SMITH BAY WHARF

DRAFT ENVIRONMENTAL IMPACT STATEMENT

APPENDIX J

PREPARED FOR KANGAROO ISLAND PLANTATION TIMBERS BY ENVIRONMENTAL PROJECTS

JANUARY 2019

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APPENDIX J – TERRESTRIAL ECOLOGICAL ASSESSMENTS

Appendix J1 – Smith Bay Planting Guide

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Shortened Forms

Abbreviation	Definition
DEWNR	Department of Environment, Water and Natural Resources
ha	hectare
KI	Kangaroo Island
KINTPP	Kangaroo Island nationally threatened plant project
NRKI	Natural Resources Kangaroo Island
PIRSA	Primary Industries and Regions South Australia
SEB	Significant Environmental Benefit
sp.	Species undefined
ssp.	Subspecies
var.	Variety
WoNS	Weed of National Significance

1. PLANTING GUIDE

This Planting Guide has been prepared to inform the landscape plan for the study area. The list may also help with on-site revegetation to gain a significant environmental benefit (SEB) offset.

1.1 Planning for Landscaping and Revegetation

Sourcing planting materials

Options for planting can include using tubestock or direct seeding techniques, or a mixture of both. Direct seeding tends to be a cheaper option and is good for large-scale projects, while tubestock may be preferred for smaller, more complex projects or those on difficult terrain. Some species cannot be propagated by direct seeding techniques and need to be grown in a nursery from seed or cuttings and planted as tubestock.

Local native species should be used in any landscaping or revegetation project, with local provenance material preferred. Where possible, planting materials (such as seeds and tubestock) should be sourced on Kangaroo Island to minimise potential biosecurity risks. Stock would need to be ordered about 12 months before planting to ensure that there was time to collect the required material and propagate the tubestock. Seeds and cuttings should be collected from the local area wherever possible.

Trees for Life provides locally collected seed that can be used for direct seeding or nursery propagation. In 2016 it published advice for revegetation projects on Kangaroo Island: *The Tree Scheme: information on selecting species for the Kangaroo Island Zone.* For more information on the organisation, see https://www.treesforlife.org.au/.

The Kangaroo Island Native Plant Nursery provides tubestock for revegetation, landscaping and gardens. The nursery is open from May to August each year and offers well over 100 different species of KI native plants. For larger orders of 300 or more plants, the nursery will collect seed from around the area where the plants are to be grown, to ensure that provenance is continued. Plants grown from provenance seed have excellent survival rates as their genetics are adapted to tolerate those particular environmental conditions. Orders for stock are taken from 1 July to be ready for the following winter's planting season. A range of guarding materials and stakes are also available to purchase from the nursery.

Please see: http://www.naturalresources.sa.gov.au/kangarooisland/plants-and-animals/native-plants/native-plant-nursery

The Kangaroo Island nationally threatened plant project (KINTPP) is working to establish how to break seed dormancy in difficult species, particularly those that are rare and threatened.

The KINTPP grows up to 150 native plant species at its Cygnet River nursery to re-instate habitat for KI's rarest plants. The majority of these plants require a number of different seed treatments for successful germination. The KINTPP works in partnership with landholders, hobby farmers and lifestyle property owners to restore bushland and can be contacted through Natural Resources Kangaroo Island (NRKI).

Please see: http://www.naturalresources.sa.gov.au/kangarooisland/land-and-water/habitat-restoration

Revegetation for SEB offset

Construction for the proposal would result in clearing up to 2.9 ha of native vegetation. Under the *Native Vegetation Act 1991*, clearing a small amount of terrestrial native vegetation at the study area would require the preparation of an offset strategy which would be developed in consultation with the Native Vegetation Council. To offset the terrestrial vegetation clearance for the study area, 9.13 ha would need to be revegetated and managed, including weed control, monitoring and reporting requirements.

Department for Environment and Water (DEW) Native Vegetation Branch recommend a minimum width of 30 m for at least 90 per cent of its width for a shelter belt or screening planting to have value as a revegetation offset (Schutz, A pers. comm. 3 August 2017). Revegetation patches with a lower perimeter to area ratio (such as round or square blocks) are preferred over long narrow patches as this decreases the potential for 'edge effects' to impact the success of a project. Revegetation 'corridors' that are used to connect two or more existing remnant vegetation areas are also highly valued.

Weeds and pathogens

A total of 19 weed species have been recorded within the study area, including four listed as declared under the *Natural Resources Management Act 2004* (Table 1-1) (EBS Ecology 2018). Bridal creeper is also a Weed of National Significance (WoNS). There is no record of phytophthora on the study area; however, it has been recorded within the local area (DEWNR 2012). Management of weeds and pathogens will be integral to the success of landscaping and revegetation on the study area.

Table 1-1: Weed species recorded in the study area

Family	Species	Common Name
Agavaceae	**Agave attenuata*	Spineless century plant
Compositae	**Arctotheca calendula*	Cape weed
	**Cirsium vulgare*	Spear thistle
	**Onopordum acaulon*	Stemless thistle
Cruciferae	**Sinapis arvensis*	Charlock
Euphorbiaceae	**Euphorbia paralias*	Sea spurge
Fumariaceae	**Fumaria muralis*	Wall fumitory
Gramineae	**Avena* sp.	Wild oats
	**Gastridium phleoides*	Nit-grass
	**Hordeum* sp.	Barley grass
	**Phalaris* sp.	Canary grass
Iridaceae	**Romula rosea* var. *australis*	Common onion-grass
Labiatae	***Marrubium vulgare*	Horehound
	**Lavandula* sp.	Lavender
Leguminosae	**Medicago polymorpha* var. *polymorpha*	Burr medic
	**Trifolium dubium*	Suckling clover
Liliaceae	***Asparagus asparagoides* f. *asparagoides*	Bridal creeper

Family	Species	Common Name
	**Asphodelus fistulosus*	Onion weed
Malvaceae	**Malva parviflora*	Small-flower marshmallow
	**Eucalyptus globulus* subsp. *globulus*	Tasmanian blue gum (planted)
Oxalidaceae	***Oxalis pes-caprae*	Soursob
Scrophulariaceae	**Kickxia* sp.	Toadflax
Solanaceae	***Lycium ferocissimum*	African boxthorn
Urticaceae	**Urtica urens*	Small nettle

* Introduced species

** Declared pest plant under the NRM Act

Primary Industries and Regions South Australia (PIRSA) have produced advice on weed control measures for declared weeds in South Australia, available from:

http://www.pir.sa.gov.au/__data/assets/pdf_file/0020/232382/PIRSA_WeedControlHandbook_2017.pdf

1.2 Suggested Species List

Table 1-2 is a list of species suggested for planting at the KI Seaport, either as part of the landscape plan or in revegetation works. These species are all native to Kangaroo Island and have been chosen as they grow in the local area and can be cultivated from seed or cuttings relatively easily. The list includes species which have been recorded on the site (EBS Ecology 2018) as well as species recommended by Trees for Life for planting in the local area, specifically the Linois Plains, Menzies Hills and the coastal zone (Trees for Life 2016).

Table 1-2: Suggested species list

Species name	Common name	Life form
Trees and tall shrubs		
Acacia longifolia var. sophorae	Coastal wattle	Shrub, 2–6 m
Acacia pycnantha	Golden wattle	Tree, 4–6 m
Acacia retinodes var. *uncifolia*	Coast silver wattle	Tree to 8 m
Allocasuarina verticillata	Drooping sheoak	Tree, 5–8 m
Callitris gracilis	Cypress pine	Tree, 5–10 m
Eucalyptus cneorifolia	KI narrow-leaved mallee	Tree to 10 m
Eucalyptus diversifolia	Coastal white mallee	Tree to 10 m, or mallee to 4 m
Eucalyptus lansdowneana ssp. albopurpurea	Port Lincoln gum	Tree or mallee to 6 m
Eucalyptus odorata	Red mallee	Tree or mallee to 10 m
Eucalyptus oleosa	Swamp gum	Tree to 17 m
Eucalyptus phenax	Cong mallee	Mallee to 7 m
Eucalyptus rugosa	Kingscote mallee	Mallee or tree to 10 m

Species name	Common name	Life form
Melaleuca lanceolata	Dryland teatree	Shrub or tree to 10m
Pittosporuam phylliraeoides var. microcarpa	Native apricot	Tree to 17 m
Medium shrubs		
Acacia cupularis	Coastal umbrella bush	Shrub, 1–2 m
Acacia leiophylla	Coast golden wattle	Shrub, 1–2.5 m
Acacia paradoxa	Kangaroo thorn	Shrub to 3 m
Acacia triquetra	Mallee wreath wattle	Shrub to 1.5 m
Adriana klotzschii	Coast bitter-bush	Shrub 1–3 m
Atriplex cinerea	Coast saltbush	Shrub to 1.5 m
Beyeria lechenaultii	Pale turpentine bush	Shrub 0.5–1.5 m
Callistemon rugulosus	Scarlett bottle-brush	Shrub to 4 m
Grevillea ilicifolia	Holly-leaved grevillea	Shrub to 2 m
Hakea muelleriana	Desert hakea	Shrub, 1–4 m
Hakea rostrata	Beaked hakea	Shrub, 1–5 m
Hakea rugosa	Dwarf hakea	Shrub, 0.2–2.5 m
Hakea vittata	Limestone needlebush	Shrub, 0.1–2 m
Hibbertia pallidiflora	Pale Guinea-flower	Shrub to 2 m
Ixodia achillaeoides ssp. alata	Hills daisy	Shrub, 0.1–2 m
Melaleuca acuminata	Mallee honey-myrtle	Shrub, 1–2 m
Melaleuca brevifolia	Short-leaf honey-myrtle	Shrub, 2–3 m
Melaleuca gibbosa	Slender honey-myrtle	Shrub, 0.4–3 m
Melaleuca uncinata	Broombrush	Shrub to 3 m
Myoporum insulare	Common boobialla	Shrub, 1–3 m
Olearia axillaris	Coastal daisy	Shrub, 2–3 m
Olearia microdisca	Small flowered daisy-bush	Shrub to 1.5 m
Olearia ramulosa	Twiggy daisy-bush	Shrub to 1.5 m
Rhagodia candolleana	Seaberry saltbush	Shrub to 1.5 m
Scaevola crassifolia	Cushion fanflower	Shrub to 1.5 m
Templetonia retusa	Cockies tongue	Shrub, 1–3 m
Thryptomene ericaea	Heath thryptomene	Shrub 0.5–1.2 m
Small shrubs and groundcovers		
Acrotriche cordata	Coast ground-berry	Shrub 0.2–1 m
Acrotriche patula	Shiny ground-berry	Shrub 0.2–1 m
Carpobrotus rossii	Native pigface	Prostrate shrub to 0.3 m

Species name	Common name	Life form
Correa backhousiana var. insularis	Round-leaf correa	Shrub 0.5–2 m
Correa pulchella	Salmon correa	Shrub 0.3–1 m
Correa reflexa var. reflexa	Common correa	Shrub 0.5–2 m
Dampiera lanceolata var. insularis	Grooved dampiera	Shrub to 1 m
Dodonea humilis	Dwarf hop-bush	Shrub 0.1–1 m
Enchylaena tomentosa	Ruby saltbush	Shrub to 1 m
Eremophila glabra	Tar bush	Shrub 0.1–3 m
Eutaxia diffusa	Large-leaf eutaxia	Shrub to 1 m
Goodenia varia	Sticky goodenia	Shrub to 1 m
Helichrysum leucopsideum	Satin everlasting	Herb, 0.15–0.5 m
Hibbertia riparia	Erect guidnea-flower	Shrub to 0.5 m
Lasiopetalum baueri	Slender velvet-bush	Shrub 0.5–1.5 m
Lasiopetalum discolor	Coast velvet-bush	Shrub to 1 m
Leucophyta brownii	Coast cushion bush	Shrub to 1 m
Logania crassifolia	Coast logania	Prostrate shrub to 0.3 m
Myoporum parvifolium	Creeping boobialla	Prostrate shrub to 0.1 m
Olearia rudis	Azure daisy-bush	Shrub to 1 m
Pomaderris paniculosa	Mallee pomaderris	Shrub 0.5 m
Swainsona lessertiifolia	Coast swainson-pea	Shrub to 0.6 m
Tetragonia implexicoma	Bower spinach	Shrub to 0.3 m
Zygophyllum billardierei	Coast twinleaf	Shrub to 0.6 m
Grasses and sedges		
Austrostipa flavescens	Coast spear-grass	Clump to 1.2 m
Austrostipa stipoides	Prickly spear-grass	Clump to 1.2 m
Danthonia geniculata	Kneed wallaby-grass	Clump 0.1–0.45 m
Dianella brevicaulis	Short-stem flax lily	Clump to 0.5–1.2 m
Gahnia deusta	Limestone saw-sedge	Clump 0.3–0.5 m
Isolepis nodosa	Knobby club-rush	Clump 0.5–1.5 m
Lepidosperma gladiatum	Coast sword-sedge	Clump 1 m or taller
Lepidosperma viscidum	Sticky sword-sedge	Clump 0.2–0.5 m
Orthrosanthus multiflorus	Morning flag	Clump 0.3–0.6 m
Xanthorrea semiplana tateana	Tate's grass-tree	Grass-tree to 4 m
Climbers		
Clematis microphylla	Old man's beard	Climber

References

Department of Environment, Water and Natural Resources (DEWNR) 2012, *Vulnerability of DEWNR reserves on Kangaroo Island*, Science Resource Centre, South Australia.

EBS Ecology 2018, *Smith Bay Ecological Assessment,* sub-consultant's report prepared for Environmental Projects on behalf of KIPT Pty Ltd.

Trees for Life 2016, *The Tree Scheme: information on selecting species for the Kangaroo Island Zone,* Trees for Life Inc., Brooklyn Park, South Australia.

Appendix J2 – Smith Bay Ecological Assessment – EBS Ecology

ebs ecology

Smith Bay Ecological Assessment

KIPT – Kangaroo Island

Smith Bay Ecological Assessment

04 May 2018

Project Number: E60701.

CITATION: EBS Ecology (2018) Smiths Bay Ecological Assessment – KIPT Kangaroo Island, EBS Ecology, Adelaide.

Cover photograph: Coastal vegetation within the project area.

3/119 Hayward Avenue
Torrensville, South Australia 5031
t: 08 7127 5607
email: info@ebsecology.com.au

EXECUTIVE SUMMARY

EBS Ecology undertook a terrestrial flora and fauna survey for a site at Smith Bay on Kangaroo Island (South Australia) on 17 August 2016. An additional vegetation assessment was undertaken on 15 February 2018. The site is mostly cleared, with small remnants of vegetation and is approximately 20.68 ha in size. The area is situated within Allotments 51 and 52, North Coast Road at Smith Bay (Kangaroo Island). There is still a requirement to conduct some roadside vegetation surveys along transport routes, once the layout has been confirmed.

A Protected Matters Report was generated on 03 April 2018 to identify matters of national environmental significance under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) that may occur or may have suitable habitat occurring within the project area. A buffer of 10 km was applied for this search (DOE, 2018). A Biological Database of South Australia (BDBSA) search was obtained from the Department of Environment, Water and Natural Resources (DEWNR) on 8 August 2016, to identify flora and fauna species previously recorded within and around the project area (DEWNR, 2016).

One Threatened Ecological Community (TEC), the Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland (Critically Endangered) was highlighted as being likely to occur within the search area. A small patch of Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Tall Open Forest was recorded during the August 2016 field survey. This vegetation was situated on the access track into the project area. The section of vegetation did not meet the condition requirements to be qualified as a TEC. The February 2018 survey identified a patch of vegetation which met the condition requirements as Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland TEC. EBS understands that the TEC assessed during the February 2018 survey is outside of the direct impact area of the project and is unlikely to require clearing.

Eight EPBC listed flora species were identified by the EPBC Protected Matters search as potentially occurring or having habitat potentially occurring within the vicinity of the project area; all eight were determined to be unlikely to occur. Six EPBC listed fauna species were identified in the EPBC Protected Matters Report as potentially occurring or having habitat potentially occurring within the vicinity of the project area; this included four bird species and two mammal species. Fourteen bird and two mammal species listed as migratory or marine under the EPBC Act were identified in the EPBC Protected Matters Report as potentially occurring or having habitat potentially occurring within the land based habitats of the project area. Two out of the 14 are known to occur within the project area: the White-bellied Sea-Eagle (*Haliaetus leucogaster*) and Pacific Gull (*Larus pacificus*). Description of listed fauna (including migratory and marine) species, assessed as having potential to occur within the KIPT Smith Bay project site (and the potential impact on these species), is detailed within Section 7. There were 12 listed whales and cetaceans that were identified by the EPBC Protected Matters search as potentially occurring within the project area. EBS encourages the proponent to read the ecological assessment results in conjunction with

the results from the marine survey; the latter will have assessed the likely direct and indirect impacts of the development on marine fauna, during the construction and operational phases of the project.

The BDBSA Search identified 13 threatened flora species with records within 10 km of the project area. None of the species were recorded during the August 2016 field survey. It is considered unlikely that any of the 13 threatened flora species would occur within the project area.

The BDBSA search identified 13 threatened birds, four threatened mammal species and one threatened reptile species with records within 10 km of the project area. Eight of the 18 species identified are considered as potentially occurring or known to occur within the project area.

The majority of the native vegetation recorded within project area has been cleared. Much of the area is now an Exotic Grassland / Herbland. Seven vegetation associations were recorded within the project area Vegetation association and condition mapping is provided as part of this report; vegetation condition ranged from 0:1 to 6:1.

Thirty flora species were recorded within the project area; it was dominated by weed flora species due to the degraded conditions, likely to be a result of previous land practices. Out of the 30 flora species recorded, only 11 were native flora species. These were observed as small patches or scattered individuals. There were no observations of any threatened species at national or state level. Four of the 19 weeds species recorded are listed as declared under the Natural Resources Management Act 2004.

Twenty-three (23) fauna species were observed within the project area which included 18 native birds, 3 introduced birds and two native mammals. A White-bellied Sea-Eagle (*Haliaeetus leucogaster*) was observed during the field survey at Smith Bay. The individual was observed foraging in the area, searching for prey in circular motions across the project area and along the coastal zone. Diggings belonging to the Kangaroo Island Echidna (*Tachyglossus aculeatus multiaculeatus*) were observed within vegetation association 2, within planted *Eucalyptus* trees along the access track within the project area. These diggings appeared to be fresh, having been established within a few days of the field assessment. Diggings continued into the adjacent property to the west of the project area.

Discussion around the preferred habitat and potential impacts on species determined as possible, likely or known to occur within the Smith Bay project area, is detailed in Section 6. From this, recommendations are listed in section 7.

GLOSSARY AND ABBREVIATION OF TERMS

BAM	Bushland Assessment Method
BDBSA	Biological Databases of South Australia
DEWNR	Department of Environment, Water and Natural Resources
DOE	Department of the Environment
EBS	EBS Ecology
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
NPW Act	*National Parks and Wildlife Act 1972*
NRM Act	*Natural Resources Management Act 2004*
NV Act	*Native Vegetation Act 1991*
NVC	Native Vegetation Council
SEB	Significant Environmental Benefit
ssp.	Subspecies
spp.	species (plural)
TEC	Threatened ecological community

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1 INTRODUCTION

EBS Ecology undertook a terrestrial flora and fauna survey for a site at Smith Bay on Kangaroo Island (South Australia) on the 17 August 2016. An additional vegetation survey was undertaken on 15 February 2018. There is still a requirement to conduct some roadside vegetation surveys along transport routes, once the layout has been confirmed. EBS encourages the proponent to read the ecological assessment results in conjunction with the marine survey report.

Kangaroo Island Plantation Timbers Ltd (KIPT) operates a number of timber plantation estates across Kangaroo Island (KI) and requires a wharf facility to export timber logs off-shore. KIPT owns a potentially suitable site, at Smith Bay, to build the required facility and looks to fund such a facility by exporting their timber logs, and logs of other timber companies on Kangaroo Island.

KIPT's Smith Bay proposal is currently in early concept and pre-feasibility phase. Appropriate approvals will be required to build the proposed facility, which is likely to require dredging of adjacent marine areas, construction of marine and land-based infrastructure to support the wharf facility and installation of new support services and upgrades to existing infrastructure.

1.1 Objectives

The objectives of the project were to:

- Database search to identify potential threatened species that inhabit that area;
- Research of threatened species identified to better understand their habitat and determine if they are likely to occur within the project area;
- Review of relevant literature and existing spatial data;
- Conduct a flora and fauna survey which included recording vegetation associations and scattered trees, flora species present, vegetation condition, location of threatened flora species (if present), determining the location of areas which should be avoided, identify areas of weed infestations, fauna species observed and potential habitat for fauna;
- Assess any species of national, state or local conservation significance known or likely to occur within the project area and determine possible impacts of the project on these species;
- Produce a technical report, presenting the results of background research and the field survey including vegetation descriptions, potential impacts to native vegetation, a summary of flora and fauna species known to or likely to occur in the area (including pest plants and animals) and descriptions on species and environmental areas of significance and
- Recommend possible management strategies to minimise potential impacts.

1.2 Project area

The site is mostly cleared, with some coastal vegetation and is approximately 12 ha in size. The area is situated within Allotments 51 and 52, North Coast Road at Smith Bay (Kangaroo Island) (Figure 1).

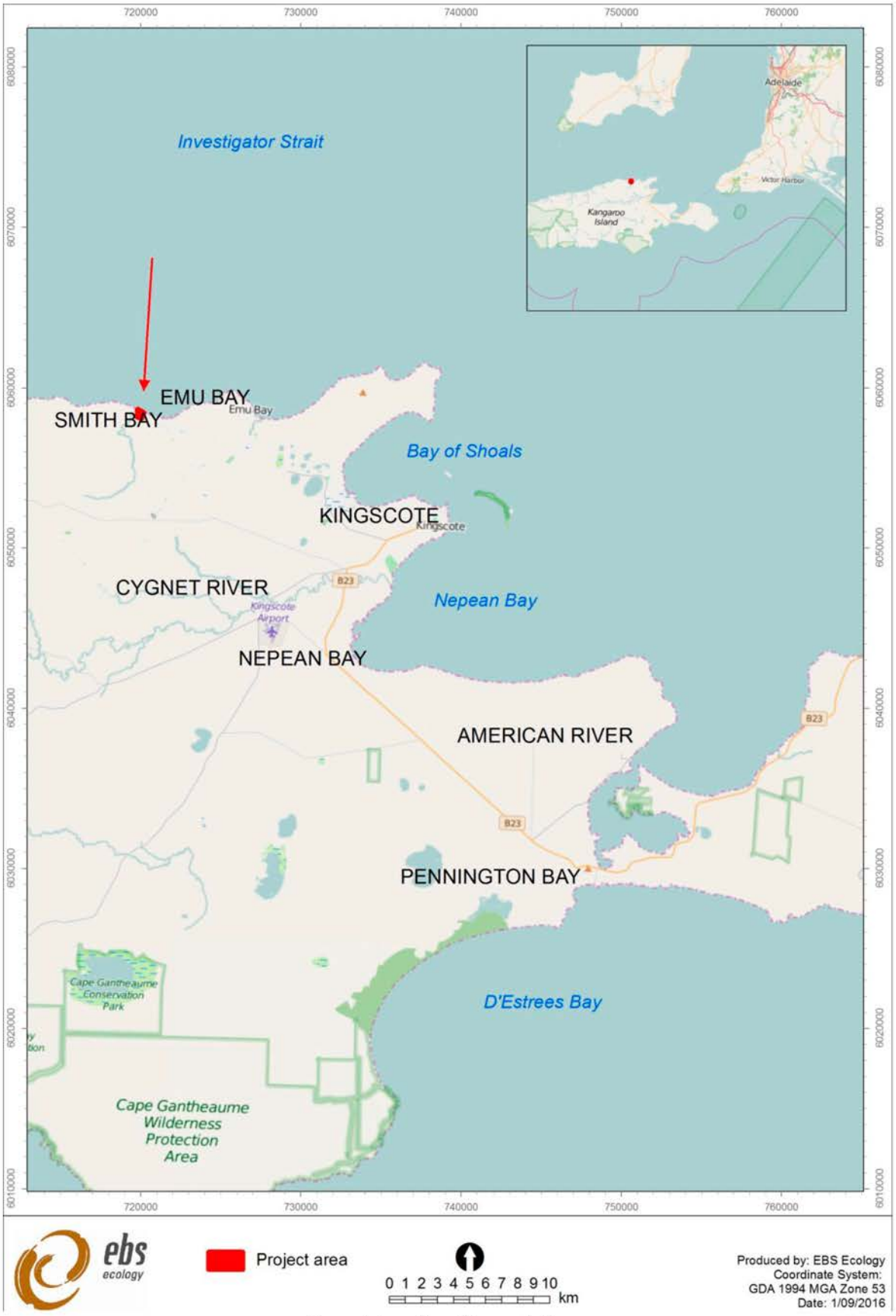


Figure 1. Location of the project area.

2 COMPLIANCE AND LEGISLATIVE SUMMARY

The following acts that are relevant to this project are summarised below. A detailed description of the legislative requirements regarding each act, is summarised in Appendix 1:

- *Environmental Protection and Biodiversity Conservation Act 1999*;
- *Native Vegetation Act 1991*;
- *National Parks and Wildlife Act 1972*; and
- *Natural Resources Management Act 2004*.

3 BACKGROUND INFORMATION

3.1 Environmental setting

3.1.1 IBRA

Interim Biogeographical Regionalisation of Australia (IBRA) is a landscape based approach to classifying the land surface across a range of environmental attributes, which is used to assess and plan for the protection of biodiversity. The project area falls within the Kanmantoo IBRA bioregion and Kangaroo Island IBRA sub-region and Stokes Bay Environmental Association (Table 1 & Figure 2).

Approximately 54% (22949 ha) of the Stokes Bay Environmental Association is mapped as remnant native vegetation, of which of which 44% (10167 ha) is formally conserved. There are three Conservation Park's located within 20 km of the project area. These are:

- Pardana Conservation Park (approximately 18 km south south-west from the project area) (6552204 ha);
- Lathami Conservation Park (approximately 17 km west from the project area) (11750891 ha) and
- Cygnet Estuary Conservation Park (approximately 16 km south-east from the project area) (3341612 ha).

There is also on property under a Heritage Agreement (HA864 (709018 ha)) approximately 2.5 km south-west of the project area. A large bushfire burnt over an area of approximately 170 ha to the west of Smith Creek in 1955.

3.1.2 Administrative boundaries

The project area lies within the District Council of Kangaroo Island and the Kangaroo Island Natural Resources Management Board Region. The project area is within the Hundreds of Menzies and the County of Carnarvon.

Table 1. IBRA Region, sub-region, and environmental association environmental landscape summary.

Kanmantoo IBRA bioregion	
Temperate, well defined uplands of Cambrian and Late Proterozoic marine sediments, and a lateritized surface becoming increasingly dissected northwards, with eucalypt open forests and woodlands and heaths on mottled yellow and ironstone gravelly duplex soils in the wetter areas, and Eucalyptus odorata and drooping sheoak on shallow rocky soils in drier areas. Extensively cleared for agriculture.	
Kangaroo Island IBRA subregion	
The island is characterised by an undulating upland plain with an extensive laterite cover which gives rise to mottled-yellow duplex soils. The plain rises to an average height of 100 - 150m and is bounded by a densely dissected scarp falling steeply to the cliffed coastline. Along the southern coastline some dunes are developed but otherwise these are rare. A characteristic feature of the eastern, somewhat lower-lying part of the island is the occurrence of numerous rounded salt lakes and depressions, which may be due to the solution processes in the calcrete cover. Shallow red sands occur on the intervening plains. In the eastern part of the island are scattered remnants of mallee communities dominated by coastal mallee (E. diversifolia) and Kangaroo Island narrowleaf mallee (Eucalyptus cneorifolia). On deeper soils in the wetter, western part of the island, the mallee is replaced by woodlands of Kangaroo Island mallee ash (E. remota), brown stringybark (E. baxteri), sugar gum (E. cladocalyx) and cup gum (E. cosmophylla). Scattered stands of these forests occur as uncleared blocks in the central section of the island, but in the west large tracts remain in conservation reserves.	
Remnant vegetation	Approximately 52% (228982 ha) of the subregion is mapped as remnant native vegetation, of which 62% (142541ha) is formally conserved
Landform	Central Island; dissected tableland with moderate to very steep slopes. Coastal fringe & eastern area; coastal dune formations with small plains,swamps, lagoons, lunettes. Undulating old dune formations largely stripped of sands exposing dune limest*
Geology	Small areas of sandy acidic yellow soils with a laterite layer on the tableland remnants. Ironstone gravels on tableland. Commercial gypsum mining
Soil	Calcareous sand soil of minimal development, Coherent sandy soils, Sand soils with mottled yellow clayey subsoils, Cracking clays
Vegetation	Mallee heath and shrublands
Conservation significance	98 species of threatened fauna, 199 species of threatened flora. 15 wetlands of national significance.
Stokes Bay IBRA environmental association	
Remnant vegetation	Approximately 54% (22949 ha) of the association is mapped as remnant native vegetation, of which 44% (10167ha) is formally conserved
Landform	Dissected margin of a laterite surface with occasional ridges and hills on metamorphics
Geology	Laterite and metamorphics.
Soil	Weakly structured grey-brown sandy soils and hard pedal mottled-yellow duplex soils.
Vegetation	Low open forest or open scrub of brown stringybark, cup gum and coastal mallee, open scrub of cup gum and broombush and open heath of coast daisy bush and coastal bearded heath.
Conservation significance	36 species of threatened fauna, 71 species of threatened flora. 0 wetlands of national significance.

