

Witton Bluff Base Trail Project

Flora and Fauna Assessment

August 2020



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Executive summary

This report summarises the flora and fauna values that may be impacted by proposed construction of the Witton Bluff Base Trail. The area was surveyed in August 2020. Whilst there are sections of remnant vegetation along the proposed trail route, it is generally in poor to moderate condition. The first section of the trail (from the north), proposed to follow the existing track, is abutted by highly disturbed vegetation, with grassy and herbaceous weeds dominant, and native species (including both species that have naturally recolonised the site and species that are considered to be planted) are generally scattered low and medium shrub species. This area was allocated a low retention value. On the northern limestone platform, where the trail is proposed to become a boardwalk, there is scattered low native shrub and groundcover species, and this area is considered to be in a moderate condition, with the low diversity of species and wide spacing of shrubs due to exposure to salt and wind from the ocean. This section was allocated a moderate retention value. The southern area of limestone platform is devoid of native species due to coastal exposure. There is a small section of native shrubland at the southern end of the assessed area. This area is considered to be in poor to moderate condition, with a moderate diversity of native species, but a number of highly threatening weeds in coastal systems also present. This area was allocated a moderate retention value.

The proposed project falls within the area where the *Native Vegetation Act 1991* applies, and so the City of Onkaparinga will require approval to clear native vegetation on the site under *Regulation 12(36) – Recreation Track* of the *Native Vegetation Act 1991*. This Regulation allows for clearance of vegetation to establish or maintain a track for public recreational use involving the use of non-motorised vehicles, such as for bicycles or horses. When making a decision in relation to the information to be provided by an applicant to inform whether approval should be granted, the Native Vegetation Council (NVC) will assess the level of risk to biodiversity presented by the clearance proposal. In this instance the level of risk is likely to be ‘Level 2’ as likely areas of clearance may exceed 500m². Level 2 clearance applications are delegated to the Native Vegetation Management Unit for assessment and decision. Data collected during this assessment can be used to provide this clearance application once final impact envelopes are known.

No species of State or National conservation significance were observed during field survey, and the potential impact area is unlikely to provide significant habitat for any flora or fauna of State or National conservation significance. As such a referral under the *Environment Protection and Biodiversity Conservation Act 1999* is unlikely to be required.

1. Introduction

Since 2003, the City of Onkaparinga has been working in close partnership with the Department of Planning, Transport and Infrastructure to deliver the State Government’s Coast Park vision for a 70km coastal linear park between North Haven and Sellicks Beach on the Adelaide coastline. To date 51.5km of Coast Park have been completed, 17.1km within the City of Onkaparinga area. A further 18.5km are yet to be completed, 13.9km within the City of Onkaparinga.

In June 2019, council approved the Coast Park Plan 2019 “Delivering the Coast Park Vision”. The Plan highlighted gaps in the delivery of Coast Park and provided priority actions for the staged

implementation of the remaining 13.9km. The northern section of Coast Park (Council's northern boundary at Pedler Creek, Moana) is fully constructed (8.1km) or design for the unconstructed sections is well advanced, with the exception of the Port Stanvac segment (3km, which is not owned by Council).

Witton Bluff Base Trail (WBBT) at Port Noarlunga was identified in the Coast Park Plan as a priority action, with detailed design to commence in 2019-20 and construction in 2020-2021. The Witton Bluff Base Trail segment will provide a considerable tourist drawcard, creating a unique experience with the shared use path close to the water's edge.

Funding was secured from state government in May 2020 as part of the Open Space and Places for People Grant Program.

The WBBT project scope focuses on the creation of a 1.1km section of accessible pathway around Witton Bluff, extending from the foreshore at Christies Beach to just north of the Port Noarlunga jetty (refer Figure 1). The proposal is to seal the existing gravel path from the Christies Beach foreshore to the Bluff and continue with a new boardwalk pathway around the base of the cliffs and above the limestone shelf to the Port Noarlunga foreshore. Concept design work commenced in 2008 with initial investigations and development of early concepts.

The scope of the WBBT works include:

- Upgrade of the existing unsealed pathway from Christies Beach to the wave-cut shelf to a 3-metre-wide (4m including 0.5m shoulders) DDA compliant shared-use path
- A new 3m wide (clear) DDA compliant boardwalk above the wave-cut shelf designed to accommodate both pedestrians and cyclists
- A coastal path link in the embayment area between the wave-cut shelves, which could consist of:
 - modification of the existing revetment wall
 - construction of an elevated platform
 - a bridge type structure
- Repair of the existing seawall (subject to budget)
- New and formalised viewing areas and pedestrian and cyclist access connections to adjoining shared path and cycle networks
- New landscaping and revegetation with local indigenous species suitable to the coastal environment
- Interpretive and wayfinding signage
- Appropriate trail lighting and furniture
- Public art to reflect the coastal setting and recognise Kaurua heritage, including the important Tjilbruke Dreaming

In 2005 an Ecological Investigation¹ was undertaken on part of the site shown below as part of a larger study. This work concluded that:

¹ Connell Wagner 2005. Witton Bluff Base Trail: Environmental Feasibility and Design Concept Study. Repoer prepared for City of Onkaparinga.

“The majority of this area contains little native vegetation and the impact on native vegetation in this area is considered to be insignificant. The main area containing native vegetation is located at the southern end of the proposed trail where the trail will connect to the stairs. At this point there may be an impact on several large native shrubs, which may require some trimming, but should not require removal. The understorey vegetation in this area is dominated by weed species, and therefore the proposed development will have a negligible impact on native flora.

Any construction works associated with the proposed trail should avoid the areas on the cliff face, as it contains significant native vegetation.”

The intent of this report is to summarise flora and fauna that may be impacted by the proposed Witton Bluff Base Trail, and provide an overview of referrals or approvals that will be required under the *Native Vegetation Act 1991* and/or the *Environment Protection and Biodiversity Conservation Act 1999*.



Figure 1: map of areas assessed

2. Methods

2.1 Flora assessment

Data was gathered as per the Bushland Assessment method² which is used by the Native Vegetation Council and accredited consultants to assess the value of remnant vegetation. Field data was gathered on Tuesday 4th and Monday 24th of August 2020.

To provide a broad indication of the condition of remnant vegetation within the assessed areas, each habitat type was assessed against the following condition criteria³ to allocate a condition score.

Condition	General Description	Indicated by:
Very Poor	Weed-dominated with only scattered areas or patches of native vegetation	- Vegetation structure no longer intact (eg. 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, no evidence of soil surface crust)
Poor	Native vegetation with considerable disturbance	- Vegetation structure substantially altered (eg. 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)
Moderate	Native vegetation with some disturbance	- Vegetation structure altered (eg. one or more vegetation strata depleted) - Most seed sources available to regenerate original structure - Obvious signs of disturbance (eg. tracks, bare ground) - Minor clearing (<10% of area) - Considerable weed infestation with some aggressive weeds - Evidence of some grazing (tracks, soil surface crust patchy)
Good	Native vegetation with little disturbance	- Vegetation structure intact (eg. all strata intact) - Disturbance minor, only affecting individual species - Only non-aggressive weeds present - Some litter build-up
Excellent	Intact vegetation	- 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

² Native Vegetation Management Unit (2020). Native Vegetation Council (NVC) Bushland Assessment Manual. Government of South Australia, Adelaide.

³ Based upon condition assessment used in Native Vegetation Council (2005). Guidelines for a Native Vegetation Significant Environmental Benefit Policy for the clearance of native vegetation associated with the minerals and petroleum industry.

In addition, an assessment of the retention value of the vegetation within the project area was undertaken. Each community was assigned to one of the following categories:

- High retention value – Vegetation that is deemed significant, either as a good condition remnant of vegetation representative of the native vegetation that occurs in the region, or that forms important habitat for species of State or National conservation significance.
- Medium retention value –Vegetation that is deemed moderate condition vegetation (which may include revegetation) and that is representative of the native vegetation that occurs in the region, but does not form important habitat for species of State or National conservation significance.
- Low retention value – vegetation that is not considered to be representative of the native vegetation that occurs in the region (which may include revegetation) and does not form important habitat for any species of State or National conservation significance.

2.1.1 Vegetation mapping

Vegetation mapping was based upon aerial photography, supplemented by field observations, including the use of tracking on a hand held GPS whilst walking the boundaries of vegetation associations that were difficult to detect on aerial photography. The vegetation was mapped to 2 metres outside the existing track boundary on the eastern side of the existing track, and all vegetation present to the west of the existing track was mapped and assessed, along with patches along the proposed boardwalk section. Final shapefiles were digitised based upon field notes and tracks, photographs and attributes that could be detected on the aerial photography.

2.2 Fauna assessment

2.2.1 Bird Survey

Bird survey was undertaken along the length of the proposed Base Trail, as per standard Biological Survey of South Australia methods⁴. Identification was either visual or by call.

2.3 Database Searches for Flora and Fauna

Results from these surveys were supplemented with desktop searches within a 5 kilometre buffer of the boundaries of the survey area using the following resources:

- South Australian Department of Environment, Water and Natural Resources Biological Database of South Australia (BDBSA) search⁵;
- Birdlife Australia post 2006 records (which includes all Birdlife Australia records not incorporated into the BDBSA database)
- Department of Environment and Energy (DoEE) Protected Matters Search Tool (PMST);⁶

⁴ Owens, H. (ed.) (2000). Guidelines for Vertebrate Surveys in South Australia using the Biological Survey of South Australia. Biological Survey and Research Section, Department for Environment and Heritage.

