or on vehicles and machinery, as prevention of infestation is the most cost-effective form of weed control. 	No new Declared Plants or other weeds introduced to the Subject site via construction activities. The extent of Declared Plants and other weeds in the Subject site is reduced.	<ul style="list-style-type: none"> Follow the incident notification and reporting procedure. Remove or treat any new infestations of Declared Plants that result from construction activities and monitor for re-emergence.



Work limitations	Risk	Management Actions	Performance Criteria	Corrective Actions
		<p><u>Weed Hygiene</u> The risk of spreading weeds can be reduced through the implementation of appropriate hygiene protocols and safeguards. All Development contractors and staff should drive on designated roads and avoid driving through areas where weeds are present whenever possible. All Development contractors are required to clean vehicles, machinery, and footwear prior to entering and leaving a site, as outlined below.</p> <p>Examples of weed hygiene measures that could be implemented on site include:</p> <ul style="list-style-type: none"> • Wash-down bay: The establishment and use of a wash-down bay with high-pressure water is the most effective way to remove seeds and mud from vehicles and prevent the spread of weeds from different areas (Rudman et al. 2004). This is likely to be a practical option for the Development. However, a wash down bay must be established with consideration to the receiving environment and the greywater runoff. • Dry Brushing: Alternatively, the use of dry brushing can be a suitable alternative for seed and mud removal, if implemented properly. This includes following weed hygiene standards and general procedures, such as those outlined in the Tasmanian Washdown Guidelines for Weed and Disease Control (page 8 and page 9; Rudman et al. 2004). It is imperative that all visible soil and seeds are removed, particularly on tyres, from the undercarriage (including areas around springs and axles), and the vehicle grill. It is important that vehicles be cleaned from the top down and that the vehicle be moved part way through the cleaning process to ensure that the entire tyre is cleaned. It is also important the vehicles are cleaned before entering the subject site and on their departure. For example, a vehicle traveling from Adelaide to subject site would need to be cleaned prior to departing subject site and again upon arrival to Adelaide (to remove any seeds picked up during transit). • Vacuuming: Vacuuming inside the vehicle cab / other machinery and using a brush to remove contaminants such as burrs is recommended. Footwear and socks should be monitored and cleaned regularly to prevent the spread of seeds. Contaminated materials removed from vehicles and equipment should be disposed in an appropriate manner to ensure that weed seeds are not 		



Work limitations	Risk	Management Actions	Performance Criteria	Corrective Actions
		<p>dispersed to new areas. For example, the cleaning area should be situated in the most disturbed areas and a reasonable distance (at least 30 m) (Rudman et al. 2004) away from high-quality areas to prevent seeds and contaminants from reaching unaffected areas of native vegetation.</p> <ul style="list-style-type: none"> • <u>Weed Identification, Assessment and Monitoring</u> The assessment of weed presence and impact at the subject site is recommended to be conducted periodically. The observation of newly established weed species, especially those listed as Declared Plants, will trigger management procedures to enable the rapid control and eradication of infestations in a timely manner, to minimise their chance of establishment and prevent detrimental impacts on the Development’s land. Contractors should be informed of what Declared Plants occur on site, this could be included as part of contractor’s training and induction. 		
Source only weed-free raw materials.	Introduction of novel weeds to subject site. Exacerbation of existing weed infestations.	<p>Recommended:</p> <ul style="list-style-type: none"> • Ensure that raw materials (e.g., rubble, gravel, sand) brought onto site are free of weeds. Ensure imported fill is clean and free of weed propagules by conducting visual inspections of loads upon arrival. 	No Declared Plants or other weeds introduced to site via construction materials.	



6 FAUNA IMPACTS AND MITIGATION

This section addresses the three assessment requirements relating to fauna:

Assessment Requirement:

- Describe the Development activities with the potential to impact on native fauna species and listed threatened and migratory fauna species and habitats and provide an assessment of how those impacts will be avoided or mitigated.
- Identify all potential sources of light pollution from the construction and operation of the proposed Development. Describe their impacts on native fauna, including nocturnal species, and how these impacts will be managed.
- Detail appropriate buffer distances that would be required between the proposed Development and threatened species, including feeding areas, nesting sites and roosting sites, and the Mutton Cove Conservation Reserve more specifically.

6.1 Threatened Fauna Impacts

A number of species requiring targeted management have been identified in the site surveys and assessments. Species of particular importance are those protected under the *EPBC Act* (as threatened or migratory) and the *NPW Act*. A total of 11 migratory or threatened under the *EPBC Act* and/or threatened under the *NPW Act* (Table 9). The remaining species identified in the subject site are not threatened and are common in the region, therefore these species are unlikely to be impacted by the Development (Table 9). Despite substantial historical impacts from land clearing and filling, disruption of natural tidal flows, pollution, and exposure to noise and light impacts, the subject site retains areas of terrestrial, aquatic and marine habitat that provide resources for many fauna species. The Development's construction activities will have direct and indirect impacts on threatened fauna that utilise habitat resources within or adjacent to the subject site. The clearing of native vegetation will reduce available habitat in the region for native fauna species that use it, including Commonwealth and state-listed threatened species. Fauna may be affected by direct construction impacts including removal or disturbance of habitat and possible lethal impacts to individuals. Indirect impacts include but are not limited to noise, vibration, and dust. Development activities and their potential associated impacts are presented in Table 13.