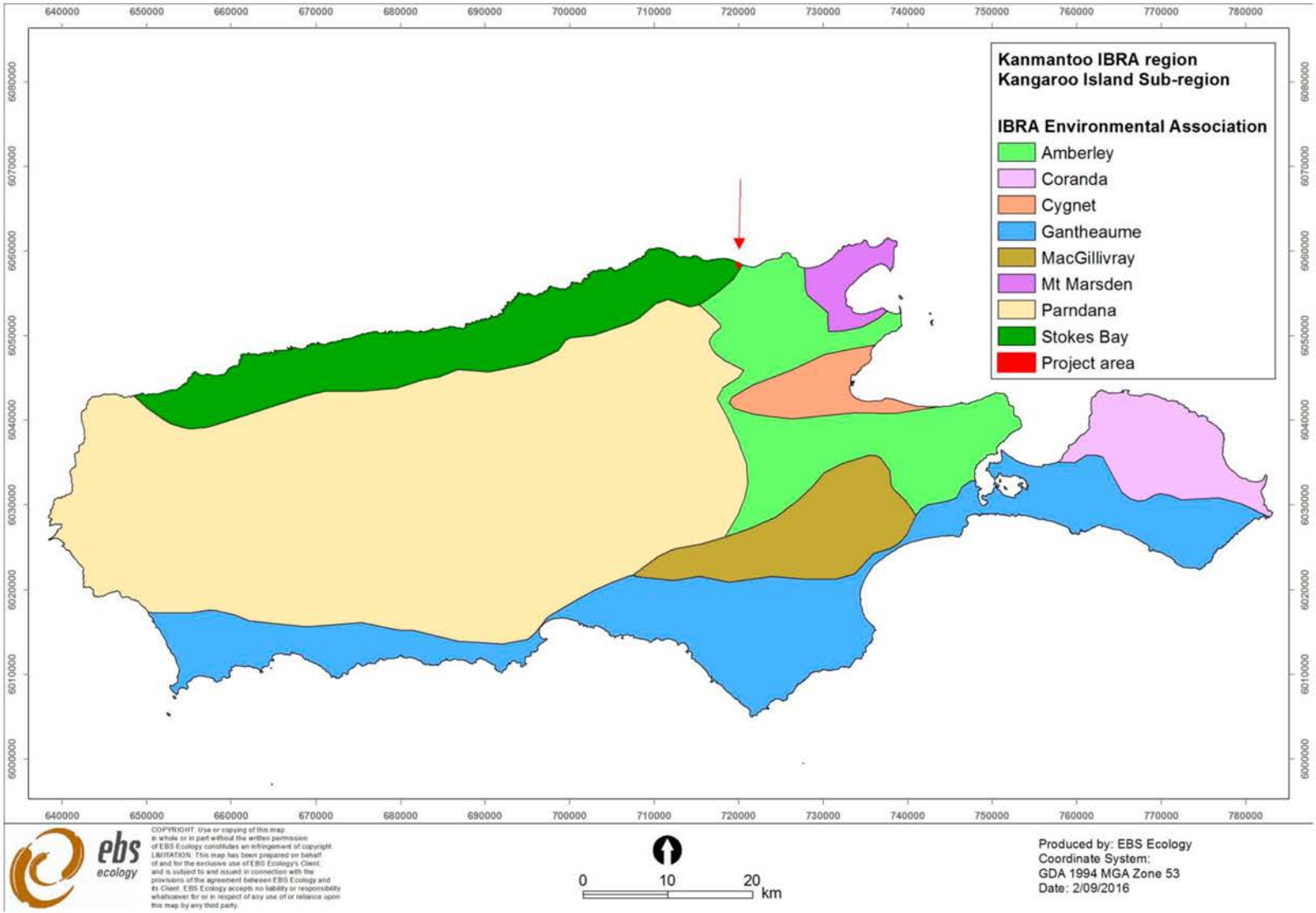


Figure 2. IBRA mapping.

4 METHODS

4.1 Database searches

A Protected Matters Report was generated on 03 April 2018 to identify matters of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) that may occur or may have suitable habitat occurring within the project area. A buffer of 10 km was applied for this search (DOE, 2018).

A Biological Database of South Australia (BDBSA) search was obtained from the DEWNR on 8 August 2016, to identify flora and fauna species previously recorded within and around the project area (DEWNR, 2016). The BDBSA is comprised of an integrated collection of corporate databases which meet DEWNR standards for data quality, integrity and maintenance. In addition to DEWNR biological data the BDBSA also includes data from partner organisations (Birds Australia, Birds SA, Australasian Wader Study Group, SA Museum, and other State Government Agencies). This data is included under agreement with the partner organisation for ease of distribution but they remain owners of the data and should be contacted directly for further information.

Existing spatial datasets, relevant literature, aerial imagery and previous survey information, where relevant, was reviewed.

This information was used to build a picture of:

- native vegetation cover within the project area and immediate surrounds;
- previous survey effort in the area;
- vegetation associations present (including associations of significance) and their condition and
- flora and fauna species (including species of national or state conservation significance known or likely to occur in the area.

Any threatened species previously recorded within the area, or highlighted as potentially occurring in the area, were researched (if necessary) to determine whether suitable habitat for these species exists within the project area.

4.2 Field survey

Two field surveys have been conducted within the project area. The first survey was carried out on 17 August 2016 and the second survey was carried out on 15 February 2018. The assessment of native vegetation for clearance under the Native Vegetation Act was updated in July 2017. The vegetation assessment in February 2018 was therefore conducted under the Bushland Assessment Method (BAM) devised by the Department of Environment and Water (DEW 2017).

Survey 1

The initial field survey was carried out by Chris Harrison and Paul Drummond. The majority of the project area was traversed on foot. The vegetation communities and flora species were recorded. Each vegetation community was assigned a significant environmental benefit (SEB) condition rating. The SEB condition scores are based on assessment criteria for the condition of vegetation communities in Table 3. All fauna species observed during the vegetation survey were recorded. No dedicated fauna surveys (i.e. trapping, active searching) were conducted. All location data was recorded using a hand held GPS.

Survey 2

The survey was carried out by NVC accredited consultant Andrew Sinel. The survey focused on an additional patch of vegetation within close proximity to the project area. The vegetation survey was performed in accordance with the BAM manual (DEW 2017). The BAM uses biodiversity 'surrogates' or 'indicators' to measure biodiversity value against benchmark communities. Each area to be assessed is termed an application area ('Block'), within which different vegetation associations ('sites') are identified and compared to the Nature Conservation Society of South Australia's 'benchmark' vegetation communities. A representative 1 hectare 'Quadrat' is surveyed for each site.

Three components (vegetation condition, conservation value and landscape context) of the biodiversity value of the site are measured and scored (Table 2). These three component scores are combined to provide a 'Unit Biodiversity Score' (per ha) and then multiplied by the size (hectares) of the site to provide a 'Total Biodiversity Score' for the site. This is used to calculate an SEB area and value for payment in to the Native Vegetation Fund derived from the clearance of native vegetation (DEW 2017).

Table 2. Components of the biodiversity value of a site that are measured in the Bushland Assessment Method.

Parameter	Factors
Vegetation condition	• Native species diversity • Number of native lifeforms and their cover • Number of regenerating species • Weed cover and the level of invasiveness of dominant species • Cover of bare ground, fallen timber, exotic species in the understorey • Tree health and the number of individuals supporting hollows
Conservation value	• The presence of federal or state listed threatened ecological communities, and their conservation rating. • Number of threatened plant species recorded at the site, and their conservation rating • Number of threatened fauna species for potential habitat occurs within the site, and their conservation rating.
Landscape context	• Percentage vegetation cover within 5 km • Block shape • Distance to remnant of > 50 ha • Remnancy of IBRA Association

Parameter	Factors
	• Percentage of vegetation protected within the IBRA Association • The presence of riparian vegetation, swamps or wetlands
Mean annual rainfall	The mean annual rainfall for the assessment area.
Area of clearance	The area of native vegetation (ha) to be cleared for the project.

4.3 Limitations

BDBSA flora and fauna records were limited to a 10 km buffer around the project area. The reliability of the BDBSA data ranges from 100 m to over 100 km. Fauna species, in particular birds, also have the ability to traverse distances in excess of 20 km. It is also acknowledged that the presence of species may not be adequately represented by database records. Hence the BDBSA results may not highlight all threatened flora and fauna species that may occur in the area.

The timing of the field surveys was not optimal for the detection of some annual and herbaceous species. A number of flora recorded could only be identified to genus level due to a lack of distinguishing identification features such as flowers or fruits. It should be noted however, that the number of species missing from the species list is expected to be low and data collected is considered adequate to make a reasonable assessment of potential impacts of the proposed works on flora and fauna.

Table 3. SEB ratios used to rate condition of vegetation communities.

Condition	SEB ratio	% total indigenous cover	Overstorey condition description	Understorey condition description	Indicators	NVC Interim Policy (1.2.11)
Very Poor	0:1	<10%	No overstorey stratum remaining.	Complete destruction of indigenous understorey* (by grazing &/or introduced plants).	Vegetation structure no longer intact (e.g. removal of one or more vegetation strata). Scope for regeneration, but not to a state approaching good condition without intensive management. Dominated by very aggressive weeds. Partial or extensive clearing (> 50% of area). Evidence of heavy grazing (tracks, browse lines, species changes, complete depletion of soil surface crust).	Where proposed clearance is considered to be minor and of limited biodiversity impact, e.g. lopping of overhanging limbs only or minor clearance of shrubs in areas otherwise considered as highly disturbed.
	1:1	10-19%	Scattered trees in poor health and/or representing an immature stand.	Almost complete destruction of indigenous understorey* (by grazing &/or introduced plants) - reduced to scattered clumps and individual plants.		
	2:1	20-29%	Scattered trees either immature in good health, or mature in poor/moderate health. Alternatively, the dominant overstorey stratum is largely intact and an immature stand (or regrowth), and is generally in poor health.			Where proposed clearance is in areas dominated by introduced species, the area of native vegetation is largely reduced to scattered trees, indigenous understorey reduced to scattered clumps and individual plants.
Poor	3:1	30-39%	Dominant overstorey stratum is largely intact and a moderately healthy mature stand.	Heavy loss of native plant species (by grazing &/or introduced plants). The understorey* consists predominately of alien species, although a small number of natives persist.	Vegetation structure substantially altered (e.g. one or more vegetation strata depleted). Retains basic vegetation structure or the ability to regenerate it. Very obvious signs of long-term or severe disturbance. Weed dominated with some very aggressive weeds. Partial clearing (10 – 50% of area). Evidence of moderate grazing (tracks, browse lines, soil surface crust extensively broken).	
	4:1	40-49%	Dominant overstorey stratum is largely intact and is a healthy mature stand with high wildlife habitat value (e.g. hollows).			Where the proposed clearance is of mostly intact overstorey vegetation but there is still considerable weed infestation amongst the understorey flora
Moderate	5:1	50-59%	Dominant overstorey stratum is largely intact – any condition+	Moderate loss of native understorey diversity. Weed-free areas small. Substantial invasion of aliens resulting in significant competition, but native understorey* persists; for example, may be a low proportion of native species and a high native cover, or a high proportion of native species and low native cover.	Vegetation structure altered (e.g. one or more vegetation strata depleted). Most seed sources available to regenerate original structure. Obvious signs of disturbance (e.g. tracks, bare ground). Minor clearing (<10% of area). Considerable weed infestation with some aggressive weeds. Evidence of some grazing (tracks, soil surface crust patchy).	
	6:1	60-69%	Dominant overstorey stratum is largely intact – any condition+	Moderate but not severe weed infestation amongst the understorey flora.		Where the proposed clearance is of mostly intact overstorey vegetation with moderate but not severe weed infestation amongst the understorey flora. Clearance is not seriously at variance with the Principles.

Condition	SEB ratio	% total indigenous cover	Overstorey condition description	Understorey condition description	Indicators	NVC Interim Policy (1.2.11)
Good	7:1	70-79%	Original overstorey stratum is still dominant and intact – any condition+	Understorey only slightly modified. High proportion of native species and native cover in the understorey*; reasonable representation of probable pre-European vegetation.	Vegetation structure intact (e.g. all strata intact). Disturbance minor, only affecting individual species. Only non-aggressive weeds present. Some litter build-up.	
	8:1	80-89%	Original overstorey stratum is still dominant and intact – any condition+	Understorey only slightly modified. High proportion of native species and native cover in the understorey*; reasonable representation of probable pre-European vegetation.		Where the proposed clearance is of mostly intact overstorey and understorey vegetation, weed infestation is moderate to low, but the original vegetation is still dominant. Clearance is assessed by the Native Vegetation Council to be at variance with the Principles.
Excellent	9:1	> 89%	Original vegetation is still dominant and intact. Overstorey individuals in good condition and represent a mature stand.	Diverse vegetation with very little weed infestation.Understorey largely undisturbed, minimal loss of plant species diversity. Very little or no sign of alien vegetation in the understorey*; resembles probable pre-European condition.	All strata intact and botanical composition close to original. Little or no signs of disturbance. Little or no weed infestation. Soil surface crust intact. Substantial litter cover.	
	10:1		Original vegetation is still dominant and intact. Overstorey individuals in good condition and represent a mature stand, with high habitat value (e.g. hollows).			Where the proposed clearance is of diverse vegetation with very little weed infestation. Clearance is assessed by the Native Vegetation Council to be seriously at variance with the Principles.

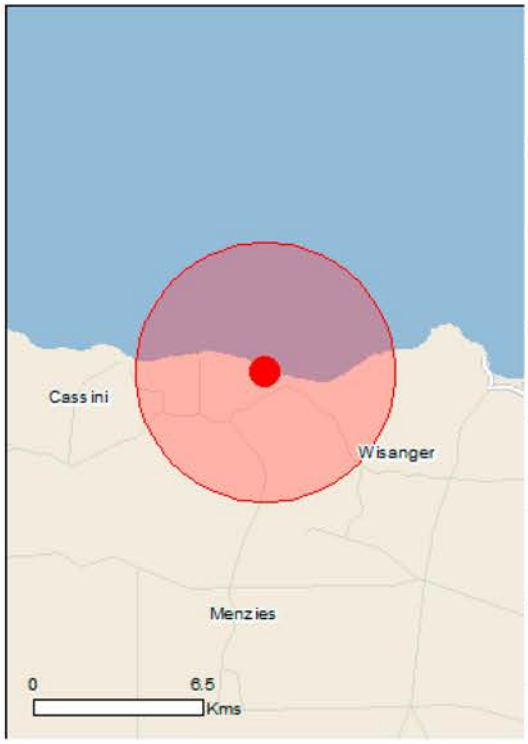
*Or all strata if the upper and lower strata are difficult to distinguish
+ Ratio assessment will largely depend upon condition of understorey associated with an intact overstorey stratum.
Adapted from *Guide to Roadside Vegetation Survey Methodology for South Australia* (Stokes *et al.* 2006) and *Guidelines for a Native Vegetation Significant Environmental Benefit Policy (*DWLBC 2005).

5 RESULTS

5.1 Matters of national environmental significance

Table 4 summarises the results of the EPBC Protected Matters Report, with the relevant matters of national environmental significance further discussed below.

Table 4. Summary of the results of the EPBC Act Protected Matters Search.



Matters of National significance under the EPBC Act 1999	Identified within the search area
Threatened Ecological Communities	1
Threatened Species	44
Migratory Species	40
Listed Marine Species	74
Whales and other Cetaceans	12
State and Territory Reserves	6
Invasive Species	48
Nationally Important Wetlands	0

5.1.1 Threatened ecological communities

One Threatened Ecological Community (TEC), the Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland (Critically Endangered) was highlighted as being likely to occur within the search area. A small patch of Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Tall Open Forest was recorded during the August 2016 field survey. This vegetation was situated on the access track into the project area. The section of vegetation did not meet the condition requirements to be qualified as a TEC.

The February 2018 survey identified a patch of vegetation which met the condition requirements as Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland TEC.

5.1.2 Threatened flora species

Eight EPBC listed flora species were identified by the EPBC Protected Matters search as potentially occurring or having habitat potentially occurring within the search area (Appendix 2). All eight species were determined to be unlikely to occur within the project area.

5.1.3 Threatened fauna species

Six EPBC listed threatened fauna species that may occur on land within the project area were identified by the EPBC Protected Matters Report (Appendix 2). A further 12 EPBC listed threatened marine and/or pelagic seabirds, turtles, whales and sharks were determined to potentially occur within marine habitats of the project area; however, are not discussed within this report (Appendix 2). Description of listed terrestrial fauna species assessed as having potential to occur within the KIPT Smith Bay project site (and the potential impact on these species), is detailed within Section 6.

5.1.4 Migratory and marine species

Fourteen bird and two mammal species that may occur on land within the project area were identified by the EPBC Protected Matters Report (Appendix 2). A further 30 marine and/or pelagic seabirds, turtles, fish and sharks were determined to potentially occur within marine habitats of the project area; however, are not discussed within this report (Appendix 2).

Two marine species are known to occur within the project area: the White-bellied Sea-Eagle (*Haliaetus leucogaster*) and Pacific Gull (*Larus pacificus*). Description of listed fauna species assessed as having potential to occur within the KIPT Smith Bay project site (and the potential impact on these species), is detailed within Section 5.1.4.

Pelagic seabirds have not been included within Section 5.1.4 as they are expected to occur within the marine environments of the project area. EBS encourages the proponent to read the ecological assessment results in conjunction with the results from the marine survey; the latter will have assessed the likely direct and indirect impacts of the development on marine fauna, during the construction and operational phases of the project.

5.1.5 Whales and other cetaceans

There were six listed whales and cetaceans that were identified by the EPBC Protected Matters search as potentially occurring within the project area (Appendix 2).

5.2 Matters of State environmental significance

This section provides a summary of the Biological Database of South Australia (BDBSA) search results. The full list of flora species recorded in the BDBSA within 10 km of the project area is provided in Appendix 3. The full list of fauna species recorded in the BDBSA within 10 km of the study area is provided in Appendix 4.

5.2.1 Threatened flora species

The BDBSA Search identified 13 threatened flora species with records within 10 km of the project area (DEWNR, 2016) (Appendix 2). The location of BDBSA threatened flora records is shown in Figure 3. None of the species were recorded during the August 2016 field survey. It is considered unlikely that any of the 13 threatened flora species would occur within the project area.

5.2.2 Threatened fauna species

The BDBSA Search identified 13 threatened birds, four threatened mammal species and one threatened reptile species with records within 10 km of the project area (DEWNR, 2016). These species are shown in with an assessment of their likelihood of occurrence within the project area. The location of BDBSA threatened fauna records is shown in Figure 4.

Eight of the 18 species identified are considered as potentially occurring or known to occur within the project area. The White-bellied Sea-Eagle (*Haliaeetus leucogaster*), which is listed as endangered under the NPW Act, was recorded during the August 2016 field survey.

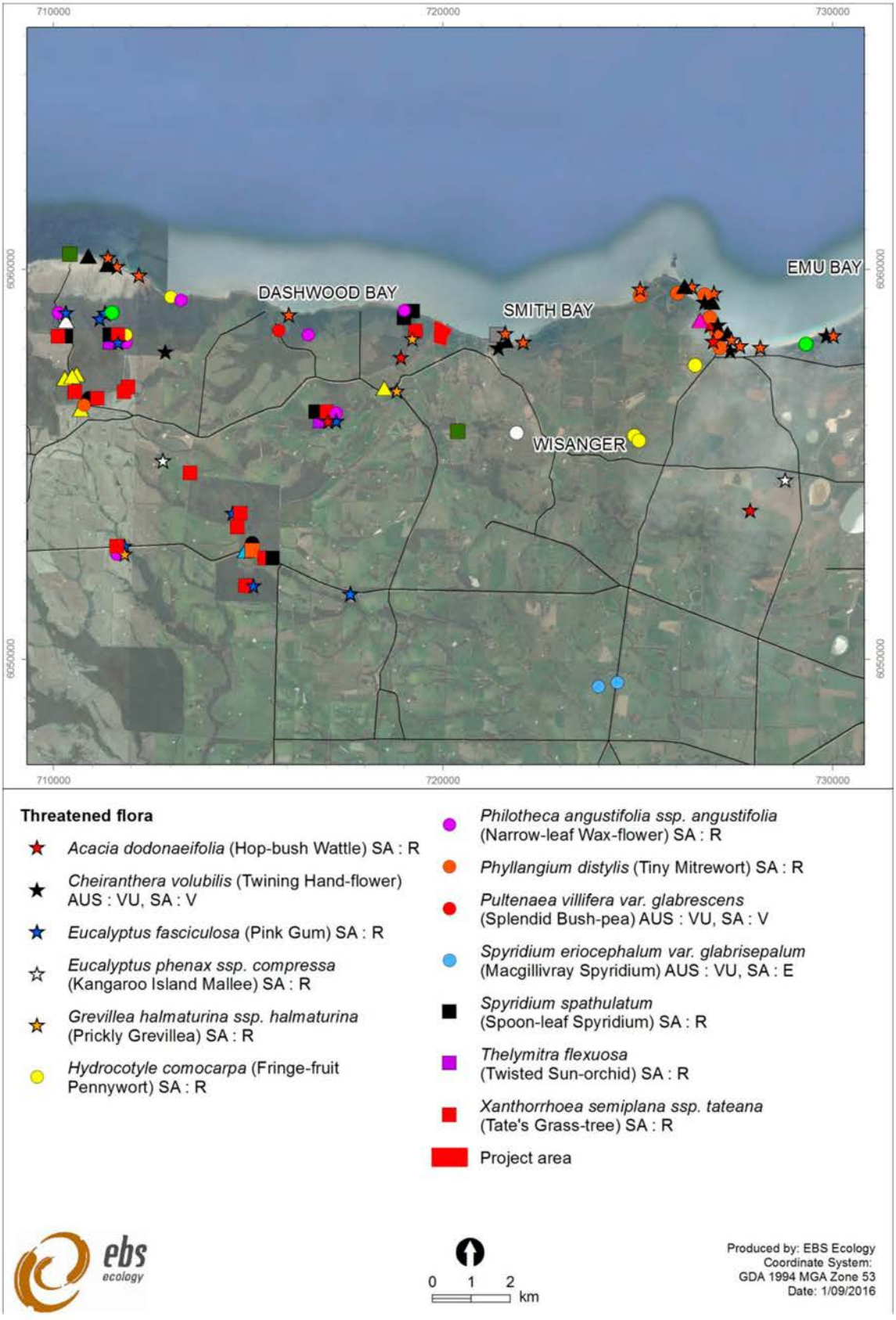


Figure 3. BDBSA threatened flora records within a 10 km radius of the project area (DEWNR, 2016).

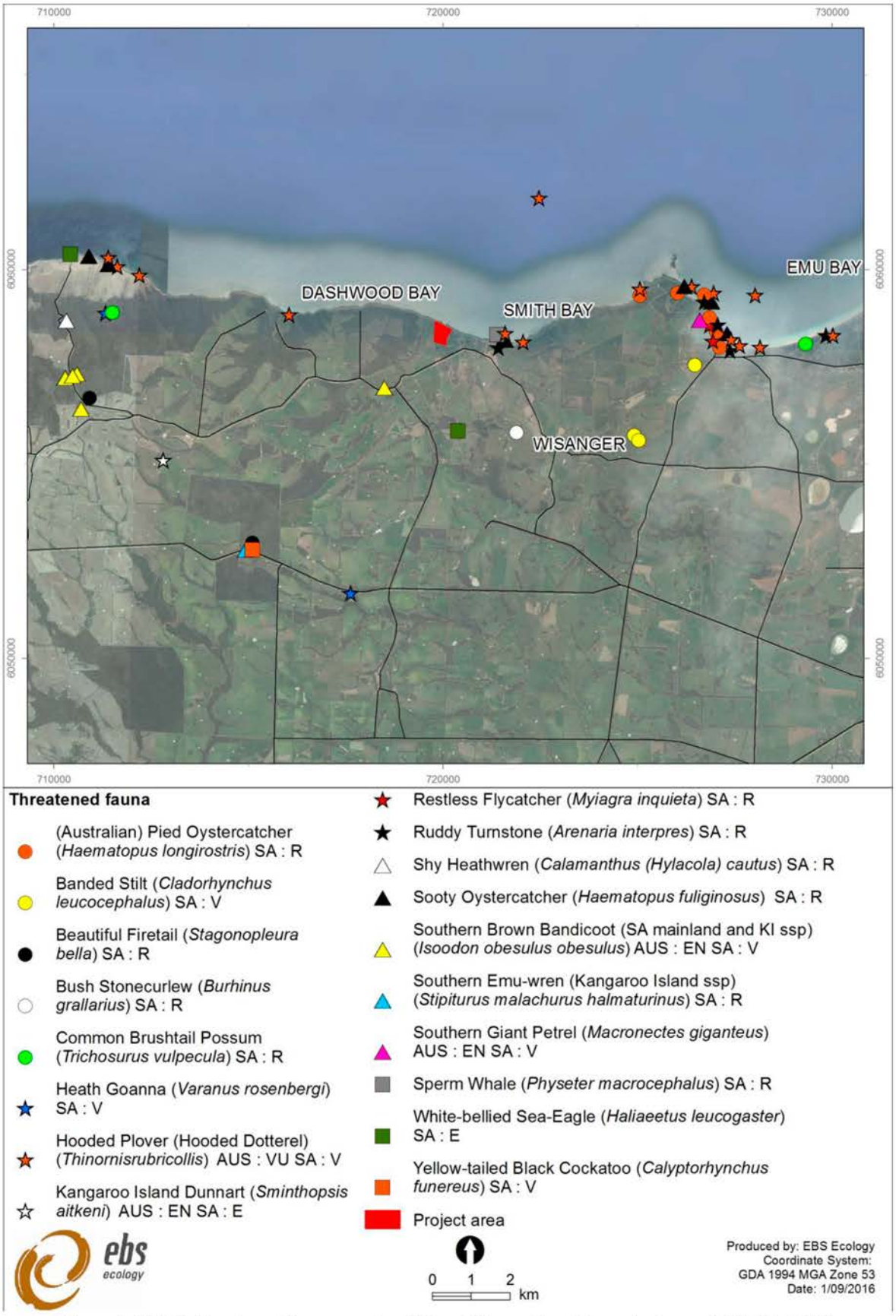


Figure 4. BDBSA threatened fauna records within a 10 km radius of the project area (DEWNR, 2016).

5.3 Field survey

5.3.1 Vegetation

The majority of the native vegetation recorded within project area has been cleared. Native vegetation is now restricted to relatively small areas of natural regeneration and small areas of remnant vegetation. Much of the area is now an Exotic Grassland / Herbland. Seven vegetation associations were recorded within the project area (Table 5). These vegetation associations are discussed in detail below. Vegetation association and condition mapping is provided in Figure 12 and Figure 13.

Vegetation Association 6 meets the condition requirements as the EPBC listed Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland TEC. This TEC is listed as critically endangered.

Thirty flora species were recorded within the project area (Table 6). The project area was dominated by weed flora species due to the degraded conditions as a result of previous land practices. Only 11 native flora species were observed which occurred as small patches or scattered individuals. There were no observations made of any threatened species at national or state level. Nineteen weed species were recorded within the project area (Figure 14), four of which are listed as declared under the *Natural Resources Management Act 2004* (Table 7).

Table 5. Summary of vegetation associations.

Vegetation association		Condition	Area (ha)
1	Exotic Grassland / Herbland (grazing pasture paddock)	0:1	12
2	*Enchylaena tomentosa* (Ruby Saltbush) Low Open Shrubland	1:1	1.5
3	Planted *Eucalyptus* spp. / planted garden species	0:1	0.4
4	*Eucalyptus diversifolia* (Coastal White Mallee) / *Myoporum insulare* (Common Boobialla) Low Open Woodland	5:1	1
5	*Eucalyptus cneorifolia* (Kangaroo Island Narrow-leaf Mallee) Tall Open Forest	6:1	0.4
6	*Eucalyptus cneorifolia* (Kangaroo Island Narrow-leaf Mallee) Mallee	Refer to vegetation association description below	4.75
7	*Eucalyptus cladocalyx ssp. crassa* (Sugar Gum) Woodland	Refer to vegetation association description below	0.63
Total			20.68

Table 6. Flora species list.

Family	Species name	Common name	Vegetation association						
			1	2	3	4	5	6	7
AGAVACEAE	**Agave attenuata*	Spineless Century Plant			✓				
CASUARINACEAE	*Allocasuarina verticillata*	Drooping Sheoak					✓		
CHENOPODIACEAE	*Atriplex cinerea*	Coast Saltbush				✓			
	Enchylaena tomentosa	Ruby Saltbush	✓	✓		✓	✓	✓	
	Rhagodia candolleana ssp. *candolleana*	Sea-berry Saltbush				✓	✓	✓	✓
COMPOSITAE	**Arctotheca calendula*	Cape Weed	✓	✓	✓	✓	✓		
	**Cirsium vulgare*	Spear Thistle	✓	✓					
	**Onopordum acaulon*	Stemless Thistle	✓						
CRUCIFERAE	**Sinapis arvensis*	Charlock	✓	✓	✓		✓		
CYPERACEAE	*Ficinia nodosa*	Knobby Club-rush	✓						
EUPHORBIACEAE	**Euphorbia paralias*	Sea Spurge	✓	✓		✓			
FUMARIACEAE	**Fumaria muralis*	Wall Fumitory				✓	✓		
GRAMINEAE	**Avena* sp.	Wild Oats	✓	✓	✓	✓	✓	✓	
	**Gastridium phleoides*	Nit-grass	✓	✓					
	**Hordeum* sp.	Barley Grass	✓	✓	✓				
	**Phalaris* sp.	Canary Grass	✓	✓					
	**Vulpia sp.*								✓
IRIDACEAE	**Romulea rosea* var. *australis*	Common Onion-grass			✓				
LABIATAE	***Marrubium vulgare*	Horehound	✓	✓					
LAMIACEAE	**Lavandula* sp.	Lavender			✓				
LEGUMINOSAE	*Acacia paradoxa*	Kangaroo Thorn							✓
	**Medicago polymorpha* var. *polymorpha*	Burr-medic	✓	✓	✓				
	**Trifolium dubium*	Suckling Clover	✓						
LILIACEAE	***Asparagus asparagoides* f. *asparagoides*	Bridal Creeper	✓		✓		✓		
	**Asphodelus fistulosus*	Onion Weed	✓	✓					
	Wurmbea dioica	Early Nancy			✓				
MALVACEAE	**Malva parviflora*	Small-flower Marshmallow	✓						
MYOPORACEAE	*Myoporum insulare*	Common Boobialla				✓	✓		
MYRTACEAE	*Eucalyptus cladocalyx ssp. crassa*	Sugar Gum							✓
	Eucalyptus cneorifolia	Kangaroo Island Narrow-leaf Mallee					✓	✓	
	Eucalyptus diversifolia ssp. *diversifolia*	Coastal White Mallee				✓			
	**Eucalyptus globulus* ssp. *globulus*	Tasmanian blue gum (Planted)			✓				
	Eucalyptus leucoxylon ssp. *leucoxylon*	South Australian Blue Gum (Planted)			✓				
	Eucalyptus cosmophylla	Cup Gum (Unconfirmed)	✓						
OXALIDACEAE	***Oxalis pes-caprae*	Soursob	✓	✓	✓	✓	✓		
POLYGONACEAE	*Muehlenbeckia gunnii*	Coastal Climbing Lignum				✓			

Family	Species name	Common name	Vegetation association						
			1	2	3	4	5	6	7
SCROPHULARIACEAE	**Kickxia* sp.	Toadflax	✓						
SOLANACEAE	***Lycium ferocissimum*	African Boxthorn	✓			✓	✓		
	**Solanum nigrum*	Black Nightshade	✓		✓				
URTICACEAE	**Urtica urens*	Small Nettle	✓						

* = Introduced species.

** = Declared pest plant under the NRM Act.

Table 7. Declared weed species recorded within the project area.

