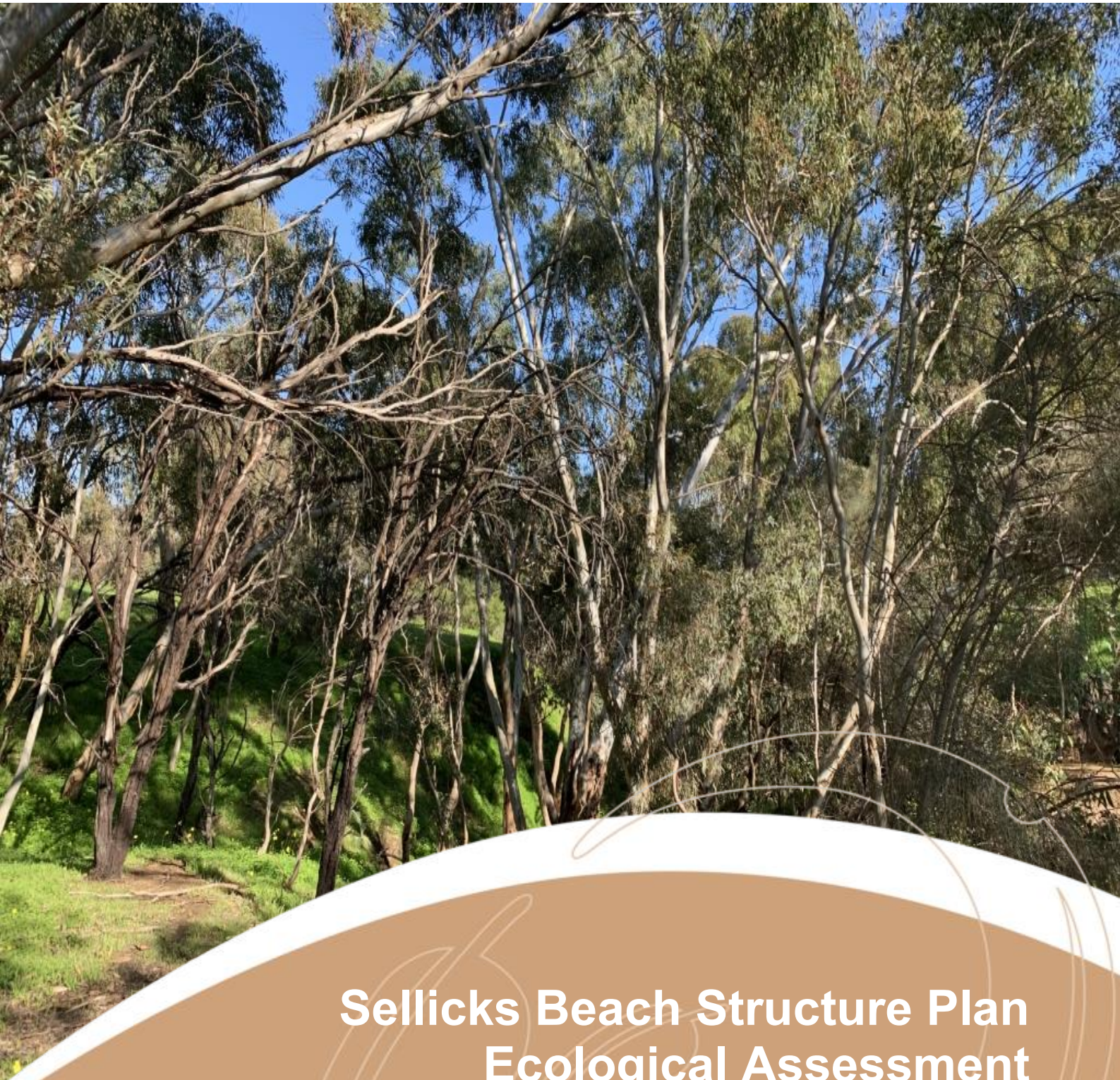

Sellicks Beach Structure Plan
Ecological Assessment

Sellicks Beach Structure Plan Ecological Assessment

21 August 2020

Version F1

Prepared by EBS Ecology for City of Onkaparinga

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GLOSSARY AND ABBREVIATION OF TERMS

BDBSA	Biological Database of South Australia
D	Declared weed under the LSA Act
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DEW	SA Department for Environment and Water
EBS	Environmental and Biodiversity Services Pty Ltd – trading as EBS Ecology
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ha	hectare(s)
Hundreds	Hundreds in South Australia – defined by the *Crown Land Management Act 2009* and used in conjunction with cadastral boundaries to assist in the definition of land parcels
IBRA	Interim Biogeographical Regionalisation of Australia
km	kilometre(s)
LSA Act	SA *Landscape South Australia Act 2019*
m	metre(s)
MNES	Matter(s) of National Environmental Significance – under the EPBC Act
NatureMaps	Initiative of DEW that provides a common access point to maps and geographic information about South Australia's natural resources in an interactive online mapping format
NPW Act	SA *National Parks and Wildlife Act 1972*
NV Act	SA *Native Vegetation Act 1991*
PMST	Protected Matters Search Tool – online tool to search for MNES under the EPBC Act
Project	Development of the Sellicks Beach structure plan
Project Area	Deferred Urban Zone and Primary Production Zone at Sellicks Beach
SA	South Australia(n)
Search Area	5 km buffer of the Project Area considered in database searches
SEB	Significant Environmental Benefit – offset under the NV Act
sp.	Species
spp.	Species (plural)
SRZ	structural root zone(s)
ssp.	Sub-species

TEC	Threatened Ecological Community – under the EPBC Act
TPZ	tree protection zone(s)
VA	Vegetation Association(s)
var.	Variety –a taxonomic rank below that of species and sub-species, but above that of form
WoNS	Weed(s) of National Significance

EXECUTIVE SUMMARY

EBS Ecology (EBS) was contracted by the City of Onkaparinga to undertake an ecological assessment to inform the development of the Sellicks Beach structure plan (the Project), focusing on all remaining Deferred Urban Zone and Primary Production Zone land (outside of the Character Preservation District).