Table 13: Construction and operational activities of the Development and associated potential impacts to threatened fauna.

Development Activity / Risk	Potential Impact
Vegetation clearance for infrastructure	<ul style="list-style-type: none"> • Clearance of habitat within the approved the subject site is unlikely to have a significant impact on threatened or non-threatened fauna. • The removal of samphire species may reduce the Slender-billed Thornbill's foraging and habitat resources. • Accidental harm during vegetation clearance may result in injury to fauna species.
Earthworks for all infrastructure including dredging for vessel berths	<ul style="list-style-type: none"> • Pits, trenches, or holes may entrap fauna species, including those protected under the <i>NPW Act</i> or <i>EPBC Act</i>. • Sedimentation from construction activities may affect vegetation and habitat condition, reducing accessibility and quality to foraging resources for threatened fauna, including migratory shorebirds.



Development Activity / Risk	Potential Impact
	<ul style="list-style-type: none"> • Clearing activities may produce dust and result in reduced air quality. However, this impact is likely to be minimal, if appropriate dust suppression mitigation measures are implemented. • Construction (including activities such as dredging) may cause changes in hydrological conditions therefore impacting coastal species such as migratory shorebirds. • Noise and vibration from earthworks (particularly piling) may negatively impact fauna behaviour and physiology. • Increased potential for erosion and waste runoff into the coastal ecosystem from stockpile areas.
Machinery works, including processing of raw materials such as steel	<ul style="list-style-type: none"> • Noise and vibration from machinery works may negatively impact fauna behaviour and physiology. It is expected that piling will generate the most disruptive noise.
Artificial light	<ul style="list-style-type: none"> • The Department of Climate Change, Energy Environment and Water (DCCEEW) recognises artificial light as an important and emerging issue for fauna. DCCEEW's <i>National Light Pollution Guidelines for Wildlife 2020</i>, outline the recommended management principles to reduce artificial light impacts on fauna, including Marine Turtles, Aquatic Communities, Seabirds and Migratory Shorebirds. • DCCEEW (2020) states that birds in general are known to be attracted to, and disoriented by, artificial lights. This could be a result of being blinded by the intensity of light that bleaches visual pigments and therefore failing to see visual details, or of interference with the magnetic compass used by the birds during migration. An attraction to conventional artificial night lighting may lead to other adverse consequences such as reducing fuel stores, delaying migration and increasing the chance of collision and thereby injury and death. • Specifically for migratory birds, artificial light can disorient flying birds, affect their stopover selection, and cause their death through collision with infrastructure. Birds may starve as a result of disruption to foraging, hampering their ability to prepare for breeding or migration. However, artificial light may help some species, particularly nocturnally foraging shorebirds, as they may have greater access to food (DCCEEW 2020). • Artificial light can lead to additional predation pressure on shorebirds. Shorebirds are known to avoid feeding at sites with artificial light. • Increase in artificial light is impacts are cumulative. Osborne already has lights for many developments and industries and therefore the cumulative impact of artificial light needs to be considered for the Development.
Noise	<p>The noise impacts to threatened species may manifest themselves through masking and physiological and/or behavioural response.</p> <p>Masking is the interference with the detection of a biologically relevant sound by another, usually anthropogenic, sound (Dooling, 2007). It impairs an organism's ability to communicate effectively and detect predators. Masking occurs during the production of the noise is present and does not cause damage to the hearing ability of fauna. Masking is most likely to occur in the following ways:</p> <ul style="list-style-type: none"> • Noise may impact the ability to of birds that prey on fish, molluscs, or insects to detect prey.



Development Activity / Risk	Potential Impact
	<ul style="list-style-type: none"> • Noise from the Development may impact shorebirds' ability to detect predators such as foxes, feral cats, and rats. European foxes have been observed preying on shorebirds within the subject site (Australian Submarine Agency 2024). • Noise may interfere with breeding calls, songs and displays of bird species that depend on communication in order to detect or attract mates, and breed. <p>Physiological and/or behavioural responses are defined as the changes in animal physiology or behaviour that result from noises. Noise, particularly from activities that create impulsive noise, can disrupt bird foraging, roosting, and breeding behaviour and physiology, while also making them more susceptible to predators, thereby impacting their overall health, survival, and reproductive success. The most common behavioural response for birds is flight, as they perceive the noise as a threat.</p> <p>Physiological and behavioural responses are most likely to arise in the following situations:</p> <ul style="list-style-type: none"> • Species may startle or take flight away from sources of impulsive noise. This may result in disruption to feeding, roosting, or breeding. • Non-impulsive construction noises may interfere with the breeding and nesting of resident bird species, if they occur within or adjacent to the subject site. <p>Noise from the Development may result in complete avoidance of the foraging and roosting areas within the subject site. However, noise impacts on terrestrial fauna are not expected to be significant for the following reasons:</p> <ul style="list-style-type: none"> • Threatened species are unlikely to remain in the subject site once habitats have been cleared for the Development. • The duration of impacts will be limited to noisy construction activities and will return to baseline levels once they are completed. • The scale of direct noise impacts will affect only individuals within the exceedance distances of threatened fauna, rather than populations. • Species are mobile and have the ability to move away into nearby suitable habitat.
Vehicle movements	<ul style="list-style-type: none"> • Unauthorised driving over critical adjacent habitat may degrade habitat conditions. • The introduction and / or spread of weeds from vehicles leading to reduced habitat condition (for e.g., increasing predation pressure on migratory shorebirds).
Works causing fire risk	<ul style="list-style-type: none"> • Potential for fire incidents leading to a reduction in vegetation condition and extent, and potential harm to fauna species. This is a low risk considering the type of vegetation present in the subject site.
Works causing chemical / oil spill risk	<ul style="list-style-type: none"> • Potential for chemical spills (e.g., fuel) causing degradation of critical marine and terrestrial habitat, potentially causing downstream effects to other ecosystems in the region.
Human presence (Staff and contractor movements / activities)	<ul style="list-style-type: none"> • Littering leading to decrease in the quality of habitat and potential ingestion by fauna species, including those listed under the <i>NPW Act</i> or <i>EPBC Act</i>. • Increased foot traffic resulting in interruption and disturbance of foraging behaviour in migratory shorebirds, as well as breeding behaviour in resident birds such as Pied and Sooty Oystercatchers.