⁵ Department of Environment and Natural Resources, Biological Databases of SA (BDSA). This data has been sourced from the South Australian Department of Environment, Water and Natural Resources Biological Database of SA. Recordset number DEWNRBDBSA200818-2.

⁶ Australian Government (2020). <http://www.environment.gov.au/epbc/protected-matters-search-tool> accessed 24/8/2020.

The 5km buffer was chosen in keeping with the Native Vegetation Council's "Bushland Assessment Method"⁷. For State or Nationally threatened species, a likelihood assessment was undertaken based upon comparison of known published habitat notes for all species against the habitat types observed during the field survey.

3. Results

3.1 Vegetation communities

Four vegetation types were mapped in the assessment area - none of the communities present are of State or National conservation significance. The four vegetation communities are mapped in Figure 2 and described below.

3.1.1 Vegetation Community 1: **Oxalis pes-caprae*, **Aizoon pubescens*, **Reichardia tingitana*, **Gramineae spp.* herbland with scattered emergent *Nitraria billardieri*, *Myoporum insulare*

This vegetation type is at the northern end of the area assessed (Figure 3), along with a small section at the base of Witton Bluff (Figure 4). It is considered to be in poor to very poor condition, with the understorey dominated by introduced weed species, with Soursob (**Oxalis pes-caprae*) and Coastal Galenia (**Aizoon pubescens*) the most abundant weeds, with annual introduced grasses also abundant.

Nitre Bush (*Nitraria billardieri*) is the most common moderate sized shrub species present, estimated at <5% cover overall, and is considered likely to be a naturally regenerating species, however there are also some indigenous medium shrub species present which are considered likely to be planted, including Common Boobialla (*Myoporum insulare*), Cushion Fanflower (*Scaevola crassifolia*), Forked Twinleaf (*Zygophyllum confluens*) and Umbrella/Cup Wattle (*Acacia ligulata/cupularis*).

There are scattered low (<0.5m) understorey shrubs (<1% cover overall), including Salt Bluebush (*Maireana oppositifolia*), Coast Bonefruit (*Threlkeldia diffusa*), Ruby Saltbush (*Enchylaena tomentosa*), Small-spine bindyi (*Sclerolaena uniflora*), Black-seed Samphire (*Tecticornia pergranulata ssp. pergranulata*) and Marsh Saltbush (*Atriplex paludosa ssp.*). The latter species is considered likely to have been planted, but other species are considered likely to have regenerated from seed present in the soil or deposited in the area by fauna. At ground layer, Round-leaf Pigface (*Disphyma crassifolium ssp. clavellatum*) forms cover of <1%, with weed species dominant at this level. Total native understorey biomass is estimated at <5% (ie introduced species make up over 95% of the ground layer biomass). This area was allocated a **low** retention value.

⁷ Native Vegetation Management Unit (2019). Native Vegetation Council (NVC) Bushland Assessment Manual. Government of South Australia, Adelaide.



Figure 2: Vegetation in the potential impact area



Figure 3: Vegetation Community 1, taken facing S from 269535, 6108501 (WGS 84, Zone 54)



Figure 4: Vegetation Community 1, taken facing S from 269190, 6108027 (WGS 84, Zone 54)

3.1.2 Vegetation Community 2: *Atriplex nummularia* shrubland

This vegetation type extends from approximately opposite the end of Dale Avenue to the end of Benny Avenue (Figure 2). It is considered to be in poor to very poor condition, with the understorey dominated by introduced weed species, and the overstorey layer principally Old Man Saltbush (*Atriplex nummularia*), which has been planted or has naturally regenerated from plantings along the Esplanade, but is not considered part of the indigenous flora of the Mount Lofty Ranges region⁸. This species forms cover of 6-25%. Nitre Bush (*Nitraria billardieri*) is also present as scattered plants, forming <1% cover overall.

There are scattered low (<0.5m) understorey shrubs (<1% cover overall), including Salt Bluebush (*Maireana oppositifolia*), Ruby Saltbush (*Enchylaena tomentosa*), Small-spine bindyi (*Sclerolaena uniflora*), and Marsh Saltbush (*Atriplex paludosa* ssp.). The latter species is considered likely to have been planted, but other species are considered likely to have regenerated from seed present in the soil or deposited in the area by fauna. At ground layer, Round-leaf Pigface (*Disphyma crassifolium* ssp. *clavellatum*) forms cover of <1%, with weed species dominant at this level. There were also very scattered Wallaby Grass (*Rytidosperma* sp.) present. Figure 5 provides an indicative photograph of this community. Total native understorey biomass is estimated at <5% (ie introduced species make up over 95% of the ground layer biomass). This area was allocated a **low** retention value.



Figure 5: Vegetation Community 2, taken facing S from 269332, 6108225 (WGS 84, Zone 54)

⁸ Gillam, S. and Urban, R. (2014) Regional Species Conservation Assessment Project, Phase 1 Report: Regional Species Status Assessments, Adelaide and Mount Lofty Ranges NRM Region. Department of Environment, Water and Natural Resources, South Australia.

3.1.3 Vegetation Community 3: *Maireana oppositifolia* very open shrubland

This vegetation type occurs on the northern limestone platform (Figure 2). It is considered to be in moderate condition, with the low diversity of species and wide spacing of shrubs due to exposure to salt and wind from the ocean. Overall cover of vegetation is estimated at <1%. The most abundant species is Salt Bluebush (*Maireana oppositifolia*), with the only other native species detected in the survey area being the low shrub Black-seed Samphire (*Tecticornia pergranulata* ssp. *pergranulata*) and the mat plant Round-leaf Pigface (*Disphyma crassifolium* ssp. *clavellatum*). Weeds are also very scattered, with Sea-lavender (**Limonium campanyonis*) and an introduced annual grass (**Gramineae* sp.) plentiful but of low cover (<1%), and scattered Gazania (**Gazania linearis*) and Common Iceplant (**Mesembryanthemum crystallinum*) also present. Figure 6 provides an indicative photograph of this community. This area was allocated a **moderate** retention value.



Figure 6: Vegetation Community 3, taken facing S from 269211, 6107914 (WGS 84, Zone 54)

3.1.4 Vegetation Community 4: *Nitraria billardieri*, *Myoporum insulare* shrubland

This vegetation type occurs at the southern end of the assessed area (Figure 2). It is considered to be in poor to moderate condition, with a moderate diversity of native species, but a number of highly threatening weeds in coastal systems also present. Nitre Bush (*Nitraria billardieri*) and Coastal Boobialla (*Myoporum insulare*) are the overstorey dominant moderate sized shrub species, generally of height 1-2 metres but occasionally exceeding 2 metres. The Nitre Bush is more abundant on the exposed west facing coastal slopes, with the Coastal Boobialla present in the more sheltered south facing slopes in this section. Coast Saltbush (*Atriplex cinerea*) is also present as scattered plants in the overstorey, along with the weed Boxthorn (**Lycium ferocissimum*). The native creeper Coastal Climbing Lignum (*Muehlenbeckia gunnii*) is present twining through the overstorey shrubs.

There are scattered low (<0.5m) understorey shrubs (<1% cover overall), including Salt Bluebush (*Maireana oppositifolia*), Coast Bonefruit (*Threlkeldia diffusa*), Ruby Saltbush (*Enchylaena tomentosa*) and Marsh Saltbush (*Atriplex paludosa* ssp.). The latter species is considered likely to have been planted, but other species are considered likely to have regenerated from seed present in the soil or deposited in the area by fauna.

At ground layer, Round-leaf Pigface (*Disphyma crassifolium* ssp. *clavellatum*) is plentiful, but total cover is still estimated at <1%. Grassy and herbaceous weeds are common, forming 80% of the understorey biomass, including Hare's Tail Grass (*Lagurus ovatus*), Burr-medic (*Medicago polymorpha* var. *polymorpha*), Gazania (*Gazania* sp.), Soursob (*Oxalis pes-caprae*), Common Sow-thistle (*Sonchus oleraceus*), and an iceplant species (not currently flowering but considered likely to be *Drosanthemum candens*). Figures 7 and 8 show indicative photographs of this community. This area was allocated a **moderate** retention value.



Figure 7: Vegetation Community 4, taken facing SE from 269264, 6107599 (WGS 84, Zone 54)



Figure 8: Vegetation Community 4, taken facing SSE from 269268, 6107603 (WGS 84, Zone 54)

3.2 Native Plant Species

Table 1 provides a list of native plant species observed in the potential impact area. No species of State or National conservation significance were detected in the area examined. The two species of highest regional conservation significance (Vulnerable) are both considered to be planted in the site. Three other species, Nitre Bush (*Nitraria billardieri*), Small-spine Bindyi (*Sclerolaena uniflora*) and Black-seed Samphire (*Tecticornia pergranulata* ssp. *pergranulata*) are considered Rare at a regional level.

No flora species of State or National conservation significance have been recorded in the potential impact area. Appendix 1 provides a list of flora species of State and National conservation significance that have been recorded within 5km of the site, along with an assessment of the likelihood that the species would occur in the potential impact area. Given the small size of the potential impact area, the relatively disturbed nature of the vegetation present, the coastal nature of the vegetation, and the fact that the site has been surveyed on two occasions (this study and by Environment and Biodiversity Services for Connell Wagner in 2005⁹) it is considered unlikely that any species of State or National conservation significance are naturally occurring in the site (although note that the state Rare Creeping Boobialla *Myoporum parvifolium* was noted in revegetation near the site).