Species name	Common name	Location description
Asparagus asparagoides f. *asparagoides*	Bridal Creeper	Occur as scattered individuals and small patches within vegetation associations 1, 3, 5.
Lycium ferocissimum	African Boxthorn	Occur as scattered individuals within vegetation associations 1, 4, 5.
Marrubium vulgare	Horehound	Occur as large patches within vegetation associations 1 and scattered individuals within vegetation association 2.
Oxalis pes-caprae	Soursob	Common throughout the entire project area and all vegetation associations.

Vegetation Association 1: Exotic Grassland / Herbland (grazing pasture paddock)

Vegetation Association 1 (Figure 5) appears to be an old grazing paddock with the majority of flora species being exotic pasture species. Condition was recorded as very poor with only a very small amount of native flora species present occurring as very scattered individuals. No stock grazing was observed at the time the survey was undertaken. The area directly surrounding the house was mowed. A number of dams were recorded within the paddocks on the property. The vegetation association was dominated by exotic species such as *Avena sp.* (Wild Oats), *Marrubium vulgare* (Horehound) and *Arctotheca calendula* (Cape Weed).

Figure 5. Vegetation Association 1.

Vegetation Association 2: Enchylaena tomentosa (Ruby Saltbush) Low Open Shrubland

Vegetation Association 2 (Figure 6) contains small areas of regenerating native vegetation. This area appears to have once contained a series of large tanks and has been previously levelled, filled with gravel, and a drainage network established. The area is highly degraded with a SEB condition of 1:1 (Very Poor). Regenerating *Enchylaena tomentosa* (Ruby Saltbush) covers approximately 10-20% of the area, while the remaining is dominated by weed species similar to Vegetation Association 1.

Figure 6. Vegetation Association 2.

Vegetation Association 3: Planted Eucalyptus spp. / planted garden species

Vegetation Association 3 (Figure 7) occurs on the vehicle access track and also surrounds the house on the property. The *Eucalyptus* species have been planted are likely to be greater than 10 years old. The understory is dominated by weed species similar to Vegetation Association 1. This association recorded a SEB condition rating of 0:1 (Very Poor).

Figure 7. Vegetation Association 3.

Vegetation Association 4: Eucalyptus diversifolia (Coastal White Mallee) / Myoporum insulare (Common Boobialla) Low Open Woodland

Vegetation Association 4 (Figure 8) occurs at the northern extent of the project area directly behind the low foredune / rocky beach. Native flora species is dominated by *Eucalyptus diversifolia* (Coastal White Mallee), *Myoporum insulare* (Common Boobialla) with understory species including *Rhagodia candolleana* ssp. *candolleana* (Sea-berry Saltbush), *Atriplex cinerea (Coast Saltbush)* and *Muehlenbeckia gunnii* (Coastal Climbing Lignum). Vegetation condition was recorded as 5:1 (Moderate); exotic flora species were common in the understory and included *Avena sp.* (Wild Oats), *Euphorbia paralias* (Sea Spurge) and *Oxalis pes-caprae* (Soursob).

Figure 8. Vegetation Association 4.

Vegetation Association 5: Eucalyptus cneorifolia (Kangaroo Island Narrow-leaf Mallee) Tall Open Forest

Vegetation Association 5 occurs outside the project area but occurs within the access track to property. This vegetation association occurs as a linear strip either side of the track and is approximately two metres to 20 meters wide. Vegetation association 5 was recorded as being in moderate condition with an SEB condition score of 6:1. The area contains many tall *Eucalyptus cneorifolia* (Kangaroo Island Narrow-leaf Mallee) with flora understory species including *Enchylaena tomentosa* (Ruby Saltbush) and *Rhagodia candolleana* ssp. *candolleana* (Sea-berry Saltbush). Exotic flora species were common and included *Avena* sp. (Wild Oats), *Oxalis pes-caprae* (Soursob) and *Asparagus asparagoides* f. *asparagoides* (Bridal Creeper).

Figure 9. Vegetation Association 5.

Vegetation Association 6: Eucalyptus cneorifolia (Kangaroo Island Narrow-leaf Mallee) Mallee

The *Eucalyptus cneorifolia* (Kangaroo Island Narrow-leaf Mallee) Mallee covers an area of 4.75 ha (Figure 12). This association meets the condition thresholds for a patch to qualify as a TEC under the EPBC Act (DotE 2014). The vegetation association contained a dominant overstorey of *Eucalyptus cneorifolia* which averaged 8 m in height. The understorey was sparse containing *Rhagodia candolleana* ssp. *candolleana* (Sea-berry Saltbush), *Enchylaena tomentosa* (Ruby Saltbush). The understorey contained a dense and continuous layer of plant litter (Figure 10). The introduced species, *Avena barbata* (Wild Oats) was sparsely distributed throughout sections of the vegetation association.

One BAM quadrat (A1) was conducted within the *Eucalyptus cneorifolia* (Kangaroo Island Narrow-leaf Mallee) Mallee vegetation association. The vegetation condition score for Quadrat A1 was 19.25 and the total biodiversity score was 139.53 (Table 8).

Table 8. Summary of assessment Quadrat A1.

BCM benchmark community	KI 1.1 Woodlands, low woodlands and mallee with dense sclerophyll shrub understorey
Size of site (ha)	4.75
Landscape context score	1.09
Vegetation condition score	19.25
Conservation significance score	1.40
Unit biodiversity score	29.38
Total biodiversity score	139.53

Figure 10. Vegetation Association 6.

Vegetation Association 7: Eucalyptus cladocalyx ssp. crassa (Sugar Gum) Woodland

The *Eucalyptus cladocalyx ssp. crassa* (Sugar Gum) Woodland was recorded in two relatively small patches totalling 0.63 ha. Both examples of Vegetation Association 7 were located within a larger patch of *Eucalyptus cneorifolia* (Kangaroo Island Narrow-leaf Mallee) Mallee (Vegetation Association 6) (Figure 12). The average height of the overstorey was 20 m. The understorey contained *Acacia paradoxa* (Kangaroo Thorn), *Rhagodia candolleana* ssp. *candolleana* (Sea-berry Saltbush) and the introduced species *Vulpia sp.* (Fescue).

One BAM quadrat (A2) was conducted within the *Eucalyptus cladocalyx ssp. crassa* (Sugar Gum) Woodland vegetation association. The vegetation condition score for Quadrat A2 was 17.55 and the total biodiversity score was 13.47 (Table 9). A representative photo of Vegetation Association is provided in Figure 11.

Table 9. Summary of assessment Quadrat A2.

BCM benchmark community	KI 1.1 Woodlands, low woodlands and mallee with dense sclerophyll shrub understorey
Size of site (ha)	0.63
Landscape context score	1.09
Vegetation condition score	17.55
Conservation significance score	1.10
Unit biodiversity score	21.04
Total biodiversity score	13.47

Figure 11. Vegetation Association 7.

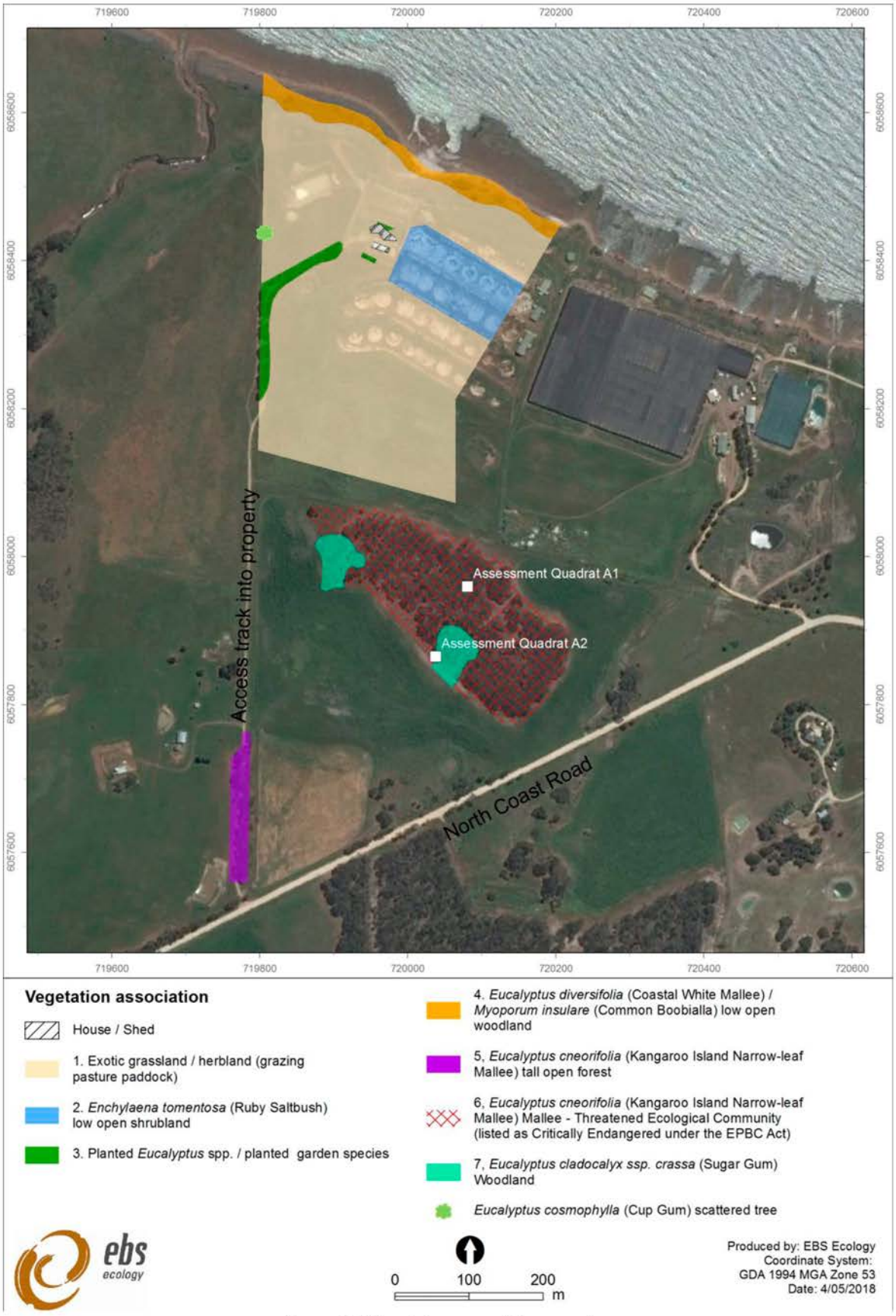


Figure 12. Vegetation association mapping.

Figure 13. Vegetation condition mapping.

Figure 14. Locations of declared weed species recorded during the August 2016.

5.3.2 Fauna

Twenty-three (23) fauna species were observed within the project area and included 18 native birds, 3 introduced birds and two native mammals (Table 10).

A White-bellied Sea-Eagle (*Haliaeetus leucogaster*) was observed during the field survey at Smith Bay; this species is rated as nationally marine and State endangered. The individual was observed foraging in the area, searching for prey in circular motions across the project area and along the coastal zone (Figure 15). A pair of White-bellied Sea-eagles is also known to breed in the area. This species is discussed in more detail in section 6.2, including potential impacts associated with the proposed development.

Diggings belonging to the Kangaroo Island Echidna (*Tachyglossus aculeatus multiaculeatus*) were observed within vegetation association 2, within the planted *Eucalyptus* trees along the access track within the project area (Figure 15). These diggings appeared to be fresh, having been established within a few days of the field assessment. Diggings continued into the adjacent property to the west of the project area; this species is discussed in more detail in section 6.3, including potential impacts associated with the proposed development.

Table 10. Fauna species recorded during the survey.

Species name	Common name	Conservation status		Method of observation	Quantity
		AUS	SA		
Birds					
**Alauda arvensis*	Eurasian Skylark			Fly over	2
Anthochaera carunculata	Red Wattlebird			Fly over	1
Aquila audax	Wedge-tailed Eagle			Soaring in the distance	1
Chroicocephalus novaehollandiae	Silver Gull			Fly over	8
Coracina novaehollandiae	Black-faced Cuckoo-shrike			Fly over	1
Corvus coronoides	Australian Raven			Fly over	7
Coturnix pectoralis	Stubble Quail			Flushed	1
Falco cenchroides	Nankeen Kestrel			Fly over	2
Gymnorhina tibicen	Australian Magpie			Fly over	4
Haliaeetus leucogaster	White-bellied Sea-Eagle	Ma	E	Fly over	1
Hirundo neoxena	Welcome Swallow			Fly over	11
Larus pacificus	Pacific Gull			Fly over	2
Malurus cyaneus	Superb Fairy-wren			Active group in vegetation	8
**Passer domesticus*	House Sparrow			Fly over	18
Phalacrocorax varius	[Australian] Pied Cormorant			Roosting on rocks	31
Platycercus elegans	Crimson Rosella			Fly over	3
Rhipidura leucophrys	Willie Wagtail			Fly over	3
**Sturnus vulgaris*	Common Starling			Fly over	2

Species name	Common name	Conservation status		Method of observation	Quantity
		AUS	SA		
Tadorna tadornoides	Australian Shelduck			Fly over	2
Vanellus miles	Masked Lapwing			Fly over	2
Zosterops lateralis	Silvereye			Active in vegetation	1
Mammals					
Macropus fuliginosus fuliginosus	Western Grey Kangaroo (Kangaroo Island sub-species			Resting and flushed through the project area	4
Tachyglossus aculeatus multiaculeatus	Kangaroo Island Echidna	EN		Diggings	Unknown

Aus: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare.

Figure 15. Locations of conservation rated species recorded during the August 2016 survey.

5.4 Significant Environmental Benefit (SEB) Calculations

5.4.1 What is a significant environmental benefit (SEB)

For native vegetation clearance that falls under exemption *5(1)(c)*, approval for native vegetation clearance is conditional on providing a significant environmental benefit (SEB). A SEB can be achieved through several options including managing and/or formally protecting an area of native vegetation for conservation purposes (Heritage Agreement), undertaking a revegetation program on the site of the operation or within the same region of the State or alternatively, making a payment into the Native Vegetation Fund. The primary aim of the SEB is to achieve a net environmental gain, which contributes to improving the biodiversity values of the region, rather than simply off-setting the vegetation clearance.

5.4.2 SEB calculations for the areas surveyed in August 2016

The SEB requirement for remnant vegetation clearance was calculated based on the Native Vegetation Council (NVC) policy document *Guidelines for a Native Vegetation Significant Environmental Benefit Interim Policy* (DWLBC 2005). The SEB offset area for vegetation patches is derived by multiplying the clearance area by the appropriate SEB ratio.

The ratio is assigned according to the condition of the vegetation and whether the clearance is at variance or seriously at variance to the Principles of Clearance. This includes factors such as whether the vegetation is considered intact and if it provides habitat for threatened species. At the NVC meeting of 4-5 August 2003, it was resolved that offset ratios of 2:1 to 10:1 be applied when clearance is endorsed, with a minimum of 8:1 to apply when the clearance is seriously at variance with the Clearance Principles (e.g. if the area provides important habitat for wildlife such as a State listed rare species) and 10:1 to apply when the clearance involves vegetation that is considered 'substantially intact' under the NV Act.

Should a payment into the Native Vegetation Fund be the preferred option to satisfy the required SEB, the following formula is utilised to convert required set-aside area into dollar value.

Formula for calculating SEB payment into Native Vegetation Fund =

(Land value[1] per ha x required SEB in ha) + (management fee per ha[2] x area cleared)

[1]Land value (Local Government Area values updated by Valuation SA)

[2] Management fee = $800 per ha (flat rate calculated by the Native Vegetation Council).

5.4.4 SEB calculations for the areas surveyed in February 2018

EBS understands that the vegetation associations assessed during the February 2018 survey are outside of the direct impact area of the project and are unlikely to require clearing. The following clearance summary (Table 11) and SEB calculations (Table 12) highlight the very high conservation value of the patch of vegetation.

Table 11. Clearance impact summary.

Site	Area (ha)	SEB points of loss	Hectares required
A1	4.75	139.53	18.31
A2	0.063	13.47	1.77
Total	**4.81**	**153**	**20.08**

Table 12. SEB offset requirement with payment option summary.

Site (area of proposed vegetation clearance)	Clearance (ha)	SEB points required	Payment into fund requirement
A1	4.75	146.51	$86,441.08
		Administration fee	$4,322.05
		Sub-total	$90,763.13
A2	0.063	14.14	$8,342.91
		Administration fee	$417.15
		Sub-total	$8,760.06
		Grand Total	**$99,523.19**

5.4.5 Summary of the SEB calculations for the Project for vegetation assessed in August 2016

The land value within the Project area is **$803 per/ha**. KIPT estimate that **2.92 ha** of native vegetation will be required to be cleared for the Project footprint. The total SEB offset should all the **2.92 ha** of native vegetation require clearance is **9.13 ha**. The required SEB payment, if that is the preferred method, is **$9,666.99** (**Table 13**).

Table 13. Significant Environmental Benefit calculation for the Project.

Veg ID	Veg description	SEB condition	Area ha	SEB number	SEB Offset	Mgt Fee	Land Value	SEB ($$)
1	Exotic grassland / herbland (grazing pasture paddock)	0:1	11.95	0	-	800	803	-
2	*Enchylaena tomentosa* (Ruby Saltbush) low open shrubland	1:1	1.49	1	1.49	800	803	2,384.84
3	Planted *Eucalyptus spp.* / planted garden species	0:1	0.39	0	-	800	803	-
3	Planted *Eucalyptus spp.* / planted garden species	0:1	0.01	0	-	800	803	-
3	Planted *Eucalyptus spp.* / planted garden species	0:1	0.01	0	-	800	803	-
4	*Eucalyptus diversifolia* (Coastal White Mallee) / *Myoporum insulare* (Common Boobialla) low open woodland	5:1	0.96	5	4.79	800	803	4,612.02
5	*Eucalyptus cneorifolia* (Kangaroo Island Narrow-leaf Mallee) tall open forest	6:1	0.48	6	2.85	800	803	2,670.13
			15.28		**9.13**			**9,666.99**

6 DISCUSSION

6.1 Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland Ecological Community

The ecological community is only known to occur on the eastern part of Kangaroo Island (Figure 16), a region that has been heavily cleared and is least protected by conservation reserves (Commonwealth of Australia, 2004). Small stands of *E. cneorifolia* occur on the mainland but are not part of the ecological community because they are degraded or belong to different kinds of mallee vegetation.

A single patch of this community occurs on the access track into the project area. This was surveyed in August 2016 and did not meet the condition criteria as it was not 60 metres wide:

(https://www.environment.gov.au/system/files/resources/ab8e9576-38e6-4dc7-9b36-becca5028f42/files/kangaroo-island-mallee-woodlands.pdf).

Simple minimum condition thresholds have been developed for the KI Mallee Woodland ecological community, based on patch widths of 60 metres:

- Patches that have a width of 60 metres or more tend to retain intact native vegetation and qualify as the listed community.
- Patches that are less than 60 metres wide along most of their length tend to be degraded, with low native species diversity and high weed cover, and are excluded from the listing. This excludes most stands on farms that serve as windbreaks or shelterbelts, as well as narrow remnants that lie along road verges.

The February 2018 survey identified a patch of vegetation (Vegetation Association 6) which met the condition requirements as Kangaroo Island Narrow-leaved Mallee (*Eucalyptus cneorifolia*) Woodland TEC. EBS understands that TEC assessed during the February 2018 survey is outside of the direct impact area of the project and are unlikely to require clearing. A referral under the EBPC Act would be required

Also this community is situated on public roads surrounding the project area, which has currently not been assessed (as the transport route is currently unknown). If any clearance, trimming or activity is likely to occur along public roads, as part of the design footprint of this project, this will need to be referred for an environmental impact assessment and approval to determine if it is likely to have a significant impact on the ecological community.

6.2 White-bellied Sea-Eagle

The White-bellied Sea-Eagle is typically found in coastal habitats including offshore islands. The habitats occupied by sea eagles are characterised by the presence of large areas of open water (larger rivers, swamps, lakes and the sea). Sea eagles generally forage over large expanses of open water; this is particularly true of birds that occur in coastal environments close to the sea-shore, where they forage over in-shore waters (Marchant and Higgins 1993; Smith 1985).

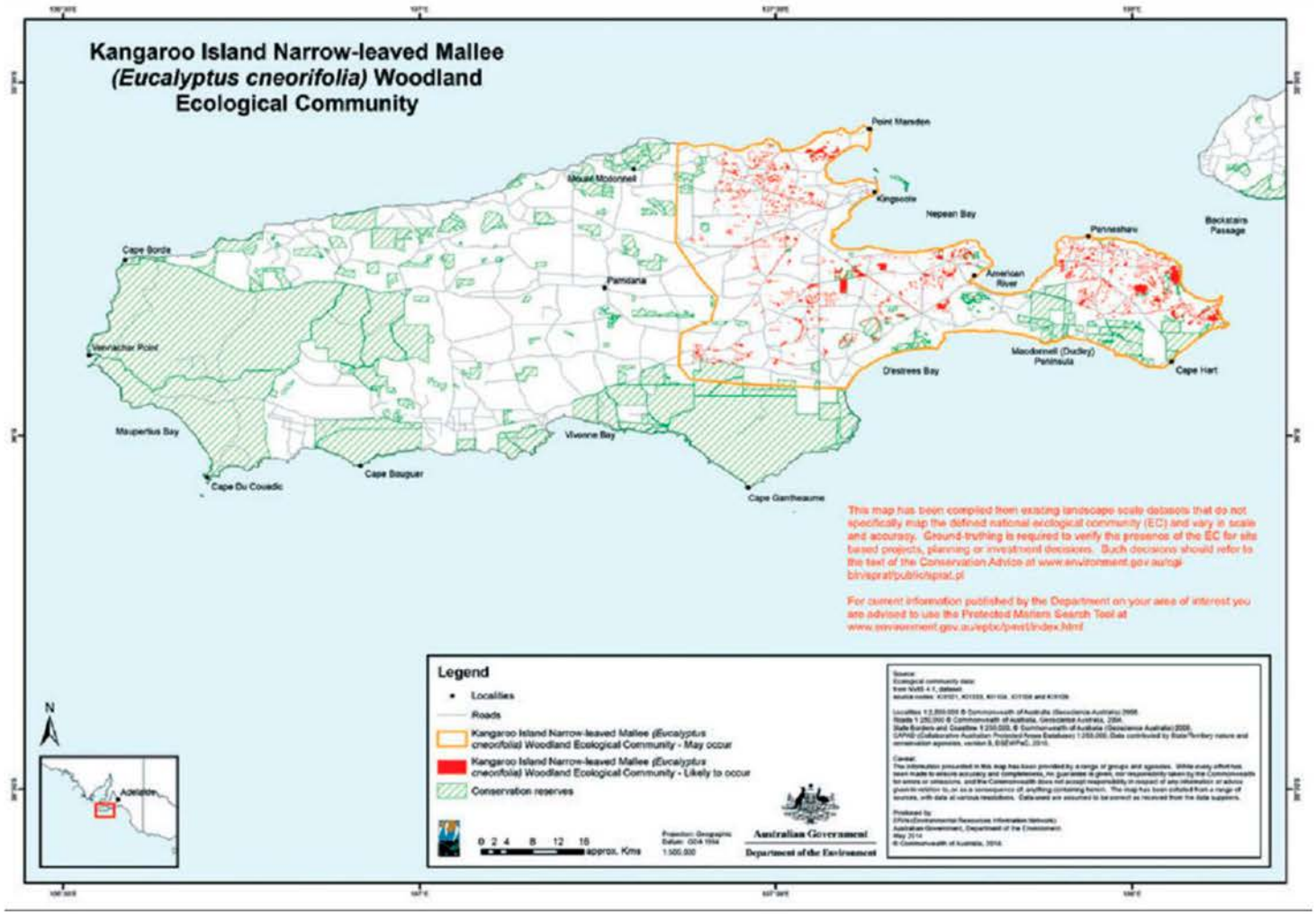


Figure 16. Kangaroo Island Narrow-leaved Mallee Woodland Ecological Community (Commonwealth of Australia, 2014).

Coastal development has been identified as the primary cause of the significant reduction in White-bellied Sea-Eagles across South Australia. In recent decades on Kangaroo Island and in other coastal regions of SA, tourism developments, land subdivision, penetration into remote coastal areas by off-road vehicles and various forms of recreation, have each been implicated in the abandonment of Sea-Eagle nesting sites (Dennis et al 2011b). The species is particularly sensitive to human related disturbances at critical times of their breeding cycle and this has been attributed to many nest failures and territory desertions (Dennis et al 2014). Just the approach of a human, within line-of-sight of a nest, could have negative implications for a nesting pair at a critical nesting time (T. Dennis 2016, pers comm).

Sea eagles are long lived, take many years to mature and defend specific territories centred on favoured nesting and roost sites, which can be used for successive generations (Dennis et al 2014).
White-bellied Sea-Eagles have several guard roosts in the vicinity of their nesting territory where they spend considerable amounts of the day. These roosts are utilised for hunting, observing approaching predators and for territorial defence. These roosts are always within line-of-sight of the nest but can be as far as 800m away from the nest (Dennis et al 2014).

In extensive South Australian studies, Dennis et al (2011b) found that sea eagle nest success decreased rapidly with an increase in human disturbance. Unlike in other areas of Australia, the majority of South Australian sea-eagle nests and guard roosts are on isolated and open cliffs devoid of major vegetation (Dennis et al 2014). Therefore, nests and guard roosts can be disturbed much easier in these exposed locations and from a greater distance than they are in more vegetated habitats (Dennis et al 2011a). South Australian nests are also usually below the top of the cliff so nests are more than likely disturbed from above which intensifies the disturbance to the nesting pair (Dennis et al 2012).

South Australia has a small and isolated population of the species with only 70-80 pairs, mostly occurring on offshore Islands (Dennis et al 2014). Kangaroo Island contains a significant proportion of the known population with 26.4% of the states known population focused around 18 occupied territories (Dennis et al 2011b).

In South Australia, the breeding season for WBSE's is from May to December inclusive, timing of avoidance of any disturbance should be mid-May to December to cover the breeding season. Disturbance at the start of the season may impact whether the birds breed that year or not, and disturbance during the later nestling period could leave the chicks unprotected from exposure or predators.

A single sea-eagle was observed foraging within the coastal zone of the project area during the site visit on 17 August 2016. This species is also known to breed in the general area. The species has recent

records within the coastal zone near the project area with a record at Emu Bay on 18/4/2011 (Atlas of Living Australia, 2016). This coastal species is known to the project area and is likely to utilise it as a flyway for foraging. The project area is not suitable for breeding. The risk of the White-bellied Sea-Eagle pair known to the area, being impacted by the development, is considered to be low from a landward perspective. If this project is successful, EBS recommends a seasonal avoidance from mid-May to September (which is considered to be the most sensitive period during breeding). Any construction activity (within close proximity to the coastline) should be avoided during this period, as a precautionary measure for this species. If this is unachievable, then the proponent needs to consultant with White-bellied Sea-Eagle biologists, to determine if other mitigation measures can be achieve. From a seaward perspective, there is a higher risk to White-bellied Sea-Eagles if the shipping route, used for this project, is too close to the shore or within close proximity to known nests. It would be EBS's recommendation that ships utilise a specified route to the project site and not along the shoreline.

6.3 Kangaroo Island Echidna

The Kangaroo Island echidna occurs at a single location and there is continuing decline in the number of mature individuals. The Kangaroo Island echidna is restricted to Kangaroo Island, South Australia and its extent of occurrence is estimated at 4400 km2 (Woinarski et al., 2014).

Kangaroo Island echidnas are relatively common throughout most of the Island's remaining natural vegetation, but at a lower density than prior to European settlement due to habitat loss (Rismiller, 1999). They are declining due to predation by cats and pigs, and due to road mortality. Recruitment does not keep up with the rate of non-natural and natural deaths (P. Rismiller, pers. comm.) The number of mature individuals is estimated at 5000 and the population size reduction is approaching 30% in 75 years (i.e. three generations).

The Threatened Species Scientific Committee (TSSC) considers that the species' extent of occurrence is restricted, and the geographic distribution is precarious for the survival of the species because its occurrence is restricted to a single location and decline in number of mature individuals may be inferred.

Echidna scratching's were observed during the field survey completed by EBS on 17 August 2016; no individuals were observed. There is suitable habitat for this species surrounding the project area. It is recommended that the project area be micro-sited prior to construction activities occurring; if individuals were observed, an authorised professional would be able to relocate any individuals found to a suitable area nearby.

6.4 Southern Brown Bandicoot (eastern subspecies)

The Southern Brown Bandicoot (eastern subspecies) (*Isodon obsesulus obsesulus*) is a medium sized (0.4 -1.85 kg), terrestrial marsupial that is listed as endangered under the EPBC Act and vulnerable under the NPW Act. The species is distributed throughout temperate south-eastern Australia (Brown and Main 2010). In South Australia, the species is distribution in four isolated populations, located in the Mount Lofty Ranges and Fleurieu Peninsula, South East, Kangaroo Island, and Eyre Peninsula. The Eyre Peninsula population is extinct, with extensive surveys in 1993 unable to determine presence of South Brown Bandicoots. The Kangaroo Island population, is rated regionally as near threatened (Gillam 2013). The population is considered to be in decline; however remains widespread over the island, albeit not abundant (Brown and Main 2010; Gillam 2013).

Within temperate south-eastern Australia, the Southern Brown Bandicoot inhabits dense vegetation on well drained sandy soils (Strahan 1995). As such, the species occurs in heath, shrubland, sedgeland and heathy forest and woodland vegetation communities (Brown and Main 2010). A dense understorey is of ut-most importance for the species, with sites with greater vegetation density in the ground layer preferred by the Southern Brown Bandicoot (Brown and Main 2010). The species establishes its nest within depressions in dense understorey vegetation; however, nests may also occur within logs and the burrows created by other species. The floristics are less important than structure for the Southern Brown Bandicoot, with the species having benefited in the Mount Lofty Ranges, South Australia, from the dense vegetation structure offered by exotic weeds, which include blackberry (*Rubus* spp.), gorse (*Ulex* spp.) and broom (*Cytisus* spp.) (Brown and Main 2010; J Parker pers comm.).

The major threats to the South Brown Bandicoot listed in the Recovery Plan are (Brown and Main 2010):

- Habitat loss, fragmentation, and isolation;
- Fire;
- Introduced predators.

These severity of each of the major threats varies over its distribution. Kangaroo Island has significantly higher remnancy of native vegetation than other temperate regions in south-eastern Australia; however, this is concentrated on the southern and western sectors of the island (DoEE 2016). Subpopulations present within the central and norther sectors of the island, where remnancy is significantly lower, are are likely to be adversely impacted by habitat loss and fragmentation.

Fire is expected to be a major threat to the Kangaroo Island population of the Southern Brown Bandicoot, as landscape scale fires have occurred though their habitat. In 2007, lightning strikes ignited a fire which

burnt 95,000 ha of land, the majority of which occurred in Flinders Chase National Park (Peace and Mills 2012). Prescribed burns may also adversely impact the species, if not performed strategically, to ensure a mosaic of fire ages. For example, Southern Brown Bandicoots in northern Sydney were absent from habitat for five years post prescribed burns (Brown and Main 2010).