6.2 Threatened Fauna Mitigations and Management

The following table presents actions to mitigate and manage potential impacts on threatened native fauna (Table 14).

Table 14: A summary of mitigation management actions for threatened fauna during construction and operation phases of the development. The implementation of incident notification and reporting is recommended to follow the structure outlined in section 8 of this report.

Work limitations	Risk	Management Actions	Performance Criteria	Corrective Actions
Native vegetation clearance	Clearance within and outside of footprint resulting in loss of habitat, fauna injury / death.	<p>Required:</p> <ul style="list-style-type: none"> In accordance with the <i>NPW Act</i> it is illegal to take, kill, hunt, catch, restrain or injure a protected animal or eggs of a protected animal, therefore pre-clearance checks will be conducted to inspect vegetation for fauna prior to clearance, as necessary. Pre-clearance checks will also cover non-threatened fauna. <p>Recommended:</p> <ul style="list-style-type: none"> Native vegetation clearance will be restricted to within the subject site boundary, and only be cleared if essential for Development works to occur. Where design allows, avoid areas of native vegetation, particularly adjacent to constructed coastal swales and along the drainage lines and intertidal flat / coastline (shorebird habitat), and samphire shrubland (Slender-billed Thornbill habitat). All clearance, including laydowns, access tracks, and stockpiles will be managed to avoid run-off and indirect impacts to the native environment. Use of designated tracks for vehicle and pedestrian movements. 	No clearance of native vegetation outside of the construction zone.	Stop works in that area. Follow the incident notification and reporting procedure.
Native vegetation condition	Vegetation is degraded during construction, resulting in degraded habitat quality for fauna.	<p>Required:</p> <ul style="list-style-type: none"> No discharge of stormwater or wastewater including nutrient or pathogen export, into adjacent protected areas such as Mutton Cove CP. <p>Recommended:</p> <ul style="list-style-type: none"> No waste material deposited on or left in native vegetation. No vehicles driving across native vegetation within the subject site. 	No waste, hazardous materials or other contaminants observed within adjacent vegetation communities.	Refine waste management to achieve management actions. Stop works in that area.



Work limitations	Risk	Management Actions	Performance Criteria	Corrective Actions
				Follow the incident notification and reporting procedure.
Waste produced from development works	Ingestion of marine debris from machinery works by coastal species such as migratory shorebirds. Erosion and movement of sediment downstream / downslope	<p>Required:</p> <ul style="list-style-type: none"> Stormwater will be treated prior to discharge into the Port River. <p>Recommended:</p> <ul style="list-style-type: none"> The Department of the Environment and Energy's <i>Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans</i> provides key actions to reduce waste produced by developments. The Development could support two actions including Actions 1.02 limiting single-use plastic use and Action 1.03 encouraging development of a circular economy (Department of the Environment and Energy 2018). These actions could be supported via mitigations in the CEMP and OEMP and inducting staff on waste management. Regular auditing of waste, particularly any radioactive waste present on-site and appropriate disposal. Areas of bare soil and stockpiles should be managed to prevent erosion during the construction process. Disturbed areas should be appropriately stabilised as soon as possible following construction (this includes removal of control measures, such as sediment fences, when they are no longer required). 	No pollution / contamination incidents resulting in injury / death to threatened fauna.	Where relevant, follow the incident notification and reporting procedure.
Coastal impacts	Affecting hydrology of the coastal ecosystem resulting in physiological stress to migratory species	<p>Recommended:</p> <ul style="list-style-type: none"> If construction timeframes allow, undertake loud construction activities, such as piling, outside of migratory bird season in areas of sensitive coastal habitats such as the intertidal flats/coastline and swale drains within/adjacent to the subject site or; Minimise construction noise during September to February, where possible. 	No unnecessary disturbance impacts to threatened fauna.	Follow the incident notification and reporting procedure.