⁹ Connell Wagner 2005. Witton Bluff Base Trail: Environmental Feasibility and Design Concept Study. Repoer prepared for City of Onkaparinga.

Table 1: Native plant species detected during field survey

Scientific Name	Common Name	Conservation status			Community			
		EPBC ¹⁰	NPW ¹¹	Reg. ¹²	1	2	3	4
<i>Acacia ligulata/cupularis</i>	Umbrella/Cup Wattle (planted)			RA	X			
<i>Atriplex cinerea</i>	Coast Saltbush			LC				X
* <i>Atriplex nummularia</i>	Old-man Saltbush (planted)					X		
<i>Atriplex paludosa ssp.</i>	Marsh Saltbush (planted)				X	X		X
<i>Disphyma crassifolium ssp. clavellatum</i>	Round-leaf Pigface			LC	X	X	X	X
<i>Enchylaena tomentosa var. tomentosa</i>	Ruby Saltbush			LC	X	X		X
<i>Euphorbia drummondii</i>				LC	X			
<i>Leucophyta brownii</i>	Coast Cushion Bush			NT				X
<i>Maireana oppositifolia</i>	Salt Bluebush			LC	X	X	X	X
<i>Muehlenbeckia gunnii</i>	Coastal Climbing Lignum			LC	X	X		X
<i>Myoporum insulare (planted)</i>	Common Boobialla			NT	X			X
<i>Nitraria billardieri</i>	Nitre-bush			RA	X	X		X
<i>Rytidosperma sp.</i>	Wallaby-grass					X		
<i>Scaevola crassifolia</i>	Cushion Fanflower (planted)			VU	X			
<i>Sclerolaena uniflora</i>	Small-spine Bindyi			RA	X	X		
<i>Tecticornia pergranulata ssp. pergranulata</i>	Black-seed Samphire			RA	X		X	
<i>Threlkeldia diffusa</i>	Coast Bonefruit			NT	X			X
<i>Zygophyllum confluens (planted)</i>	Forked Twinleaf			VU	X			

*Native plant species but not considered indigenous to the area

3.3 Fauna

Table 2 provides a list of birds observed during field survey. The relatively disturbed nature of the site, urban nature of the area, and ongoing disturbance from walkers mean that the diversity of bird species that would use the impact areas would be relatively low. No species of State or National conservation significance were observed but two species of regional conservation significance were observed – the regionally rare Black-faced Cormorant (*Phalacrocorax fuscescens*) and the regionally Vulnerable Pacific Gull (*Larus pacificus*).

Appendix 2 provides a list of all fauna species of State or National conservation significance that have been recorded within 5km of the site. Whilst there are some rated fauna species, such as the Peregrine Falcon (*Falco peregrinus*) that may occasionally fly over the site, or the Sooty Oystercatcher (*Haematopus fuliginosus*) which may roost or feed on the rocky banks, it is considered unlikely that any of the areas of native vegetation assessed provide significant habitat for species of State or National conservation significance. The potential impact areas are considered unlikely to provide habitat for any mammal, reptile or amphibian species of conservation significance.

¹⁰ As per the Environment Protection and Biodiversity Conservation Act 1999

¹¹ As per the National Parks and Wildlife Act 1972

¹² As per Gillam, S. and Urban, R. (2014) *Regional Species Conservation Assessment Project, Phase 1 Report: Regional Species Status Assessments, Adelaide and Mount Lofty Ranges NRM Region*. Department of Environment, Water and Natural Resources, South Australia.

Table 2: Bird species observed during field survey

Scientific Name	Common Name	Conservation status			Notes 1
		EPBC ¹³	NPW ¹⁴	Reg. ¹⁵	
<i>Gymnorhina tibicen</i>	Australian Magpie			LC	Observed in shrublands along cliffs
<i>Phalacrocorax fuscescens</i>	Black-faced Cormorant			RA	Roosting on edge of limestone shelf
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant			LC	Roosting on edge of limestone shelf
<i>Microcarbo melanoleucos</i>	Little Pied Cormorant			LC	Roosting on rock wall
<i>Corvus mellori</i>	Little Raven			LC	Flew over site
<i>Falco cenchroides</i>	Nankeen Kestrel			LC	Foraging along cliffs
<i>Larus pacificus</i>	Pacific Gull			VU	Observed on beach adjacent Port Noarlunga Jetty
<i>Phalacrocorax varius</i>	Pied Cormorant			LC	Roosting on edge of limestone shelf
<i>Chroicocephalus novaehollandiae</i>	Silver Gull			LC	Flew over site
<i>Gavialis virescens</i>	Singing Honeyeater			LC	Common in shrubland areas

3.4 Introduced plant species

Table 3 provides details of introduced plant species observed during field survey. Some species could not be identified, such as some annual grasses, as no features, such as seed heads, were present at the time of inspection. Weeds that formed high cover (>5%) in one or more sites included Soursob, Coastal Galenia, Gazania, Barley Grass and Burr-medic. The generally high cover scores for weeds reflect that most of the vegetation assessed was in poor condition, having been exposed to previous disturbance from trail construction and ongoing impacts.

Five Declared species were observed in the area surveyed, three of which (African Boxthorn, Olive and Tamarisk) showed evidence of active control by the City of Onkaparinga.

Table 3: Introduced plant species detected during field survey

Scientific Name	Common Name	Threat rating ¹⁶	Declared ¹⁷	Community			
				1	2	3	4
<i>Aizoaceae, likely Drosanthemum candens</i>	Rodondo creeper						2
<i>Aizoon pubescens</i>	Coastal Galenia	2		4	3		
<i>Arctotheca calendula</i>	Capeweed	2		2	2		1
<i>Avena barbata</i>	Bearded Oat	2		1			
<i>Cenchrus clandestinus</i>	Kikuyu	3		1			
<i>Echium plantagineum</i>	Salvation Jane	2	Declared	1			
<i>Ehrharta longiflora</i>	Annual Veldt Grass	2			1a		2
<i>Erodium moschatum</i>	Musk Stork's-bill	2		1			

¹³ As per the Environment Protection and Biodiversity Conservation Act 1999

¹⁴ As per the National Parks and Wildlife Act 1972

¹⁵ As per Gillam, S. and Urban, R. (2014) *Regional Species Conservation Assessment Project, Phase 1 Report: Regional Species Status Assessments, Adelaide and Mount Lofty Ranges NRM Region*. Department of Environment, Water and Natural Resources, South Australia.

¹⁶ As per the Bushland Assessment Manual 2020

¹⁷ As per the Landscapes Act 2019

Scientific Name	Common Name	Threat rating ¹⁶	Declared ¹⁷	Community			
				1	2	3	4
<i>Euphorbia paralias</i>	Sea Spurge	3		1			
<i>Gazania linearis</i>	Gazania	3	Declared	1a	1a	1	3
<i>Gramineae sp.</i>						1a	
<i>Hordeum marinum</i>	Sea Barley-grass	1			1a		
<i>Hordeum sp.</i>	Barley-grass	1		2	3		
<i>Lactuca serriola f. serriola</i>	Prickly Lettuce	2		1a			
<i>Lagurus ovatus</i>	Hare's Tail Grass	2					2
<i>Limonium companyonis</i>	Sea-lavender	2		1a	1a	1a	1
<i>Lolium sp.</i>	Ryegrass	1					1
<i>Lycium ferocissimum</i>	African Boxthorn	3	Declared		1		1a
<i>Malva parviflora</i>	Small-flower Marshmallow	1		1			
<i>Medicago polymorpha var. polymorpha</i>	Burr-medic	2			1a		3
<i>Mesembryanthemum crystallinum</i>	Common Iceplant	2		2	2	1	1a
<i>Mesembryanthemum nodiflorum</i>	Slender Iceplant	2		1	1a		
<i>Olea europaea</i>	Olive	4	Declared	1			
<i>Oxalis pes-caprae</i>	Soursob	4		5	4		2
<i>Rapistrum rugosum</i>	Turnipweed	2		1a			
<i>Reichardia tingitana</i>	False Sowthistle	2		1a	2		
<i>Sonchus oleraceus</i>	Common Sow-thistle	1		1a	1a		2
<i>Tamarix sp.</i>	Tamarisk species	2	Declared	1			

*Cover/abundance categories: 1: not many, <1% cover, 1a: plentiful but low cover, 2: 1-5% cover, 3: 6-25% cover, 4: 26-50% cover

4. Native Vegetation Act 1991

The proposed project falls within the area where the *Native Vegetation Act 1991* applies, and so the City of Onkaparinga will require approval to clear native vegetation on the site under *Regulation 12(36) – Recreation Track* of the *Native Vegetation Act 1991*. This Regulation allows for clearance of vegetation to establish or maintain a track for public recreational use involving the use of non-motorised vehicles, such as for bicycles or horses.

When making a decision in relation to the information to be provided by an applicant to inform whether approval should be granted, the Native Vegetation Council (NVC) will assess the level of risk to biodiversity presented by the clearance proposal. In this instance the level of risk is likely to be **‘Level 2’** as areas of clearance may exceed 500m². Level 2 clearance applications are delegated to the Native Vegetation Management Unit for assessment and decision. Data collected during this project can be used to provide this clearance application once final impact envelopes are known.