The feral cat (*Catus felis*) and fox (*Vulpes vulpes*) are the two primary predators of the South Brown Bandicoot. Foxes are not present on Kangaroo Island; however, cats are widespread over all habitats on the island and are considered a major threat to the Southern Brown Bandicoot (Brown and Main 2010). Cats are able to predate animals that weigh up to 3 kg, and therefore, Southern Brown Bandicoot are a suitable prey item (DoE 2015). Predation by the feral cat and fox are considered to be the primary cause for the total or regional extinction for an array of mammal species within the critical weight range (35 g – 5.5 kg) in Australia (DoE 2015).

The closest record of a Southern Brown Bandicoot to the Project area occurred in 2010 (ALA 2017). The record was 1.3 km (spatial inaccuracy 500-1000 m) from the boundary of the Project area (ALA 2017). Suitable habitat for the presence of South Brown Bandicoots may occur 500 m from the Project area. There is no suitable habitat for the species within the Project area, which has been heavily cleared and does not support stands of dense scrubby vegetation. The Project is not expected to have a significant impact on the species (**Table 14**).

Table 14. Southern Brown Bandicoot (eastern subspecies) assessed against the Significant Impact Criteria for an endangered species

Significant Impact Criteria	Result
Lead to a long-term decrease in the size of a population	The Project will not clear, isolate or fragment any existing Southern Brown Bandicoot habitat. The Project area falls upon land that has already been cleared, with the only native vegetation available consisting of small pockets of coastal mallee (Vegetation Association 5) and roadside woodland (Vegetation Association 4). The native vegetation within the Project area is too small in size and lacks the dense understorey structure required for the presence of Southern Brown Bandicoots. Given this, there will be no long-term decrease in the size of the population, no reduction in the area of occupancy of the species, no fragmentation of a population, and no disruption to the breeding cycle of the Southern Brown Bandicoot.
Reduce the area of occupancy of the species	
Fragment an existing population into two or more populations	
Adversely affected habitat critical to the survival of the species	
Disrupt the breeding cycle of a population	
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent the a species is likely to decline	
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered species' habitat	Feral cats are considered to establish in all habitats over Kangaroo Island. Cats on Kangaroo Island are more abundant around developed areas, and therefore further development within the Project area may be beneficial (Natural Resources Kangaroo Island 2015). A feral cat eradication program has been established on Kangaroo Island, with the aim of a cat free island by 2030 (Natural Resources Kangaroo Island 2015). This program which has $2 million in funding, should mitigate the threat of cats to Southern Brown Bandicoots located in large remnants nearby (Natural Resources Kangaroo Island 2015).

Significant Impact Criteria	Result
Introduce disease that may cause the species to decline, or	Phytophthora, a root fungus, is a threat to native vegetation on Kangaroo Island. To ensure the Project does not contribute to its spread, vehicles and machinery will not enter remnant vegetation outside of the Project area.
Interfere with the recovery of the species	The Project will not interfere with the recovery of the species, as the Project area falls outside suitable habitat for the species.

6.5 Other fauna that may be impacted upon

There were a number of species identified in sections 5.1 and 5.2 that were assessed as having potential to occur within the KIPT Smith Bay project site. The following table (Table 15) summarises the species that were assessed as possible, likely or known to occur; potential impact on these species is also summarised.

Table 15. Description of listed fauna species (national and state) assessed as having potential to occur within the KIPT Smith Bay project site.

Species (EPBC & NPW status)	Description
EPBC listed	
Calyptorhynchus lathami halmaturinus (Glossy Black-Cockatoo (Kangaroo Island)) – endangered	The Glossy Black-Cockatoo (Kangaroo Island) is currently restricted to Kangaroo Island in South Australia. It has been recorded at sites on the northern and western coasts of the island, from Sandy Creek to Antechamber Bay, and along inland river systems including Cygnet, Stun'sail Boom, Harriet and Eleanor Rivers (Garnett et al. 1999; Glossy Black-Cockatoo Recovery Program, unpublished records; Higgins 1999; Joseph 1982; Mooney & Pedler 2005; Pepper 1997). Recent reports from the Glossy Black-Cockatoo Recovery Team suggest the subspecies may breed on the American River. This site is considered to be the eastern-most breeding site for the species at present (Glossy Black-Cockatoo Recovery Program, unpublished records). The Glossy Black-Cockatoo (Kangaroo Island) inhabits woodlands that are dominated by Drooping Sheoak (*Allocasuarina verticillata*) and often interspersed with taller stands of Sugar Gum (*Eucalyptus cladocalyx*). These woodlands occur in small gullies adjacent to cleared land in coastal and sub-coastal areas, generally on shallow acidic soils on the steep and rocky slopes of gorges and valleys, along inland creek and river systems (Garnett & Crowley 2000; Joseph 1982; Mooney & Pedler 2005; Pepper 1996, 1997). Though most activity is confined to Drooping Sheoak and Sugar Gum, the Glossy Black-Cockatoo (Kangaroo Island) occasionally utilises other tree species, including Blue Gum (*Eucalyptus leucoxylon*), Manna Gum (*E. viminalis*) for breeding and Slaty Sheoak (*Allocasuarina muelleriana*) for foraging (Joseph 1982; P. Mooney 2007, pers. comm.; Pepper 1993). The Glossy Black-Cockatoo (Kangaroo Island) does not occur in any of the threatened ecological communities, nor is it associated with any other threatened species, listed under the EPBC Act. The Glossy Black-Cockatoo (Kangaroo Island) is present on Kangaroo Island throughout the year (Higgins 1999). It appears that at least some birds undertake local movements, some of which are in response to the availability of food. For example, during the breeding season, some birds travel up to 30 km per day between nesting and feeding sites (Mooney & Pedler 2005; Pepper 1993). Most birds tend to wander in the general vicinity of their natal area, although some individuals may leave their natal area and travel up to 78 km to join a new flock (Southgate 2002 in Mooney & Pedler 2005). Glossy Black Cockatoo (GBC) have been sited and identified regularly feeding 2km from the site at Smith Bay (DEWNR pers.comm. 2016). The proposed site is located 600m from GBC feeding habitat with another situated along the North Coast Road (approximately 2km away) (DEWNR pers.comm. 2016). The 2015 annual population census recorded 15 individuals utilising roadside vegetation along the North Coast Road. The flock comprised of six adult pairs and three immature birds, which represents approximately 4% of the KI population (DEWNR pers.comm. 2016).

Species (EPBC & NPW status)	Description
Calidris ferruginea (Curlew Sandpiper) – Critically endangered	The Curlew Sandpiper is listed as Critically Endangered, Migratory and Marine under the EPBC Act, and is subject to the bilateral migratory bird agreements with Japan (JAMBA), China (CAMBA) and the Republic of Korea (ROKAMBA), under the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) (TSSC 2015). The breeding range of the Curlew Sandpiper extends across the Arctic Tundra in Siberia. The species distribution extends over multiple flyways with individuals spending their non-breeding season in Africa, Asia and Australia. Individuals that spend their non-breeding season in Australia operate on the East-Asian Australasian Flyway (TSSC 2015). Approximately 13% of the global population of Curlew Sandpipers occur on the East-Asian Australasian Flyway. Key flyway staging areas are located across south-east Asia and northern China on the shores of the Yellow Sea (Bamford *et al.* 2008). The majority of the EAA Flyway population (115,000 of 172,750 individuals) spend their non-breeding season in Australia. Curlew Sandpipers arrive in Australia from September and depart for northern migration between the months of March and May. Within Australia, Curlew Sandpipers occur primarily around the coasts, however may be present inland following rainfall events (Queensland Wader Study Group 2010). The Curlew Sandpiper has been recorded in all states during the non-breeding season as well as the breeding season, when some birds forego their opportunity to breed and remain in Australia (TSCC 2015). Sites supporting more than 1% of the individuals within the EAA Flyway are concentrated within the south-east, south-west and north-west of the country (Bamford *et al.* 2008). The vast majority of Curlew Sandpipers in Australia are present within coastal and subcoastal habitats. The habitats within which they are present from fresh to hypersaline, and include: intertidal mudflats, saltworks, sewage farms, wetlands, lakes, swamps and lagoons (Pizzey and Knight 2007). Although irregularly present inland, Curlew Sandpipers have been observed at ephemeral and permanent lakes, dams, waterholes, bore drains, and floodwaters (TSSC 2015). Within all of these habitats, Curlew Sandpipers are typically present foraging in microhabitats of exposed mud or shallow water, within sheltered areas. Roosting typically occurs above the water line on spits, islets, islands or areas which offer an open view to observer predators. The Curlew Sandpiper has been recorded on numerous occasions within the Bay of Shoals, located approximately 12 km from the project area (ALA 2018). The species could potentially occur the dams in the project area. The coastline in the project area is unsuitable habitat for the species.

Species (EPBC & NPW status)	Description
Neophoca cinerea (Australian Sea-lion) – vulnerable, Ma	The breeding range extends from Houtman Abrolhos, Western Australia (WA), Breeding colonies occur on islands or remote sections of coastline. to The Pages Island, east of Kangaroo Island, South Australia (SA). Overall, 66 breeding colonies have been recorded to date: 28 in WA and 38 in SA (Shaughnessy 1999). The Australian Sea-lion exhibits high site fidelity and little movement of females between colonies has been observed. There is little or no interchange of females between breeding colonies, even between those separated by short distances (Campbell et al. 2008). About 30% of the population occurs at sites in WA and 70% in SA. The Australian Sea-lion is neither increasing in population numbers nor expanding its range (DAFF 2007b). Due to the species long breeding cycle (17.6 months) the time required to increase population size is longer than for species with shorter breeding cycles (Orsini & Newsome 2005). An analysis of pup production at the Seal Bay colony on Kangaroo Island, SA, indicates a rate of decrease of 0.77% per year (12% decline between 1985–2003) (Shaughnessy et al. 2006). Smaller populations are highly vulnerable to extinction especially in the context of loss to fisheries bycatch and the high site fidelity of females (Goldsworthy et al. 2010). Australian Sea-lions use a wide variety of habitats (Gales et al.1994) for breeding sites (called rookeries) and, during the non-breeding season, for haul-out sites (rest stops, which are also useful for predator avoidance, thermal regulation and social activity) (Campbell 2005). Australian Sea-lions prefers the sheltered side of islands and avoids exposed rocky headlands that are preferred by the New Zealand Fur Seal (*Arctocephalus forsteri*). The Australian Sea-lion has records mainly distributed along the southern coastline of KI (Atlas of Living Australia, 2016). It is unlikely that this species would breed within the coastal zone of the project area, given that habitat is unsuitable, however there is the possibility that this species may pass through the area. Risk to this species is unknown in terms of knowing what impact increased shipping traffic might have on individuals if present in the area. The coastal zone associated with the project area should be micro-sited prior to construction.
Sternula nereis nereis (Australian Fairy Tern) – vulnerable	The Australian Fairy Tern is found on coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons. It favours both fresh and saline wetlands and near-coastal terrestrial wetlands, including lakes and salt-ponds (DOE 2015). Sheltered estuaries to the east of the project area appear suitable for this species, although there have been no recent records for the coastal area in proximity to the project site. Generally confined to the coastal zone but possible fly over. The closest record to the project area was 23 individuals recorded at Bay of Shoals 19/10/2005, where birds were observed as feeding and roosting (Atlas of Living Australia, DEWNR).

Species (EPBC & NPW status)	Description
Thinornis rubricollis (Hooded Plover) – Vulnerable, Ma	The Hooded Plover (eastern) is widely dispersed on or near sandy beaches in south-eastern Australia. Its range extends from about Jervis Bay in New South Wales to the western reaches of the Eyre Peninsula in South Australia, and includes Tasmania and various offshore islands such as Kangaroo Island, King Island and Flinders Island (Barrett et al. 2003; Garnett & Crowley 2000; Marchant & Higgins 1993). The dispersed nature of the breeding distribution means that all populations are important, and that loss of any population would result in fragmentation. The Hooded Plover (eastern) occurs in coastal areas, on or near high energy sandy beaches. They are generally found close to shore, but may occasionally visit sites located a short distance inland (e.g. lakes near the coast). Hooded Plovers (eastern) mainly inhabit sandy ocean beaches and their adjacent dunes. They have been claimed to have reasonably narrow preferences when it comes to beach habitat, but recent studies suggest that a variety of beach types may be used. Hooded Plovers (eastern) are sometimes found in habitats other than beaches, e.g. on rock platforms, reefs, around near coastal lakes and lagoons. The Department of Environment, Water and Natural Resources (DEWNR) have records from the biennial KI census of a pair of Hooded Plover at Smith Bay in 2010, 2014 and 2016 (DEWNR pers.comm. 2016).
Migratory/marine	
Apus pacificus (Fork-tailed Swift) - Migratory (Marine)	The Fork-tailed Swift is of Asian origin. The species is almost exclusively aerial during its stay in Australia. This species can be classed as common throughout its range and is frequently observed ahead of large storm fronts, hawking for insects. It mostly occurs over inland plains but sometimes above foothills or in coastal areas. It is an Australian summer visitor. It is considered a possible fly-over species in relation to the project area, thus potential impact to this species is considered low.
Ardea alba (Great Egret, White Egret) - Migratory (Wetland)	The Great Egret has been reported in a wide range of wetland habitats (e.g. inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small, natural and artificial). It prefers shallow water, particularly when flowing, but may be seen on any watered area, including damp grasslands. Great Egrets can be seen alone or in small flocks, often with other egret species, and roost at night in groups. It is partially migratory, with northern hemisphere birds moving south from areas with cold winters. Populations across Australia are considered to fluctuate in size in recognition of the highly variable availability of suitable wetland habitat. The species occupies individual sites erratically, and often in highly variable numbers, across a wide geographic area. It may potentially occur at wetlands within the broader area, flying over the project area infrequently or using the project area occasionally to travel between sites. It is expected that this species could occur as an infrequent visitor to the site, with generally low numbers of individuals across the region.
Ardea ibis (Cattle Egret) - Migratory (Wetland)	The Cattle Egret utilises grasslands, woodlands and wetlands with a preference for moist areas with tall grass, or shallow open wetlands, and wetland margins. It is common in northern Australia, but uncommon in most of their range in southern Australia. Suitable habitats exist within and near the project area. The species is known to move freely between preferred habitat types. It is expected that this species is likely to occur as an infrequent visitor to the site, with generally low numbers of individuals across the region.

Species (EPBC & NPW status)	Description
Arenaria interpres (Ruddy Turnstone) - Migratory (Wetland), state rare	The Ruddy Turnstone is a migratory wading species which is a common visitor to parts of South Australia's coastline during its routine non breeding migration (Sept-Mar). The species prefers rockier coastline in southern Australia but is also observed on tidal mudflats and mangroves. It feeds around coastal lagoons and occasionally in low vegetation in saltmarsh or in grassy areas above the tideline. The species has recent records within the coastal zone near the project area (DEWNR 2016); this is in the same vicinity where a record of the Hooded Plover was recorded. This coastal species could be a possibly fly-over. The coastal zone including beach area should be micro-sited prior to construction activities taking place.
Calidris acuminata (Sharp-tailed Sandpiper) - Migratory (Wetland)	The Sharp-tailed Sandpiper is commonly found during the Australian summer. It prefers muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, saltmarsh or other low vegetation. There are no recent records of this species along the coast in close proximity to the project area (DEWNR 2016); the most recent was 29/10/2012 situated near salt lagoon on the North Coast Road adjacent to Bay of Shoals (Atlas of Living Australia, DEWNR 2016). This coastal species could be a possibly fly-over.
Calidris ruficollis (Red-necked Stint) - Migratory (Wetland)	The Red-necked Stint is mostly found in sheltered coastal areas. It forages on bare wet mud on intertidal mudflats, sandflats or in very shallow water (DOE 2016). There are no recent records of this species however an individual record is recorded from the Atlas of Living Australia (DEWNR 2016) from 6/2/1984 at the northern end of Emu Bay. This coastal species could be a possibly fly-over.
Pandion haliaetus (Osprey) - Migratory (Wetland)	The Osprey is a medium size raptor that usually occurs singularly or in pairs. It occurs in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. It requires extensive areas of open fresh, brackish or saline water for foraging. The breeding population of Osprey in SA is small and fragmented. There are no recent records of this species within close proximity of the project area; a single observation of an Osprey was made south of Point Marsden on 6/6/2010 in open limestone coastline with low coastal cliffs. Whilst no suitable habitat is present within the coastal zone of the project area, cliffs do occur either side of the project area along the coastal fringe. This predominantly coastal species is considered a possible fly-over in relation to the project area.
Phalacrocorax fuscescens (Black-faced Cormorant)	The Black-faced Cormorant is found along the southern coasts of mainland Australia and Tasmania, and is common in Bass Strait and in Spencer Gulf, South Australia. Black-faced Cormorants frequent coastal waters and are found in flocks in large bays, deep inlets, rocky headlands and islands. They seldom visit beaches. Black-faced Cormorants are sedentary. The Black-faced Cormorant breeds throughout the year in large colonies on off-shore islands. The nest is always on the ground, usually of seaweed and grasses on bare rock (Higgins and Davies 1996). The closest record of this species to the project area is at Cape D'Estaing on 30/9/2002, near Emu Bay. This coastal species could be a possibly fly-over.
Tringa nebularia (Common Greenshank) – Migratory	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats. It uses both permanent and ephemeral terrestrial wetlands and forages and roosts in shallow ponds and at the edge of wetlands. Birds are mostly present between August and April, though some data suggested birds have remained in SA through the winter months. The closest record of this species to the project area is at Shoal Bay on 15/7/2000. The species would generally be found in the coastal area but is considered a possible fly-over species.

Species (EPBC & NPW status)	Description
Larus pacificus (Pacific Gull) - Ma	The Pacific Gull is endemic to southern Australia. The subspecies *L. p. georgii* is found on the coasts of south-western Western Australia and western South Australia. The Pacific Gull is usually found on sandy beaches but also rocky coasts and offshore islands. The species forages along sandy beaches, feeding mainly on molluscs, fish, crabs and other marine animals. They are usually seen singularly or in pairs. The Pacific Gull breeds from October to December in single pairs or small, loose colonies on offshore islands, cliffs and headlands. The Pacific Gull was observed within the coastal zone of the project area during the site visit in August 2016. The closest record of this species to the project area is at Cape D'Estaing on 30/9/2002, near Emu Bay. There were also several other records for this species around Emu Bay. This coastal species could be a possibly fly-over, however is unlikely to utilise the coastal zone for breeding.
State listed	
Calyptorhynchus funereus (Yellow-tailed Black Cockatoo - vulnerable	The Yellow-tailed Black-Cockatoo is found in south-eastern Australia, from south and central eastern Queensland to Victoria, Tasmania, and west to Eyre Peninsula in South Australia. They inhabit a variety of habitat types, but favour eucalypt woodlands, especially stringybark forests and woodlands with a heathy understorey and adjacent pine plantations. The favoured food is seeds of native trees including Allocasuarina spp. and Banksia spp, and but birds also feed on pinecones of introduced pines, and on seeds from ground plants, as well as insects. Yellow-tailed Black-Cockatoos feed in small to large flocks. They breed in the hollows of large old growth eucalypts. Its vulnerable status is based largely on a presumed low population (<10,000 individuals) and lowered reproductive potential, due to a reduction in the numbers of the large tree hollows required for nesting and a lack of suitable food near nesting areas. Threats include the loss of large nesting hollows and the loss of native trees and shrubs used for food. The impacts of wildfire and prescribed burning may be detrimental if food plants are reduced or trees with hollows are destroyed. Competition for nesting hollows with other birds is likely another major threatening process. No individuals were detected during the survey on site. This species is likely to pass through the project area only and would not use it for foraging or roosting. The overall risk to the species is considered to be low based on the lack of suitable habitat within the project area.
Haematopus fuliginosus (Sooty Oystercatcher) - rare	The Sooty Oystercatcher is endemic to Australia and is widespread in coastal eastern, southern and western Australia. The Sooty Oystercatcher is strictly coastal, usually within 50 m of the ocean. It prefers rocky shores, but will be seen on coral reefs or sandy beaches near mudflats (Marchant and Higgins 1990). It breeds on offshore islands and isolated rocky headlands. Mostly resident and territorial, moving to islands to breed. This species may roost along the water frontage/sandy shore of the project area. It is unlikely that the Sooty Oystercatcher would breed here however. The coastal zone associated with the project area should be micro-sited prior to construction.

Species (EPBC & NPW status)	Description
Haematopus longirostris (Australian Pied Oystercatcher) - rare	The Pied Oystercatcher is found in coastal areas throughout the Australian continent except for areas of unbroken sea cliffs such as the Great Australian Bight. Pied Oystercatchers have probably declined throughout much of their range and the current population may be as low as 10,000 (Marchant and Higgins 1993). The Pied Oystercatcher prefers mudflats, sandbanks and sandy ocean beaches and is less common along rocky or shingle coastlines. Although rarely recorded far from the coast, the Pied Oystercatcher may occasionally be found in estuarine mudflats and short pasture. This species may roost along the water frontage/sandy shore of the project area. It is unlikely that the Pied Oystercatcher would breed here however. The coastal zone associated with the project area should be micro-sited prior to construction.
Trichosurus vulpecula (Common Brushtail Possum) - rare	The Common Brushtail Possum is widespread throughout Australia, and is also found on Tasmania and a number of other offshore islands, including Barrow Island and Kangaroo Island. This species occupies a wide range of habitats, including rainforest, woodland, dry eucalypt forest, pine plantations, semiarid areas and even urban gardens and parks. Whilst this species was considered possible in occurring within the project area, there is suitable habitat present for this species throughout much of Kangaroo Island. The site should be micro-sited before construction activities begin and if present, can be relocated by a wildlife professional.
Varanus rosenbergi (Heath Goanna) - vulnerable	Distributed in a thin band between the south-west of WA and the south-east of SA. Natural range in SA is the higher rainfall agricultural areas in southern parts; still common on Kangaroo Island. Habitat across southern Australia includes coastal heaths, humid woodlands, and wet and dry sclerophyll forests (Cogger 2000). Whilst this species was considered possible in occurring within the project area, there is suitable habitat present for this species throughout much of Kangaroo Island. The site should be micro-sited before construction activities begin and if present, can be relocated by a wildlife professional.

7 RECOMMENDATIONS

7.1 Legislation and compliance

Native Vegetation Act 1991

- Minimise clearance to that necessary for the proposed development; use existing tracks and access points, if possible, or locate new access points in areas which do not require the removal or pruning of native vegetation or impact on understorey vegetation;
- Avoid vegetation communities four and five – as these are the only remnant patches located within the project area. Although the patch of Kangaroo Island Narrow-leaved Mallee Woodland did not qualify as a TEC, this community near the entrance point to the site on the access road leading in, should be avoided where possible;
- Avoid disturbance and/or clearance to Vegetation Associations 6 and 7. This patch of vegetation contains a critically endangered TEC which is protected under the EBPC Act. It is recommended that an EPBC referral is submitted should the project have any impacts on this patch of vegetation;
- If any clearance, trimming or activity is likely to occur along public roads, as part of the design footprint of this project, this will need to be referred for an environmental impact assessment and approval to determine if it is likely to have a significant impact on the ecological community;
- Transport routes need to be identified and assessed to gain an overall picture of potential impact of the proposed development, including any vegetation clearance, and
- Approval for vegetation clearance for such developments is conditional on the achievement of a significant environmental benefit (SEB) elsewhere on the property or within the region to compensate for the vegetation to be cleared. This SEB calculation will need to be undertaken once the construction footprint is known. This will then need to be submitted as part of a Native Vegetation Clearance Application, if any vegetation is likely to be cleared.

7.2 Site management

- Seasonal avoidance should be mitigated from mid-May to the end of December for any construction activity (with close proximity to the coastline) as a precautionary measure for the White-bellied Sea-Eagle;
- It should be adopted that the shipping route proposed for exportation of timber to and from the site, should be direct to the site and not close along the shoreline. This is to limit close proximity to potential WBSE nests and limit disturbance to potential foraging flyways within the area;

- Prior to any construction taking place, an inspection should occur on site for the presence of fauna species such as the nationally endangered Kangaroo Island Echidna. If present on site, a certified person will need to be engaged to relocate the individual (s) to suitable habitat nearby;
- A Construction Environmental Management Plan (CEMP) should be developed and adopted as part of proposed development;
- Adopt mitigation measures around the potential spread of weeds on site; vegetative material removed from the site must be managed appropriately (i.e. any dumping should occur at a licensed waste facility: no spreading of material contaminated with weed propagules amongst native vegetation);
- Stockpile sites, vehicle / machinery parking areas and general laydown areas should be located away from any native vegetation and not within the dripline of any trees;
- Weed management strategies (including weed hygiene procedures) should be implemented to ensure that weed species are not introduced to the construction area or spread throughout the construction area.
- Undertake control of declared weed species present on site (i.e. Olive control); refer to the Weed Control Handbook for Declared Plants in South Australia (Biosecurity SA, PIRSA) (http://www.adelaideplainsequine.com/wp/wp-content/uploads/2015/05/Full_Document_Final_Weeds-control-SA4445.pdf).

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9 APPENDICES

Appendix 1. Compliance and Legislation summary.

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places – defined in the Act as 'matters of national environmental significance'. The nine matters of national environmental significance protected under the Act are:

- World Heritage properties
- National Heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- a water resource, in relation to coal seam gas development and large coal mining development.

Any action that has, will have, or is likely to have a significant impact on matters of national environmental significance requires referral under the EPBC Act. Substantial penalties apply for undertaking an action that has, will have or is likely to have significant impact on a matter of national environmental significance without approval.

This report is focused on listed threatened species and ecological communities which are recognised as a matter of national environmental significance. Consequently, any action that is likely to have a significant impact on listed threatened species and ecological communities under the EPBC Act must be referred to the Minister and undergo an environmental assessment and approval process.

The EPBC Act Significant Impact Guidelines (Commonwealth of Australia 2013) provide overarching guidance on determining whether an action is likely to have a significant impact on a matter of national environmental significance. In terms of nationally threatened species, the guidelines define an action as likely to have a significant impact if there is a real chance or possibility that it will:

- lead to a long term decrease in the population
- reduce the area of occupancy of the species

- fragment an existing population
- adversely affect critical habitat
- disrupt breeding cycles
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in the establishment of invasive species that are harmful to the species
- introduce disease that may cause the species to decline
- interfere with the recovery of the species.

Native Vegetation Act 1991

In South Australia, under the *Native Vegetation Act 1991* (NV Act), all clearance of native vegetation requires the approval of the Native Vegetation Council (NVC) unless it is covered by a specific exemption contained within the Native *Vegetation Regulations 2003*.

Native vegetation refers to any naturally occurring local plant species that are indigenous to South Australia, from small ground covers and native grasses to large trees and water plants.

"Clearance", in relation to native vegetation, means:

- the killing or destruction of native vegetation;
- the removal of native vegetation;
- the severing of branches, limbs, stems or trunks of native vegetation;
- the burning of native vegetation;
- any other substantial damage to native vegetation, and includes the draining or flooding of land, or any other act or activity, that causes the killing or destruction of native vegetation, the severing of branches, limbs, stems or trunks of native vegetation or any other substantial damage to native vegetation.

Approval must be obtained before performing any activity that could cause substantial damage to native plants. This also applies to dead trees that may provide habitat for animals. These activities include but are not limited to:

- the cutting down, destruction or removal of whole plants
- the removal of branches, limbs, stems or trunks (including brush cutting and woodcutting)
- burning
- poisoning
- slashing of understorey

- drainage and reclamation of wetlands
- grazing by animals (in some circumstances).

Under the *Native Vegetation Act 1991*, the NVC considers applications to clear native vegetation under ten principles. Native vegetation should not be cleared if it is significantly at odds with these principles:

- it contains a high level of diversity of plant species
- it is an important wildlife habitat
- it includes rare, vulnerable or endangered plant species
- the vegetation comprises a plant community that is rare, vulnerable or endangered
- it is a remnant of vegetation in an area which has been extensively cleared
- it is growing in, or association with, a wetland environment
- it contributes to the amenity of the area
- the clearance of vegetation is likely to contribute to soil erosion, salinity, or flooding
- the clearance of vegetation is likely to cause deterioration in the quality of surface or underground water
- after clearance, the land is to be used for a purpose which is unsustainable.

The principles apply in all cases, except where the vegetation has been considered exempt under the *Native Vegetation Regulations 2003* or can be classified as an 'intact stratum'. 'Intact stratum' means that applications will usually be denied when the vegetation has not been seriously degraded by human activity within the last 20 years.

All approved vegetation clearance must also be conditional on achieving a Significant Environmental Benefit (SEB) to offset the clearance. The requirement for a SEB also applies to several of the exemptions. Potential SEB offsets include:

- the establishment and management of a set-aside area to encourage the natural regeneration of native vegetation.
- the protection and management of an established area of native vegetation
- entering into a Heritage Agreement on land where native vegetation is already established to further preserve or enhance the area in perpetuity
- a payment to the Native Vegetation Fund (only where the above options are not possible).

A submission to the Native Vegetation Council will need to establish that:

- the building or structure cannot be established without the need to clear some vegetation, and
- the site chosen contains the least significant native vegetation, provided that construction is practicable on that site.

In particular, a proponent should seek to avoid areas containing an intact stratum of native vegetation.

Approval for vegetation clearance for such developments is conditional on the achievement of a significant environmental benefit elsewhere on the property or within the region to compensate for the vegetation to be cleared.

A management plan must be prepared that describes the works that will result in the environmental benefit, which may include providing for the management of other native vegetation, the restoration of native vegetation, or the replanting of a cleared area. If this is not achievable on the property, the applicant may apply to the Native Vegetation Council to make a payment into the Native Vegetation Fund that will be used by the Native Vegetation Council to achieve an environmental benefit elsewhere in the region.

National Parks and Wildlife Act 1972

Vascular plants and vertebrate animals (e.g. mammals, birds, reptiles and amphibians) are protected in South Australia under the threatened species schedules of the *National Parks and Wildlife Act 1972* (NPW Act): Schedule 7 (endangered species), Schedule 8 (vulnerable species) and Schedule 9 (rare species). The criteria used to define threatened species in South Australia are generally based on categories and definitions from the IUCN Red List Categories and Criteria.

The current schedules do not include non-vascular plants, fish, insects, butterflies, spiders, scorpions and other invertebrates, fungi and other life forms which do not have a current legal conservation status in South Australia.

South Australian freshwater and marine fish, some marine invertebrates and crustaceans are protected under the *Fisheries Management Act 2007*. Some of these species have been identified as threatened and recommended for listing under the NPW Act but currently do not have a legal conservation status.