This ecological assessment summarises the relevant environmental legislation, the desktop assessment results (ecological database searches), the key ecological values and constraints, the assessment of the risk of development harming any ecological matters, and recommendations, particularly those around ecological linkage opportunities.

Desktop assessment

A desktop assessment was undertaken to determine the potential for any threatened flora and fauna species, and Threatened Ecological Communities (TECs) (both Commonwealth and State listed) to occur within the Project Area. This was achieved by reviewing satellite imagery and undertaking database searches using a 5 kilometre (km) buffer of the Project Area (Search Area).

The key results of the desktop assessment include:

- No nationally threatened flora or TECs were considered likely to occur within the Project Area;
- The nationally Vulnerable and State Rare Grey-headed Flying Fox (*Pteropus Poliocephalus*) was considered highly likely to occur within the Project Area. No other nationally threatened fauna were considered likely to occur;
- The State Rare *Acacia iteaphylla* (Flinders Ranges Wattle) is known to occur within the Project Area, with planted individuals recorded. No other State threatened flora were considered likely to occur; and
- The State Rare Elegant Parrot (*Neophema elegans*) was considered likely to occur. No other State threatened fauna were considered likely to occur.

Field assessment

The field assessment was undertaken on 14–15 July 2020. The entire Project Area was traversed (except where access was not permitted) to map vegetation associations and condition, assess trees regulated and significant under the *Development Act 1993* (Development Act), record any opportunistic fauna observation and identify any threatened and exotic flora species.

The key results of the field assessment include:

- A total of six broad vegetation associations (VA) were mapped within the Project Area:
    - VA 1 – Amenity Plantings (11.112 hectares (ha));
    - VA 2 – Horticulture (Olive Groves, Grape Vines, Fruit Trees) (18.371 ha);
    - VA 3 – Olive Escapees over *Oxalis pes-caprae* +/- *Cynara cardunculus* +/- *Echium plantagineum* (15.580 ha);
    - VA 4 – Revegetated Patch (4.290 ha);

  - VA 5 – Exotic Patch (2.738 ha); and
  - VA 6 – Exotic Grassland / Pasture (76.812 ha).

- A total of 74 trees protected under the Development Act were recorded within the Project Area, including 48 regulated and 26 significant trees. A further 19 trees were identified as possibly being regulated or significant. However, access restrictions meant these trees could not be assessed;
- A total of 48 flora species were recorded within the Project Area, including 19 native and 39 weed species. Of the 19 native species recorded, only six were naturally occurring, regenerating in certain understoreys of VAs 1 and 4;
- No nationally threatened flora species were recorded within the Project Area;
- Planted individuals of the State Rare *Acacia iteaphylla* (Flinders Ranges Wattle) were recorded in VA 1, along the northern side of Gulf View Road, within 150 m from the western boundary of the Project Area;
- Of the 39 weed species recorded within the Project Area, 12 were declared under the *Landscape South Australia Act 2019* and four were Weeds of National Significance (WoNS);
- A total of 21 fauna species were recorded within the Project Area, including 20 bird, four of which were introduced, and one amphibian species;
- No nationally or State threatened fauna species were recorded;
- The majority of the habitat in the Project Area was of low value (116.35 ha). This included certain amenity plantings (VA 1) (e.g. sparse/weedy areas), horticulture areas (VA 2), Olive escapee areas (VA 3), the exotic patch (VA 5) and exotic grasslands/pastures (VA 6);
- Certain amenity plantings (VA 1) and revegetated patches (VA 4) provided moderate habitat value (11.529 ha), including planted *Pinus halepensis* and *Allocasuarina verticillata* trees that provide food resources for the State Vulnerable Yellow-tailed Black Cockatoo (*Zanda funerea whiteae*); and
- The large *Eucalyptus camaldulensis* and *E. cladocalyx* trees planted in a low-lying area north of Gulf View Road, approximately 200 m from the western boundary of the Project Area were mapped as high value habitat (1.024 ha). These trees were classed as having high value based on the availability of nesting sites, roosting sites hollows and food resources.

Linkage opportunities

The main linkage opportunity exists between the large creek line running through the centre of the Project Area and Sellicks Creek to the west of the Project Area, and the vegetated hills face areas east of the Project Area. This creek line already contains sections that have been revegetated with the planted native species being well established. Further revegetation and the removal of weeds in this areas would expand on the rehabilitation project undertaken in Sellicks Creek.

Recommendations

Based on the high-level ecological assessment, the following recommendations are made:

- Undertake an assessment(s) under the *Native Vegetation Act 1991* or *Native Vegetation Regulations 2017* to ensure no regenerating native vegetation is cleared without appropriate assessment, approval and offset. This should include more intensive searches of vegetation patches of interest;
- Avoid and/or minimise clearance of any native vegetation, revegetated areas and/or important amenity vegetation/habitat identified in the Project Area;
- Consider off target damage and/or indirect impacts to roadside vegetation in any future developments;
- Consider indirect impacts to fauna as result of develop (e.g. increased vehicle strike) and implement design features to avoid/minimise these impacts;
- Undertake an assessment(s) under the Development Act for any regulated and/or significant trees requiring clearance, bearing in mind that addition regulated/significant trees may occur in areas where access was restricted during the current field assessment;
- Retain, extend and improve Revegetation Patches (VA 4);
- Maintain and improve linkage between the vegetated hills face areas east of the Project Area and Sellicks Creek and important amenity areas within the Project Area; and
- Implement management actions that maintain good weed hygiene to avoid introducing or spreading declared weeds and WoNS.