When assessing the clearance application, the NVC will consider the measures taken by the proponent to avoid and minimize impacts on biodiversity and rare or threatened species or ecological communities within the site or immediate vicinity of the development. The proponent will need to have addressed, and show evidence of adhering to, the following **‘Mitigation Hierarchy’**:

- a) Avoidance – outline measures taken to avoid clearance of native vegetation such as making adjustments to the location, design, size or scale of the activity in order to reduce the impact.
- b) Minimization – if clearance cannot be avoided, outline measures taken to minimize the extent, duration and intensity of impacts of the clearance on biodiversity to the fullest possible extent.
- c) Rehabilitation or restoration – outline measures taken to rehabilitate ecosystems that have been degraded, and to restore ecosystems that have been degraded, or destroyed by the impact of clearance that cannot be avoided or further minimized, such as allowing for the re-establishment of the vegetation.
- d) Offset – any adverse impact on native vegetation that cannot be avoided or further minimized should be offset by the achievement of a significant environmental benefit that outweighs that impact.

The clearance proposal will also need to consider **Principles of Clearance b, c and d**¹⁸, namely does the vegetation:

- b. have significance as a habitat for wildlife
- c. include plants of a rare, vulnerable or endangered species
- d. comprise the whole, or a part, of a plant community that is Rare, Vulnerable or Endangered

¹⁸ Under the *Native Vegetation Act 1991*

The NVC will also consider whether there are any other alternatives that involve no clearance, less clearance or clearance of vegetation that is less significant (or has been degraded to a greater extent than the vegetation proposed to be cleared).

To offset vegetation clearance, the proponent is required to either set aside an appropriate area of native vegetation and develop a **Significant Environmental Benefit (SEB)** Management Plan that will be approved by the Native Vegetation Council for implementation, OR make a payment into the Native Vegetation Fund.

If approval is granted, clearance is only permitted once any conditions that apply to the approval are complied with, including in relation to the SEB. Conditions imposed in connection with an approval are binding and enforceable against the person to whom the approval is granted, and this includes any subsequent owners and occupiers of the land. Permitted clearance must be undertaken within 2 years of approval being granted, unless otherwise specified.

4.1 Mitigation Hierarchy

As discussed previously, with regard to approvals under the *Native Vegetation Act 1991*, the proponent will need to have addressed, and show evidence of adhering to, the '**Mitigation Hierarchy**'. Specific recommendations to minimise impacts, with reference to this hierarchy, are addressed below.

- a) **Avoidance** – outline measures taken to avoid clearance of native vegetation such as making adjustments to the location, design, size or scale of the activity in order to reduce the impact.
 - Clearance will be avoided by use of existing trail and installation of a boardwalk (which reduces disturbance)
 - Try to avoid placing infrastructure associated with boardwalk areas (eg support posts) on native plants in Communities 3 and 4
- b) **Minimization** – if clearance cannot be avoided, outline measures taken to minimize the extent, duration and intensity of impacts of the clearance on biodiversity to the fullest possible extent.

Impacts will be minimised by working along the existing trail wherever possible.

The following measures should also be undertaken to ensure impacts on remnant vegetation are minimized.

- Access, parking and storage of equipment and material and plant debris should be away from native vegetation (
- Stockpiles of materials and debris will be removed from the site upon completion of the works.
- Topsoil disturbance should be minimized and returned to its approximate area of origin, where practical.
- All equipment should be free of soil and vegetation prior to moving onto and off site, to prevent the spread of diseases and weeds affecting native vegetation.
- Equipment should be washed down well away from the site.
- Clean, sterile building material should be used to prevent the spread of weeds and diseases. Any excavated soil and cleared plant material should be confined within the

building/impact envelope, placed in areas not supporting native vegetation, or removed from the site completely.

c) **Rehabilitation or restoration** – outline measures taken to rehabilitate ecosystems that have been degraded, and to restore ecosystems that have been degraded, or destroyed by the impact of clearance that cannot be avoided or further minimized, such as allowing for the re-establishment of the vegetation.

All areas

- Consider a weed control and revegetation program along trail verges, particularly in Communities 1 and 2. Species that may be suitable for revegetation include:
 - *Acacia longifolia* var. *sophorae* (Coastal Wattle)
 - *Atriplex cinerea* (Coast Saltbush)
 - *Atriplex paludosa* ssp. *cordata* (Marsh Saltbush)
 - *Carpobrotus rossii* (Native Pigface)
 - *Dianella revoluta* var. *revoluta* (Black-anther Flax-lily)
 - *Disphyma crassifolium* ssp. *clavellatum* (Round-leaf Pigface)
 - *Enchylaena tomentosa* var. *tomentosa* (Ruby Saltbush)
 - *Ficinia nodosa* (Knobby Club-rush)
 - *Leucophyta brownii* (Coast Cushion Bush)
 - *Maireana oppositifolia* (Salt Bluebush)
 - *Myoporum insulare* (Common Boobialla)
 - *Olearia axillaris* (Coast Daisy-bush)
 - *Rhagodia candolleana* ssp. *candolleana* (Sea-berry Saltbush)
 - *Scaevola crassifolia* (Cushion Fanflower)
 - *Threlkeldia diffusa* (Coast Bonefruit)

In addition, weed control could be undertaken, focussing on high threat weeds as per Table 3.

d) **Offset** – any adverse impact on native vegetation that cannot be avoided or further minimized should be offset by the achievement of a significant environmental benefit that outweighs that impact.

City of Onkaparinga will advise whether a suitable SEB offset is available, or whether a payment into the Native Vegetation Fund will be made.

4.2 Principles of Clearance b, c and d

Any clearance proposal will also need to consider Principles of Clearance b, c and d¹⁹, namely does any vegetation to be cleared:

- b. have significance as a habitat for wildlife
- c. include plants of a rare, vulnerable or endangered species

¹⁹ Under the *Native Vegetation Act 1991*

- d. comprise the whole, or a part, of a plant community that is Rare, Vulnerable or Endangered

These Principles are addressed below, with reference to data gathered within the assessed sites:

b. the vegetation has significance as a habitat for wildlife

The “Guide for applications to clear native vegetation”²⁰ provides the following criteria for assessment against this Principle:

Threatened Fauna Score	At Variance with the Principles
0	Not at variance
<0.05	At variance
>0.05	Seriously at variance

None of the areas of remnant vegetation (Communities 1-4) are considered to be at variance with this Principle. Note also that a vegetation association with a Unit Biodiversity Score of >60 is considered to be seriously at variance with this Principle. Whilst UBS scores have not been calculated for the components of this project at this stage, it is considered likely that none of the communities in this project would exceed this UBS score.

c. The site includes plants of a rare, vulnerable or endangered species

The “Guide for applications to clear native vegetation”²¹ provides the following criteria for assessment against this Principle:

Threatened Flora Score	At Variance with the Principles
0	Not at variance
<0.1	At variance
>0.1	Seriously at variance

None of the areas of remnant vegetation (Communities 1-4) are considered to be at variance with this Principle.

d. The vegetation comprises the whole, or a part, of a plant community that is Rare, Vulnerable or Endangered

None of the areas of remnant vegetation are considered to be plant communities that are rare, vulnerable or endangered.

²⁰ Native Vegetation Council (2017). Guide for applications to clear native vegetation under the Native Vegetation Act 1991 and Native Vegetation Regulations 2017. Department for Environment, Water and Natural Resources, Adelaide.

²¹ Native Vegetation Council (2017). Guide for applications to clear native vegetation under the Native Vegetation Act 1991 and Native Vegetation Regulations 2017. Department for Environment, Water and Natural Resources, Adelaide.

5. Significant Impact Assessment under the *EPBC Act 1999*:

The *EPBC Act 1999* Significant Impact Guidelines²² provide overarching guidance on determining whether an action is likely to have a significant impact on a matter of National environmental significance.

5.1 Listed Threatened Species and Ecological Communities

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.

Appendix 2 provides an overview of the likelihood of presence of species of National conservation significance. The impact area is not considered to provide key habitat for any species of National conservation significance, and as such the proposed project is not considered likely to have a significant impact on any species of national conservation significance.

5.2 Listed Migratory Species

The *EPBC Act* Significant Impact Guidelines define an action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

The scale of impact from the proposed project is very small, and is considered highly unlikely to have a significant impact on any listed migratory species.

²² Australian Government Department of the Environment (2013). Matters of National Environmental Significance Significant impact guidelines 1.1, Environment Protection and Biodiversity Conservation Act 1999. Australian Government, Canberra.

No referral under the *Environment Protection and Biodiversity Conservation Act* is considered to be needed if the impact areas are those shown in Figure 2.