Under the NPW Act, persons must not:

- take a native plant on a reserve, wilderness protection area, wilderness protection zone, land reserved for public purposes, a forest reserve or any other Crown land
- take a native plant of a prescribed species on private land
- take a native plant on private land without the consent of the owner (such plants may also be covered by the *Native Vegetation Act 1991*)

- take a protected animal or the eggs of a protected animal without approval
- keep protected animals unless authorised to do so
- use poison to kill a protected animal without approval.

Natural Resources Management Act 2004

Under the *Natural Resources Management Act 2004* (NRM Act), landholders have a legal responsibility to manage declared pest plants and animals and prevent land and water degradation.

Key components under the Act include the establishment of regional Natural Resource Management (NRM) Boards and development of regional NRM Plans; the ability to control water use through prescription, allocations and restrictions; requirement to control declared pest plants and animals, and activities that might result in land degradation.

A 'duty of care' is a fundamental component of this Act, i.e. ensuring one's environmental and civil obligation by taking reasonable steps to prevent land and water degradation. Persons can be prosecuted if they are considered negligent in meeting their obligations.

Appendix 2. Threatened flora, fauna, migratory/marine and whales/other cetacean species identified by the EPBC Protected Matters tool and BDBSA search, as possibly occurring within the project area.

Threatened flora species identified by EPBC Protected Matters Search Tool as possibly occurring within the project area.

Species name	Common name	Conservation status		Likelihood of occurrence
		Aus	SA	
Caladenia tensa	Greencomb Spider-orchid, Rigid Spider-orchid	EN		Unlikely
Cheiranthera volubilis	Twining Finger Flower	VU	V	Unlikely
Pomaderris halmaturina subsp. halmaturina	Kangaroo Island Pomaderris	VU	V	Unlikely
Ptilotus beckerianus	Ironstone Mulla Mulla	VU	V	Unlikely
Pultenaea villifera var. glabrescens	Yellow Bush-pea, Splendid Bush-pea	VU	V	Unlikely
Spyridium eriocephalum var. glabrisepalum	MacGillivray Spyridium	VU	E	Unlikely
Thelymitra matthewsii	Spiral Sun-orchid	VU	E	Unlikely
Veronica derwentiana subsp. homalodonta	Mount Lofty Speedwell	CE	E	Unlikely

Threatened fauna species identified by EPBC Protected Matters Search Tool as possibly occurring within the project area.

Species name	Common name	Conservation status		Likelihood of occurrence
		Aus	SA	
Birds				
Botaurus poiciloptilus	Australasian Bittern	EN	V	Unlikely
Calidris canutus	Red Knot	E, Mi (W)		Unlikely
Calidris ferruginea	Curlew Sandpiper	CE, Mi (W)		Possible
Calyptorhynchus lathami halmaturinus	Glossy Black-Cockatoo (Kangaroo Island), Glossy	EN	E	Possible– fly over (foraging habitat is situated closeby but not within the project area)
Diomedea antipodensis†	Antipodean Albatross†	VU, Mi (Ma)		Unlikely
Diomedea epomophora (sensu stricto) †	Southern Royal Albatross†	VU, Mi (Ma)	V	Unlikely
Diomedea exulans (sensu lato) †	Wandering Albatross†	VU, Mi (Ma)	V	Possible (fly-over)
Diomedea sanfordi†	Northern Royal Albatross†	EN, Mi (Ma)		Unlikely
Halobaena caerulea†	Blue Petrel†	VU		Possible (fly-over)
Limosa lapponica baueri	Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit	VU		Unlikely

Species name	Common name	Conservation status		Likelihood of occurrence
		Aus	SA	
Limosa lapponica menzbieri	Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri)	CE		Unlikely
Macronectes giganteus†	Southern Giant-Petrel, Southern Giant Petrel†	EN, Mi (Ma)	V	Possible (fly-over)
Macronectes halli†	Northern Giant Petrel†	VU, Mi (Ma)		Possible (fly-over)
Numenius madagascariensis	Far Eastern Curlew	CE, Mi (W)	V	Unlikely
Pachyptila turtur subantarctica†	Fairy Prion (southern) †	VU, Ma		Possible (fly-over)
Phoebetria fusca†	Sooty Albatross†	VU, Mi (Ma)		Possible (fly-over)
Pterodroma mollis†	Soft-plumaged Petrel†	VU, Ma		Unlikely
Rostratula australis	Australian Painted Snipe	EN, Ma		Unlikely
Sternula nereis nereis	Australian Fairy Tern	VU		Possible - – coastal in front of project area
Thalassarche cauta cauta†	Shy Albatross, Tasmanian Shy Albatross†	VU, Mi (Ma)		Possible (fly-over)
Thalassarche cauta steadi†	White-capped Albatross†	VU, Ma		Unlikely
Thalassarche impavida†	Campbell Albatross, Campbell Black-browed Albatross†	VU, Mi (Ma)		Unlikely
Thalassarche melanophris†	Black-browed Albatross†	VU, Mi (Ma)		Possible (fly-over)
Thinornis rubricollis rubricollis	Hooded Plover (eastern)	VU, Ma	V	Likely
Zoothera lunulata halmaturina	Bassian Thrush (South Australian)	VU	R	Unlikely
Mammals				
Balaenoptera musculus	Blue Whale	EN, Mi (Ma)	E	Unlikely
Eubalaena australis	Southern Right Whale	EN, Mi (Ma)	V	Possible
Isoodon obesulus obesulus	Southern Brown Bandicoot (Eastern)	EN	V	Unlikely
Megaptera novaeangliae	Humpback Whale	VU, Mi (Ma)	V	Possible
Neophoca cinerea	Australian Sea-lion, Australian Sea Lion	VU, Ma	V	Likely
Sminthopsis aitkeni	Kangaroo Island Dunnart	EN	E	Unlikely
Tachyglossus aculeatus multiaculeatus	Kangaroo Island Echidna	EN		Known – diggings were recorded during the 2016 survey by EBS
Reptiles				
Caretta caretta	Loggerhead Turtle	EN, Mi (Ma)	E	Unlikely
Chelonia mydas	Green Turtle	VU, Mi (Ma)	V	Possible

Species name	Common name	Conservation status		Likelihood of occurrence
		Aus	SA	
Dermochelys coriacea	Leatherback Turtle, Leathery Turtle, Luth	EN, Mi (Ma)	V	Unlikely
Sharks				
Carcharodon carcharias	Great White Shark	VU, Mi (Ma)		Likely

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Migratory and marine species identified by EPBC Protected Matters Search Tool as possibly utilising or flying over the project area.

Species name	Common name	Conservation status		Likelihood of occurrence
		AUS	SA	
Birds				
Actitis hypoleucos	Common Sandpiper	Mi (W), Ma		Possible (dams and coastline)
Apus pacificus	Fork-tailed Swift	Mi (Ma), Ma		Possible
Ardea alba	Great Egret	Ma		Possible (dams)
Ardea ibis	Cattle Egret	Ma	R	Possible
Ardenna carneipes†	Flesh-footed Shearwater†	Mi (Ma), Ma	R	Possible (fly-over)
Arenaria interpres	Ruddy Turnstone	Mi (W), Ma	R	Possible
Calidris acuminata	Sharp-tailed Sandpiper	Mi (W), Ma		Possible
Calidris canutus	Red Knot	EN, Mi (W), Ma		Unlikely
Calidris ferruginea	Curlew Sandpiper	CE, Mi (W), Ma		Possible
Calidris melanotos	Pectoral Sandpiper	Mi (W), Ma	R	Unlikely
Calidris ruficollis	Red-necked Stint	Mi (W), Ma		Possible
Catharacta skua†	Great Skua†	Ma		Unlikely
Diomedea antipodensis†	Antipodean Albatross†	VU, Mi (Ma)		Unlikely
Diomedea epomophora (sensu stricto) †	Southern Royal Albatross†	VU, Mi (Ma)	V	Unlikely
Diomedea exulans (sensu lato) †	Wandering Albatross†	VU, Mi (Ma)	V	Possible (fly-over)
Diomedea sanfordi†	Northern Royal Albatross†	EN, Mi (Ma)		Unlikely
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Mi (W), Ma	R	Unlikely
Haliaeetus leucogaster	White-bellied Sea-Eagle	Ma	E	Known
Halobaena caerulea†	Blue Petrel†	VU, Ma		Possible (fly-over)
Larus pacificus	Pacific Gull	Ma		Known
Limosa lapponica	Bar-tailed Godwit	Mi (W), Ma	R	Unlikely

Macronectes giganteus†	Southern Giant-Petrel, Southern Giant Petrel†	EN, Mi (Ma)	V	Possible (fly-over)
Macronectes halli†	Northern Giant Petrel†	VU, Mi (Ma)		Possible (fly-over)
Motacilla cinerea	Grey Wagtail	Mi (T), Ma		Unlikely
Motacilla flava	Yellow Wagtail	Mi (T), Ma		Unlikely
Myiagra cyanoleuca	Satin Flycatcher	Mi (T), Ma	E	Unlikely
Numenius madagascariensis	Far Eastern Curlew	CE, Mi (W), Ma	V	Unlikely
Pachyptila turtur subantarctica†	Fairy Prion (southern) †	VU, Ma		Possible (fly-over)
Pandion haliaetus	Osprey	Mi (W), Ma	R	Possible – fly over
Phalacrocorax fuscescens	Black-faced Cormorant	Ma		Possible
Phoebetria fusca†	Sooty Albatross†	VU, Mi (Ma)		Possible (fly-over)
Pterodroma mollis†	Soft-plumaged Petrel†	VU, Ma		Unlikely
Puffinus carneipes†	Flesh-footed Shearwater†	Mi (Ma)	R	Unlikely
Rostratula australis	Australian Painted Snipe	EN, Ma		Unlikely
Thalassarche impavida†	Campbell Albatross, Campbell Black-browed Albatross†	VU, Mi (Ma)		Unlikely
Thalassarche melanophris†	Black-browed Albatross†	VU, Mi (Ma)		Possible (fly-over)
Thalassarche cauta†	Tasmanian Shy Albatross†	Mi (Ma), Ma		Possible (fly-over)
Thalassarche steadi†	White-capped Albatross†	VU, Ma		Possible (fly-over)
Thinornis rubricollis	Hooded Plover	Ma	V	Unlikely
Thinornis rubricollis rubricollis	Hooded Plover (eastern)	VU, Ma	V	Likely
Tringa nebularia	Common Greenshank	Mi (W), Ma		Possible
	Fish			
Acentronura australe	Southern Pygmy Pipehorse	Ma		Unlikely
Campichthys tryoni	Tryon's Pipefish	Ma		Possible
Filicampus tigris	Tiger Pipefish	Ma		Unlikely
Heraldia nocturna	Upside-down Pipefish	Ma		Unlikely
Hippocampus abdominalis	Big-belly Seahorse	Ma		Possible
Hippocampus breviceps	Short-head Seahorse	Ma		Possible
Histiogamphelus cristatus	Rhino Pipefish	Ma		Possible
Hypselognathus rostratus	Knifesnout Pipefish	Ma		Possible
Kaupus costatus	Deepbody Pipefish	Ma		Possible
Leptoichthys fistularius	Brushtail Pipefish	Ma		Possible
Lissocampus caudalis	Australian Smooth Pipefish	Ma		Possible
Lissocampus runa	Javelin Pipefish	Ma		Unlikely
Maroubra perserrata	Sawtooth Pipefish	Ma		Unlikely
Notiocampus ruber	Red Pipefish	Ma		Unlikely
Phycodurus eques	Leafy Seadragon	Ma		Possible
Phyllopteryx taeniolatus	Common Seadragon	Ma		Unlikely
Pugnaso curtirostris	Pugnose Pipefish	Ma		Possible

Solegnathus robustus	Robust Pipefish	Ma		Unlikely
Stigmatopora argus	Spotted Pipefish	Ma		Possible
Stigmatopora nigra	Black Pipefish	Ma		Possible
Stigmatopora olivacea	A pipefish	Ma		Possible
Stipecampus cristatus	Ringback Pipefish	Ma		Possible
Urocampus carinirostris	Hairy Pipefish	Ma		Unlikely
Vanacampus margaritifer	Mother-of-pearl Pipefish	Ma		Unlikely
Vanacampus phillipi	Port Phillip Pipefish	Ma		Possible
Vanacampus poecilolaemus	Longsnout Pipefish	Ma		Possible
Vanacampus vercoi	Verco's Pipefish	Ma		Possible
Mammals				
Arctocephalus forsteri	Long-nosed Fur-seal	Ma		Possible
Arctocephalus pusillus	Australian Fur-seal	Ma	R	Unlikely
Balaenoptera edeni	Bryde's Whale	Mi (Ma)	R	Possible
Balaenoptera musculus	Blue Whale	EN, Mi (Ma)	E	Unlikely
Caperea marginata	Pygmy Right Whale	Mi (Ma)	R	Unlikely
Eubalaena australis	Southern Right Whale	EN, Mi (Ma)	V	Possible
Lagenorhynchus obscurus	Dusky Dolphin	Mi (Ma)		Unlikely
Megaptera novaeangliae	Humpback Whale	VU, Mi (Ma)	V	Possible
Neophoca cinerea	Australian Sea-lion, Australian Sea Lion	VU, Ma	V	Likely
Orcinus orca	Killer Whale, Orca	Mi (Ma)		Unlikely
Reptiles				
Caretta caretta	Loggerhead Turtle	EN, Mi (Ma)	E	Unlikely
Chelonia mydas	Green Turtle	VU, Mi (Ma)	V	Possible
Dermochelys coriacea	Leatherback Turtle, Leathery Turtle, Luth	EN, Mi (Ma)	V	Unlikely
Sharks				
Carcharodon carcharias	Great White Shark	VU, Mi (Ma)		Likely
Lamna nasus	Porbeagle, Mackerel Shark	Mi (Ma)		Unlikely

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Whales and other Cetaceans identified by EPBC Protected Matters Search Tool as possibly utilising the project area.

Species name	Common name	Conservation status		Likelihood of occurrence
		Aus	SA	
Balaenoptera acutorostrata	Minke Whale	Ma	R	Unlikely
Balaenoptera edeni	Bryde's Whale	Mi (Ma)	R	Possible
Balaenoptera musculus	Blue Whale	EN, Mi (Ma)	E	Unlikely

Caperea marginata	Pygmy Right Whale	Mi (Ma)	R	Unlikely
Delphinus delphis	Common Dolphin	Ma		Likely
Eubalaena australis	Southern Right Whale	EN, Mi (Ma)	V	Possible
Grampus griseus	Risso's Dolphin	Ma	R	Unlikely
Lagenorhynchus obscurus	Dusky Dolphin	Mi (Ma)		Unlikely
Megaptera novaeangliae	Humpback Whale	VU, Mi (Ma)	V	Possible
Orcinus orca	Killer Whale, Orca	Mi (Ma)		Unlikely
Tursiops aduncus	Indian Ocean Bottlenose Dolphin	Ma		Likely
Tursiops truncates s.str.	Bottlenose Dolphin	Ma		Unlikely

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Threatened flora species identified from the BDBSA search.

Species name	Common name	Conservation status		Most recent record	Likelihood of occurrence
		Aus	SA		
Acacia dodonaeifolia	Hop-bush Wattle		R	29/10/1991	Unlikely
Cheiranthera volubilis	Twining Hand-flower	VU	V	9/09/1985	Unlikely
Eucalyptus fasciculosa	Pink Gum		R	11/10/2007	Unlikely
Eucalyptus phenax ssp. compressa	Kangaroo Island Mallee		R	30/04/1993	Unlikely
Grevillea halmaturina ssp. halmaturina	Prickly Grevillea		R	11/10/2007	Unlikely
Hydrocotyle comocarpa	Fringe-fruit Pennywort		R	6/09/1996	Unlikely
Philotheca angustifolia ssp. angustifolia	Narrow-leaf Wax-flower		R	18/08/2012	Unlikely
Phyllangium distylis	Tiny Mitrewort		R	15/11/1989	Unlikely
Pultenaea villifera var. glabrescens	Splendid Bush-pea	VU	V	5/04/1997	Unlikely
Spyridium eriocephalum var. glabrisepalum	Macgillivray Spyridium	VU	E	16/08/2002	Unlikely
Spyridium spathulatum	Spoon-leaf Spyridium		R	29/10/1991	Unlikely
Thelymitra flexuosa	Twisted Sun-orchid		R	1/06/1992	Unlikely
Xanthorrhoea semiplana ssp. tateana	Tate's Grass-tree		R	11/10/2007	Unlikely

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Threatened fauna species identified from the BDBSA search.

Species name	Common name	Conservation status		Most recent record	Likelihood of occurrence
		Aus	SA		
Birds					
Arenaria interpres	Ruddy Turnstone	Mi (W), Ma	R	17/04/2003	Possible
Burhinus grallarius	Bush Stone-curlew		R	15/08/1923	Unlikely
Calamanthus (Hylacola) cautus	Shy Heathwren		R	23/10/1990	Unlikely
Calyptorhynchus funereus	Yellow-tailed Black Cockatoo		V	28/10/1990	Possible
Cladorhynchus leucocephalus	Banded Stilt		V	15/11/1991	Unlikely
Haematopus fuliginosus	Sooty Oystercatcher		R	9/11/2012	Likely
Haematopus longirostris	(Australian) Pied Oystercatcher		R	16/11/2014	Likely
Haliaeetus leucogaster	White-bellied Sea-Eagle	Ma	E	23/10/1990	Known
Macronectes giganteus	Southern Giant Petrel	EN, Mi (Ma)	V	30/09/1973	Possible (fly-over)
Myiagra inquieta	Restless Flycatcher	Mi (T), Ma	R	30/08/2000	Unlikely
Stagonopleura bella	Beautiful Firetail		R	28/10/1990	Unlikely
Stipiturus malachurus halmaturinus	Southern Emu-wren (Kangaroo Island ssp)		R	30/10/1990	Unlikely
Thinornis rubricollis	Hooded Plover (Hooded Dotterel)	VU. Ma	V	22/11/2014	Possible
Mammals					
Isoodon obesulus obesulus	Southern Brown Bandicoot (SA mainland and KI ssp)	EN	V	26/09/2011	Unlikely
Physeter macrocephalus	Sperm Whale		R	14/08/2007	Nil
Sminthopsis aitkeni	Kangaroo Island Dunnart	EN	E	8/06/1969	Unlikely
Trichosurus vulpecula	Common Brushtail Possum		R	31/10/1990	Possible
Reptiles					
Varanus rosenbergi	Heath Goanna		V	29/10/1990	Possible

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Appendix 3. Flora species recorded in the BDBSA within 10 km of the study area (DEWNR, 2016).

Family	Species name	Common name	Conservation status	
			Aus	SA
ACROTYLACEAE	*Antrocentrum nigrescens*			
ADIANTACEAE	*Cheilanthes austrotenuifolia*	Annual Rock-fern		
AIZOACEAE	*Carpobrotus rossii (NC)*	Native Pigface		
	Tetragonia implexicoma	Bower Spinach		
ALARIACEAE	*Ecklonia radiata*			
AMARANTHACEAE	**Alternanthera pungens*	Khaki Weed		
ANADYOMENACEAE	*Microdictyon umbilicatum*			
APOCYNACEAE	*Alyxia buxifolia*	Sea Box		
ARESCHOUGIACEAE	*Areschougia congesta*			
	Erythroclonium muelleri			
	Rhabdonia clavigera			
BONNEMAISONIACEAE	*Delisea hypneoides*			
BORAGINACEAE	*Myosotis australis*	Austral Forget-me-not		
CAMPANULACEAE	*Wahlenbergia gracilenta*	Annual Bluebell		
CARYOPHYLLACEAE	**Cerastium balearicum*	Chickweed		
	**Cerastium glomeratum*	Common Mouse-ear Chickweed		
	**Polycarpon tetraphyllum*	Four-leaf Allseed		
	**Sagina maritima*	Sea Pearlwort		
	**Silene nocturna*	Mediterranean Catchfly		
	**Stellaria media*	Chickweed		
CASUARINACEAE	*Allocasuarina muelleriana ssp. notocolpica*	Kangaroo Island Oak-bush		
	Allocasuarina striata	Stalked Oak-bush		
	Allocasuarina verticillata	Drooping Sheoak		
CAULERPACEAE	*Caulerpa alternans*			
	Caulerpa brownii			
	Caulerpa flexilis			
	Caulerpa flexilis var. muelleri			
	Caulerpa obscura			
	Caulerpa scalpelliformis			
	Caulerpa sedoides			
	Caulerpa simpliciuscula			
	Caulerpa simpliciuscula var. laxa			
	Caulerpa trifaria			
	Caulerpa vesiculifera			
CENTROLEPIDACEAE	*Aphelia gracilis*	Slender Aphelia		
	Aphelia pumilio	Dwarf Aphelia		
	Aphelia sp.	Aphelia		
	Centrolepis aristata	Pointed Centrolepis		
	Centrolepis strigosa ssp. strigosa	Hairy Centrolepis		

Family	Species name	Common name	Conservation status	
			Aus	SA
CERAMIACEAE	*Anotrichium tenue var. thyrsigerum*			
	Ceramium monacanthum			
	Ceramium puberulum			
	Dasyphila preissii			
	Haloplegma preissii			
CHAMPIACEAE	*Champia viridis*			
CHENOPODIACEAE	*Atriplex cinerea*	Coast Saltbush		
	Dysphania pumilio	Small Crumbweed		
	Einadia nutans ssp. nutans	Climbing Saltbush		
	Rhagodia candolleana ssp. candolleana	Sea-berry Saltbush		
	Threlkeldia diffusa	Coast Bonefruit		
CHORDARIACEAE	*Cladosiphon filum*			
	Polycerea nigrescens			
CLADOSTEPHACEAE	*Cladostephus spongiosus*			
CODIACEAE	*Codium mamillosum*			
	Codium pomoides			
COMPOSITAE	**Arctotheca calendula*	Cape Weed		
	Brachyscome goniocarpa	Dwarf Daisy		
	**Carduus tenuiflorus*	Slender Thistle		
	Cotula australis	Common Cotula		
	Euchiton sphaericus	Annual Cudweed		
	**Hypochaeris glabra*	Smooth Cat's Ear		
	**Hypochaeris radicata*	Rough Cat's Ear		
	Ixodia achillaeoides ssp.	Ixodia		
	Ixodia achillaeoides ssp. alata	Hills Daisy		
	Lagenophora huegelii	Coarse Bottle-daisy		
	**Leontodon rhagadioloides*	Cretan Weed		
	Leptorhynchos waitzia	Button Immortelle		
	Millotia tenuifolia var. tenuifolia	Soft Millotia		
	Olearia axillaris	Coast Daisy-bush		
	Olearia ramulosa	Twiggy Daisy-bush		
	Olearia teretifolia	Cypress Daisy-bush		
	Ozothamnus retusus	Notched Bush-everlasting		
	Podolepis rugata ssp. littoralis			
	Podolepis rugata var. littoralis (NC)	Coast Copper-wire Daisy		
	Podotheca angustifolia	Sticky Long-heads		
	**Rhaponticum repens*	Creeping Knapweed		
	Senecio dolichocephalus	Woodland Groundsel		
	Senecio odoratus	Scented Groundsel		

Family	Species name	Common name	Conservation status	
			Aus	SA
	Senecio odoratus var. longifolius (NC)	Narrow-leaf Scented Groundsel		
	Senecio picridioides	Purple-leaf Groundsel		
	Senecio pinnatifolius (NC)	Variable Groundsel		
	Senecio pinnatifolius var. maritimus	Variable Groundsel		
	**Sonchus oleraceus*	Common Sow-thistle		
	Sonchus sp.	Sow-thistle		
	Stuartina muelleri	Spoon Cudweed		
	Vittadinia australasica var. australasica	Sticky New Holland Daisy		
CORALLINACEAE	*Amphiroa anceps*			
	Jania affinis			
	Jania micrarthrodia			
	Jania minuta			
	Metagoniolithon radiatum			
CRASSULACEAE	*Crassula closiana*	Stalked Crassula		
	Crassula colorata var. colorata	Dense Crassula		
	Crassula sieberiana ssp. tetramera (NC)	Australian Stonecrop		
CRUCIFERAE	**Cakile maritima ssp. maritima*	Two-horned Sea Rocket		
	**Cardamine hirsuta*	Hairy Bitter-cress		
	**Lepidium didymum*	Lesser Swine's-cress		
	**Lepidium draba*	Hoary Cress		
	**Sinapis arvensis*	Charlock		
CUPRESSACEAE	*Callitris canescens*	Scrubby Cypress Pine		
	Callitris gracilis	Southern Cypress Pine		
	Callitris rhomboidea	Oyster Bay Pine		
CYMODOCEACEAE	*Amphibolis antarctica*	Sea Nymph		
CYPERACEAE	*Chorizandra enodis*	Black Bristle-rush		
	Gahnia sp.	Saw-sedge		
	Gahnia trifida	Cutting Grass		
	Isolepis hookeriana (NC)	Grassy Club-rush		
	**Isolepis marginata*	Little Club-rush		
	Isolepis platycarpa	Flat-fruit Club-rush		
	Isolepis sp.	Club-rush		
	Lepidosperma canescens	Hoary Rapier-sedge		
	Lepidosperma carphoides	Black Rapier-sedge		
	Lepidosperma congestum (NC)	Clustered Sword-sedge		
	Lepidosperma semiteres	Wire Rapier-sedge		
	Lepidosperma sp.	Sword-sedge/Rapier-sedge		
	Lepidosperma viscidum	Sticky Sword-sedge		

Family	Species name	Common name	Conservation status	
			Aus	SA
	Schoenus breviculmis	Matted Bog-rush		
	Schoenus sp.	Bog-rush		
CYSTOSEIRACEAE	*Acrocarpia paniculata*			
	Caulocystis uvifera			
	Cystophora botryocystis			
	Cystophora expansa			
	Cystophora monilifera			
	Cystophora moniliformis			
	Cystophora polycystidea			
	Cystophora siliquosa			
	Cystophora subfarcinata			
	Cystoseira trinodis			
	Scaberia agardhii			
DASYACEAE	*Heterosiphonia australis*			
	Heterosiphonia callithamnium			
	Heterosiphonia lawrenciana			
	Heterosiphonia muelleri			
DELESSERIACEAE	*Chauviniella coriifolia*			
	Hemineura frondosa			
DENNSTAEDTIACEAE	*Pteridium esculentum ssp. esculentum*	Bracken Fern		
DICTYOTACEAE	*Dictyopteris muelleri*			
	Dictyota furcellata			
	Dictyota radicans			
	Dilophus fastigiatus			
	Dilophus gunnianus			
	Dilophus robustus			
	Dilophus tener			
	Distromium flabellatum			
	Distromium multifidum			
	Lobophora variegata			
	Lobospira bicuspidata			
	Pachydictyon paniculatum			
	Pachydictyon polycladum			
	Zonaria angustata			
	Zonaria crenata			
	Zonaria spiralis			
	Zonaria turneriana			
DILLENIACEAE	*Hibbertia aspera (NC)*			
	Hibbertia empetrifolia ssp. radians	Scrambling Guinea-flower		
	Hibbertia paeninsularis	Peninsula Guinea-flower		

Family	Species name	Common name	Conservation status	
			Aus	SA
	Hibbertia pallidiflora	Round-leaf Guinea-flower		
	Hibbertia riparia	Bristly Guinea-flower		
	Hibbertia riparia (NC)	Guinea-flower		
	Hibbertia sericea	Silky Guinea-flower		
	Hibbertia sericea var. (NC)	Silky Guinea-flower		
	Hibbertia sericea var. major (NC)	Large Guinea-flower		
	Hibbertia sericea var. sericea (NC)	Silky Guinea-flower		
	Hibbertia sp.	Guinea-flower		
	Hibbertia virgata	Twiggy Guinea-flower		
DROSERACEAE	*Drosera auriculata*	Tall Sundew		
	Drosera glanduligera	Scarlet Sundew		
	Drosera macrantha ssp. planchonii	Climbing Sundew		
	Drosera peltata (NC)	Pale Sundew		
	Drosera pygmaea	Tiny Sundew		
	Drosera schmutzii			
	Drosera whittakeri			
DUMONTIACEAE	*Gibsmithia womersleyi*			
ECTOCARPACEAE	*Hincksia mitchelliae*			
EPACRIDACEAE	*Acrotriche affinis*	Ridged Ground-berry		
	Acrotriche depressa	Native Currant		
	Acrotriche halmaturina	Kangaroo Island Ground-berry		
	Astroloma conostephioides	Flame Heath		
	Astroloma humifusum	Cranberry Heath		
	Leucopogon costatus	Twiggy Beard-heath		
	Leucopogon parviflorus	Coast Beard-heath		
	Leucopogon rufus	Ruddy Beard-heath		
	Leucopogon woodsii	Nodding Beard-heath		
	Lissanthe strigosa ssp. subulata	Peach Heath		
EUPHORBIACEAE	*Bertya rotundifolia*	Round-leaf Bertya		
	Beyeria lechenaultii	Pale Turpentine Bush		
	**Euphorbia paralias*	Sea Spurge		
	**Euphorbia terracina*	False Caper		
	Micrantheum demissum	Dwarf Micrantheum		
	Phyllanthus saxosus	Rock Spurge		
	Phyllanthus striaticaulis	Southern Spurge		
	Poranthera huegelii	Heath Poranthera		
	Poranthera microphylla (NC)	Small Poranthera		
GENTIANACEAE	*Sebaea ovata*	Yellow Sebaea		
GERANIACEAE	**Erodium botrys*	Long Heron's-bill		
	**Erodium cicutarium*	Cut-leaf Heron's-bill		

Family	Species name	Common name	Conservation status	
			Aus	SA
	**Geranium molle var. molle*	Soft Geranium		
GOODENIACEAE	*Dampiera lanceolata var.*	Grooved Dampiera		
	Dampiera lanceolata var. insularis	Kangaroo Island Dampiera		
	Goodenia amplexans	Clasping Goodenia		
	Goodenia blackiana	Native Primrose		
	Goodenia geniculata	Bent Goodenia		
	Goodenia ovata	Hop Goodenia		
	Goodenia varia	Sticky Goodenia		
	Scaevola aemula	Fairy Fanflower		
	Scaevola crassifolia	Cushion Fanflower		
	Selliera radicans	Shiny Swamp-mat		
GRAMINEAE	**Aira cupaniana*	Small Hair-grass		
	Austrostipa elegantissima	Feather Spear-grass		
	Austrostipa flavescens	Coast Spear-grass		
	Austrostipa hemipogon	Half-beard Spear-grass		
	Austrostipa mollis	Soft Spear-grass		
	Austrostipa sp.	Spear-grass		
	**Avena barbata*	Bearded Oat		
	**Avena sp.*	Oat		
	**Brachypodium distachyon*	False Brome		
	**Briza minor*	Lesser Quaking-grass		
	**Briza sp.*	Quaking Grass		
	**Bromus hordeaceus ssp. hordeaceus*	Soft Brome		
	**Critesion sp. (NC)*	Barley-grass		
	**Ehrharta longiflora*	Annual Veldt Grass		
	**Hordeum hystrix*	Mediterranean Barley-grass		
	Lachnagrostis filiformis	Common Blown-grass		
	**Lagurus ovatus*	Hare's Tail Grass		
	Neurachne alopecuroidea	Fox-tail Mulga-grass		
	**Poa annua (NC)*	Winter Grass		
	Poa poiformis var. poiformis	Coast Tussock-grass		
	**Polypogon monspeliensis*	Annual Beard-grass		
	Rytidosperma setaceum	Small-flower Wallaby-grass		
	Rytidosperma sp.			
	Spinifex sericeus (NC)	Rolling Spinifex		
	**Thinopyrum junceiforme*	Sea Wheat-grass		
	**Vulpia myuros f. myuros*	Rat's-tail Fescue		
GYROSTEMONACEAE	*Gyrostemon thesioides*	Broom Wheel-fruit		
HALORAGACEAE	*Glischrocaryon behrii*	Golden Pennants		
	Gonocarpus mezianus	Broad-leaf Raspwort		