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1 INTRODUCTION

EBS Ecology (EBS) was contracted by the City of Onkaparinga to undertake an ecological assessment to inform the development of the Sellicks Beach structure plan (the Project). The structure plan is being prepared for the Sellicks Beach area with a focus on all remaining Deferred Urban Zone and Primary Production Zone land (outside of the Character Preservation District).

The Sellick Beach structure plan will inform the location, form and timing of development together with what infrastructure and services will be required to facilitate urban development.

Whilst the timing of any future development of the land is ultimately based upon a sewer solution for the wider Sellicks Beach area, a number of various issues need to be resolved through appropriate investigations to inform the future rezoning of the Project Area.

1.1 Objectives

The objectives of the ecological assessment include:

- Undertake a desktop assessment to determine the flora and fauna species, and ecological communities potentially occurring within the Project Area, with particular focus on species and communities threatened nationally under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and in South Australia (SA) under the SA *National Parks and Wildlife Act 1972* (NPW Act);
- Undertake an inspection of the Project Area to gain an understanding of conditions and constraints;
- Determine and map the presence of significant vegetation and flora and fauna species, including native vegetation, declared weeds and Weeds of National Significance (WoNS);
- Provide an overview of the regulated and significant trees protected under the SA *Development Act 1993* (Development Act) within and adjacent to the Project Area;
- Discuss the ecological importance of the Project Area, with consideration to its value as a linkage / transitional zone between the hills and coastal ecosystems; and
- Provide recommendations, particularly around how this link can be strengthened / improved.

1.2 Project Area

The Project Area is the Deferred Urban Zone and Primary Production Zone at Sellicks Beach as shown in Figure 1.The Project Area comprises approximately 130 ha of private land and road reserve, and located between the township of Sellicks Beach and Main South Road, South Australia (SA).

The Project Area is largely utilised for horticulture and stock grazing, with residential properties and associated grounds also throughout.

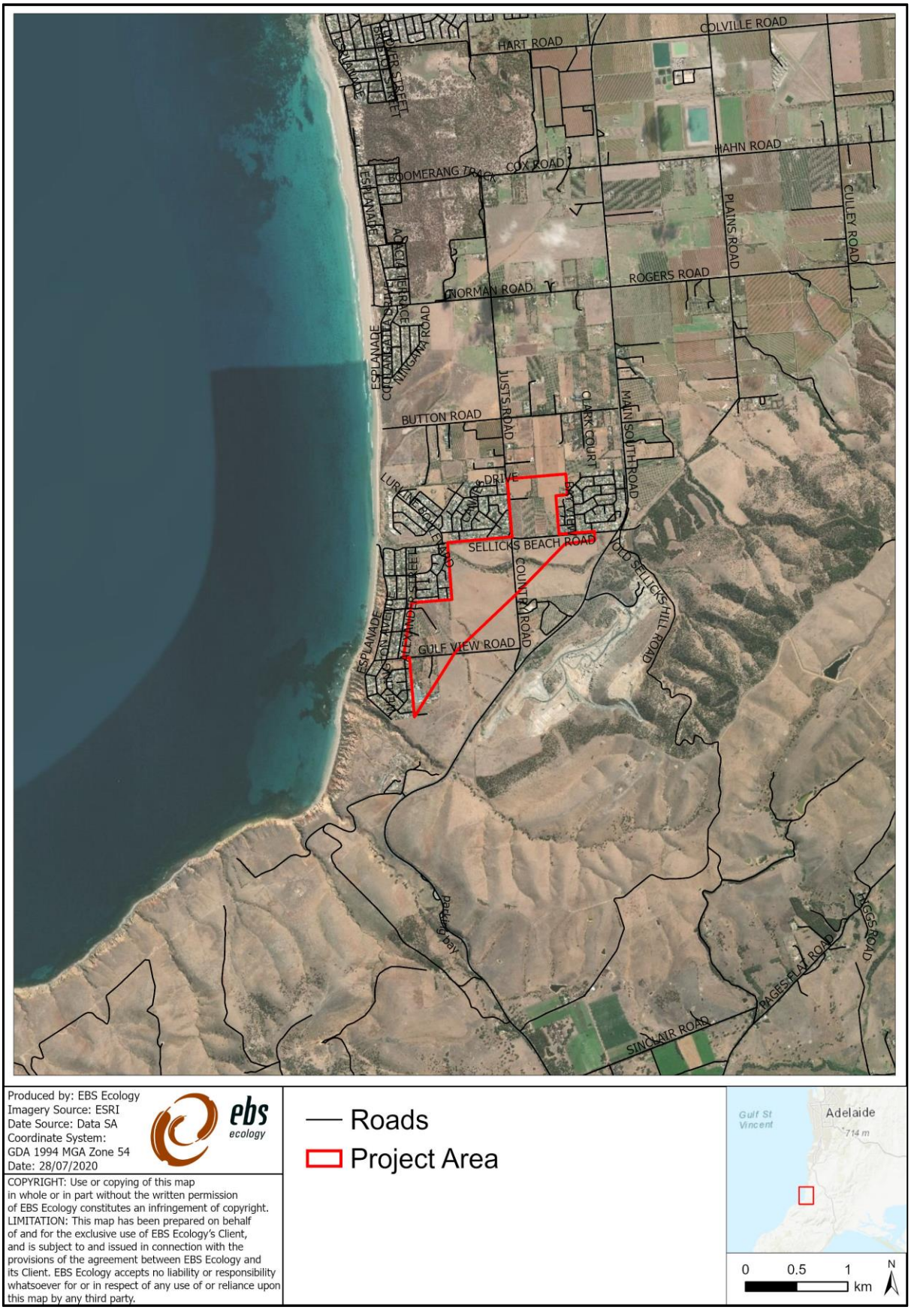


Figure 1. Location and extent of the Project Area (Deferred Urban Zone and Primary Production Zone at Sellicks Beach).