Appendix 1: Flora of State and National Significance from database review

Scientific Name	Common name	Source	AUS ²³	SA ²⁴	Comments on potential for the area assessed to form habitat for this species
<i>Acacia genistifolia</i>	Broom Wattle	1		E	Unlikely - highly disturbed habitat and not observed during field observation.
<i>Amphibromus archeri</i>	Pointed Swamp Wallaby-grass	1		R	Unlikely - habitat in the site is highly disturbed.
<i>Austrostipa multispiculis</i>	Many-flowered Spear-grass	1		R	Unlikely - habitat in the site is highly disturbed.
<i>Austrostipa tenuifolia</i>		1		R	Unlikely - habitat in the site is highly disturbed.
<i>Caladenia conferta</i>	Coast Spider-orchid	3	E	E	Highly unlikely due to lack of nearby records, the disturbed and weedy nature of the habitats present in the site and the close proximity to the coast.
<i>Caladenia tensa</i>	Greencomb Spider-orchid	3	E		Highly unlikely due to lack of nearby records, the disturbed and weedy nature of the habitats present in the site and the close proximity to the coast.
<i>Diplachne parviflora</i> (NC)	Small-flower Beetle-grass	1		R	Unlikely - unsuitable and degraded habitat.
<i>Eucalyptus leucoxylon</i> ssp. <i>megalocarpa</i>	Large-fruit Blue Gum	1		R	Highly unlikely as would have been detected if present.
<i>Euphrasia collina</i> ssp. <i>osbornii</i>	Osborn's Eyebright	1,3	E	E	Unlikely - highly disturbed habitat and no recent records nearby.
<i>Glycine latrobeana</i>	Clover Glycine	3			Highly unlikely due to lack of nearby records, the disturbed and weedy nature of the habitats present in the site and the close proximity to the coast.
<i>Maireana decalvans</i>	Black Cotton-bush	1		E	Unlikely - highly disturbed habitat and not detected during field survey.
<i>Myoporum parvifolium</i>	Creeping Boobialla	1		R	Unlikely as a remnant species, but noted in revegetation near the Port Noarlunga jetty (outside assessment area).
<i>Olearia pannosa</i> ssp. <i>pannosa</i>	Silver Daisy-bush	3	V	V	Highly unlikely due to lack of nearby records, the disturbed and weedy nature of the habitats present in the site and the close proximity to the coast.
<i>Orobanche cernua</i> var. <i>australiana</i>	Australian Broomrape	1		R	Present in nearby Southport Dunes (pers. obs.), but unlikely in this area due to highly disturbed nature of the site along with coastal exposure.

²³ Australian conservation rating under the *Environment Protection and Biodiversity Conservation Act 1999*

²⁴ South Australian conservation rating under the *National Parks and Wildlife Act 1972*

Scientific Name	Common name	Source	AUS ²³	SA ²⁴	Comments on potential for the area assessed to form habitat for this species
<i>Picris squarrosa</i>	Squat Picris	1		R	Present in nearby Southport Dunes (pers. obs.), but unlikely in this area due to highly disturbed nature of the site along with coastal exposure.
<i>Prasophyllum pallidum</i>	Pale Leek-orchid	3	V	R	Highly unlikely due to lack of nearby records, the disturbed and weedy nature of the habitats present in the site and the close proximity to the coast.
<i>Prasophyllum pruinatum</i>	Plum Leek-orchid	1,3	E	E	Unlikely - highly disturbed habitat and not observed during field observation.
<i>Thelymitra epipactoides</i>	Metallic Sun-orchid	3	E	E	Highly unlikely due to lack of nearby records, the disturbed and weedy nature of the habitats present in the site and the close proximity to the coast.
<i>Thelymitra matthewsii</i>	Spiral Sun-orchid	3	V	E	Highly unlikely due to lack of nearby records, the disturbed and weedy nature of the habitats present in the site and the close proximity to the coast.

1 = Records within 5km from Biological database of SA search, 3= Protected Matters Search Tool (PMST) 5km buffer

Key to Conservation Codes: CR=Critically Endangered, E=Endangered, V=Vulnerable, R=Rare

Appendix 2: Fauna of State and National Significance from database review

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
BIRDS					
<i>Actitis hypoleucos</i>	Common Sandpiper	1,2		R	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. This species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats ²⁷ . Migratory species, breeding in Northern Hemisphere, and flying to the Southern Hemisphere in the southern spring and summer.

²⁵ Australian conservation rating under the *Environment Protection and Biodiversity Conservation Act 1999*

²⁶ South Australian conservation rating under the *National Parks and Wildlife Act 1972*

²⁷ Australian Government Department of the Environment and Energy Species Profile and Threats Database. *Actitis hypoleucos* Common Sandpiper. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59309 accessed 24/4/2017.

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Anhinga novaehollandiae novaehollandiae</i>	Australasian Darter	1,2		R	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. The Darter is found in wetlands and sheltered coastal waters, mainly in the Tropics and Subtropics. It prefers smooth, open waters, for feeding, with tree trunks, branches, stumps or posts fringing the water, for resting and drying its wings ²⁸ .
<i>Ardea intermedia plumifera</i>	Plumed Egret	1,2		R	Unlikely to be present in this area - prefers terrestrial wetlands.
<i>Biziura lobata</i>	Musk Duck	1,2		R	Unlikely in the impact area - musk ducks favour deep water where they dive for crustaceans, aquatic insects, fish, and amphibians, together with a small quantity of vegetation ²⁹ .
<i>Botaurus poiciloptilus</i>	Australasian Bittern	1,3	E	E	No suitable habitat in impact area - Australasian Bittern's preferred habitat is comprised of wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds (e.g. <i>Phragmites</i> , <i>Cyperus</i> , <i>Eleocharis</i> , <i>Juncus</i> , <i>Typha</i> , <i>Baumea</i> , <i>Bolboschoenus</i>) or cutting grass (<i>Gahnia</i>) growing over a muddy or peaty substrate ³⁰ .
<i>Bubulcus ibis coromandus</i>	Eastern Cattle Egret	1,2		R	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. This species is found in grasslands, woodlands and wetlands, and is not common in arid areas. It also uses pastures and croplands, especially where drainage is poor ³¹ . Can be found in poorly drained pasture grazed by cattle and other stock, and wetlands and river systems.

²⁸ <https://www.birdlife.org.au/bird-profile/australasian-darter>

²⁹ <https://birdssa.asn.au/birddirectory/musk-duck/> accessed 10/10/2018.

³⁰ Department of Sustainability, Environment, Water, Population and Communities (2011). Approved Conservation Advice for *Botaurus poiciloptilus* (Australasian Bittern). Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities.

³¹ Birdlife Australia Bird Profiles (2018). <http://www.birdlife.org.au/bird-profile/cattle-egret> accessed 10/10/2018.

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Calidris canutus</i>	Red Knot	3	E		Unlikely in impact area – no nearby records. During the non-breeding season in Australasia, the red knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts and sometimes on sandy ocean beaches or shallow pools on exposed rock platforms. They are occasionally seen on terrestrial saline wetlands near the coast and on sewage ponds and saltworks ³² .
<i>Calidris ferruginea</i>	Curlew Sandpiper	1,2,3	CR	E	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. In Australia, curlew sandpipers mainly occur on 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, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Occasionally they are recorded around floodwaters. ³³ Migratory species, breeding in Northern Hemisphere, and flying to the Southern Hemisphere in the southern spring and summer.
<i>Calyptorhynchus (Zanda) funereus whiteae</i>	Yellow-tailed Black Cockatoo	1,2		V	Unlikely due to lack of trees – this species is found in a variety of habitats including grassy woodland, riparian, forest, heathland, subalpine areas, pine plantations, and occasionally in urban areas, as long as there is a plentiful food supply ³⁴ .
<i>Cereopsis novaehollandiae novaehollandiae</i>	Cape Barren Goose	1,2		R	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. The Cape Barren Goose is a grazing bird, eating predominantly the common island tussock grass, <i>Poa poiformis</i> , as well as spear grass and various herbs and succulents. They also eat pasture grasses, including barley and clover, and legumes ³⁵ .

³² Threatened Species Scientific Committee (2016). Conservation Advice *Calidris canutus* Red knot. Canberra: Department of the Environment. Available from: <http://www.environment.gov.au/biodiversity/threatened/species/pubs/855-conservation-advice-05052016.pdf>. Accessed 2/10/2018.

³³ Department of the Environment (2015). Conservation Advice *Calidris ferruginea* curlew sandpiper. Canberra: Department of the Environment.

³⁴ https://en.wikipedia.org/wiki/Yellow-tailed_black_cockatoo

³⁵ Birdlife Australia Bird Profiles (2018). <http://www.birdlife.org.au/bird-profile/cape-barren-goose> accessed 10/10/2018.

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Cinlosoma punctatum anachoreta</i>	Spotted Quailthrush	1	CR	E	Highly unlikely – the species has no published records in the Mount Lofty Ranges since 1984 ³⁶ .
<i>Cladorhynchus leucocephalus</i>	Banded Stilt	1,2		V	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. Banded Stilts are found mainly in saline and hypersaline (very salty) waters of the inland and coast, typically large, open and shallow ³⁷ . Nomadic bird, depending on available wetlands. Mass nesting in more remote inland saline wetlands when periodically flooded (eg. Lake Torrens).
<i>Coturnix ypsilophora australis</i>	Brown Quail	1,2		V	Unlikely – this species prefers dense grasslands, often on the edges of open forests, and bracken. May sometimes be seen alongside roads ³⁸ .
<i>Diomedea antipodensis</i>	Antipodean Albatross	3	V		Unlikely in the impact area - ocean bird. Spends most of its life (except nesting), in flight fishing from ocean. Like other Albatross, they can be seen in coastal waters in winter to early spring, on continental shelf edge, and from shore during storms which blow them closer in shore. Occasionally can found dead on beaches. Very unlikely to occur.
<i>Diomedea epomorpha</i>	Southern Royal Albatross	3	V	V	Unlikely in the impact area - ocean bird. Spends most of its life (except nesting), in flight fishing from ocean. Like other Albatross, they can be seen in coastal waters in winter to early spring, on continental shelf edge, and from shore during storms which blow them closer in shore. Occasionally can found dead on beaches.
<i>Diomedea exulans</i>	Wandering Albatross	3	V	V	Unlikely in the impact area - ocean bird. Spends most of its life (except nesting), in flight fishing from ocean. Like other Albatross, they can be seen in coastal waters in winter to early spring, on continental shelf edge, and from shore during storms which blow them closer in shore. Occasionally can found dead on beaches.