Family	Species name	Common name	Conservation status	
			Aus	SA
	Gonocarpus tetragynus	Small-leaf Raspwort		
	Haloragis sp.	Raspwort		
HALYMENIACEAE	*Carpopeltis phyllophora*			
HYPNEACEAE	*Hypnea ramentacea*			
	Hypnea valentiae			
IRIDACEAE	**Gladiolus carneus*	Broad-leaf Painted Lady		
	Orthrosanthus multiflorus	Morning Flag		
	Patersonia fragilis	Short Purple-flag		
JUNCACEAE	*Juncus bufonius*	Toad Rush		
	Juncus pallidus	Pale Rush		
JUNCAGINACEAE	*Triglochin procera*	Water-ribbons		
	Triglochin sp.	Arrowgrass/Water-ribbons		
KALLYMENIACEAE	*Callophyllis rangiferina*			
LABIATAE	*Prostanthera serpyllifolia ssp. microphylla*	Small-leaf Mintbush		
	Prostanthera spinosa	Spiny Mintbush		
	**Stachys arvensis*	Stagger Weed		
LAURACEAE	*Cassytha glabella f. dispar*	Slender Dodder-laurel		
	Cassytha melantha	Coarse Dodder-laurel		
	Cassytha peninsularis	Peninsula Dodder-laurel		
	Cassytha pubescens	Downy Dodder-laurel		
LEGUMINOSAE	*Acacia cupularis*	Cup Wattle		
	Acacia cyclops	Western Coastal Wattle		
	Acacia dodonaeifolia	Hop-bush Wattle		R
	Acacia ligulata (NC)	Umbrella Bush		
	Acacia longifolia ssp. sophorae	Coastal Wattle		
	Acacia myrtifolia	Myrtle Wattle		
	Acacia paradoxa	Kangaroo Thorn		
	Acacia provincialis	Swamp Wattle		
	Acacia pycnantha	Golden Wattle		
	Acacia retinodes	Wirilda		
	Acacia retinodes var. (NC)	Silver Wattle		
	Acacia spinescens	Spiny Wattle		
	Acacia verticillata ssp. ovoidea	Prickly Moses		
	Daviesia asperula ssp. asperula	Kangaroo Island Bitter-pea		
	Daviesia brevifolia	Leafless Bitter-pea		
	Daviesia sp.	Bitter-pea		
	Dillwynia glaberrima	Smooth Parrot-pea		
	Dillwynia hispida	Red Parrot-pea		
	Dillwynia sericea	Showy Parrot-pea		
	Eutaxia diffusa	Large-leaf Eutaxia		

Family	Species name	Common name	Conservation status	
			Aus	SA
	Eutaxia microphylla	Common Eutaxia		
	Eutaxia sp.	Eutaxia		
	Gompholobium ecostatum	Dwarf Wedge-pea		
	Kennedia prostrata	Scarlet Runner		
	**Medicago polymorpha var. polymorpha*	Burr-medic		
	**Medicago sp.*	Medic		
	**Melilotus indicus*	King Island Melilot		
	Phyllota pleurandroides	Heathy Phyllota		
	Platylobium obtusangulum	Holly Flat-pea		
	Pultenaea daphnoides	Large-leaf Bush Pea		
	Pultenaea elachista	Limestone Bush-pea		
	Pultenaea laxiflora	Loose-flower Bush-pea		
	Pultenaea penna	Feather Bush-pea		
	Pultenaea teretifolia var. brachyphylla	Short-leaf Bush-pea		
	Pultenaea vestita	Feather Bush-pea		
	Pultenaea vestita (NC)	Feather Bush-pea		
	Pultenaea villifera var. glabrescens	Splendid Bush-pea	VU	V
	Pultenaea viscidula	Dark Bush-pea		
	Swainsona lessertiifolia	Coast Swainson-pea		
	Templetonia retusa	Cockies Tongue		
	**Trifolium angustifolium*	Narrow-leaf Clover		
	**Trifolium campestre*	Hop Clover		
	**Trifolium dubium*	Suckling Clover		
	**Trifolium sp.*	Clover		
	**Ulex europaeus*	Gorse		
LIAGORACEAE	*Helminthora australis*			
	Liagora harveyana			
LILIACEAE	**Asparagus asparagoides f.*			
	Bulbine semibarbata	Small Leek-lily		
	Burchardia umbellata	Milkmaids		
	Caesia calliantha	Blue Grass-lily		
	Chamaescilla corymbosa var. corymbosa	Blue Squill		
	Dianella brevicaulis	Short-stem Flax-lily		
	Dianella brevicaulis/revoluta var.	Black-anther Flax-lily		
	Laxmannia orientalis	Dwarf Wire-lily		
	**Muscari armeniacum*	Grape Hyacinth		
	Thysanotus patersonii	Twining Fringe-lily		
	Thysanotus racemoides	Rush Fringe-lily		

Family	Species name	Common name	Conservation status	
			Aus	SA
	Xanthorrhoea semiplana ssp. tateana	Tate's Grass-tree		R
LOGANIACEAE	*Logania crassifolia*	Coast Logania		
	Logania ovata	Oval-leaf Logania		
	Mitrasacme paradoxa (NC)	Wiry Mitrewort		
	Phyllangium distylis	Tiny Mitrewort		R
	Phyllangium divergens	Wiry Mitrewort		
MALVACEAE	*Lawrencia spicata*	Salt Lawrencia		
	Malva preissiana (NC)	Australian Hollyhock		
MYOPORACEAE	*Eremophila glabra ssp. glabra*	Tar Bush		
	Myoporum insulare	Common Boobialla		
	Myoporum viscosum (NC)	Sticky Boobialla		
MYRTACEAE	*Baeckea crassifolia*	Desert Baeckea		
	Callistemon rugulosus	Scarlet Bottlebrush		
	Callistemon rugulosus var. rugulosus (NC)	Scarlet Bottlebrush		
	Calytrix glaberrima	Smooth Heath-myrtle		
	Calytrix sp.	Fringe-myrtle		
	Calytrix tetragona	Common Fringe-myrtle		
	Darwinia micropetala	Small Darwinia		
	Eucalyptus albopurpurea	Purple-flowered Mallee Box		
	Eucalyptus baxteri	Brown Stringybark		
	Eucalyptus cladocalyx ssp.	Sugar Gum		
	Eucalyptus cneorifolia	Kangaroo Island Narrow-leaf Mallee		
	Eucalyptus cosmophylla	Cup Gum		
	Eucalyptus diversifolia ssp. diversifolia	Coastal White Mallee		
	Eucalyptus fasciculosa	Pink Gum		R
	Eucalyptus leucoxylon ssp. leucoxylon	South Australian Blue Gum		
	Eucalyptus obliqua	Messmate Stringybark		
	Eucalyptus odorata	Peppermint Box		
	Eucalyptus odorata (NC)	Peppermint Box		
	Eucalyptus phenax ssp. compressa	Kangaroo Island Mallee		R
	Eucalyptus rugosa	Coastal White Mallee		
	Eucalyptus sp.			
	Euryomyrtus ramosissima ssp. ramosissima	Rosy Baeckea		
	Leptospermum continentale	Prickly Tea-tree		
	Leptospermum myrsinoides	Heath Tea-tree		
	Melaleuca acuminata ssp. acuminata	Mallee Honey-myrtle		

Family	Species name	Common name	Conservation status	
			Aus	SA
	Melaleuca brevifolia	Short-leaf Honey-myrtle		
	Melaleuca gibbosa	Slender Honey-myrtle		
	Melaleuca halmaturorum	Swamp Paper-bark		
	Melaleuca lanceolata	Dryland Tea-tree		
	Melaleuca uncinata	Broombush		
	Thryptomene ericaea	Heath Thryptomene		
ORCHIDACEAE	*Acianthus sp.*	Mosquito Orchid		
	Caladenia latifolia	Pink Caladenia		
	Caladenia tentaculata	King Spider-orchid		
	Corybas dilatatus (NC)	Common Helmet-orchid		
	Corybas sp.	Helmet-orchid		
	Cyrtostylis robusta	Robust Gnat-orchid		
	Diuris orientis	Wallflower Donkey-orchid		
	Leporella fimbriata	Fringed Hare-orchid		
	Microtis arenaria	Notched Onion-orchid		
	Microtis sp.	Onion-orchid		
	Orchidaceae sp.	Orchid Family		
	Pheladenia deformis	Bluebeard Orchid		
	Prasophyllum elatum	Tall Leek-orchid		
	Pterostylis nana	Dwarf Greenhood		
	Pterostylis nutans	Nodding Greenhood		
	Pterostylis sanguinea	Blood Greenhood		
	Pterostylis sp.	Greenhood		
	Pyrorchis nigricans	Black Fire-orchid		
	Thelymitra antennifera	Lemon Sun-orchid		
	Thelymitra benthamiana	Leopard Sun-orchid		
	Thelymitra flexuosa	Twisted Sun-orchid		R
	Thelymitra luteocilium	Yellow-tuft Sun Orchid		
	Thelymitra sp.	Sun-orchid		
OXALIDACEAE	*Oxalis perennans (NC)*	Native Sorrel		
PAPAVERACEAE	**Fumaria muralis ssp. muralis*	Wall Fumitory		
PEYSSONNELIACEAE	*Peyssonnelia capensis*			
	Peyssonnelia novae-hollandiae			
	Sonderopelta coriacea			
PHACELOCARPACEAE	*Phacelocarpus apodus*			
PITTOSPORACEAE	*Billardiera cymosa (NC)*	Sweet Apple-berry		
	Billardiera cymosa ssp. cymosa	Sweet Apple-berry		
	Billardiera cymosa/versicolor	Apple-berry		
	Billardiera uniflora	One-flower Apple-berry		
	Billardiera versicolor	Yellow-flower Apple-berry		
	Bursaria spinosa ssp. spinosa	Sweet Bursaria		

Family	Species name	Common name	Conservation status	
			Aus	SA
	Cheiranthera volubilis	Twining Hand-flower	VU	V
	Pittosporum angustifolium	Native Apricot		
PLANTAGINACEAE	*Plantago sp. B (R.Bates 44765)*	Little Plantain		
PLOCAMIACEAE	*Plocamium angustum*			
	Plocamium cartilagineum			
	Plocamium mertensii			
	Plocamium preissianum			
POLYGALACEAE	*Comesperma calymega*	Blue-spike Milkwort		
	Comesperma volubile	Love Creeper		
POLYGONACEAE	*Muehlenbeckia adpressa*	Climbing Lignum		
	Muehlenbeckia gunnii	Coastal Climbing Lignum		
PORTULACACEAE	*Calandrinia calyptrata*	Pink Purslane		
POSIDONIACEAE	*Posidonia angustifolia*	Narrow-leaf Tapeweed		
	Posidonia sinuosa	Narrow-leaf Tapeweed		
PRIMULACEAE	**Anagallis arvensis*	Pimpernel		
PROTEACEAE	*Adenanthos macropodianus*	Kangaroo Island Gland-flower		
	Adenanthos terminalis	Yellow Gland-flower		
	Banksia marginata	Silver Banksia		
	Banksia ornata	Desert Banksia		
	Conospermum patens	Slender Smoke-bush		
	Grevillea halmaturina ssp. halmaturina	Prickly Grevillea		R
	Grevillea linearifolia (NC)	Prickly Grevillea		
	Hakea mitchellii	Heath Needlebush		
	Hakea rostrata	Beaked Hakea		
	Isopogon ceratophyllus	Horny Cone-bush		
	Petrophile multisecta	Kangaroo Island Conesticks		
RANUNCULACEAE	*Clematis microphylla var. microphylla (NC)*	Old Man's Beard		
RHAMNACEAE	*Cryptandra hispidula*	Rough Cryptandra		
	Cryptandra tomentosa (NC)	Heath Cryptandra		
	Pomaderris paniculosa ssp. paralia	Coast Pomaderris		
	**Rhamnus alaternus*	Blowfly Bush		
	Spyridium eriocephalum var.	Heath Spyridium		
	Spyridium eriocephalum var. glabrisepalum	Macgillivray Spyridium	VU	E
	Spyridium nitidum	Shining Spyridium		
	Spyridium spathulatum	Spoon-leaf Spyridium		R
	Spyridium vexilliferum var. latifolium (NC)	Winged Spyridium		
	Spyridium waterhousei	Waterhouse's Cryptandra		
	Stenanthemum leucophractum	White Cryptandra		

Family	Species name	Common name	Conservation status	
			Aus	SA
	Trymalium wayi	Grey Trymalium		
RHODOMELACEAE	*Brongniartella australis*			
	Chiracanthia arborea			
	Cladurus elatus			
	Cliftonaea pectinata			
	Dasyclonium incisum			
	Dictyomenia harveyana			
	Ditria expleta			
	Halydictyon arachnoideum			
	Laurencia clavata			
	Laurencia filiformis f. filiformis			
	Laurencia forsteri			
	Laurencia majuscula			
	Polysiphonia amphibolis			
	Polysiphonia succulenta			
	Veleroa adunca			
RHODYMENIACEAE	*Botryocladia sonderi*			
	Erythrymenia minuta			
	Gloiocladia halymenioides			
	Rhodymenia foliifera			
RUBIACEAE	*Galium compactum*	Compact Bedstraw		
	Galium migrans (NC)	Loose Bedstraw		
	**Galium murale*	Small Bedstraw		
	Opercularia varia	Variable Stinkweed		
RUTACEAE	*Boronia coerulescens ssp. coerulescens*	Blue Boronia		
	Boronia edwardsii	Edwards' Boronia		
	Correa decumbens	Spreading Correa		
	Correa pulchella	Salmon Correa		
	Correa reflexa (NC)	Common Correa		
	Correa reflexa var. reflexa (NC)	Common Correa		
	Philotheca angustifolia ssp. angustifolia	Narrow-leaf Wax-flower		R
SANTALACEAE	*Choretrum chrysanthum/glomeratum*	Sour-bush		
	Choretrum glomeratum	White Sour-bush		
	Exocarpos aphyllus	Leafless Cherry		
	Exocarpos cupressiformis	Native Cherry		
	Leptomeria aphylla	Leafless Currant-bush		
SAPINDACEAE	*Dodonaea baueri*	Crinkled Hop-bush		
	Dodonaea humilis	Dwarf Hop-bush		
	Dodonaea viscosa ssp.	Sticky Hop-bush		

Family	Species name	Common name	Conservation status	
			Aus	SA
	Dodonaea viscosa ssp. angustissima	Narrow-leaf Hop-bush		
SARGASSACEAE	*Sargassum decipiens*			
	Sargassum distichum			
	Sargassum fallax			
	Sargassum lacerifolium			
	Sargassum linearifolium			
	Sargassum paradoxum			
	Sargassum spinuligerum			
SCROPHULARIACEAE	**Parentucellia latifolia*	Red Bartsia		
	**Verbascum creticum*	Cretan Mullein		
SEIROCOCCACEAE	*Scytothalia dorycarpa*			
	Seirococcus axillaris			
SOLANACEAE	**Datura ferox*	Long-spine Thorn-apple		
	**Lycium ferocissimum*	African Boxthorn		
	Nicotiana maritima	Coast Tobacco		
	**Solanum elaeagnifolium*	Silver-leaf Nightshade		
SPOROCHNACEAE	*Bellotia eriophorum*			
	Sporochnus radiciformis			
STACKHOUSIACEAE	*Stackhousia aspericocca ssp.*	Bushy Candles		
	Stackhousia aspericocca ssp. One-sided inflorescence (W.R.Barker 697)	One-sided Candles		
STERCULIACEAE	*Lasiopetalum baueri*	Slender Velvet-bush		
	Lasiopetalum behrii	Pink Velvet-bush		
	Lasiopetalum schulzenii	Drooping Velvet-bush		
	Lasiopetalum sp. Cordate-leaved (H.P.Vonow 810)	Heart-leaf Velvet-bush		
	Thomasia petalocalyx	Paper-flower		
STYLIDIACEAE	*Stylidium calcaratum*	Spurred Trigger-plant		
	Stylidium despectum	Hundreds And Thousands		
	Stylidium inundatum (NC)	Hundreds And Thousands		
	Stylidium perpusillum	Tiny Trigger-plant		
TELOSCHISTACEAE	*Caloplaca marina*			
	Xanthoria parietina			
THYMELAEACEAE	*Pimelea glauca*	Smooth Riceflower		
	Pimelea macrostegia	Kangaroo Island Riceflower		
	Pimelea octophylla	Woolly Riceflower		
	Pimelea phylicoides	Heath Riceflower		
	Pimelea serpyllifolia ssp. serpyllifolia	Thyme Riceflower		
	Pimelea sp.	Riceflower		
	Pimelea stricta	Erect Riceflower		

Family	Species name	Common name	Conservation status	
			Aus	SA
TREMANDRACEAE	*Tetratheca halmaturina*	Leafless Kangaroo Island Tetratheca		
	Tetratheca insularis	Kangaroo Island Tetratheca		
UDOTEACEAE	*Chlorodesmis baculifera*			
UMBELLIFERAE	*Apium annuum*	Annual Celery		
	**Conium maculatum*	Hemlock		
	Daucus glochidiatus	Native Carrot		
	Hydrocotyle callicarpa	Tiny Pennywort		
	Hydrocotyle comocarpa	Fringe-fruit Pennywort		R
	Trachymene pilosa	Dwarf Trachymene		
	Xanthosia huegelii	Hairy Xanthosia		
	Xanthosia leiophylla	Cut-leaf Xanthosia		
URTICACEAE	*Parietaria cardiostegia*	Mallee Smooth-nettle		
	**Urtica urens*	Small Nettle		
VALONIACEAE	*Dictyosphaeria sericea*			
VERRUCARIACEAE	*Verrucaria subdiscreta*			
VIOLACEAE	*Viola hederacea (NC)*	Ivy-leaf Violet		
	Viola sieberiana	Tiny Violet		

Aus: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare.

* = Introduced species.

Appendix 4. Fauna species recorded in the BDBSA within 10 km of the study area (DEWNR, 2016).

Class	Species name	Common name	Conservation status	
			Aus	SA
ACTINOPTERI	*Galaxias maculatus*	Common Galaxias		
AMPHIBIA	*Crinia signifera*	Common Froglet		
	Limnodynastes dumerilii	Banjo Frog		
	Limnodynastes tasmaniensis	Spotted Marsh Frog		
	Litoria ewingii	Brown Tree Frog		
AVES	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater		
	Acanthiza lineata	Striated Thornbill		
	Acanthiza pusilla	Brown Thornbill		
	Acanthorhynchus tenuirostris	Eastern Spinebill		
	Accipiter cirrocephalus	Collared Sparrowhawk		
	**Alauda arvensis*	Eurasian Skylark		
	Anthochaera carunculata	Red Wattlebird		
	Anthochaera chrysoptera	Little Wattlebird		
	Anthus australis	Australian Pipit		
	Aquila audax	Wedge-tailed Eagle		
	Arenaria interpres	Ruddy Turnstone		R
	Artamus personatus	Masked Woodswallow		
	Burhinus grallarius	Bush Stonecurlew		R
	Cacatua sanguinea	Little Corella		
	Cacomantis flabelliformis	Fan-tailed Cuckoo		
	Calamanthus (Hylacola) cautus	Shy Heathwren		R
	Calidris acuminata	Sharp-tailed Sandpiper		
	Calidris ruficollis	Red-necked Stint		
	Calyptorhynchus funereus	Yellow-tailed Black Cockatoo		V
	**Carduelis carduelis*	European Goldfinch		
	Chalcites lucidus	Shining Bronze Cuckoo		
	Charadrius ruficapillus	Red-capped Plover		
	Chroicocephalus novaehollandiae	Silver Gull		
	Cladorhynchus leucocephalus	Banded Stilt		V
	Colluricincla harmonica	Grey Shrikethrush		
	Corvus coronoides	Australian Raven		
	Corvus mellori	Little Raven		
	Cygnus atratus	Black Swan		
	Dacelo novaeguineae	Laughing Kookaburra		
	Egretta novaehollandiae	White-faced Heron		
	Elanus axillaris	Black-shouldered Kite		
	Eolophus roseicapilla	Galah		
	Epthianura albifrons	White-fronted Chat		
	Eudyptula minor	Little Penguin		
	Falco cenchroides	Nankeen Kestrel		

Class	Species name	Common name	Conservation status	
			Aus	SA
	Fulica atra	Eurasian Coot		
	Gliciphila melanops	Tawny-crowned Honeyeater		
	Glossopsitta porphyrocephala	Purple-crowned Lorikeet		
	Grallina cyanoleuca	Magpielark		
	Gymnorhina tibicen	Australian Magpie		
	Haematopus fuliginosus	Sooty Oystercatcher		R
	Haematopus longirostris	(Australian) Pied Oystercatcher		R
	Haliaeetus leucogaster	White-bellied Sea-Eagle		E
	Himantopus leucocephalus	White-headed Stilt		
	Hirundo neoxena	Welcome Swallow		
	Hydroprogne caspia	Caspian Tern		
	Larus pacificus	Pacific Gull		
	Lichenostomus cratitius	Purple-gaped Honeyeater		
	Macronectes giganteus	Southern Giant Petrel	EN	V
	Malurus cyaneus	Superb Fairywren		
	Melithreptus brevirostris	Brown-headed Honeyeater		
	Microcarbo melanoleucos	Little Pied Cormorant		
	Myiagra inquieta	Restless Flycatcher		R
	Neochmia temporalis	Red-browed Finch		
	Ninox boobook	Southern Boobook		
	Pachycephala pectoralis	Australian Golden Whistler (Golden Whistler)		
	Pachyptila turtur	Fairy Prion		
	Pardalotus punctatus	Spotted Pardalote		
	Pardalotus striatus	Striated Pardalote		
	**Passer domesticus*	House Sparrow		
	**Pavo cristatus*	Indian Peafowl		
	Pelecanus conspicillatus	Australian Pelican		
	Petrochelidon nigricans	Tree Martin		
	Petroica boodang	Scarlet Robin		
	Phalacrocorax carbo	Great Cormorant		
	Phalacrocorax fuscescens	Black-faced Cormorant		
	Phalacrocorax varius	[Australian] Pied Cormorant		
	Phaps chalcoptera	Common Bronzewing		
	Phaps elegans	Brush Bronzewing		
	Phaps sp.			
	Phylidonyris novaehollandiae	New Holland Honeyeater		
	Phylidonyris pyrrhopterus	Crescent Honeyeater		
	Platycercus elegans	Crimson Rosella		
	Rhipidura albiscapa	Grey Fantail		
	Rhipidura leucophrys	Willie Wagtail		

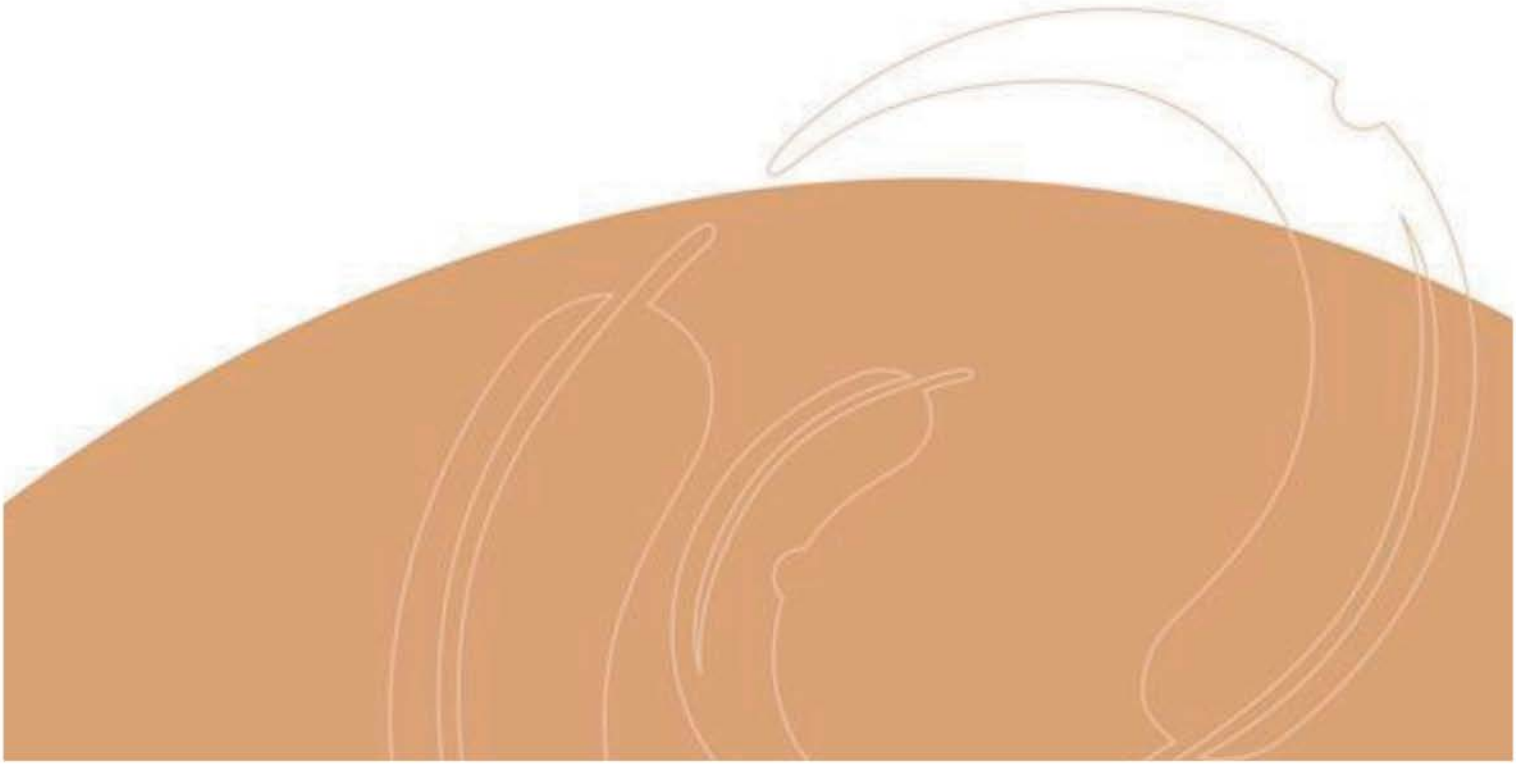
Class	Species name	Common name	Conservation status	
			Aus	SA
	Sericornis frontalis	White-browed Scrubwren		
	**Spilopelia chinensis*	Spotted Dove		
	Stagonopleura bella	Beautiful Firetail		R
	Stipiturus malachurus halmaturinus	Southern Emu-wren (Kangaroo Island ssp)		R
	Strepera versicolor	Grey Currawong		
	**Sturnus vulgaris*	Common Starling		
	Tachybaptus novaehollandiae	Australasian Grebe		
	Tadorna tadornoides	Australian Shelduck		
	Thalasseus bergii	Greater Crested Tern		
	Thinornis rubricollis	Hooded Plover (Hooded Dotterel)	VU	V
	Threskiornis moluccus	Australian White Ibis		
	Trichoglossus haematodus	Rainbow Lorikeet		
	Tringa nebularia	Common Greenshank		
	Vanellus miles	Masked Lapwing		
	Zosterops lateralis	Silvereye		
MAMMALIA	*Cercartetus concinnus*	Western Pygmy-possum		
	Delphinus delphis	Short-beaked Common Dolphin		
	**Felis catus*	Domestic Cat (Feral Cat)		
	Isoodon obesulus obesulus	Southern Brown Bandicoot (SA mainland and KI ssp)	EN	V
	Macropus eugenii	Tammar Wallaby		
	Mesoplodon layardii	Strap-toothed Whale		
	**Mus musculus*	House Mouse		
	Physeter macrocephalus	Sperm Whale		R
	Pseudocheirus peregrinus	Common Ringtail Possum		
	Rattus fuscipes	Bush Rat		
	Sminthopsis aitkeni	Kangaroo Island Dunnart	EN	E
	Trichosurus vulpecula	Common Brushtail Possum		R
	Tursiops aduncus	Indo-Pacific Bottlenose Dolphin		
	Tursiops truncatus	Common Bottlenose Dolphin		
REPTILIA	*Austrelaps labialis*	Pygmy Copperhead		
	Christinus marmoratus	Marbled Gecko		
	Hemiergis decresiensis	Three-toed Earless Skink		
	Hemiergis peronii	Four-toed Earless Skink		
	Lampropholis guichenoti	Garden Skink		
	Lerista bougainvillii	Bougainville's Skink		
	Lerista dorsalis	Southern Four-toed Slider		
	Liopholis whitii	White's Skink		
	Menetia greyii	Dwarf Skink		
	Morethia obscura	Mallee Snake-eye		
	Underwoodisaurus milii	Barking Gecko		

Class	Species name	Common name	Conservation status	
			Aus	SA
	Varanus rosenbergi	Heath Goanna		V

Aus: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation Codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare.

* = Introduced species.

EBS Ecology
3/119 Hayward Avenue
Torrensville, SA 5031
www.ebsecology.com.au
t. 08 7127 5607
f. 08 8352 1222



Appendix J3 – MNES Impact Assessment – Flora and Fauna

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1. MNES POTENTIALLY OCCURRING IN THE STUDY AREA

A Protected Matters Report generated on 3 April 2018 identified matters of national environmental significance (MNES) as listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment and Energy (DoEE) 2018a). A 10 km buffer zone was used to generate a set of listed species and communities that might exist in the study area.

An assessment was undertaken to determine the likelihood of the MNES species being present in the study area and to comment on the significance of any suitable vegetation within the area (Table 1-1 and Table 1-2). Resources used to complete the assessment included:

- EBS Ecology 2018, *Smith Bay Ecological Assessment*. Sub-consultant's report prepared for Environmental Projects on behalf of KIPT Ltd, V.3, 7 May 2018.
- KIPT Ltd 2016, *Referral of Proposed Action – Kangaroo Island Plantation Timbers Ltd Smith Bay Wharf Development*, controlled action referral to the Government of Australia, dated July 2016.