Work limitations	Risk	Management Actions	Performance Criteria	Corrective Actions
Vehicle and machinery activity, noise	Vehicle activity around the subject site. Noise from construction disrupting foraging or breeding behaviour. Fire risk and fuel leakages resulting in large-scale destruction of habitat	<p>Recommended:</p> <ul style="list-style-type: none"> • Use of designated tracks for vehicle and machinery movements. • As recommended by the <i>EPBC Act Policy Statement 3.21 Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species 2017</i>, where possible, to minimise significant construction activities during the migratory bird season (October to March) (DCCEEW 2017). • If construction timeframes allow, minimise loud noise sources, such as piling, during the migratory bird season (October to March), in areas of sensitive coastal habitats such as the intertidal flats and swale drains within/adjacent to the subject site. • Where possible, minimise construction noise if overwintering bird species, such as the Red Necked Stint, are present in the subject site. • Where appropriate, regular auditing of fire risks and implementing necessary mitigation strategies to minimise these risks. • Where appropriate, regular auditing of machinery used on-site and appropriate storage and disposal of chemicals such as fuel. 	No unnecessary disturbance impacts to threatened fauna. No changes observed in shorebird behaviour due to noise.	Follow the incident notification and reporting procedure.
Vehicle and machinery activity, human activity	Artificial light disrupting foraging or breeding behaviour.	<p>Given that the subject site occurs within 20 km of important migratory shorebird habitat, it is important to consider the impacts of light.</p> <p>Recommended:</p> <ul style="list-style-type: none"> • Where Australian Standards, design, work health and safety and security requirements allow, lights should be shielded where possible so they are not visible from the sky and usage should be minimised. • Where design and security precautions allow, usage of fixed window screens or window tinting on fixed windows and skylights to contain light inside buildings. • Where design and security precautions allow, intensity of light used for the purposes of the Development to be as low as possible. • Shorebirds are sensitive to short-wavelength (blue / violet) and UV lights, so where practicable long-wavelength (red) lights should be utilised, where design and security precautions allow. 	No changes observed in shorebird behaviour due to artificial light.	If appropriate, reconsider lighting options.

Work limitations	Risk	Management Actions	Performance Criteria	Corrective Actions
		<ul style="list-style-type: none"> • Perimeter lighting could be operated when night-time illumination is necessary but remain off at other times. • Where design allows, use suitable commercial luminaires to minimise impacts to shorebirds (DCCEEW 2023b). <ul style="list-style-type: none"> ○ Light types suitable for use near migratory shorebird habitat include low-pressure sodium vapour, high-pressure sodium vapour, filtered LED, filtered metal halide, and filtered white LED. ○ Light types not suitable for use near migratory shorebird habitat include white LED, metal halide, white fluorescent, halogen, and mercury vapour. • Increased education about migratory birds is recommended in the <i>EPBC Act Policy Statement 3.21 Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species 2017</i>, as such potential educational opportunities include: <ul style="list-style-type: none"> ○ Install shorebird identification signs and warning signs around areas of important habitat to help educate the site workers about migratory shorebirds, their roosting locations, the impacts of disturbance, and how to avoid disturbing feeding/roosting birds. ○ Workers and visitors to the site are inducted as to the importance of adjacent conservation values, the need to minimise disturbance to shorebirds, and vessel and other operations should avoid disturbance to Bird Island and adjacent tidal flats. 		



6.3 Introduced Fauna Impacts

Introduced fauna can impact native wildlife by predation, habitat displacement, competition for resources, diminish amenity values, and be a general nuisance.

6.4 Introduced Fauna Mitigations and Management

It is essential that pest management is implemented as part of Development, the guidance outlined in this TFFRA relating to pest management can be incorporated the Project's Construction Environmental Management Plan (CEMP) and Biosecurity Management Plan. Note this document does not replace the requirement for a CEMP, nor is it intended to act as a definitive guide for pest management on site (Table 15).

Pest management during construction strategies include

- Induction and Training
- Prevention
- Adherence to Declared Animal Policies; and
- Waste Management.

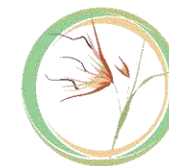


Table 15: Introduced Fauna Mitigations and Management for the SCY. The implementation of incident notification and reporting is recommended to follow the structure outlined in section 8 of this report.

Work limitations	Risk	Management Actions	Performance Criteria	Corrective Actions
<p>Contractors accidentally bringing pests onto the site.</p> <p>Waste on the subject site attracting pests, such as feral cats, foxes, or rats.</p> <p>Waste within the subject site attracting Silver Gulls.</p>	<p>New pest species within the subject site.</p> <p>Increased abundance of pest species within the subject site.</p>	<p>Required:</p> <p><u>Adherence to Declared Animal Policies</u></p> <ul style="list-style-type: none"> Management in accordance with the Declared Animal Policies administered under the <i>LSA Act</i>, available at this link: https://pir.sa.gov.au If relevant, feral animal control, where relevant (e.g. baiting, cage trapping), the Development will have to obtain relevant permits and authorisations from PIRSA, Green Adelaide Landscape Board and/or the City of PAE). Report suspected sightings of Declared Animals to Development's environmental advisor and/or relevant authorities. <p>Recommended:</p> <p><u>Induction and Training</u></p> <ul style="list-style-type: none"> Induct all site personnel to provide an understanding of relevant pest species issues. The Department of the Environment (2015) suggests in Action 2.2 and 3.2 (Pg 17 and 20, respectively) in the threat abatement plan for predation by feral cats that training can be provided through various forms of media. Training material can be accessed from: https://pestsmart.org.au/. <p><u>Prevention</u></p> <ul style="list-style-type: none"> Ensure no cats, dogs, rodents or introduced avian species are brought to the site with contractors by maintaining effective biosecurity processes of construction materials coming to the subject site. <p><u>Waste Management</u></p> <ul style="list-style-type: none"> Waste management measures should be implemented to avoid increased abundance of pests and opportunistic native fauna. Ensure all general waste receptacles have secured lids to deter scavengers, such as rats. Waste collection sites be regularly monitored for any wildlife activity and scavenging. Removing all food waste from site or storing in secured bins. Regular monitoring of areas, such as stockpiles, that are likely to shelter pest animals for infestations and removing these appropriately. 	<p>No new or increased pest infestations introduced due to construction activities.</p>	<p>Follow the incident notification and reporting procedure. ANI to inform relevant authorities or landowners if required.</p> <p>Complete incident reporting and follow-up actions.</p> <p>Where project infrastructure increases pest abundance, those infestations are to be treated.</p> <p>Where new infestations emerge due to construction activities, those infestations are to be treated.</p>