³⁶ Threatened Species Scientific Committee (2002). Commonwealth Listing Advice on *Cinlosoma punctatum anachoreta* (Spotted Quail-thrush (Mt Lofty Ranges)).

³⁷ Birdlife Australia Bird Profiles (2018). <http://www.birdlife.org.au/bird-profile/banded-stilt> accessed 10/10/2018.

³⁸ <http://birdlife.org.au/bird-profile/Brown-Quail>

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Diomedea sanfordi</i>	Northern Royal Albatross	3	V	V	Unlikely in the impact area - ocean bird. Spends most of its life (except nesting), in flight fishing from ocean. Like other Albatross, they can be seen in coastal waters in winter to early spring, on continental shelf edge, and from shore during storms which blow them closer in shore. Occasionally can found dead on beaches.
<i>Egretta garzetta nigripes</i>	Little Egret	1,2		R	Unlikely in the impact area, but likely in association with the Onkaparinga estuary.
<i>Egretta sacra</i>	Pacific Reef Heron (Eastern Reef Egret)	1,2		R	Possibly may be present at times - the Eastern Reef Egret lives on beaches, rocky shores, tidal rivers and inlets, mangroves, and exposed coral reefs ³⁹ .
<i>Falco hypoleucos</i>	Grey Falcon	3	V	R	Unlikely in the impact area - usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey ⁴⁰ .
<i>Falco peregrinus</i>	Peregrine Falcon	1,2		R	May possibly forage over the site. Scattered nearby records, and may feed on Rock Doves (<i>Columba livia</i>) nesting in the cliff area. The Peregrine Falcon is found in most habitats, from rainforests to the arid zone, and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites, and prefers coastal and inland cliffs or open woodlands near water ⁴¹ .
<i>Falco subniger</i>	Black Falcon	1		R	Unlikely - found along tree-lined watercourses and in isolated woodlands, mainly in arid and semi-arid areas. It roosts in trees at night and often on power poles by day ⁴² .
<i>Falcunculus frontatus frontatus</i>	Eastern Shrike-tit	1,2		R	Unlikely to be present. This species is found in eucalypt forests and woodlands, forested gullies and along rivers in drier areas. It can also be found in rainforests. It is sometimes seen in parks and gardens, on farms with scattered trees, and on pine plantations ⁴³ .

³⁹ Birdlife Australia Bird Profiles (2018). <http://www.birdlife.org.au/bird-profile/eastern-reef-egret> accessed 10/10/2018

⁴⁰ <https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10330> accessed 10/10/2018

⁴¹ Birdlife Australia Bird Profiles (2018). <http://www.birdlife.org.au/bird-profile/peregrine-falcon> accessed 10/10/2018

⁴² <http://www.birdsinbackyards.net/species/Falco-subniger>

⁴³ <http://www.birdsinbackyards.net/species/Falcunculus-frontatus>

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Gallinago hardwickii</i>	Latham's Snipe	1,2		R	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. Latham's Snipe are seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture ⁴⁴ . Migratory species, breeding in Northern Hemisphere (mainly Japan), and flying to the Southern Hemisphere in the southern spring and summer.
<i>Gerygone olivacea olivacea</i>	White-throated Gerygone	1		R	Unlikely – the species occurs mainly in open dry eucalypt (<i>Eucalyptus</i>) woodland and dense riparian vegetation in tropical areas ⁴⁵ .
<i>Grantiella picta</i>	Painted Honeyeater	3	V	R	Unlikely as no suitable habitat present - it inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. ⁴⁶
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	1,2		R	Possibly may use the area from time to time - 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 ⁴⁷ .
<i>Halobaena caerulea</i>	Blue Petrel	3	V		Unlikely in the impact area - ocean bird. Like other ocean birds, when not nesting, spend most of their time flying over ocean fishing. Although more common in southern Atlantic and Indian Oceans ice packs, they can occur in winter and early spring off the edge of the continental shelf. They can be rarely seen from shore during storms that blow them inshore. Following storms, occasionally could be found dead from exhaustion on beaches.
<i>Hieraaetus morphnoides</i>	Little Eagle	1		V	Typically seen over woodland and open forest. Considered unlikely to use the site as habitat.

⁴⁴ Birdlife Australia Bird Profiles (2018). <http://www.birdlife.org.au/bird-profile/lathams-snipe> accessed 10/10/2018

⁴⁵ <https://www.hbw.com/species/white-throated-gerygone-gerygone-olivacea>

⁴⁶ Department of the Environment (2015). Conservation Advice *Grantiella picta* painted honeyeater.

⁴⁷ Birdlife Australia Bird Profiles (2018). <http://www.birdlife.org.au/bird-profile/sooty-oystercatcher> accessed 10/10/2018

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Larus dominicanus</i>	Kelp Gull	2		R	A possible visitor on the beach.
<i>Lewin pectoralis pectoralis</i>	Lewin's Rail	1		V	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. Generally found in dense vegetation around wetlands. ⁴⁸
<i>Limosa lapponica baueri</i>	Bar-tailed Godwit	1,3	V		Unlikely in impact areas, more likely in nearby Onkaparinga estuary. This species occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats ⁴⁹ . Migratory species, breeding in Northern Hemisphere, and flying to the Southern Hemisphere in the southern spring and summer.
<i>Limosa lapponica menzbieri</i>	Northern Siberian Bar-tailed Godwit	3	CR		Unlikely due to lack of records, and would not use the habitats present in impact areas. This species occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. ⁵⁰ Migratory species, breeding in Northern Hemisphere, and flying to the Southern Hemisphere in the southern spring and summer.
<i>Limosa limosa</i>	Black-tailed Godwit	1		R	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. Black-tailed Godwits inhabit estuarine mudflats, beaches and mangroves ⁵¹ . Migratory species, breeding in Northern Hemisphere, and flying to the Southern Hemisphere in the southern spring and summer.

⁴⁸ <http://datazone.birdlife.org/species/factsheet/22692521>

⁴⁹ Threatened Species Scientific Committee (2016). Conservation Advice *Limosa lapponica baueri* Bar-tailed godwit (western Alaskan). Canberra: Department of the Environment. Available from:

<http://www.environment.gov.au/biodiversity/threatened/species/pubs/86380-conservation-advice-05052016.pdf> accessed 2/10/2018.

⁵⁰ Threatened Species Scientific Committee (2016). Conservation Advice *Limosa lapponica menzbieri* Bar-tailed godwit (northern Siberian). Canberra: Department of the Environment. Available from:

<http://www.environment.gov.au/biodiversity/threatened/species/pubs/86432-conservation-advice-05052016.pdf> accessed 2/10/2018.

⁵¹ Birdlife Australia Bird Profiles (2018). <http://www.birdlife.org.au/bird-profile/bar-tailed-godwit> accessed 10/10/2018.

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Lophoictinia isura</i>	Square-tailed Kite	1		E	Unlikely in impact areas - in southern Australia, Square-tailed Kites mainly inhabit open eucalypt forests and woodlands, often dominated by stringybarks, peppermints or box-ironbark eucalypts, as well as Woollybutt, Spotted Gum, Manna Gum, Messmate, River Red Gums, as well as other trees such as Angophora, cypress-pines and casuarinas ⁵² .
<i>Macronectes giganteus</i>	Southern Giant-Petrel	1	E	V	Unlikely in the impact area - ocean bird. Nests in southern Southern Ocean islands to Antarctica. Like other ocean birds, when not nesting, spend most of their time flying over ocean fishing. In winter and early spring they can be observed off the edge of the continental shelf. They can be rarely seen from shore during storms that blow them inshore. Following storms, occasionally could be found dead from exhaustion on beaches.
<i>Macronectes halli</i>	Northern Giant Petrel	3	V		Unlikely in the impact area - ocean bird. Similar to last except smaller and nest in more northern Southern Ocean islands to Southern Giant Petrel. Range of both overlap. Like other ocean birds, when not nesting, spend most of their time flying over ocean fishing. In winter and early spring they can be observed off the edge of the continental shelf. They can be rarely seen from shore during storms that blow them inshore. Following storms, occasionally could be found dead from exhaustion on beaches.
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (YP, MN, AP, MLR, MM, SE)	1		R	Widespread species, although more common in semi-arid woodland. Unlikely to use the habitats present in the assessment area.
<i>Melithreptus gularis</i>	Black-chinned Honeyeater	1,2		V	Unlikely – generally found in the upper levels of open eucalypt forests and woodlands dominated by box and ironback eucalypts. It is often found along waterways, especially in arid and semi-arid areas and in northern Australia. It is occasionally seen in gardens and street trees ⁵³ . In South Australia it generally prefers Blue Gum (<i>Eucalyptus leucoxylon</i>) communities.