2 BACKGROUND INFORMATION

2.1 Compliance and legislative summary

The following Commonwealth and State environmental legislation is relevant to the Project Area:

- Commonwealth EPBC Act;
- SA NPW Act;
- SA Development Act;
- SA *Native Vegetation Act 1991* (NV Act); and
- SA *Landscapes South Australia Act 2019* (LSA Act).

A summary of the environmental legislation relevant to the Project is provided in Appendix 1.

2.2 Environmental setting

2.2.1 Administrative boundaries

The Project Area is located within the Green Adelaide Landscape Management Region, Willunga Hundreds, Adelaide County, and Onkaparinga Local Government Area.

2.2.2 IBRA

The 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 is located within the Flinders Lofty Block IBRA region, Mount Lofty Ranges IBRA subregion and Aldinga (northwest) and Mt Wilson (southeast) IBRA environmental associations.

The Flinders Lofty Block IBRA region, Mount Lofty Ranges IBRA subregion and Aldinga (northwest half of Project Area) and Mt Wilson (southeast half of Project Area) IBRA environmental associations and summarised in Appendix 2. Native vegetation remnancy values for the subregion and environmental associations are outlined in

Table 1. Native vegetation remnancy values for the IBRA subregion and environmental associations that the Project Area falls within.

IBRA subregion / environmental association	Remnant native vegetation (%)	Remnant native vegetation (ha)	Conserved remnant native vegetation (%)	Conserved remnant native vegetation (ha)
Mount Lofty Ranges IBRA subregion	15%	46,432 ha	27%	12,706 ha
Aldinga IBRA environment association	3%	902 ha	44%	399 ha
Mt Wilson IBRA environment association	6%	980 ha	4%	37 ha

3 METHODS

3.1 Desktop assessment

A desktop assessment was undertaken to determine the potential for any threatened flora and fauna species, and TECs (both Commonwealth and State listed) to occur within the Project Area. This was achieved by reviewing satellite imagery and undertaking database searches using a 5 km buffer of the Project Area (Search Area).

3.1.1 Review of satellite imagery

The Project Area has been subject to extensive land clearance and there have been substantial plantings undertaken within and around watercourses. Satellite imagery of the Project Area from 1949–2020 was provided by the City of Onkaparinga on 16 July 2020. The imagery was reviewed to determine the level of vegetation clearance, remaining remnant vegetation and planted vegetation within the Project Area, and assist in determining the likelihood of occurrence of threatened flora and fauna species, and TECs identified in the PMST report and BDBSA data extract (see Section 3.1.3).

3.1.2 Database searches

A Protected Matters Search Tool (PMST) report was generated on 13 July 2020 to identify Matters of National Environmental Significance (MNES) under the EPBC Act relevant to the Project Area (DAWE 2020a). This included flora and fauna species, migratory species and TECs protected under the EPBC Act that may occur or have suitable habitat within the Project Area. Only species and TECs identified in the PMST report that are likely or known to occur within the Search Area were assessed for their likelihood of occurrence.

A data extract from the Biological Database of South Australia (BDBSA) was obtained from the NatureMaps to identify flora and fauna species that have been recorded within 5 km of the Project Area (DEW 2020; data extracted 13 July 2020). The BDBSA is comprised of an integrated collection of species records from the South Australian Museum, conservation organisations, private consultancies, Birds SA, Birdlife Australia and the Australasian Wader Study Group, which meet the SA Department for Environment and Water's (DEW) standards for data quality, integrity and maintenance. Only species with records since 1995 and within 1 km spatial reliability (reliable records) were assessed for their likelihood of occurrence.

3.1.3 Likelihood of occurrence

Each threatened flora and fauna species, and TECs identified in the PMST report and BDBSA data extract were assigned a rating (Known, Highly Likely, Likely, Possible, Unlikely), which described their likelihood of occurrence within the Project Area. The following criteria were considered when assigning each likelihood rating:

- Date of the most recent record (taking into consideration the date of the last surveys undertaken in the area);
- Proximity of the records (i.e. distance to the Project Area);

- Landscape, vegetation remnancy and vegetation type at the location of records (taking into the consideration of the landscape, remnancy and vegetation type of the Project Area, with higher likelihood assigned to species that were found in similar locations, conditions and/or vegetation associations); and
- Knowledge of the species' habitat preferences, causes of its decline, the conspicuousness of the species and local population trends.

3.2 Field survey

The field assessment was undertaken by NVC Accredited EBS Senior Ecologist Mark Laws on 14–15 July 2020. The entire Project Area was traversed (except where access was not permitted) with the following data recorded:

- Vegetation association mapping and condition;
- Assessment of the following parameters of regulated and significant trees:
    - Circumference at 1 metre (m) (regulated >2 m; significant >3 m);
    - Diameter at breast height (to calculate tree protection zones (TPZ)); and
    - Diameter immediately above the buttress (to calculation structural root zones (SRZ)).
- Opportunistic recording of fauna species;
- Opportunistic recording of threatened and exotic flora species.

3.3 Native vegetation risk assessment

The risk to native vegetation within each vegetation association in the Project Area was assessed based on its relevance to the NV Act and its condition and value (Table 2).