7 MONITORING

Monitoring, inspections, and auditing of flora and fauna will be used to identify any non-compliance or other issues that may require further management. The timing of inspections and external site audits will be defined in the CEMP, using the metric presented in Table 16. The data collected during the Monitoring Process will also provide evidence on the achievement of objectives of this TFFRA. When monitoring detects a management issue that requires action, this will be reported to an Environment Manager or Construction Manager engaged with the Development.

Table 16: Monitoring criteria and their timeframe.

Measure	Measured using	Target Metric	Person Responsible	Timing
Flora				
Native flora management	Observations of clearance areas and impact minimisation measures.	100 % compliance with permitted impacts.	Environmental Officer; Construction Manager.	During construction and operation
Declared Plants	Monthly and opportunistic inspections of site to identify new infestations. Hygiene reports during construction audits. ANI to document any new infestations.	100 % of new infestations eradicated. Pre-existing infestations mapped and treated. Records kept of weed hygiene practices implemented.	Environmental Officer; Construction Manager.	During construction and operation
Fauna				
All threatened species under the <i>EPBC Act</i> and <i>NPW Act</i> and native species of importance.	Observations of impact locations. Other measures could include targeted surveys.	100 % compliance with permitted impacts. No deaths resulting from clearance.	Environmental Officer; Construction Manager.	During construction and operation
Pest species	Monthly and opportunistic inspections of site to identify new activity. ANI to document any new introductions of pest species.	100 % of new introductions of pest species eradicated. Records kept of pest control practices implemented.	Environmental Officer; Construction Manager.	During construction and operation



8 INCIDENT AND NON-COMPLIANCE REPORTING

8.1 Incident Reporting

The Development will prepare an appropriate environmental incident reporting procedure. An outline of an Incident Reporting Matrix which could be used as a foundation of an environmental incident reporting procedure is presented in Table 17. An environmental incident reporting procedure must also include an Incident Report Form to allow the incident to be properly recorded. The Incident Report Form could include:

- The area where the incident occurred.
- The details of incident (suspected cause, was there environmental harm etc.).
- The location of the emergency or incident.
- Personnel, sub-contractor, visitor involved.
- Time of incident.
- Recommended future actions.

A register for incidents and associated corrective actions should be maintained on site and available for audit.

Table 17: An example of the Development's Incident Reporting Matrix.

Stage	Action	Timing
Incident Occurs	The Developments Environmental Manager will be notified by phone call, text, or verbal method. The scene must be preserved. The incident will be communicated by these managers to ANI.	Within 60 minutes or as soon as is reasonably practical.
Incident Notification	The Development's Incident Notification Form must be completed. The incident must be added to The Development's incident register.	Submitted by the end of the shift in which the incident occurred, and one business day maximum delay if shift timing requires.
Final Incident Report	The incident will be investigated to identify non-compliance and potential corrective and preventative actions. A report shall be submitted using The Development's Incident Report Form.	Submitted within 10 days of the incident occurring.
Corrective Actions	Corrective actions arising from the incident investigation must be implemented and recorded in the Incident Report Form for review and close-out.	At the time of submission of the incident investigation form.



8.2 Compliance Reporting

Any person who becomes aware of an event that may or has caused environmental harm must report the incident to their employer. Details of the nature and circumstances of the event must be provided. The Development's Environmental Officer will ensure that ANI, as well as appropriate external agencies are notified within the appropriate timeframe. A written report will be provided to the relevant authority within 14 business days following the initial notification of an emergency or incident or receipt of monitoring results.

The report will include:

- 1) Results and interpretation at the time of the incident and analysed.
- 2) Outcomes of actions taken at the time of the incident to prevent or minimise environmental harm.

Proposed actions to prevent a recurrence of the emergency or incident.

8.3 Corrective Action

To ensure Development impacts and incidents are managed appropriately, corrective action must be taken if compliance criteria are not met. In relation to flora and fauna management, the following corrective actions could be implemented:

- 1) Any non-approved clearance of native vegetation (within the NVC boundaries) must be reported to ANI, which will report to Native Vegetation Council (NVC) within 7 days (as required by the *NVC Act*). The report must include the details, extent and location of the non-compliance and the corrective actions to be taken.
- 2) Any death or significant, un-authorized disturbance to an *EPBC Act* listed species must be reported to ANI, which will report to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) in the form of A 'Notification of activities affecting listed species or ecological communities in or on a Commonwealth area'. The initial notification to DCCEEW must be within 2 business days, and a more extensive report, which includes correction actions to be taken, must be made within 10 days.
- 3) Any encroachment into no-go zones must be reported to the Development's Environmental Officer immediately, for reporting requirements, investigation, and development of corrective actions.
- 4) Any injured native fauna will be assessed by a suitably qualified ecologist or wildlife carer to determine appropriate treatment or response in a timely manner relative to species temporal and behavioural needs.
- 5) All non-compliances will be reported in the Incident Reporting system managed by ANI.
- 6) All non-compliances will be corrected immediately, and strategies implemented to reduce the likelihood of the incident occurring again.