Following the referral, the Minister for the Environment and Energy determined (EPBC/2016/7814, See Appendix A1) that the proposal would be likely to, or may have, a significant impact on the following MNES.

- **Listed threatened species and communities** including but not limited to:
    - southern right whale (*Eubalaena australis*)
    - Kangaroo Island echidna (*Tachyglossus aculeatus multiaculeatus*)
    - hooded plover (eastern) (*Thinornis rubricollis rubricollis*)
    - southern brown bandicoot (eastern) (*Isoodon obesulus obesulus*).
- **Listed migratory species** including but not limited to:
    - southern right whale (*Eubalaena australis*).
- **Commonwealth marine areas**: although the study area is not in a Commonwealth marine area, the EIS must consider whether there is a real chance or possibility that the proposal would affect such a marine area; for example, because it would have a substantial adverse effect on a population of a marine species such as a cetacean, including its life cycle (such as breeding, feeding, migration behaviours, live expectancy) and spatial distribution.

The four species identified by the Minister for the Environment and Energy are identified in orange text in Table 1-2.

Table 1-1: MNES potentially occurring within the study area – flora

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Threatened Ecological Communities (TEC)		
Kangaroo Island narrow-leaved mallee (*Eucalyptus cneorifolia*) woodland	Critically endangered	**Not present:** EBS Ecology's field survey of the study site in August 2016 concluded that this threatened ecological community (TEC) does not exist within the area, although it does exist in nearby properties. Patches less than 60 m wide along most of their length and featuring low native species diversity and high weed cover tend to be degraded, and are excluded from the listing (DoEE 2014). There is a single patch of Kangaroo Island narrow-leaved mallee adjacent to Freeoak Road; however, it does not meet the requirements of a protected ecological community under the TEC listing as it is not 60 m wide (EBS Ecology 2018). This is discussed in more detail in Chapter 13 – Terrestrial Ecology. The field survey undertaken by EBS Ecology in February 2018 determined that the patch of Kangaroo Island narrow-leaved mallee that occurs south of the study area, meets the requirements of a protected ecological community under the TEC listing (EBS Ecology 2018). The patch is 4.75 ha.
Plants		
Veronica derwentiana subsp. *homalodonta* Mount Lofty speedwell	Critically endangered	**Not present:** EBS Ecology's field survey of the study site in August 2016 did not find this species. Given the generally degraded nature of remnant vegetation on the site, it is considered unlikely to exist in the study area (EBS Ecology 2018).
Caladenia tensa Greencomb spider-orchid, rigid spider-orchid	Endangered	**Not present:** EBS Ecology's field survey of the study site in August 2016 did not find this species. Given the generally degraded nature of remnant vegetation on the site, it is considered unlikely to exist in the study area (EBS Ecology 2018).
Cheiranthera volubilis Twining finger flower	Vulnerable	**Not present:** EBS Ecology's field survey of the study site in August 2016 did not find this species. Given the generally degraded nature of remnant vegetation on the site, it is considered unlikely to exist in the study area (EBS Ecology 2018).
Pomaderris halmaturina subsp. *halmaturina* Kangaroo Island pomaderris	Vulnerable	**Not present:** EBS Ecology's field survey of the study site in August 2016 did not find this species. Given the generally degraded nature of remnant vegetation on the site, it is considered unlikely to exist in the study area (EBS Ecology 2018).
Ptilotus beckerianus Ironstone mulla mulla	Vulnerable	**Not present:** EBS Ecology's field survey of the study site in August 2016 did not find this species. Given the generally degraded nature of remnant vegetation on the site, it is considered unlikely to exist in the study area (EBS Ecology 2018).
Pultenaea villifera var. *glabrescens* Yellow bush-pea, splendid bush-pea	Vulnerable	**Not present:** EBS Ecology's field survey of the study site in August 2016 did not find this species. Given the generally degraded nature of remnant vegetation on the site, it is considered unlikely to exist in the study area (EBS Ecology 2018).

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Spyridium eriocephalum var. *glabrisepalum* MacGillivray spyridium	Vulnerable	**Not present:** EBS Ecology's field survey of the study site in August 2016 did not find this species. Given the generally degraded nature of remnant vegetation on the site, it is considered unlikely to exist in the study area (EBS Ecology 2018).
Thelymitra matthewsii Spiral sun-orchid	Vulnerable	**Not present:** EBS Ecology's field survey of the study site in August 2016 did not find this species. Given the generally degraded nature of remnant vegetation on the site, it is considered unlikely to exist in the study area (EBS Ecology 2018).

Table 1-2: MNES potentially occurring within the study area – fauna

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Birds		
Actitis hypoleucos Common sandpiper	Migratory wetland	**Possible (dams and coastline):** The common sandpiper breeds mainly in parts of Europe and Asia, and occasionally Africa, and is found throughout Europe, Japan and Australasia. In Australia, it inhabits all coastlines and many inland areas, although other populations are concentrated in northern and western Australia. The species inhabits a wide range of coastal and inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores, but rarely on mudflats. The common sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans; and occasionally on piers and jetties. Based on these habitat preferences, this species could possibly occur in Smith Bay.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Apus pacificus Fork-tailed swift	Migratory marine	**Potentially present but unlikely to be affected by the proposal:** EBS Ecology (2018) assessed this species as being potentially present in the study area; however, the site does not contain critical habitat for these swifts and the proposal is unlikely to have a significant impact on habitat availability. This species is almost exclusively aerial during its stay in Australia. It is considered a possible fly-over species for the study area.
Ardea alba Great egret	Marine	**Possible (dams):** The great egret inhabits a variety of inland and coastal wetlands, including lakes, saltpans, mudflats, coastal swamps, seagrass flats, saltmarshes, lagoons, estuaries, offshore coral reefs and mangroves. The species are common throughout Australia, except for the most arid areas. Breeding sites are normally positioned over water in reedbeds, bamboos, bushes, trees, mangroves and other plants near water or on islands in sites that are protected from ground predators. This marine species is unlikely to be affected by the proposal.
Ardea ibis Cattle egret	Marine	**Potentially present but unlikely to be affected by the proposal:** Cattle egret inhabit tropical and temperate open grasslands, wood lands and terrestrial wetlands including areas such as meadows, livestock pastures, semi-arid steppe and open savanna grassland subject to seasonal inundation, dry arable fields, artificial grassland, floodplains, wet pastures, shallow marshes, mangroves and irrigated grasslands (with ponds, small impoundments, wells, canals, small rivers and streams). It rarely occupies marine habitats or forested areas. In Australia it may enter woodlands or forests, having preference for freshwater, and may also use brackish or saline habitats. The species is partly migratory; some of the population migrates to New Zealand during winter. The species breed in colonies and nests are constructed in dense thickets, trees and bushes of wetland areas. The breeding period generally occurs between October to January. This marine species is unlikely to be affected by the proposal.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Ardenna carneipes Flesh-footed shearwater	Migratory marine	**Possible (fly-over):** EBS Ecology (2018) assessed this species as a possible (fly-over) in the study area. The flesh-footed shearwater breeds on 43 islands within Australian jurisdiction, including Smith Island off the south-eastern coast of Eyre Peninsula, Lord Howe Island, and numerous islands off the coast of south-western Western Australia (DoEE 2017). It is a common visitor to waters of the continental shelf and continental slope off southern Australia and around Lord Howe Island (DoEE 2017). The species migrates northward at the completion of the breeding season, moving across the southern Indian Ocean to the Arabian Sea and Gulf of Oman and possibly across Indonesia to the northern Pacific Ocean (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.
Arenaria interpres Ruddy turnstone	Migratory wetland	**Potentially present but unlikely to be affected by the proposal:** EBS Ecology (2018) assessed this coastal species as being potentially present in the study area; however, the site does not contain critical habitat for this species and the proposal is unlikely to have a significant impact on habitat availability. This species has recent records within the coastal zone near the study area (ALA 2016). and could fly over the site.
Botaurus poiciloptilus australasian Bittern	Endangered	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to inhabit the study area. There are two sub-populations, one in south-west Western Australia and one across south-eastern Australia, from south-east Queensland to south-east SA (Garnett et al. 2011). The Australasian Bittern inhabits shallow, vegetated freshwater or brackish swamps, favouring those dominated by sedges, rushes and/or reeds (Garnett et al. 2011). Based on these habitat preferences, this species is unlikely to occur in Smith Bay.
Calidris acuminata Sharp-tailed sandpiper	Migratory wetland	**Potentially present but unlikely to be affected by the proposal:** EBS Ecology (2018) assessed this coastal species a potential inhabitant of the study area, but the site lacks its critical habitat and the proposal is unlikely to have a significant impact on habitat availability. There are no recent records of this species along the coast near the study area; the most recent was on 29 October 2012 near a salt lagoon on the North Coast Road, adjacent to the Bay of Shoals (ALA 2016). These birds could fly over the study area.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Calidris canutus Red knot, knot	Endangered, migratory wetland marine	**Potentially present but unlikely to be affected by the proposal:** EBS Ecology (2018) assessed this coastal species as potentially being present in the study area; however, the site does not contain critical habitat for the red knot and the proposal is unlikely to have a significant impact on habitat availability. The species has recent records within the coastal zone near the study area (ALA 2016). It might fly over the study area but is unlikely to use it as critical habitat.
Calidris ferruginea Curlew sandpiper	Critically endangered, migratory wetland	**Potentially present but unlikely to be affected by the proposal:** EBS Ecology (2018) assessed this species as potentially being present in the study area, but the site does not contain its critical habitat and the proposal is unlikely to significantly affect habitat availability. In South Australia, curlew sandpipers inhabit widespread coastal and sub-coastal areas east of Streaky Bay. Important sites include ICI and Price Saltfields, and the Coorong. Occasionally they live in inland areas south of the River Murray and elsewhere (DoEE 2017). Records on Kangaroo Island are concentrated around Pelican Lagoon and Shoal Bay on the north-east coast and inland lakes; there are no records of this species in Smith Bay (ALA 2016). This species prefers intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast (DoEE 2017). Curlew sandpipers forage on mudflats and nearby shallow water. Based on these habitat preferences, this species is unlikely to occur in Smith Bay.
Calidris melanotos Pectoral sandpiper	Migratory wetland	**Unlikely to be present:** The pectoral sandpiper breeds in northern Russia and North America (DoEE 2017). In South Australia, it is found mostly in the south-east, from north to the River Murray and west to Yorke Peninsula (DoEE 2017). In Australasia, the pectoral sandpiper prefers shallow fresh to saline wetlands and is found in coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (DoEE 2017). Based on these habitat preferences, this species is unlikely to occur in Smith Bay.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Calidris ruficollis Red-necked stint	Migratory wetland	**Potentially present but unlikely to be affected by the proposal:** EBS Ecology (2018) assessed this species as potentially being present in the study area, but the site does not contain its critical habitat and the proposal is unlikely to significantly affect habitat availability. Although there are no recent records of this species, the *Atlas of Living Australia* recorded an individual on 6 February 1984 at the northern end of Emu Bay, 6 km east of the study site (ALA 2016). This coastal species could fly over the study area. This is discussed in more detail in Chapter 13 – Terrestrial Ecology.
Calyptorhynchus lathami halmaturinus Glossy black-cockatoo (Kangaroo Island)	Endangered	**Potentially present but unlikely to be affected by the proposal:** EBS Ecology (2018) assessed this subspecies as potentially being present in the study area; however, the site does not contain critical habitat for these cockatoos and the proposal is unlikely to have a significant impact on habitat availability. There are no suitable old-growth tree hollows at Smith Bay to provide breeding habitat, and no sheoak (*Allocasuarina verticillata*) feeding habitat. The closest suitable breeding and feeding habitat is likely to be on the hills approximately 1 km west of the site (EBS Ecology 2018). This is discussed in more detail in the Chapter 13 – Terrestrial Ecology.
Catharacta skua Great skua	Marine	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. Great skua avoid land during migration and winter, aggregating in winter to areas where it can scavenge from fisheries. Breeding occurs in May, on islands on flat ground with some vegetation cover. Most birds breed within 1 km of their birth place and usually avoid human contact. It is a marine, pelagic, aerial species, so is unlikely to occur in the study area.
Diomedea antipodensis Antipodean albatross	Vulnerable, migratory marine	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. The antipodean albatross is endemic to New Zealand; however, it forages widely in open water in the south-western Pacific Ocean, Southern Ocean and Tasman Sea (DoEE 2017). It is a marine, pelagic, aerial species, so is unlikely to occur in the study area.
Diomedea epomophora Southern royal albatross	Vulnerable, migratory marine	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. The southern royal albatross breeds on Adams, Disappointment and Auckland islands, south of New Zealand, but forages widely off the shores of southern Australia, New Zealand and Chile (Garnett et al. 2011). It is a marine, pelagic, aerial species so is unlikely to occur in the study area.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Diomedea exulans Wandering albatross	Vulnerable, migratory marine	**Possible (fly-over):** EBS Ecology (2018) assessed this species as a possible (fly-over) in the study area. The wandering albatross breeds on six subantarctic island groups and has a circumpolar distribution throughout the Southern Ocean (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.
Diomedea sanfordi Northern royal albatross	Endangered migratory, marine	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. The northern royal albatross ranges widely over the Southern Ocean, and feeds regularly in Tasmanian and South Australian waters, and less frequently in New South Wales waters (DoEE 2017). It is a marine, pelagic, aerial species so is unlikely to appear in the study area.
Gallinago hardwickii Latham's snipe, japanese snipe	Migratory wetland, marine	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be found in the study area. Latham's snipe is a non-breeding visitor to south-eastern Australia and is a passage migrant through northern Australia (DoEE 2017). It has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern South Australia (DoEE 2017). In Australia, Latham's snipe lives in permanent and ephemeral wetlands, preferring to inhabit open, freshwater wetlands with low, dense vegetation (such as swamps, flooded grasslands or heathlands, around bogs and other water bodies) (DoEE 2017). Based on these habitat preferences, this species is unlikely to occur in Smith Bay.
Haliaeetus leucogaster White-bellied sea-eagle	Marine	**Known to be present:** EBS Ecology (2018) observed this species fly over the coastal zone of the study area. Suitable nesting or guard roosting sites are located in the area. White-bellied sea-eagles generally forage over large expanses of open water (DoEE 2017). Nests generally are found on isolated and open cliffs devoid of major vegetation (Dennis et al. 2014). This species is likely to use the study area as a flyway for foraging. The area is not suitable for breeding. This is discussed in more detail in Chapter 13 – Terrestrial Ecology.
Halobaena caerulea Blue petrel	Vulnerable, marine	**Possible (fly-over):** EBS Ecology (2018) assessed this species as a possible (fly-over) in the study area. The blue petrel inhabits a few rock stacks off Macquarie Island, as well as numerous other subantarctic islands in the Indian and Atlantic oceans (Garnett et al. 2011). It forages throughout the Southern Ocean (Garnett et al. 2011). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Larus pacificus Pacific gull	Marine	**Known:** EBS Ecology (2018) observed this species within the coastal zone of the study area. The Pacific gull is endemic to southern Australia. The subspecies *L. p. georgii* is found on the coasts of south-western Western Australia and western South Australia, usually on sandy beaches and also on rocky coasts and offshore islands. It forages along sandy beaches, feeding mainly on molluscs, fish, crabs and other marine animals and is usually seen singly or in pairs. The Pacific gull breeds from October to December in pairs or in small, loose colonies on offshore islands, cliffs and headlands. The gull was observed within the coastal zone of the study area during the site visit in August 2016. The most recent record near the study area is at Cape D'Estaing near Emu Bay on 30 September 2002 (ALA 2016). There are several other records of sightings around Emu Bay. While the gulls might fly over Smith Bay they are unlikely to use the coastal zone for breeding.
Limosa lapponica baueri Bar-tailed godwit (baueri), western Alaskan bar-tailed godwit	Vulnerable,	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. The western Alaskan bar-tailed godwit breeds in north-eastern Siberia and north-western Alaska, and winters in eastern Australia and New Zealand (Garnett et al. 2011). In Australia, this species prefers muddy coastlines, estuaries, inlets, mangrove-fringed lagoons and sheltered bays (Garnett et al. 2011). Based on these habitat preferences, this species is unlikely to occur in the study area.
Limosa lapponica menzbieri Northern Siberian bar-tailed godwit, bar-tailed godwit (menzbieri)	Critically endangered	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. The species is found along most coastlines of Australia, but particularly in north-west Western Australia (Garnett et al. 2011). A coastal species, it prefers muddy coastlines, estuaries, inlets, mangrove-fringed lagoons and sheltered bays (Garnett et al. 2011). Based on these habitat preferences, this species is unlikely to occur in Smith Bay.
Macronectes giganteus Southern giant petrel	Endangered, migratory marine	**Possible (fly-over):** EBS Ecology (2018) assessed this species as a possible (fly-over) in the study area. The southern giant petrel is widespread in the Southern Ocean. It breeds on six subantarctic and Antarctic islands in Australian territory: Macquarie Island, Heard Island and McDonald Islands in the Southern Ocean, and Giganteus Island, Hawker Island, and Frazier Island in the Australian Antarctic Territories (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Macronectes halli Northern giant petrel	Vulnerable, migratory marine	**Possible (fly-over):** EBS Ecology (2018) assessed this species as a possible (fly-over) in the study area. The northern giant petrel breeds in the sub-Antarctic and visits areas off the Australian mainland mainly during the winter months (May–October) (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.
Motacilla cinerea Grey wagtail	Migratory terrestrial, marine	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. The grey wagtail breeds from western Europe to Asia and migrates to Africa, Indonesia and Australasia (Pizzey & Knight 2003). In Australia, it lives near running water in disused quarries, sandy, rocky streams in escarpments and rainforests, sewage ponds, ploughed fields and airfields (Pizzey & Knight 2003). Based on these habitat preferences, this species is unlikely to occur in Smith Bay.
Motacilla flava Yellow wagtail	Migratory terrestrial, marine	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. The yellow wagtail breeds from Europe to Siberia and western Alaska, migrating to Africa and south and south-east Asia, Indonesia and Australasia (Pizzey & Knight 2003). It is a regular summer migrant to coastal Australia (Pizzey & Knight 2003). The yellow wagtail prefers short grass and bare ground, and is found on swamp margins, sewage ponds, saltmarshes, playing fields, airfields, and town lawns (Pizzey & Knight 2003). Based on these habitat preferences, this species is unlikely to occur in Smith Bay.
Myiagra cyanoleuca Satin flycatcher	Migratory terrestrial, marine	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. The satin flycatcher is found in eastern Australia from Cape York in Queensland to far south-eastern South Australia, and is an occasional visitor to Kangaroo Island (Pizzey & Knight 2003). It prefers heavily vegetated gullies in forests, taller woodlands, coastal forests and mangroves (Pizzey & Knight 2003). Based on these habitat preferences, this species is unlikely to occur in Smith Bay.
Numenius madagascariensis Eastern curlew, far eastern curlew	Critically endangered, migratory wetland	**Unlikely to be present:** The eastern curlew is found in all states and has a primarily coastal distribution (DoEE 2017). Within South Australia, it has a patchy distribution with concentrations around the Coorong, Gulf St Vincent and Yorke Peninsula (ALA 2016). The birds prefer sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (DoEE 2017). Occasionally, the species is found on ocean beaches (often near estuaries) and coral reefs, rock platforms, or rocky islets. Based on these habitat preferences, it is unlikely to occur in Smith Bay.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Pachyptila turtur subantarctica Fairy prion (southern)	Vulnerable, marine	**Possible (fly-over):** EBS Ecology (2018) assessed this species as a possible (fly-over) in the study area. The birds breed on Macquarie Island and a number of other subantarctic islands (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.
Pandion haliaetus Osprey	Migratory Wetland, marine	**Possible (fly-over):** EBS Ecology (2018) assessed this species as a possible (fly-over) in the study area however, the site does not contain its critical habitat and the proposal is unlikely to have a significant impact on habitat availability. A single observation of an osprey was made south of Point Marsden on 6 June 2010 in open limestone coastline with low coastal cliffs (ALA 2016). The species can be observed regularly at Emu Bay and possibly on the eastern side of Cape d'Estaing. Although no suitable habitat exists within the coastal zone of the study area, there are cliffs on both sides of the area along the coastal fringe. These predominantly coastal birds are considered a possible fly-over species for the study site. This is discussed in more detail in Chapter 13 – Terrestrial Ecology. It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.
Phalacrocorax fuscescens Black-faced cormorant	Marine	**Potentially present but unlikely to be affected by the proposal:** EBS Ecology (2018) assessed this species as possible in the study area. The black-faced cormorants are confined to inshore marine habitats and can be found along southern coasts of mainland Australia and Tasmania. The species is common in Bass Strait and in the Spencer Gulf. The birds are found in large bays, deep inlets, rocky headlands and islands and are rarely found along beaches. Breeding occurs throughout the year in large colonies on offshore, rocky islands, building nests made from seaweed and driftwood. It is unlikely that the species will be affected by the proposal.
Phoebetria fusca Sooty albatross	Vulnerable, migratory marine	**Possible (fly-over):** EBS Ecology (2018) assessed this species as possible (fly-over) in the study area. The sooty albatross breeds on islands in the southern Indian and Atlantic oceans, and is a rare but probably regular migrant to Australia, mostly in the autumn and winter months (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Pterodroma mollis Soft-plumaged petrel	Vulnerable, marine	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. The soft-plumaged petrel breeds on Maatsuyker Island off southern Tasmania, as well as on islands in the Southern and Indian oceans (DoEE 2017). It is generally found over temperate and subantarctic waters in the South Atlantic, southern Indian and western South Pacific Ocean, and is a regular and quite common visitor to southern Australian waters (DoEE 2017). It is a marine, pelagic, aerial species, so is unlikely to occur in the study area.
Rostratula australis Australian painted snipe	Endangered, marine	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. The Australian Painted Snipe has been recorded at wetlands in all states of Australia, but is most common in eastern Australia (DoEE 2017). It prefers shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans, as well as inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains (DoEE 2017). Based on these habitat preferences, the species is unlikely to occur in Smith Bay.
Sternula nereis nereis Australian fairy tern	Vulnerable	**Possible (coastal):** EBS Ecology (2018) assessed these terns as being potentially present in Smith Bay; however, the site does not contain critical habitat for the species and the proposal is unlikely to have a significant impact on habitat availability. This species is generally confined to the coastal zone but possibly would fly over the study area. The sighting closest to the study area was of 23 individuals observed feeding and roosting at the Bay of Shoals on 19 October 2005 (ALA 2016), which is approximately 10 km east of the study area. This is discussed in more detail in Chapter 13 – Terrestrial Ecology.
Thalassarche cauta cauta Shy albatross, Tasmanian shy albatross	Vulnerable, migratory marine	**Possible (fly-over):** EBS Ecology (2018) assessed this species as possible (fly-over) in the study area. The shy albatross breeds on Albatross Island in Bass Strait and on Mewstone and Pedra Branca islands south-west of Tasmania (Garnett et al. 2011). At sea, adults usually remain in Australian waters but sometimes travel to South Africa to forage over shelf waters (Garnett et al. 2011). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Thalassarche cauta steadi White-capped albatross	Vulnerable, marine	**Unlikely to be present:** EBS Ecology (2018) assessed this species as a possible (fly-over) in the study area. The white-capped albatross breeds on a number of islands south of New Zealand, including Disappointment, Auckland and Adams, and is probably common off the coast of south-east Australia throughout the year (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.
Thalassarche impavida Campbell albatross, Campbell black-browed albatross	Vulnerable, migratory marine	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. Campbell albatrosses breed only on subantarctic Campbell Island, south of New Zealand (DoEE 2017). Non-breeding birds are most commonly seen foraging over the oceanic continental slopes off Tasmania, Victoria and New South Wales (DoEE 2017). It is a marine, pelagic, aerial species, so is unlikely to occur in the study area.
Thalassarche melanophris Black-browed albatross	Vulnerable, migratory marine	**Possible (fly-over):** EBS Ecology (2018) assessed this species as a possible (fly-over) in the study area. The black-browed albatross breeds on Heard Island and McDonald Islands, Bishop and Clerk islets, and Macquarie Island in Australia; and at a number of other locations including South Georgia, Crozet, Kerguelen, Antipodes and Campbell islands, as well as on the Falkland Islands and on four island groups off southern Chile (Garnett et al. 2011). At sea it has a circumpolar distribution, and is common at the continental shelf and shelf-break of South Australia, Victoria, Tasmania, western and eastern Bass Strait and New South Wales (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.
Thinornis rubricollis rubricollis hooded plover (eastern)	Vulnerable, marine	**Likely:** DoEE assessed this species as potentially at risk of significant impact because of the proposal (Appendix A1). The MNES chapter (Chapter 14) discusses this species in more detail and presents an impact assessment.
Tringa nebularia Common greenshank, greenshank	Migratory wetland, marine	**Potentially present but unlikely to be affected by the proposal:** EBS Ecology (2018) assessed this species as being potentially present in the study area; however, the site does not contain its critical habitat and the proposal is unlikely to have a significant impact on habitat availability. The closest record of this species to the study area is at Shoal Bay on 15 July 2000 (ALA 2016). These birds generally would be found in the coastal area but are considered a possible fly-over species for the study area. This is discussed in more detail in the Chapter 13 – Terrestrial Ecology.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Zoothera lunulata halmaturina Bassian thrush (South Australian)	Vulnerable	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. The Bassian Thrush (South Australian) occurs in South Australia on Kangaroo Island, in the Mount Lofty Ranges and the southern Flinders Ranges (Garnett et al. 2011). On Kangaroo Island there are recent records from the Dudley Peninsula west to Flinders Chase and in forested habitats on both the north and south coasts, as well as in the catchment of the Cygnet River in the Island's centre (Garnett et al. 2011). On Kangaroo Island, the bassian thrush prefers damp eucalypt forests, but also inhabits mature mallee eucalypt woodland, and suitable habitat is confined to creek lines or dune swales (Garnett et al. 2011). Based on these habitat preferences, this species is unlikely to occur in Smith Bay.
Mammals		
Arctocephalus forsteri Long-nosed fur-seal	Marine	**Potentially present but unlikely to be affected by the proposal:** The long-nosed fur-seal occurs in the coastal waters and on the offshore islands of South and Western Australia, from just east of Kangaroo Island west to the southwest corner of the continent, and in southern Tasmania. On Kangaroo Island, there are several small colonies on the south coast in the Cape Gantheaume Wilderness Protection Area centred on Cape Gantheaume and Cape du Couedic (Shaughnessy *et al*. 2015). The long-nosed fur seal breed primarily on islands in Victoria and Tasmania, particularly in Bass Strait with small numbers elsewhere in Tasmania, and in New South Wales and South Australia (Shaughnessy *et al*. 2015). The long-nosed fur-seal is unlikely to inhabit Smith Bay, although it may pass occasionally through the region.
Balaenoptera edeni Bryde's whale	Migratory marine	**Potentially present but unlikely to be affected by the proposal:** Bryde's whales inhabit temperate to tropical waters and have been recorded in all states but not the Northern Territory (DoEE 2017). The Australian population does not display clear migration patterns and little is known about this species' population or distribution (Woinarski et al. 2014, DoEE 2017). There are no records for Kangaroo Island (ALA 2016). Bryde's whale is a pelagic species generally preferring deeper water (Woinarski et al. 2014), so is unlikely to inhabit Smith Bay, although it may pass occasionally through the region.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Balaenoptera musculus Blue whale	Endangered, migratory marine	**Unlikely to be present:** Blue whales are a highly mobile migratory species mostly found in deep-water pelagic habitats (Woinarski et al. 2014). Records of blue whales in Australian waters are widespread and include most regions of the nation's coast (DoEE 2017; Woinarski et al. 2014). Much of the continental shelf and coastal waters have no particular significance to the whales, however, and are used only for migration and opportunistic feeding, with the exception of several upwelling zones on the southern continental shelf (DoEE 2017). Preferring deep water habitat, the blue whale is unlikely to use Smith Bay, although it may pass occasionally through the region.
Caperea marginata Pygmy right whale	Migratory marine	**Unlikely to be present:** Little is known about the population size or ecology of this enigmatic species (Woinarski et al. 2014). The pygmy right whale has been recorded all along the southern coast of Australia, although its distribution is patchy and sightings are rare (DoEE 2017). On Kangaroo Island there have been sightings around American River, Kingscote and North Cape (ALA 2016). Coastal upwellings are thought to be important feeding habitat (DoEE 2017). The pygmy right whale is an uncommon visitor to Kangaroo Island and is unlikely to use Smith Bay, although it may pass occasionally through the region.
Delphinus delphis Common dolphin	Cetacean	**Likely:** Common dolphins are found in offshore waters in all Australian states and territories but are rarely seen in northern Australian Waters. This species occurs in two main locations in Australia, one in the southern south-eastern Indian Ocean and another in the Tasman Sea. Common dolphins appear to occur in medium water depths over the continental shelf, where surface temperatures range between 10°C to 20°C. The species have been observed travelling over specific ocean features, such as seamounts, ridges and escarpments. Shifts in distribution and abundance of common dolphins suggest seasonal migration (DoEE 2018). Dolphins may pass through Smith Bay but are unlikely to be affected by the proposal.
Eubalaena australis Southern right whale	Endangered, migratory marine	**Potentially present:** DoEE assessed this species as potentially at risk of significant impact because of the proposal (Appendix A1). The MNES chapter (Chapter 14) discusses these whales in more detail and presents an impact assessment. Also see Chapter 12 – Marine Ecology and Appendix I2.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Isoodon obesulus obesulus Southern brown bandicoot (eastern), southern brown bandicoot (south-eastern)	Endangered	**Potentially present:** DoEE assessed this species as potentially at risk of significant impact because of the proposal (Appendix A1). The MNES chapter (Chapter 14) discusses the bandicoots in more detail and presents an impact assessment.
Lagenorhynchus obscurus Dusky dolphin	Migratory marine	**Unlikely to be present:** The dusky dolphin is found across southern Australia from Western Australia to Tasmania, but is known from just 13 records (DoEE 2017). It may be only an occasional visitor to Australian waters, possibly from the larger New Zealand population (Woinarski et al. 2014). This species is unlikely to occur in Smith Bay.
Megaptera novaeangliae Humpback whale	Vulnerable, migratory marine	**Potentially present but unlikely to be affected by the proposal:** Humpback whale numbers have been rapidly increasing in Australian waters as they recover from extensive whaling in the 1900s (Woinarski et al. 2014). The two Australian sub-populations (eastern and western) breed and calve in the tropical waters of the northern coasts and migrate down the east and west coasts to feed in the Southern Ocean (Woinarski et al. 2014). They may pass near Smith Bay during their annual migrations, but are unlikely to use the study area as a significant stop-over.
Neophoca cinerea Australian sea lion	Vulnerable, marine	**Potentially present but unlikely to be affected by the proposal:** EBS Ecology (2018) assessed this species as being potentially present in the area; however, the site does not contain its critical habitat and the proposal is unlikely to have a significant impact on habitat availability. Records of this species are mainly distributed along the southern coastline of Kangaroo Island (ALA 2016). It is unlikely that sea lions would breed in Smith Bay or spend a significant amount of time there, but may occasionally pass through (EBS Ecology 2018).
Orcinus orca Killer whale, orca	Migratory marine	**Unlikely to be present:** Killer whales have been reported in all states of Australia, but are most commonly recorded in Tasmania, South Australia and Victoria (DoEE 2017). There are numerous records of this species around Kangaroo Island (ALA 2016). They use a wide range of coastal to oceanic marine habitats and have even been sighted in estuaries and rivers (Woinarski et al. 2014). Although they may pass through the region, they are unlikely to be present for significant periods or use Smith Bay as key habitat.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Sminthopsis aitkeni Kangaroo Island dunnart	Endangered	**Unlikely to be present:** EBS Ecology (2018) assessed this species as unlikely to be present in the study area. The Kangaroo Island dunnart is extremely difficult to find (Woinarski et al. 2014). It has been found only in mallee heath vegetation on lateritic soils of the Kangaroo Island plateau (Robinson 1995) and is likely to be restricted to conservation reserves on the western part of the Island (Gates 2011). There are no records for this species in the study area, and the small patches of relatively degraded vegetation on the site are unlikely to constitute potential habitat (EBS Ecology 2018).
Tachyglossus aculeatus multiaculeatus Kangaroo Island echidna	Endangered	**Known to be present:** EBS Ecology (2018) recorded signs that indicate this species uses the study site. DoEE assessed the echidna as potentially at risk of significant impact because of the proposal (Appendix A1). The MNES chapter (Chapter 14) discusses this species in more detail and presents an impact assessment.
Tursiops aduncus Indian ocean bottlenose dolphin	Cetacean	**Likely:** Indian ocean bottlenose dolphins are distributed continuously around the Australian mainland, occurring in the estuarine and coastal waters of eastern, western and northern Australia. In Australia, the Indian ocean bottlenose dolphin is restricted to inshore areas such as bays and estuaries, nearshore waters, open coast environments, and shallow offshore waters including coastal areas around oceanic islands. This species is known to occupy four main regions of Australia: eastern Indian Ocean, Tasman Sea, Coral Sea and Arafura/Timor Seas. Movement patterns of Indian ocean bottlenose dolphins in Australia are variable, and include year-round residency in small areas, long-range movements and migration (DoEE 2018). Dolphins may pass through Smith Bay but are unlikely to be affected by the proposal.
Reptiles		
Caretta caretta Loggerhead turtle	Endangered, migratory marine	**Unlikely to be present:** The loggerhead turtle has a global distribution throughout tropical, sub-tropical and temperate waters (DoEE 2017). Nesting is concentrated mainly on sub-tropical beaches, which in Australia include southern Queensland and Western Australia (DoEE 2017). The turtle lives in the waters of coral and rocky reefs, seagrass beds and muddy bays throughout eastern, northern and western Australia, with foraging areas extending into southern Australia (DoEE 2017). It is likely to be a rare visitor to Kangaroo Island and is unlikely to use the study area.