Table 2. Risk to native vegetation categories.

Risk category	NV Act applies	Comment
Very High	Yes	TEC under the EPBC Act or threatened ecosystem of SA
High	Yes	Patch of native vegetation
Moderate	Yes	Scattered trees, small degraded native vegetation patch
Low	Yes	Regenerating native species in disturbed / revegetated areas
	No	Native amenity trees, native revegetation
Very Low	No	Declared weed patches, exotic vegetation, exotic plantings, horticulture

3.4 Habitat assessment

Habitat within each vegetation association in the Project Area was broadly divided into three categories: 'High', 'Moderate' and 'Low' value. The assessment was made utilising satellite imagery and field assessment, with consideration of species that may utilise habitat within the Project Area based on their habitat requirements.

3.5 Limitations

The findings and conclusions expressed by EBS are based solely upon information in existence at the time of each assessment.

3.5.1 Desktop assessment

The PMST report is designed to assist in identifying the locations of MNES that may be relevant in determining obligations under the EPBC Act. Not all species listed under the EPBC Act have been mapped and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms.

Proponents using the information within a PMST report in making a referral may need to seek and consider other information sources, and may need to consider the following qualifications:

- Where TEC distributions are not well known, existing vegetation maps and point location data are used to produce indicative distribution maps;
- Threatened and migratory species distributions have been derived through a variety of methods. Where very little information is available for species maps are derived either from 0.04 or 0.02 decimal degree cells by an automated process using polygon capture techniques (static 2 km grid cells, alpha-hull and convex hull), captured manually, or by using topographic features (e.g. national park boundaries, islands, etc.);
- Only selected migratory species have been mapped; and
- Threatened species considered as vagrants, some newly listed species and TECs, and migratory species that are very widespread, vagrant, or only occur in small numbers have not been mapped.

The BDBSA only includes verified flora and fauna records submitted to DEW or partner organisations. It is recognised that knowledge is poorly captured and the presence of species may not be adequately represented by database records. Hence, the BDBSA results that have been extracted to a 5 km buffer of the Project Area may not highlight all potential threatened flora and fauna species that may occur in the Project Area. Fauna species, in particular birds, can traverse distances greater than the 5 km search buffer, and therefore, additional species may occur. Inadequate search effort (i.e. previous surveys) is another factor that can lead to threatened species not being represented by database records.

BDBSA flora and fauna records were filtered to a spatial reliability of less than 1 km and records since 1995. The spatial reliability of the BDBSA data ranges from 0-5 m to over 100 km, and therefore additional species may occur but have been discounted due to unreliable data collection. Records dating back to 1995 are included as this focuses on recent records and considers data collected during the Biological Survey of South Australia.

Although much of the BDBSA data has been through a variety of validation processes, the records may contain errors and should be used prudently. DEW gives no warranty that the data is accurate or fit for any particular purpose of the user or any person to whom the user discloses the information.

3.5.2 Field assessment

Due to the size and somewhat restricted access of the Project Area, the scope to broadly map vegetation, and the need for detailed vegetation assessments in the future, not all vegetation patches were searched; instead a high-level assessment was undertaken. As such, additional flora species, including threatened species, although unlikely, may be present. Therefore, proposed development areas will need to be searched in detail for the presence of regenerating native vegetation and threatened flora species. Furthermore, some flora species may have gone undetected where flora was surveyed (e.g. if they were dormant, inconspicuous or lacked distinguishable features such as flowers or seed at the time of the survey).

Fauna records were limited to opportunistic observations. Therefore, species additional to those recorded during the field survey may occur within the Project Area.

4 DESKTOP ASSESSMENT RESULTS

4.1 Review of satellite imagery

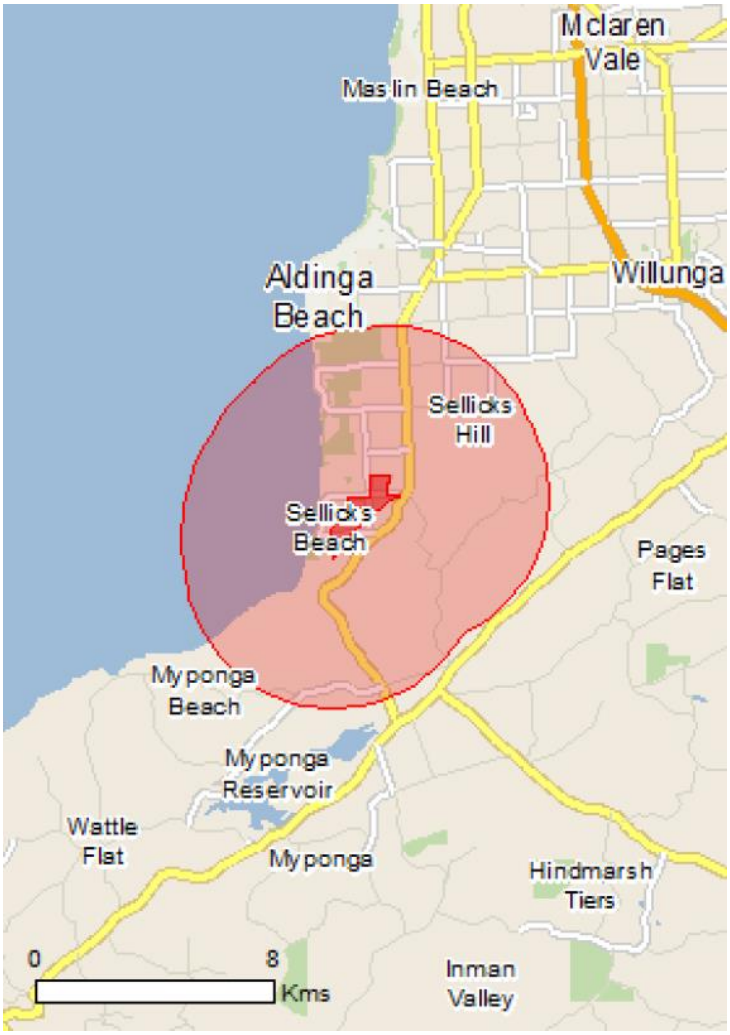
The review of satellite imagery of the Project Area dating back to 1949 revealed that the Project Area was almost entirely cleared of native vegetation prior to 1949.