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APPENDIX A – PLANT SPECIES LIST

The plant species identified within the survey area. Species origin is noted as 'Indigenous' to the Adelaide Plains region, 'Native' to Australia, or 'Exotic' to Australia. Note that this is not an exhaustive list, as the survey will have seasonal limitations.

Table 18: Plant species observed within the subject site.

Species	Common Name	Origin	VA1	VA2b	VA4
<i>Acacia cupularis</i>	Coastal Umbrella Bush	Indigenous			✓
<i>Acacia longifolia</i> ssp. <i>sophorae</i>	False Boobialla	Indigenous	✓		
<i>Acacia ligulata</i>	Dune Wattle	Indigenous	✓		✓
<i>Acacia leiophylla</i>	False Golden Wattle	Indigenous			
<i>Acacia pycnantha</i>	Golden Wattle	Indigenous	✓		✓
<i>Acacia saligna</i>	Golden Wreath Wattle	Native			
<i>Acacia</i> sp.	Wattle	Native			
<i>Allocasuarina verticillata</i>	Drooping She-oak	Indigenous			✓
<i>Asparagus asparagoides</i>	Bridal Creeper	Exotic	✓		✓
<i>Asphodelus fistulosus</i>	Onion Weed	Exotic	✓		✓
<i>Atriplex cinerea</i>	Grey Saltbush	Indigenous	✓	✓	
<i>Atriplex paludosa</i>	Marsh Saltbush	Indigenous	✓		
<i>Atriplex semibaccata</i>	Creeping Saltbush	Indigenous	✓	✓	
<i>Atriplex vesicaria</i>	Bladder Saltbush	Indigenous			
<i>Austrostipa</i> sp.	Spear-grass	Indigenous	✓	✓	✓
<i>Avena</i> sp.	Wild Oats	Exotic	✓		✓
<i>Avicennia marina</i> ssp. <i>marina</i>	Grey Mangrove	Indigenous			
<i>Callistemon rugulosus</i>	Scarlet Bottlebrush	Indigenous			
<i>Callitris gracilis</i>	Southern Cypress Pine	Indigenous	✓		✓
<i>Cakile edentula</i>	Sea Rocket	Exotic	✓		
<i>Carpobrotus rossii</i>	Karkalla	Indigenous	✓	✓	✓
<i>Casuarina glauca</i>	Swamp Oak	Exotic	✓	✓	
<i>Cenchrus ciliaris</i>	Buffel Grass	Exotic			
<i>Chloris truncata</i>	Windmill Grass	Indigenous	✓	✓	
<i>Crassula ovata</i>	Jade Plant	Exotic			
<i>Crocosmia crocosmiiflora</i>	Montbretia	Exotic	✓		
<i>Cynara cardunculus</i>	Artichoke Thistle	Exotic	✓	✓	
<i>Cynodon dactylon</i> var.	Couch	Exotic			
<i>Dianella brevicaulis</i>	Blueberry Flax-lily	Indigenous	✓	✓	✓
<i>Distichlis distichophylla</i>	Emu-grass	Indigenous			
<i>Dittrichia graveolens</i>	Stinkwort	Exotic			
<i>Disphyma crassifolium</i> ssp. <i>clavulatum</i>	Rounded Pig-face	Indigenous	✓		
<i>Dodonaea viscosa</i> ssp. <i>angustissimus</i>	Narrow-leaf Hop-bush	Indigenous			✓
<i>Enchylaena tomentosa</i>	Ruby Saltbush	Indigenous	✓	✓	✓
<i>Enneapogon nigricans</i>	Black-heads	Indigenous			✓
<i>Erigeron bonariensis</i>	Flaxleaf Fleabane	Exotic	✓	✓	
<i>Eragrostis cilianensis</i>	Stink Grass	Exotic			
<i>Epilobium billardierianum</i>	Robust Willow Herb	Indigenous			
<i>Erodium</i> sp.	Storks-bill species	Exotic			
<i>Eucalyptus camaldulensis</i>	River Red Gum	Indigenous			
<i>Eucalyptus leucoxydon</i>	SA Blue Gum	Indigenous			
<i>Eucalyptus cladocalyx</i>	Sugar Gum	Native			
<i>Eucalyptus socialis</i>	Red Mallee	Indigenous			
<i>Eucalyptus</i> sp.	Gum Tree	Native	✓		
<i>Euphorbia drummondii</i>	Flat Spurge	Native			✓
<i>Euphorbia</i> sp.	Spurge	Exotic			
<i>Euphorbia terracina</i>	False Caper	Exotic	✓	✓	✓