Species name	EPBC Act status	Likelihood of presence and significance of habitat within the study area
Chelonia mydas Green turtle	Vulnerable, migratory marine	**Potentially present but unlikely to be affected by the proposal:** Green turtles nest, forage and migrate across tropical northern Australia, although individuals can stray into temperate waters (DoEE 2017). This marine pelagic species is unlikely to be affected by the proposal.
Dermochelys coriacea Leatherback turtle, leathery turtle	Endangered, migratory marine	**Unlikely to be present:** The leatherback turtle is a pelagic feeder found in tropical, subtropical and temperate waters throughout the world (DoEE 2017). No major nesting has been recorded in Australia, although scattered isolated nesting (one to three nests a year) occurs in southern Queensland and the Northern Territory (DoEE 2017). The leatherback turtle is a highly pelagic species, venturing close to shore mainly during the nesting season (DoEE 2017). It is likely to be a rare visitor to Kangaroo Island and is unlikely to visit the study area.
Sharks		
Carcharodon carcharias White shark, great white shark	Vulnerable, migratory marine	**Likely:** The great white shark is widely, but sparsely, found in all seas including cold temperate waters in both hemispheres (DoEE 2017). Although capable of crossing ocean basins, the species is typically found from close inshore habitats (such as rocky reefs and shallow coastal bays) to the outer continental shelf and slope areas (DoEE 2017). Although great whites may occasionally visit Smith Bay, they are unlikely to use the study area in any significant way.
Lamna nasus Porbeagle, mackerel shark	Migratory marine	**Unlikely to be present:** The porbeagle is wide-ranging and inhabits temperate, subarctic and subantarctic waters of the North Atlantic and Southern Hemisphere (DoEE 2017). It primarily inhabits oceanic waters and areas around the edge of the continental shelf, only occasionally moving into coastal waters (DoEE 2017). Although it may be occasionally present in Smith Bay, it is unlikely to use the study area in any significant way.

Note: species identified by the Department of the Environment and Energy in the EPBC referral (Appendix A1 – DAC Guidelines for the EIS) have been highlighted in orange text.

2. IMPACT ASSESSMENT

The proposal was the subject of an impact assessment on each species that could be present within the Smith Bay area. The three different phases of the proposal were considered (construction, operation and decommissioning) (Table 2-1 and Table 2-2).

The four species identified by the Minister for the Environment and Energy have been identified in orange text in Table 2-2.

A separate impact assessment (using the Matters of National Environmental Significance – Significant impact guidelines 1.1) on the four MNES species is presented in Chapter 14 - MNES.

Table 2-1: Impact assessment for protected flora occurring adjacent to the study area

Species	Status		Description	Impact assessment		
	EPBC Act	NPW Act		Construction	Operation	Decommissioning
Plants						
Kangaroo Island narrow-leaved mallee (*Eucalyptus cneorifolia*) woodland	Critically endangered	Not listed	There is a single patch of Kangaroo Island narrow-leaved mallee adjacent to Freeoak Road however, it does not meet the requirements of a protected ecological community under the TEC listing as it is not 60 m wide (EBS Ecology 2018). The patch of Kangaroo Island narrow-leaved mallee south of the study area meets the requirements of a protected ecological community under the TEC listing (EBS Ecology 2018).	Unlikely to have a significant impact The proposal site would be fenced to prevent unauthorised access to the patch of vegetation The CEMP would identify the site boundary	Unlikely to have a significant impact Buffer distances would be incorporated into the final design to reduce the likelihood of the proposal impacting the vegetation outside of the study area All stormwater runoff from operations would be collected onsite and would not discharge onto native vegetation	Unlikely to have a significant impact The proposal site would be fenced to prevent unauthorised access to the patch of vegetation The CEMP would identify the site boundary

Table 2-2: Impact assessment for fauna potentially occurring within the study area

Species	Status		Description	Impact assessment		
	EPBC Act	NPW Act		Construction	Operation	Decommissioning
Birds						
Actitis hypoleucos Common sandpiper	Migratory wetland, marine	Not listed	The common sandpiper uses a wide range of coastal wetlands and some inland wetlands. It is mostly found around muddy margins or rocky shores. The common sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream. The species is often associated with mangroves. There is a lack of suitable habitat for this	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
			species in Smith Bay and it is considered an infrequent visitor to the area.			
Apus pacificus Fork-tailed swift	Migratory (marine), marine	Not listed	The fork-tailed swift is of Asian origin and is almost exclusively aerial during its summer stay in Australia. This species can be classed as common throughout its range and is frequently observed ahead of large storm fronts, hunting insects. It is seen mostly over inland plains but sometimes above foothills or in coastal areas. It is considered a possible fly-over species in relation to the study area.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Ardea alba Great egret, white egret	Marine	Not listed	The great egret has been reported in a wide range of wetland habitats (for example, inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small, natural and artificial). It prefers shallow water, particularly flowing water, but may be seen on any watery area, including damp grasslands. The egret can be found alone or in small flocks, often with other egret species, and roosts at night in groups. It is partially migratory, with northern hemisphere birds moving south from areas with cold winters. Populations across Australia are considered to fluctuate in size in recognition of the highly variable availability of suitable wetland habitat. The species occupies individual sites erratically, and often in highly variable numbers, across a wide geographic area. It may occur at wetlands within the broader area, flying over the study area infrequently or using it occasionally to travel between sites. It is expected that this species would be an infrequent visitor to Smith Bay, with generally few individuals across the region.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Ardea ibis Cattle egret	Marine	Rare	The cattle egret utilises grasslands, woodlands and wetlands and prefers moist areas with tall grass, or shallow open wetlands, and wetland margins. It is common in northern Australia, but uncommon in most of its range in southern Australia.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
			Suitable habitats exist within and near the study area. The species is known to move freely between preferred habitat types. Generally, there are few of these egrets across the region and they are expected to visit Smith Bay infrequently.			
Ardenna carneipes Flesh-footed shearwater	Migratory (marine), marine	Rare	The flesh-footed shearwater breeds on 43 islands within Australian jurisdiction, including Smith Island off the south-eastern coast of Eyre Peninsula, Lord Howe Island, and numerous islands off the coast of south-western Western Australia (DoEE 2017). It is a common visitor to waters of the continental shelf and continental slope off southern Australia and around Lord Howe Island (DoEE 2017). The species migrates northward at the completion of the breeding season, moving across the southern Indian Ocean to the Arabian Sea and Gulf of Oman and possibly across Indonesia to the northern Pacific Ocean (DoEE 2017). It could be a fly-over species.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Arenaria interpres Ruddy turnstone	Migratory (wetland), marine	Rare	The ruddy turnstone is a migratory wading species which is a common visitor to Spencer Gulf during its routine non-breeding migration (September–March). The species prefers rockier coastline in southern Australia but is also observed on tidal mudflats and mangroves. It feeds around coastal lagoons and occasionally in low vegetation in saltmarsh or in grassy areas above the tide line. The species has recent records within the coastal zone near the study area (ALA 2016); this is in the same vicinity as where the hooded plover was recorded. This coastal bird could be a fly-over species.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Calidris acuminata Sharp-tailed sandpiper	Migratory (wetland), marine	Not listed	The sharp-tailed sandpiper is usually seen during the Australian winter. It prefers muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, saltmarsh or other low vegetation. There are no recent records of this species along the coast near the study area; the most recent was on 29	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
			October 2012 near a salt lagoon on the North Coast Road adjacent to the Bay of Shoals (ALA 2016). These coastal birds could be a fly-over species.			
Calidris ferruginea Curlew sandpiper	Critically endangered, migratory (wetland), marine	Not listed	In South Australia, curlew sandpipers inhabit widespread coastal and sub-coastal areas east of Streaky Bay. Important sites include ICI and Price Saltfields, and the Coorong. Occasionally they live in inland areas south of the River Murray and elsewhere (DoEE 2017). Records on Kangaroo Island are concentrated around Pelican Lagoon and Shoal Bay on the north-east coast and inland lakes; there are no records of this species in Smith Bay (ALA 2016). This species prefers intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast (DoEE 2017). Curlew sandpipers forage on mudflats and nearby shallow water. Based on these habitat preferences, this species is unlikely to occur in Smith Bay. It could be a fly-over species.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Calidris ruficollis Red-necked stint	Migratory (wetland), marine	Not listed	The red-necked stint is found mostly in sheltered coastal areas. It forages on bare, wet mud on intertidal mudflats, sandflats or in very shallow water (DoEE 2017). Although there are no recent records of this species in the general area, the *Atlas of Living Australia* recorded an individual on 6 February 1984 at the northern end of Emu Bay (ALA 2016). It could be a fly-over species.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Calyptorhynchus funereus Yellow-tailed black-cockatoo	Not listed	Vulnerable	The yellow-tailed black-cockatoo is found in south-eastern Australia, from south and central eastern Queensland to Victoria, Tasmania, and west to Eyre Peninsula in South Australia. It inhabits a variety of habitat types, but favours eucalypt woodlands, especially stringybark forests and woodlands with a heathy understorey and adjacent pine	Unlikely to have a significant impact due to the lack of suitable habitat in the study area	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
			plantations. Its favoured food is seeds of native trees including *Allocasuarina* spp. and *Banksia* spp., but it also feeds on cones of introduced pines, seeds from ground plants, and insects. Yellow-tailed black-cockatoos feed in small to large flocks. They breed in the hollows of large old-growth eucalypts. The cockatoo's vulnerable status is based mainly on a presumed low population (<10,000 individuals) and reduced reproductive potential due to fewer large tree hollows required for nesting and a lack of suitable food near nesting areas. Threats include loss of large nesting hollows and loss of native trees and shrubs used for food. The impacts of wildfire and prescribed burning may be detrimental if food plants are reduced or trees with hollows are destroyed. Competition for nesting hollows with other birds is likely to be another major threatening process. No individuals were detected during the site survey. This species is likely to only pass through the study area and would probably not use it for foraging or roosting due to the immature age of the planted eucalypts recorded during the site survey and lack of hollows (EBS Ecology 2018). The overall risk to the species as a result of the proposal is considered low, based on the lack of suitable habitat within the area.			
Calyptorhynchus lathami halmaturinus Glossy black-cockatoo (Kangaroo Island)	Endangered	Endangered	The glossy black-cockatoo (Kangaroo Island) is currently restricted to KI. It has been recorded at sites on the northern and western coasts of the Island, from Sandy Creek to Antechamber Bay, and along inland river systems including Cygnet, Stun'sail Boom, Harriet and Eleanor Rivers (DoEE 2017). This species inhabits woodlands that are dominated by drooping sheoak (*Allocasuarina verticillata*) and often interspersed with taller stands of sugar gum (*Eucalyptus cladocalyx*). These woodlands occur in small gullies adjacent to cleared land in coastal and sub-	Unlikely to have a significant impact due to the lack of suitable habitat in the study area	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
			coastal areas, generally on shallow acidic soils on the steep and rocky slopes of gorges and valleys, along inland creek and river systems (DoEE 2017). Breeding habitat comprises suitable hollows in sugar gum (*E. cladocalyx*), South Australian blue gum (*E. leucoxylon*) and manna gum (*E. viminalis* ssp. *cygnetensis*), usually located within 200 m of permanent water and 1 km of drooping sheoak (Mooney and Pedler 2005) These birds have been sighted and identified feeding regularly about 2 km from the site at Smith Bay (EBS Ecology 2018). The site is 600 m from the nearest feeding habitat, and more are situated along the North Coast Road (about 2 km away) (EBS Ecology 2018). The 2015 annual population census recorded 15 individuals inhabiting roadside vegetation along the North Coast Road. The flock comprised six adult pairs and three immature birds, which represents approximately 4 per cent of the Kangaroo Island population (EBS Ecology 2018). There are no suitable old-growth tree hollows at Smith Bay to provide breeding habitat for the subspecies. Furthermore, there is no sheoak (*Allocasuarina verticillata*) feeding habitat in the study area.			
Diomedea exulans Wandering albatross	Vulnerable, migratory (marine)	Vulnerable	The wandering albatross breeds on six subantarctic island groups and has a circumpolar distribution throughout the Southern Ocean (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Haematopus fuliginosus Sooty oystercatcher	Not listed	Rare	The sooty oystercatcher is endemic to Australia and is widespread in coastal eastern, southern and western Australia. The bird is strictly coastal and usually found within 50 m of the ocean. It prefers rocky shores but can be seen on coral reefs or sandy beaches near mudflats (DoEE 2017). It breeds on offshore islands and isolated rocky headlands and is	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
			mostly resident and territorial, moving to islands to breed. This species may roost along the water frontage/sandy shore of the study area; however, it is unlikely to breed there as the area does not provide optimal breeding habitat.			
Haematopus longirostris Australian pied oystercatcher	Not listed	Rare	The pied oystercatcher is found in coastal areas throughout the Australian continent except for areas of unbroken sea cliffs such as on the Great Australian Bight. Pied oystercatchers have probably declined throughout much of their range and the current population may be as low as 10,000 (DoEE 2017). This species prefers mudflats, sandbanks and sandy ocean beaches and is less common along rocky or shingle coastlines. Although rarely recorded far from the coast, the pied oystercatcher may occasionally be found in estuarine mudflats and short pasture. This species may roost along the water frontage/sandy shore of the study area; however, it is unlikely to breed there due to a lack of habitat.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Haliaeetus leucogaster White-bellied sea-eagle	Marine	Endangered	The white-bellied sea-eagle is usually found in coastal habitats including offshore islands. These habitats are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, sea). The birds generally forage over large expanses of open water; this is particularly true of those in coastal environments close to the shore, where they forage over in-shore waters (Smith 1985). White-bellied sea-eagles are long-lived, take many years to mature and defend specific territories around favoured nesting and roosting sites, which can be used for successive generations (Dennis et al. 2014). These birds have several guard roosts near their nesting territory, where they spend	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
			considerable amounts of the day. Unlike in other areas of Australia, the majority of South Australian white-bellied sea-eagle nests and guard roosts are on isolated and open cliffs devoid of major vegetation (Dennis et al. 2014). Therefore, nests and guard roosts can be disturbed much more easily in these exposed locations and from a greater distance than in more vegetated habitats (Dennis et al. 2011a). South Australia has a small and isolated population of the species, with only 70–80 pairs, mostly occurring on offshore islands (Dennis et al. 2014). Kangaroo Island contains about a quarter of the state's known population concentrated around 18 occupied territories (Dennis et al. 2011b). In South Australia, the breeding season for white-bellied sea-eagles is from May to December inclusive, with the most sensitive period being from mid-May to September (Dennis et al. 2011a). A single bird was observed foraging within the coastal zone of the study area during the site visit in August 2016. This species is also known to breed in the general area. It has been recorded within the coastal zone near the study area, including an instance at Emu Bay on 18 April 2011 (ALA 2016). This coastal species is likely to utilise the area as a fly-over pathway for foraging. There are no suitable old-growth trees or cliffs at Smith Bay to support breeding. It is unlikely that additional ship movements (12-18 a year) would affect nesting or foraging behaviour, as ships would not pass closer than 3-4 km from a nesting site.			
Halobaena caerulea Blue petrel	Vulnerable	Not listed	The blue petrel inhabits a few rock stacks off Macquarie Island, as well as numerous other subantarctic islands in the Indian and Atlantic oceans (Garnett et al. 2011). It forages throughout the Southern Ocean (Garnett et al.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
			2011). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.			
Larus pacificus Pacific gull	Marine	Not listed	The Pacific gull is endemic to southern Australia. The subspecies *L. p. georgii* is found on the coasts of south-western Western Australia and western South Australia, usually on sandy beaches and also on rocky coasts and offshore islands. It forages along sandy beaches, feeding mainly on molluscs, fish, crabs and other marine animals and is usually seen singly or in pairs. The Pacific gull breeds from October to December in pairs or in small, loose colonies on offshore islands, cliffs and headlands. The gull was observed within the coastal zone of the study area during the site visit in August 2016. The most recent record near the study area is at Cape D'Estaing near Emu Bay on 30 September 2002 (ALA 2016). There are several other records of sightings around Emu Bay. While the gulls might fly over Smith Bay they are unlikely to use the coastal zone for breeding.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Macronectes giganteus Southern giant petrel	Endangered, migratory (marine)	Vulnerable	The southern giant petrel is widespread in the Southern Ocean. It breeds on six subantarctic and Antarctic islands in Australian territory: Macquarie Island, Heard Island and McDonald Islands in the Southern Ocean, and Giganteus Island, Hawker Island, and Frazier Island in the Australian Antarctic Territories (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Macronectes halli Northern giant petrel	Vulnerable, migratory (marine)	Not listed	The northern giant petrel breeds in the sub-Antarctic and visits areas off the Australian mainland mainly during the winter months (May–October) (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
Pachyptila turtur subantarctic Fairy prion (southern)	Vulnerable	Not listed	The birds breed on Macquarie Island and a number of other subantarctic islands (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Pandion haliaetus Osprey	Migratory (wetland), marine	Rare	The osprey is a medium-size raptor that usually lives singly or in pairs in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. It requires extensive areas of open fresh, brackish or saline water for foraging. The breeding population of ospreys in South Australia is small and fragmented. A single bird was observed south of Point Marsden on 6 June 2010 in open limestone coastline with low coastal cliffs (ALA 2016). The species can be seen regularly at Emu Bay and possibly on the eastern side of Cape d'Estaing. Although no suitable habitat exists within the coastal zone of the study site, there are cliffs on either side of the area along the coastal fringe. The osprey is considered a possible fly-over species. It is unlikely that additional ship movements (12-18 a year) would impact nesting or foraging behaviour, as ships would not pass closer than 3–4 km from a nesting site.	Unlikely to have a significant impact due to the lack of suitable habitat in the study area	Unlikely to have a significant impact	Unlikely to have a significant impact
Phalacrocorax fuscescens Black-faced cormorant	Marine	Not listed	Black-faced cormorants inhabit the southern coasts of mainland Australia and Tasmania and is common in Bass Strait and in Spencer Gulf, South Australia. They frequent coastal waters and are found in flocks in large bays, deep inlets, rocky headlands and on islands. They seldom visit beaches. Black-faced cormorants are sedentary, breeding throughout the year in large colonies on offshore islands. Their nests are usually made of seaweed and grasses and are always on the ground, on bare rock (DoEE 2017). The closest record of this species to the study area is at Cape D'Estaing near Emu Bay on 30 September 2002. These birds could be a fly-	Unlikely to have a significant impact due to the lack of suitable habitat in the study area	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
			over species.			
Phoebetria fusca Sooty albatross	Vulnerable, migratory (marine)	Endangered	The sooty albatross breeds on islands in the southern Indian and Atlantic oceans, and is a rare but probably regular migrant to Australia, mostly in the autumn and winter months (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Sternula nereis nereis Australian fairy tern	Vulnerable	Not listed	The Australian fairy tern is found on coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons. It favours both fresh and saline wetlands and near-coastal terrestrial wetlands, including lakes and salt-ponds (DoEE 2017). Sheltered estuaries east of the study area appear suitable for this species, although there have been no recent records for the coastal area near the study site. The species is generally confined to the coastal zone but possibly would fly over the site. The closest record to the study area was of 23 individuals observed feeding and roosting at the Bay of Shoals on 19 October 2005 (ALA 2016).	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Thalassarche cauta cauta Shy albatross, Tasmanian shy albatross	Vulnerable, migratory (marine)	Vulnerable	The shy albatross breeds on Albatross Island in Bass Strait and on Mewstone and Pedra Branca islands south-west of Tasmania (Garnett et al. 2011). At sea, adults usually remain in Australian waters but sometimes travel to South Africa to forage over shelf waters (Garnett et al. 2011). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Thalassarche melanophris Black-browed albatross	Vulnerable, migratory (marine)	Not listed	The black-browed albatross breeds on Heard Island and McDonald Islands, Bishop and Clerk islets, and Macquarie Island in Australia; and at a number of other locations including South Georgia, Crozet, Kerguelen, Antipodes and Campbell islands, as well as on the Falkland Islands and on four island groups off southern Chile (Garnett et al. 2011). At sea it	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
			has a circumpolar distribution, and is common at the continental shelf and shelf-break of South Australia, Victoria, Tasmania, western and eastern Bass Strait and New South Wales (DoEE 2017). It is a marine, pelagic, aerial species and is unlikely to be affected by the proposal.			
Thinornis rubricollis hooded plover	Marine Vulnerable	Vulnerable	The hooded plover (eastern) is widely dispersed in south-eastern Australia on or near sandy beaches with strong (high-energy) waves, and their adjacent dunes. Its range extends from around Jervis Bay in New South Wales to the western reaches of Eyre Peninsula in South Australia and includes Tasmania and various offshore islands such as Kangaroo Island, King Island and Flinders Island (DoEE 2017). Approximately 10 m of the shore at Smith Bay has been artificially cleared of boulders and now offers a sheltered sandy section, which is used as a public boat ramp. The dispersed nature of the breeding distribution means that all populations are important, and that loss of any population would result in fragmentation. The birds are generally found close to shore but may occasionally visit sites a short distance inland, such as lakes near the coast). It has been claimed that the species has reasonably narrow preferences in beach habitat, but recent studies suggest they use a variety of beach types. They are sometimes found in habitats other than beaches, for example on rock platforms, reefs, and around/near coastal lakes and lagoons. The biennial Kangaroo Island census recorded a pair of hooded plovers at Smith Bay in 2010, 2014 and 2016 (G. Maguire 2017, pers. comm., 10 July).	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact
Tringa nebularia Common	Migratory (wetland), marine	Not listed	The common greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats. It uses both permanent and	Unlikely to have a significant impact	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
greenshank			ephemeral terrestrial wetlands and forages and roosts in shallow ponds and at the edge of wetlands. The birds are mostly present between August and April, although some data suggests they have remained in South Australia throughout the winter months. The closest record of this species to the study area is at Shoal Bay on 15 July 2000 (ALA 2016). The greenshanks would generally be found in the coastal area but are considered a possible fly-over species.			
Mammals						
Arctocephalus forsteri Long-nosed fur-seal	Marine	Not listed	See Chapter 12 - Marine Ecology			
Balaenoptera edeni Bryde's whale	Migratory (marine)	Rare	See Chapter 12 - Marine Ecology			
Delphinus delphis Common dolphin	Marine	Not listed	See Chapter 12 - Marine Ecology			
Eubalaena australis southern right whale	Endangered Migratory	Vulnerable	See Chapter 12 – Marine Ecology. See Appendix I2.			
Isoodon obesulus obesulus Southern brown bandicoot (eastern)	Endangered	Vulnerable	The southern brown bandicoot (eastern) is found from areas south of the Hawkesbury River in New South Wales to Kangaroo Island in South Australia (TSSC 2016). Within this range, it is found predominantly in coastal areas (Woinarski et al. 2014). In South Australia, the southern brown bandicoot (eastern) is found in the south-east (particularly along the Mount Burr Range), in the Mount Lofty Ranges, on Fleurieu Peninsula and on Kangaroo Island. The animal is nocturnal and rarely ventures far from cover (Braithwaite 1995). It prefers areas of dense vegetation, including wetland fringes and heathland and exotic shrubs such as blackberry (Paull 2008). Within these habitats,	Unlikely to have a significant impact on individuals or community due to the lack of dense understorey habitat within the study area.	Unlikely to have a significant impact	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
			the bandicoot prefers areas of dense ground cover of greater than 50 per cent average foliage density within the 0.2–1 m height range (DSEWPaC 2011). The presence of such dense understorey is a key factor in the assessment of potential bandicoot habitat. It feeds on earthworms and other invertebrates, as well as fungi and other subterranean plant material. This species does not create burrows, but may use the burrows of other animals; however, it will usually nest on the ground under vegetation (Paull 2008). Breeding may occur throughout the year but peaks in spring (Woinarski et al. 2014). Surveys in 2008 suggest the subspecies is widespread on Kangaroo Island, but trends in distribution are unclear (TSSC 2016). The bandicoot has been recorded at Cape Cassini, Lathami Conservation Park, Parndana Conservation Park and a number of Heritage Agreement properties within a 10 km radius of Smith Bay, but there are no records within Smith Bay itself or the adjacent properties. The nearest record is approximately 2 km south-west of the study site, where a live animal was observed in bushland adjacent to North Coast Road on 26 September 2011.			
Megaptera novaeangliae Humpback whale	Vulnerable, migratory (marine)	Vulnerable	See Chapter 12 - Marine Ecology			
Neophoca cinerea Australian sea lion	Vulnerable, marine	Vulnerable	See Chapter 12 - Marine Ecology			
Tachyglossus aculeatus multiaculeatus Kangaroo Island echidna	Endangered	Not listed	The Kangaroo Island echidna is restricted to a single location and its range is estimated to cover 4400 square kilometres (Woinarski et al. 2014). The number of mature individuals continues to decline. This species is relatively common throughout most of the Island's remaining natural vegetation, but at a lower density than before European settlement due to habitat loss (Rismiller 1999). This species is	Vegetation clearance is unlikely to have a significant impact on the local population due to the presence of suitable habitat surrounding the study area.	The impact from vehicle movements on the species is unpredictable.	Unlikely to have a significant impact

Species	Status		Description	Impact assessment		
			declining due to predation by cats and pigs, and to road kills. Breeding does not keep up with the rate of non-natural and natural deaths (TSSC 2015). The number of mature animals is estimated at 5000 and the reduction in population is approaching 30 per cent in 75 years (three generations). Because the species is restricted to a single location its prospects for survival are precarious and the number of mature individuals is likely to continue to decline. Echidnas are susceptible to heat stress and tend to be more active at night. They have acute hearing and any unusual sound will make them 'freeze' or hide underground or in leaf litter (Augee *et al*. 2006). Echidna diggings were observed during the field survey completed by EBS but no individuals were observed. There is suitable habitat for this species surrounding the study area.	Vehicle movements may have unpredictable impacts on the local population of echidnas.		
Trichosurus vulpecula Common brushtail possum	Not listed	Rare	The common brushtail possum is widespread throughout Australia and is also found on Tasmania and a number of other offshore islands, including Barrow Island and Kangaroo Island. This species occupies a wide range of habitats including rainforest, woodland, dry eucalypt forest, pine plantations, semi-arid areas and even urban gardens and parks. Although this species may occur within the study area, it can find suitable habitat throughout much of Kangaroo Island.	Unlikely to have a significant impact due to suitable habitat (eucalypt and sheoak woodland) being present in areas adjacent to the study area	Unlikely to have a significant impact	Unlikely to have a significant impact
Tursiops aduncus Indian Ocean bottlenose dolphin	Marine	Not listed	See Chapter 12 - Marine Ecology			
Reptiles						
Chelonia mydas Green turtle	Vulnerable, migratory (marine)	Vulnerable	See Chapter 12 - Marine Ecology			

Species	Status		Description	Impact assessment		
Varanus rosenbergi Heath goanna	Not listed	Vulnerable	The heath goanna is distributed in a thin band between the south-west of Western Australia and the south-east of South Australia. Its natural range in SA is higher-rainfall agricultural areas in southern regions. The species is still common on Kangaroo Island. Its habitat across southern Australia includes coastal heaths, humid woodlands, and wet and dry sclerophyll forests (Cogger 2000). Although this species may occur within the study area, it has suitable habitat throughout much of Kangaroo Island.	Unlikely to have a significant impact due to suitable habitat in areas adjacent to the study area	Unlikely to have a significant impact	Unlikely to have a significant impact
Sharks						
Carcharodon carcharias White shark, great white shark	Vulnerable, migratory (marine)	Not listed	See Chapter 12 - Marine Ecology			

2.1 Conclusions

It is unlikely that the proposal would pose an unacceptable risk to any of the threatened, migratory or marine terrestrial fauna that may inhabit the study area, with the exception of the Kangaroo Island echidna. There is not enough information (on population numbers and how many echidnas are likely to be victims of road kill) to determine the likelihood of a significant impact on the species and therefore an offsets package has been drafted (refer to Chapter 14 – MNES).

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