4.2 Matters of national environmental significance

The results of the PMST report are summarised in Table 3 (DAWE 2020a). The relevant MNES and threatened species listed under the NPW Act are discussed in detail below.

Species listed as marine under the EPBC Act, which are not also listed as threatened or migratory, only require EPBC Referral if they are likely to be significantly impacted within a Commonwealth Marine Area. As Commonwealth Marine Areas commence three nautical miles from shore, marine species are not relevant to this Project and have been excluded from further assessment. Further, fauna that complete their life cycle in marine habitats (e.g. sharks, whales, etc.) have also been excluded from further assessment due to their irrelevance to the Project, which is located on terrestrial land.

Table 3. Summary of the results of the Protected Matters Search Tool report (DAWE 2020a).

Project Area (5 km buffer)	Matters of National Environmental Significance	Number
	World heritage properties	None
	National heritage places	None
	Wetlands of international importance	None
	Great Barrier Reef marine park	None
	Commonwealth marine areas	None
	Listed Threatened Ecological Communities	3
	Listed threatened species	55
	Listed migratory species	40
	Other matters protected by the EPBC Act	
	Commonwealth land	None
	Commonwealth heritage places	None
	Listed marine species	74
	Whales and other Cetaceans	8
	Critical habitats	None
	Commonwealth reserves terrestrial	None
	Australian marine parks	None
	Extra information	
	State and Territory reserves	1
	Regional forest reserves	None
	Invasive species	40
	Nationally important wetlands	1
	Key ecological features (marine)	None

4.2.1 Threatened ecological communities

Two TECs listed under the EPBC Act were identified in the PMST report that are likely or known to occur within the Search Area:

- Subtropical and Temperate Coastal Saltmarsh – Vulnerable; and
- Swamps of the Fleurieu Peninsula – Critically Endangered.

The conservation status and likelihood of occurrence within the Project Area (including rationale) for each TEC are summarised in

Table 4. TECs likelihood of occurrence within the Project Area.

TEC	Conservation status	Likelihood of occurrence within Project Area	Rationale
Subtropical and Temperate Coastal Saltmarsh	VU	Unlikely	TEC occurs in coastal areas under regular or intermittent tidal influence. The Project Area is inland, lacking connectivity with the coast.
Swamps of the Fleurieu Peninsula	CE	Unlikely	TEC occurs as densely vegetated patches on peat, silt, peat silt or black clay soils, in and adjacent to waterlogged areas near low-lying creeks and flats. Although the Project Area contains creek lines, having been extensively cleared in the past, it lacks densely vegetated patches.

Conservation status

Conservation Codes under the *Environment Protection and Biodiversity Conservation Act 1999*: CE: Critically Endangered. EN: Endangered. VU: Vulnerable.

4.2.2 Nationally threatened flora

The PMST report identified 10 nationally threatened flora species that are likely or known to occur within the Search Area. However, all nationally threatened flora species identified are unlikely to occur within the Project Area due to its historical disturbance (extensive vegetation clearance and weed invasion).

The likelihood of occurrence in the Project Area for each nationally threatened flora species and the rationale behind this are summarised in Table 5. No nationally threatened flora species had reliable BDBSA records within 5 km of the Project Area.

4.2.3 Nationally threatened fauna

The PMST report identified a total of 18 nationally threatened fauna species that are likely or known to occur within the Search Area. This included 16 bird and two mammal species.

The nationally Vulnerable Grey-headed Flying Fox (*Pteropus Poliocephalus*) was considered highly likely to occur within the Project Area. This species is discussed further in Section 6.1.2. No other nationally threatened fauna were considered likely to occur.

The likelihood of occurrence in the Project Area for each nationally threatened fauna species and the rationale behind this are summarised in Table 5. Reliable nationally threatened fauna BDBSA records within 5 km of the Project Area are mapped in Figure 3.

Table 5. Threatened flora and fauna, and migratory species potentially occurring within the Project Area.

Scientific name	Common name	Conservation status		Source of information	Last BDBSA record (year)	Likelihood of occurrence within Project Area	Rationale
		Aus	SA				
PLANTAE	**Plants**						
Acacia iteaphylla	Flinders Ranges Wattle		R	2	2009	Known	Native to the Flinders Ranges, Gawler Ranges and Eyre Peninsular of SA. Sold as a cultivar and can become invasive outside of this distribution. Planted individuals observed during field assessment.
Caladenia tensa	Greencomb Spider-orchid	EN		1		Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Calochilus cupreus	Copper Beard Orchid	CE		1		Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Eucalyptus fasciculosa	Pink Gum		R	2	2010	Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Eucalyptus viminalis ssp. *viminalis*	Manna Gum		R	2	2000	Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Euphrasia collina ssp. *osbornii*	Osborn's Eyebright	EN		1		Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Glycine latrobeana	Clover Glycine	VU		1		Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Hibbertia tenuis		CE		1		Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Maireana rohrlachii	Rohrlach's Bluebush		R	2	2005	Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Myoporum parvifolium	Creeping Boobialla		R	2	1996	Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Olearia pannosa ssp. *pannosa*	Silver Daisy-bush	VU		1		Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Olearia passerinoides ssp. *glutescens*	Sticky Daisy-bush		R	2	2009	Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Prasophyllum frenchii	Maroon Leek-orchid	EN		1		Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Prasophyllum murfetii	Fleurieu Leek Orchid	CE		1		Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Prasophyllum pallidum	Pale Leek-orchid	VU		1		Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.
Veronica derwentiana ssp. *homalodonta*	Mount Lofty Speedwell	CE		1		Unlikely	Project Area largely disturbed by extensive vegetation clearance and weed invasion.