Species	Common Name	Origin	VA1	VA2b	VA4
<i>Ficinia nodosa</i>	Knobby Club-rush	Indigenous	✓	✓	✓
<i>Ficus macrophylla</i>	Moreton Bay Fig	Native			
<i>Frankenia pauciflora</i>	Sea-heath	Indigenous	✓		
<i>Galenia pubescens</i>	Coastal Galenia	Exotic	✓		✓
<i>Gazania sp.</i>	Gazania	Exotic		✓	
<i>Gomphocarpus cancellatus</i>	Broad-leaved Cotton-bush	Exotic	✓		
<i>Juncus acutus</i>	Spiny Rush	Exotic		✓	
<i>Lagurus ovatus</i>	Hares Tail Grass	Exotic	✓		✓
<i>Limonium companyonis</i>	Sea-lavender	Exotic	✓	✓	✓
<i>Lolium sp.</i>	Rye-grass	Exotic	✓		
<i>Lycium ferocissimum</i>	African Boxthorn	Exotic	✓	✓	✓
<i>Malva sp.</i>	Mallow	Exotic	✓		
<i>Maireana brevifolia</i>	Small-leaf Bluebush	Indigenous	✓	✓	
<i>Maireana oppositifolia</i>	Heathy Bluebush	Indigenous	✓		
<i>Medicago sp.</i>	Medic species	Exotic			
<i>Melaleuca lanceolata</i>	Black Paperbark	Indigenous	✓		✓
<i>Mesembryanthemum crystallinum</i>	Common Ice-plant	Exotic	✓		
<i>Mesembryanthemum nodiflorum</i>	Slender leaf Ice-plant	Exotic	✓		✓
<i>Moraea setifolia</i>	Thread Iris	Exotic			
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum	Indigenous			
<i>Myoporum insulare</i>	Native Juniper	Indigenous	✓	✓	✓
<i>Myoporum parvifolium</i>	Creeping Boobialla	Native		✓	
<i>Nerium oleander</i>	Olander	Exotic			
<i>Nicotiana glauca</i>	Tree Tobacco	Exotic	✓		
<i>Nitraria billardierei</i>	Nitre-bush	Indigenous	✓	✓	✓
<i>Oenothera stricta</i>	Common Evening-primrose	Exotic	✓		
<i>Olea europaea</i>	European Olive	Exotic	✓		✓
<i>Olearia axillaris</i>	Coast Daisy-bush	Indigenous	✓		✓
<i>Oxalis perennans</i>	Native Oxalis	Indigenous	✓	✓	
<i>Oxalis pes-caprae</i>	Sour Sob	Exotic	✓		✓
<i>Oxalis purpurea</i>	Purple Woodsorrel	Exotic	✓		
<i>Panicum hillmanii</i>	Witch Grass	Exotic			
<i>Pelargonium australe</i>	Austral Stork's-bill	Indigenous			
<i>Pennisetum clandestinum</i>	Kikuyu	Exotic	✓	✓	
<i>Phoenix dactylifera</i>	Date Palm	Exotic	✓		
<i>Pinus halepensis</i>	Aleppo Pine	Exotic			
<i>Pinus radiata</i>	Monterey Pine	Exotic			
<i>Piptatherum miliaceum</i>	Rice Millet	Exotic		✓	
<i>Pittosporum angustifolium</i>	Native Apricot	Indigenous			✓
<i>Plantago coronopus ssp. coronopus</i>	Bucks-horn Plantain	Exotic			
<i>Reichardia sp.</i>	Bright Eyes	Exotic	✓	✓	✓
<i>Rhagodia candolleana ssp. candolleana</i>	Sea-berry Saltbush	Indigenous			✓
<i>Rytidosperma caespitosum</i>	Common Wallaby-grass	Indigenous		✓	
<i>Salsola australis</i>	Tumbleweed	Indigenous	✓		
<i>Sarcocornia quinqueflora</i>	Beaded Glasswort	Indigenous	✓		✓
<i>Sarcozona praecox</i>	Early Noon-Flower	Indigenous			
<i>Scabiosa atropurpurea</i>	Pincushion	Exotic			
<i>Schinus molle</i>	Peppercorn	Indigenous			
<i>Senna artemisioides ssp. petiolaris</i>	Woody Cassia	Indigenous			✓
<i>Sisymbrium erysimoides</i>	Smooth Mustard	Exotic		✓	
<i>Senecio spanomerus</i>	Native Groundsel	Indigenous			
<i>Senecio sp.</i>	Groundsel	Exotic			
<i>Spergularia marina</i>	Salt Sand-spurrey	Indigenous			
<i>Spinifex hirsutus</i>	Coast Spinifex	Indigenous			



Species	Common Name	Origin	VA1	VA2b	VA4
<i>Suaeda australis</i>	Austral Seablite	Indigenous	✓	✓	✓
<i>Syzygium australe</i>	Lilly Pilly	Exotic			
<i>Tamarix aphylla</i>	Athel Pine	Exotic			
<i>Tecticornia arbuscula</i>	Shrubby Glasswort	Indigenous			✓
<i>Tecticornia halocnemoides</i>	Grey Glasswort	Indigenous	✓	✓	
<i>Tecticornia indica</i>	Brown-head Glasswort	Indigenous	✓	✓	✓
<i>Tecticornia</i> sp.	Samphire species	Indigenous			
<i>Tetragonia eremaea</i>	Annual Spinach	Indigenous	✓		
<i>Tetragonia implexicoma</i>	Bower Spinach	Indigenous			
<i>Thinopyrum elongatum</i>	Tall Wheat-grass	Exotic			
<i>Threlkeldia diffusa</i>	Coast Bonefruit	Indigenous	✓	✓	
<i>Trifolium arvense</i>	Hares-foot Clover	Exotic			
<i>Urtica dioica</i>	Stinging Nettle	Exotic			
<i>Vittadinia</i> sp.	New-holland Daisy	Indigenous			✓
<i>Watsonia meriana</i> var. <i>bulbillifera</i>	Bulbil Watsonia	Exotic			
<i>Wilsonia humilis</i>	Silky Wilsonia	Indigenous			
<i>Wahlenbergia</i> sp.	Bluebell	Indigenous			