⁵² Birdlife Australia Bird Profiles (2018). <http://www.birdlife.org.au/bird-profile/square-tailed-kite> accessed 10/10/2018

⁵³ <http://www.birdsinbackyards.net/species/Melithreptus-gularis>

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Microeca fascinans</i>	Jacky Winter	1		R	Unlikely - prefers open woodland with open shrub understorey, and also can occur in farmland with scattered paddock trees.
<i>Myiagra inquieta</i>	Restless Flycatcher	1		R	Unlikely – prefers woodland habitats.
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	1,3	CR	E	Unlikely – outside current range - during its non-breeding season, the species' occurs on the mainland from the mouth of the Murray River in South Australia to the east of Jack Smith Lake in South Gippsland, Victoria ⁵⁴
<i>Neophema chrysostoma</i>	Blue-winged Parrot	1		V	Unlikely – only one records (from 1983) within 5km. The Blue-winged Parrot inhabits a range of habitats from coastal, sub-coastal and inland areas, right through to semi-arid zones. Throughout their range they favour grasslands and grassy woodlands. They are often found near wetlands both near the coast and in semi-arid zones ⁵⁵ .
<i>Neophema elegans</i>	Elegant Parrot	1,2		R	Unlikely – whilst this species can be found in a wide variety of habitats, including grasslands, shrublands, mallee, woodlands and thickets, bluebush plains, heathlands, saltmarsh and farmland ⁵⁶ , there are scant local records, and the highly disturbed nature of the impact area and ongoing presence of people in the area are likely to preclude its presence.
<i>Neophema petrophila</i>	Rock Parrot	1		R	Unlikely – only one record within 5km and the highly disturbed nature of the impact area and ongoing presence of people in the area are likely to preclude its presence. The Rock Parrot is restricted to coastlines and offshore rocky islands, frequenting windswept coastal dunes, mangroves, saline swamps and rocky islets. It is seldom seen more than a few hundred metres from the sea ⁵⁷ .

⁵⁴ Threatened Species Scientific Committee (2006). Commonwealth Listing Advice on *Neophema chrysogaster*.

⁵⁵ <http://birdlife.org.au/bird-profile/Blue-winged-Parrot>

⁵⁶ Birdlife Australia Bird Profiles (2018). <http://birdlife.org.au/bird-profile/elegant-parrot> accessed 10/10/2018.

⁵⁷ Birdlife Australia Bird Profiles (2018). <http://birdlife.org.au/bird-profile/rock-parrot> accessed 10/10/2018

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Numenius madagascariensis</i>	Far Eastern Curlew	3	CR	V	Unlikely – no nearby records. During the non-breeding season in Australia, the eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass (Zosteraceae). Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. ⁵⁸ Migratory species, breeding in Northern Hemisphere, and flying to the Southern Hemisphere in the southern spring and summer.
<i>Oxyura australis</i>	Blue-billed Duck	1,2		R	Unlikely to use the habitats in the impact area. The Blue-billed Duck is almost wholly aquatic, and is seldom seen on land ⁵⁹ .
<i>Pachyptila turtur</i>	Fairy Prion	3		V	Unlikely in the impact area - ocean bird. Spends most of its life (except nesting), in flight fishing from ocean. Like other ocean birds, they can be seen in coastal waters in winter to early spring, on continental shelf edge, and from shore during storms which blow them closer in shore. Occasionally can found dead on beaches.
<i>Pandion haliaetus</i>	Osprey	1,2		E	Occasional records around the Onkaparinga Estuary and the mouth of the Onkaparinga. May possibly fly over site, but the site does not provide key habitat for the species. This species mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging ⁶⁰ . They range around the coast of Eyre Peninsula similar to the White-bellied Sea Eagle, fishing over the water.

⁵⁸ Department of the Environment (2015). Conservation Advice *Numenius madagascariensis* eastern curlew. Canberra: Department of the Environment.

⁵⁹ Birdlife Australia Bird Profiles (2017). <http://www.birdlife.org.au/bird-profile/blue-billed-duck> accessed 3/1/2018.

⁶⁰ http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=952 accessed 22/3/2018.

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Pedionomus torquatus</i>	Plains-wanderer	3	CR	E	Unlikely – no nearby records and no suitable habitat present. Plains-wanderers inhabit sparse grasslands with c.50% bare ground, with most vegetation less than 5 cm in height and some widely spaced plants up to 30 cm high. The species may occasionally use lower-quality habitat including cereal stubble, but cannot persist in an agricultural landscape. ⁶¹
<i>Petroica boodang boodang</i>	Scarlet Robin (SE, MLR, FR, EP)	1		R	Unlikely – no suitable habitat present. Occurs predominantly in Eucalypt woodlands and forests. Good leaf litter, perches in the height range 1-2 m, and fallen logs are important components of habitat. ⁶²
<i>Petroica phoenicea</i>	Flame Robin	1		V	Unlikely - prefers forests and woodlands ⁶³ .
<i>Pezoporus occidentalis</i>	Night Parrot	3	CR	E	Considered extinct in this region.
<i>Phoebastria fusca</i>	Sooty Albatross	3	V	E	Unlikely in the impact area - ocean bird. Spends most of its life (except nesting), in flight fishing from ocean. Like other Albatross, they can be seen in coastal waters in winter to early spring, on continental shelf edge, and from shore during storms which blow them closer in shore. Occasionally can found dead on beaches. Very unlikely to occur.
<i>Plegadis falcinellus</i>	Glossy Ibis	1		R	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. Preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. The species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons. ⁶⁴

⁶¹ Department of the Environment (2015). Conservation Advice *Pedionomus torquatus* plains-wanderer. Canberra: Department of the Environment.

⁶² Department for Environment and Heritage (2008). Threatened Species Profile *Petroica boodang boodang* Scarlet Robin. Department for Environment and Heritage, Adelaide.

⁶³ <http://www.birdsinbackyards.net/species/Petroica-phoenicea>

⁶⁴ http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=991 accessed 4/4/2018.

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Pluvialis fulva</i>	Pacific Golden Plover	1		R	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. This species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands, such as fresh, brackish or saline lakes, billabongs, pools, swamps and wet claypans, especially those with muddy margins and often with submerged vegetation or short emergent grass. ⁶⁵ Migratory species, breeding in Northern Hemisphere, and flying to the Southern Hemisphere in the southern spring and summer.
<i>Podiceps cristatus</i>	Great Crested Grebe	1,2		R	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. Inhabits wetlands from rivers and lakes to estuaries and sheltered bays, but favours large, deep, open bodies of fresh water ⁶⁶ .
<i>Pterodroma mollis</i>	Soft-plumaged Petrel	3	V		Unlikely in the impact area - ocean bird. Spends most of its life (except nesting), in flight fishing from ocean. Like other ocean birds, they can be seen in coastal waters in winter to early spring, on continental shelf edge, and from shore during storms which blow them closer in shore. Occasionally can found dead on beaches. Very unlikely to occur.
<i>Rostratula australis</i>	Australian Painted-snipe,	1,2,3	E	E	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. The Australian painted snipe occurs in shallow freshwater (occasionally brackish) wetlands, both ephemeral and permanent, such as lakes, swamps, claypans, inundated or waterlogged grassland/saltmarsh, dams, rice crops, sewage farms and bore drains, generally with a good cover of grasses, rushes and reeds, low scrub, <i>Muehlenbeckia spp.</i> (lignum), open timber or samphire. ⁶⁷
<i>Spatula rhynchotis</i>	Australasian Shoveler	1,2		R	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. - lives in heavily vegetated swamps ⁶⁸ .

⁶⁵ http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=25545

⁶⁶ Birdlife Australia Bird Profiles (2018). <http://www.birdlife.org.au/bird-profile/great-crested-grebe> accessed 10/10/2018.

⁶⁷ Department of Sustainability, Environment, Water, Population and Communities (2013). Approved Conservation Advice for *Rostratula australis* (Australian painted snipe).

⁶⁸ https://en.wikipedia.org/wiki/Australasian_shoveler

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Stagonopleura bella samueli</i>	Beautiful Firetail (MLR and KI)	1		R	Unlikely – whilst it occurs in coastal and sub-coastal heaths and heathy woodlands, the degraded nature of the site means it is unlikely. Requires dense shrubs for nesting ⁶⁹ .
<i>Sternula nereis</i>	Fairy Tern	3	V	E	May possibly fly over site from time to time, but unlikely to use any of the habitats in the impact area. This species utilises a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands, beaches and spits. ⁷⁰
<i>Stictonetta naevosa</i>	Freckled Duck	1,2		V	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. Prefers permanent fresh water swamps and creeks with heavy growth of cumbungi (bullrushes), lignum or tea-tree. During drier times, the Freckled Duck moves from ephemeral (not permanent) breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewerage ponds. ⁷¹
<i>Thalassarche cauta cauta</i>	Tasmanian Shy Albatross	3	V	V	Unlikely in the impact area - ocean bird. Form of Shy Albatross breeding off Tasmania. Ocean bird. Spends most of its life (except nesting), in flight fishing from ocean. Like other Albatross, they can be seen in coastal waters in winter to early spring, on continental shelf edge, and from shore during storms which blow them closer in shore. Occasionally can found dead on beaches. Very unlikely to occur.
<i>Thalassarche chrysostoma</i>	Grey-headed Albatross	1	E	V	Unlikely in the impact area - ocean bird. A marine species which nests in colonies on several islands in the Southern Ocean ⁷² .

⁶⁹ DEW AMLR Threatened Fauna Factsheet

⁷⁰ Department of Sustainability, Environment, Water, Population and Communities (2011). Approved Conservation Advice for *Sternula nereis nereis* (Fairy Tern). Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities. <http://www.environment.gov.au/biodiversity/threatened/species/pubs/82950-conservation-advice.pdf> accessed 2/10/2018.

⁷¹ Birdlife Australia Bird Profiles (2018). <http://www.birdlife.org.au/bird-profile/freckled-duck>. Accessed 10/10/2018.