Scientific name	Common name	Conservation status		Source of information	Last BDBSA record (year)	Likelihood of occurrence within Project Area	Rationale
		Aus	SA				
AVES	**Birds**						
Actitis hypoleucos	Common Sandpiper	Mi		1		Unlikely	In Australia, prefers narrow, sheltered and often steep shorelines (Menkhorst *et al.* 2019).
Apus pacificus	Fork-tailed Swift	Mi		1		Possible (fly-over)	In Australia, almost exclusively aerial, occurring over any terrestrial habitat (Menkhorst *et al.* 2019).
Ardenna carneipes	Flesh-footed Shearwater	Mi		1		Unlikely	Pelagic species.
Botaurus poiciloptilus	Australasian Bittern	EN	E	1, 2	1998	Possible	Found in swamps with tall dense vegetation, especially reeds, rushes and sedges (Menkhorst *et al.* 2019).
Calidris acuminata	Sharp-tailed Sandpiper	Mi		1		Possible	In Australia, common in fresh to saline inland wetlands. Also forages nearby damp grasslands (Menkhorst *et al.* 2019).
Calidris ferruginea	Curlew Sandpiper	CE, Mi		1		Unlikely	In Australia, prefers tidal flats, but also uses freshwater and brackish wetlands (Menkhorst *et al.* 2019).
Cereopsis novaehollandiae novaehollandiae	Cape Barren Goose		R	2	1998	Possible	Moves to coastal mainland during non-breeding period, occurring in short pasture, shallow wetlands and irrigated crops (Menkhorst *et al.* 2019).
Coracina papuensis robusta	White-bellied Cuckooshrike		R	2	2008	Possible	Prefers Eucalypt forests and woodlands, including remnant patches in farmland (Menkhorst *et al.* 2019).
Coturnix ypsilophora australis	Brown Quail		V	2	2002	Possible	Occurs in tall rank vegetation of grass, ferns, shrubs or herbs, often in damp or swampy areas around wetlands (Menkhorst *et al.* 2019).
Diomedea antipodensis	Antipodean Albatross	Mi		1		Unlikely	Pelagic species.
Diomedea epomophora	Southern Royal Albatross	VU, Mi		1		Unlikely	Pelagic species.
Diomedea exulans	Wandering Albatross	VU, Mi		1		Unlikely	Pelagic species.
Diomedea sanfordi	Northern Royal Albatross	EN, Mi		1		Unlikely	Pelagic species.
Falco hypoleucos	Grey Falcon	VU		1		Unlikely	Sparsely distributed and rarely encountered. Prefers opens plains with treed watercourses in arid inland (Menkhorst *et al.* 2019).
Falcunculus frontatus frontatus	Eastern Shriketit		R	2	2014	Possible	Prefers Eucalypt forests and woodlands (Menkhorst *et al.* 2019).
Hieraaetus morphnoides	Little Eagle		V	2	2007	Possible	Occurs in open wooded habitat across most of Australia (Menkhorst *et al.* 2019).
Hirundapus caudacutus	White-throated Needletail	VU, Mi		1		Possible (fly-over)	In Australia, almost exclusively aerial, occurring over many habitats, especially forests and areas with updrafts (e.g. hills, coastal cliffs) (Menkhorst *et al.* 2019).

Scientific name	Common name	Conservation status		Source of information	Last BDBSA record (year)	Likelihood of occurrence within Project Area	Rationale
		Aus	SA				
Limosa lapponica	Bar-tailed Godwit	Mi		1		Unlikely	In Australia, large flocks restricted to coastal sites with large tidal flats. Smaller groups also occur in other coastal sites (estuaries, etc.) (Menkhorst *et al.* 2019).
Melanodryas cucullata cucullata	Hooded Robin (YP, MN, AP, MLR, MM, SE)		R	2	2007	Possible	Occurs in lightly timbered habitats, especially woodlands and shrublands dominated by Eucalypts and Acacias. Prefers sites with fallen timber or other low vantage points to perch and pounce on ground-dwelling prey (Menkhorst *et al.* 2019).
Microeca fascinans fascinans	Jacky Winter		R	2	1998	Possible	Prefers Eucalypt woodlands and open forests with an open shrub layer and bare ground. Also occurs in remnant patches in farmland, roadsides, etc. (Menkhorst *et al.* 2019).
Myiagra cyanoleuca	Satin Flycatcher	Mi		1		Unlikely	Breeds in moist forests in Tasmania and southern Victoria, and those at high altitude in eastern New South Wales and southeast Queensland. Infrequently seen in central Australia (Menkhorst *et al.* 2019).
Neophema elegans elegans	Elegant Parrot		R	2	2014	Likely	Prefers open woodland, grassland, saltmarsh and rough pasture (Menkhorst *et al.* 2019).
Numenius madagascariensis	Eastern Curlew	CE, Mi		1		Unlikely	Widespread but patchily distributed along Australia's coastline, preferring extensive tidal flats (Menkhorst *et al.* 2019).
Pachyptila turtur subantarctica	Fairy Prion	VU		1		Unlikely	Pelagic species.
Pandion haliaetus	Osprey	Mi		1		Unlikely	Prefers coasts, inshore waters and tidal waters of large streams with exposed lookouts to perch (Menkhorst *et al.* 2019).
Petroica boodang boodang	Scarlet Robin		R	2	2005	Possible	Prefers Eucalypt forests and woodlands with an open understorey. In winter can disperse into more open grasslands, farmlands and occasionally parks and gardens with tree cover. Uses low perches to pounce on ground-dwelling prey (Menkhorst et al. 2019).
Petroica phoenicea	Flame Robin		V	2	2014	Possible	Breeds mainly in upland Eucalypt forests and woodlands, especially with an open understorey or small clearings. Winters in more open grasslands, farmlands and grassy woodlands (Menkhorst et al. 2019).
Phoebetria fusca	Sooty Albatross	VU, Mi		1		Unlikely	Pelagic species.
Rostratula australis	Australian Painted-snipe	EN	E	1, 2	2004	Unlikely	Prefers sites with a combination of exposed mud, shallow water and low dense fringing vegetation (Menkhorst *et al.* 2019).
Spatula rhynchotis	Australasian Shoveler		R	2	2003	Unlikely	Prefers permanent well vegetated wetlands (Menkhorst *et al.* 2019).