APPENDIX B – FAUNA SPECIES LIST

Table 19: Fauna species observed within the subject site. Species exotic to Australia are indicated with an asterisk (*).

Species (Common name)	EPBC Act	NPW Act	LSA Act
<i>Acrocephalus australis</i> (Australian Reed Warbler)			
<i>Actitis hypoleucos</i> (Common Sandpiper)	Mi	R	
<i>Anas gracilis</i> (Grey Teal)			
<i>Anas platyrhynchos</i> (Mallard) *			
<i>Anthochaera carunculata</i> (Red Wattlebird)			
<i>Anthochaera chrysoptera</i> (Little Wattlebird)			
<i>Anthus australis</i> (Australian Pipit)	Ma		
<i>Ardea intermedia</i> (Intermediate Egret)			
<i>Elseyonis melanops</i> (Black-fronted Dotterel)			
<i>Himantopus himantopus</i> (Black-winged Stilt)	Ma		
<i>Cacatua roseicapilla</i> (Galah)			
<i>Cacatua sanguinea</i> (Little Corella)			
<i>Calidris acuminata</i> (Sharp-tailed sandpiper)	VU, Mi, Ma		
<i>Calidris ruficollis</i> (Red-necked Stint)	Mi, Ma		
<i>Chroicocephalus novaehollandiae</i> (Silver Gull)			
<i>Cincloramphus cruralis</i> (Brown Songlark)			
<i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
<i>Columba livia</i> (Feral Pigeon) *			Declared
<i>Corvus mellori</i> (Little Raven)			
<i>Coturnix ypsilophora australis</i> (Brown Quail)			
<i>Cracticus tibicen</i> (Australian Magpie)			
<i>Cygnus atratus</i> (Black Swan)			
<i>Egretta novaehollandiae</i> (White-faced Heron)			
<i>Erythronyx cinctus</i> (Red-kneed Dotterel)			
<i>Gallinula tenebrosa</i> (Dusky Moorhen)			
<i>Glossopsitta concinna</i> (Musk Lorikeet)			
<i>Grallina cyanoleuca</i> (Magpie-lark)			
<i>Haematopus longirostris</i> (Pied Oystercatcher)		R	
<i>Hirundo neoxena</i> (Welcome Swallow)			
<i>Hydroprogne (Sterna) caspia</i> (Caspian Tern)	Mi		
<i>Lichenostomus virescens</i> (Singing Honeyeater)			
<i>Lichenostomus penicillata</i> (White-plumed Honeyeater)			
<i>Manorina melanocephala</i> (Noisy Miner)			
<i>Microcarbo melanoleucos</i> (Little Pied Cormorant)			
<i>Neophema elegans</i> (Elegant Parrot)		R	
<i>Ocyphaps lophotes</i> (Crested Pigeon)			
<i>Passer domesticus</i> (House Sparrow) *			Declared
<i>Pelecanus conspicillatus</i> (Australian Pelican)	Ma		
<i>Petrochelidon ariel</i> (Fairy Martin)			
<i>Phalacrocorax carbo</i> (Great Cormorant)			
<i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
<i>Platalea regia</i> (Royal Spoonbill)			
<i>Poliiocephalus poliocephalus</i> (Hoary Headed Grebe)			
<i>Porzana fluminea</i> (Australian Spotted Crane)			
<i>Rhipidura leucophrys</i> (Willie Wagtail)			
<i>Sturnus vulgaris</i> (Common Starling) *			Declared
<i>Thalasseus bergii</i> (Greater Crested Tern)	Mi		
<i>Threskiornis molucca</i> (Australian White Ibis)	Ma		
<i>Todiramphus sanctus</i> (Sacred Kingfisher)			
<i>Tringa glareola</i> (Wood Sandpiper)	Ma, Mi	R	
<i>Tringa nebularia</i> (Common greenshank)	EN, Mi		
<i>Tringa stagnatilis</i> (Marsh Sandpiper)	Mi		
<i>Turdus merula</i> (Common Blackbird)			Declared



Species (Common name)	EPBC Act	NPW Act	LSA Act
<i>Vanellus miles</i> (Masked Lapwing)			
<i>Zosterops lateralis</i> (Silvereye)			
<i>Vulpes vulpes</i> (European Fox) *			Declared
<i>Oryctolagus cuniculus</i> (Rabbit) *			Declared
<i>Hydromys chrysogaster</i> (Water Rat)			
<i>Limnodynastes tasmaniensis</i> (Spotted Marsh Frog)			
<i>Pseudonaja textilis</i> (Eastern Brown Snake)			
<i>Tiliqua rugosa</i> (Shingleback)			



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