⁷² https://en.wikipedia.org/wiki/Grey-headed_albatross

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Thalassarche impavida</i>	Campbell Albatross	3	V	V	Unlikely in the impact area - ocean bird. Similar to Black-browed Albatross. Ocean bird. Spends most of its life (except nesting), in flight fishing from ocean. Like other Albatross, they can be seen in coastal waters in winter to early spring, on continental shelf edge, and from shore during storms which blow them closer in shore. Occasionally can found dead on beaches. Very unlikely to occur.
<i>Thalassarche melanophris</i>	Black-browed Albatross	3	V		Unlikely in the impact area - ocean bird. Spends most of its life (except nesting), in flight fishing from ocean. Like other Albatross, they can be seen in coastal waters in winter to early spring, on continental shelf edge, and from shore during storms which blow them closer in shore. Occasionally can found dead on beaches. Very unlikely to occur.
<i>Thalassarche steadi</i>	White-capped Albatross	3	V		Unlikely in the impact area - ocean bird. Similar to Shy Albatross. Ocean bird. Spends most of its life (except nesting), in flight fishing from ocean. Like other Albatross, they can be seen in coastal waters in winter to early spring, on continental shelf edge, and from shore during storms which blow them closer in shore. Occasionally can found dead on beaches. Very unlikely to occur.

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Thinornis rubricollis rubricollis</i>	Hooded Plover (Hooded Dotterel)	1,2,3	V	V	This species occurs along the Adelaide and Fleurieu coastline. However there is no known breeding colonies in the small sections of beach that adjoin the proposed trail at the south ⁷³ that may be temporarily used during construction activities. These beaches are likely to be fully inundated at peak tide, and have rock walls, rather than the preferred dunes, at the back of the beach. As such, beach areas associated with this project are unlikely to be used for nesting by this species. The hooded plover (eastern) inhabits ocean beaches, particularly wide beaches backed by dunes with large amounts of seaweed, creek mouths and inlet entrances. It may also occur on near-coastal saline and freshwater lakes and lagoons, tidal bays and estuaries, on rock platforms, or on rocky or sandy reefs close to shore. ⁷⁴
<i>Tringa brevipes</i>	Grey-tailed Tattler	1		R	May possibly use the site from time to time - usually seen in small flocks on sheltered coasts with reefs and rock platforms or with intertidal mudflats. They are also found in intertidal rocky, coral or stony reefs, platforms and islets that are exposed at high tide, also shores of rock, shingle, gravel and shells and on intertidal mudflats in embayments, estuaries and coastal lagoons, especially those fringed with mangroves ⁷⁵ .
<i>Tringa glareola</i>	Wood Sandpiper	1		R	Unlikely in impact areas, more likely in nearby Onkaparinga estuary. Wood Sandpipers are seen in small flocks or singly on inland shallow freshwater wetlands, often with other waders. They prefer ponds and pools with emergent reeds and grass, surrounded by tall plants or dead trees and fallen timber ⁷⁶ . Migratory species, breeding in Northern Hemisphere, and flying to the Southern Hemisphere in the southern spring and summer.

⁷³ Emma Stephens pers. comm.

⁷⁴ Department of the Environment (2014). Conservation Advice *Thinornis rubricollis rubricollis* hooded plover (eastern). Canberra: Department of the Environment. Available from: <http://www.environment.gov.au/biodiversity/threatened/species/pubs/66726-conservation-advice.pdf> accessed 2/10/2018.

⁷⁵ <http://www.birdlife.org.au/bird-profile/grey-tailed-tattler>

⁷⁶ Birdlife Australia Bird Profiles (2018). <http://www.birdlife.org.au/bird-profile/wood-sandpiper> accessed 10/10/2018

Scientific Name	Common name	Source	AUS ²⁵	SA ²⁶	Comments on potential for the area assessed to form habitat for this species
<i>Turnix varius</i>	Painted Buttonquail	1		R	Unlikely – no suitable habitat. Temperate and eastern tropical forests and woodlands form the habitats of this species. They appear to prefer closed canopies with some understorey and deep leaf litter on the ground. ⁷⁷
<i>Zapornia tabuensis</i>	Spotless Crake	1,2		R	Unlikely - prefers wetland and swamp areas that contain dense vegetation in which to build their nests ⁷⁸ .
<i>Zoothera lunulata halmaturina</i>	Bassian Thrush	3	V	R	Unlikely – no nearby records and no suitable habitat present. This subspecies mostly inhabits damp eucalypt forest or woodland. Densely forested areas and gullies are favoured, usually with a thick canopy overhead, a thick understorey of small trees and tall shrubs, and leaf-litter below. ⁷⁹

1 = Records within 5km from Biological database of SA search, 2 = Birdlife post 2006 records within 5km, 3= Protected Matters Search Tool (PMST) 5km buffer

Key to Conservation Codes: CR=Critically Endangered, E=Endangered, V=Vulnerable, R=Rare

Scientific Name	Common name	Source	AUS ⁸⁰	SA ⁸¹	Comments on potential for the area assessed to form habitat for this species
MAMMALS					
<i>Antechinus flavipes</i>	Yellow-footed Antechinus	1		V	Unlikely – generally found in association with densely vegetated woodland and heathland in good condition.
<i>Eubalaena australis</i>	Southern Right Whale	3	E	V	Unlikely in impact area – marine species.
<i>Isodon obesulus obesulus</i>	Southern Brown Bandicoot	3	E	V	Unlikely – no nearby records and generally found in association with densely vegetated woodland and heathland in good condition.
<i>Megaptera novaeangliae</i>	Humpback Whale	3	V	V	Unlikely in impact area – marine species.

⁷⁷ <http://www.birdsinbackyards.net/species/Turnix-varius> accessed 10/10/2018.

⁷⁸ https://en.wikipedia.org/wiki/Spotless_crake

⁷⁹ Department of the Environment (2015). Conservation Advice *Zoothera lunulata halmaturina* Bassian thrush (South Australian).

⁸⁰ Australian conservation rating under the *Environment Protection and Biodiversity Conservation Act 1999*

⁸¹ South Australian conservation rating under the *National Parks and Wildlife Act 1972*

Scientific Name	Common name	Source	AUS ⁸⁰	SA ⁸¹	Comments on potential for the area assessed to form habitat for this species
<i>Neophoca cinerea</i>	Australian Sea-lion	1	V	V	Unlikely to be resident. The Australian sea-lion uses a variety of habitats when onshore, including exposed islands and reefs, rocky terrain, sandy beaches and vegetated fore dunes and swales. They also use caves and deep cliff overhangs as haul-out sites or breeding habitat ⁸²
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	1,3	V	R	Unlikely as no feeding or roosting habitat present. This species may use a range of habitats for their roosts but typically they set up camps in tall, reasonably dense trees adjacent to a water source ⁸³ .
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tailed Bat	1		R	May possibly fly over site when foraging, but no roosting habitat present in the site. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows ⁸⁴ .
<i>Trichosurus vulpecula</i>	Common Brushtail Possum	3		R	Unlikely to be present – no suitable habitat. Common Brushtail Possums are found in Eucalyptus and Sheoak woodlands. They make their dens in tree hollows or other dark confined spaces such as hollow logs or dense vegetation. ⁸⁵

1 = Records within 5km from Biological database of SA search, 3= Protected Matters Search Tool (PMST) 5km buffer

Key to Conservation Codes: CR=Critically Endangered, E=Endangered, V=Vulnerable, R=Rare

⁸² Threatened Species Scientific Committee (TSSC) (2010). Commonwealth Listing Advice on *Neophoca cinerea* (Australian Sea-lion). Department of Sustainability, Environment, Water, Population and Communities. Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities.

⁸³ Natural Resources Adelaide & Mt Lofty Ranges Threatened Species Factsheet

⁸⁴ <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10741#:~:text=Habitat%20and%20ecology&text=When%20foraging%20for%20insects%2C%20flies,to%20defend%20an%20aerial%20territory.>

⁸⁵ Natural Resources Adelaide and Mount Lofty Ranges (2016). Common Brushtail Possum *Trichosurus vulpecula*. Government of South Australia, Adelaide.

Scientific Name	Common name	Source	AUS ⁸⁶	SA ⁸⁷	Comments on potential for the area assessed to form habitat for this species
REPTILES AND AMPHIBIANS					
<i>Litoria raniformis</i>	Southern Bell Frog	1,3	V	V	Unlikely – no wetland habitats present in the impact area.
<i>Caretta caretta</i>	Loggerhead Sea Turtle	1,3	E	E	Unlikely in impact area – marine species.
<i>Chelonia mydas</i>	Green Turtle	3	V	V	Unlikely in impact area – marine species.
<i>Dermochelys coriacea</i>	Leatherback Turtle	1,3	E	V	Unlikely in impact area – marine species.

1 = Records within 5km from Biological database of SA search, 3= Protected Matters Search Tool (PMST) 5km buffer

Key to Conservation Codes: CR=Critically Endangered, E=Endangered, V=Vulnerable, R=Rare

Scientific Name	Common name	Source	AUS ⁸⁸	SA ⁸⁹	Comments on potential for the area assessed to form habitat for this species
SHARKS					
<i>Carcharodon carcharias</i>	Great White Shark	3	V		Unlikely in impact area – marine species.

1 = Records within 5km from Biological database of SA search, 3= Protected Matters Search Tool (PMST) 5km buffer

Key to Conservation Codes: CR=Critically Endangered, E=Endangered, V=Vulnerable, R=Rare

⁸⁶ Australian conservation rating under the *Environment Protection and Biodiversity Conservation Act 1999*

⁸⁷ South Australian conservation rating under the *National Parks and Wildlife Act 1972*

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