Scientific name	Common name	Conservation status		Source of information	Last BDBSA record (year)	Likelihood of occurrence within Project Area	Rationale
		Aus	SA				
Stagonopleura bella samueli	Beautiful Firetail (MLR and KI)		R	2	2007	Possible	Prefers sedgelands, heathlands and heathy woodlands, especially those with *Allocasuarina*, paperbarks and tea-tree; never far from running water (Menkhorst *et al.* 2019).
Sternula nereis nereis	Australian Fairy Tern	VU		1		Unlikely	Found along sandy coastlines with sheltered inshore waters; occasionally on adjacent lakes and saltworks (Menkhorst *et al.* 2019).
Thalassarche cauta	Shy Albatross	EN, Mi		1		Unlikely	Pelagic species.
Thalassarche steadi	White-capped Albatross	VU, Mi		1		Unlikely	Pelagic species.
Thinornis cucullatus cucullatus	Hooded Plover (eastern)	VU	V	1		Unlikely	Usually restricted to wide open beaches (Menkhorst *et al.* 2019).
Tringa nebularia	Common Greenshank	Mi		1		Unlikely	Prefers coastal and freshwater habitats with open mudflats or still shallow water (Menkhorst *et al.* 2019).
Turnix varius varius	Painted Buttonquail		R	2	2005	Possible	Prefers dry open Eucalypt forests and woodlands with much leaf-litter and moderate to sparse understorey of grass, small shrubs and fallen timber (Menkhorst *et al.* 2019).
Zapornia tabuensis	Spotless Crake		R	2	2005	Possible	Prefers wetlands with dense vegetative cover (Menkhorst *et al.* 2019).
Zoothera lunulata halmaturina	Bassian Thrush (South Australian)	VU		1		Unlikely	Occurs in moist forests from coast to sub-alps, sometimes in gardens and pine plantations (Menkhorst *et al.* 2019).
MAMMALIA	**Mammals**						
Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	EN		1		Unlikely	Known to inhabit a variety of habitats including heathland, shrubland, sedgeland, heathy open forest and woodland with dense ground cover (50–80% average foliage density in the 0.2–1 m height range) (DAWE 2020b).
Pteropus Poliocephalus	Grey-headed Flying Fox	VU	R	1, 2	2020	Highly Likely	Utilises vegetation communities including rainforests, open forests, closed and open woodlands. Also feeds on commercial fruit crops and on introduced tree species in urban areas. Primary food source is blossom from Eucalypts and related genera (DAWE 2020b).

Conservation status

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.

Source of Information

1. **EPBC Act Protected Matters Search Tool report (DAWE 2020a) – 5 km buffer applied to Project Area.**
2. **Biological Database of South Australia data extract via NatureMaps (DEW 2020) - 5 km buffer applied to Project Area.**

4.2.4 Migratory fauna

The PMST report identified 18 migratory species that are likely or known to occur within the Search Area. However, no migratory species identified are likely to occur within the Project Area due to a lack of suitable habitat.

The likelihood of occurrence in the Project Area for each migratory species and the rationale behind this are summarised in Table 5. No migratory species had BDBSA records within 5 km of the Project Area.

4.3 Matters of State environmental significance

4.3.1 State threatened flora

The BDBSA data extract identified six State threatened flora species with reliable records within the Search Area.

The State Rare *Acacia iteaphylla* (Flinders Ranges Wattle) is known to occur within the Project Area, with planted individuals recorded. This species is discussed further in Section 6.1.1. All remaining State threatened flora species identified are unlikely to occur within the Project Area due to its historical disturbance (extensive vegetation clearance and weed invasion).

The likelihood of occurrence in the Project Area for each State threatened flora species and the rationale behind this are summarised in Table 5. State threatened flora species with reliable BDBSA records within 5 km of the Project Area are mapped in Figure 2.

4.3.2 State threatened fauna

The BDBSA data extract identified a total of 17 State threatened fauna species with reliable records within the Search Area. This included 16 bird and one mammal species.

The State Rare Grey-headed Flying Fox (*Pteropus Poliocephalus*) was considered highly likely to occur within the Project Area, while the State Rare Elegant Parrot (*Neophema elegans*) was considered likely to occur. These species are discussed further in Section 6.1.2. No other State threatened fauna were considered likely to occur.

The likelihood of occurrence in the Project Area for each State threatened fauna species and the rationale behind this are summarised in Table 5. State threatened fauna species with reliable BDBSA records within 5 km of the Project Area are mapped in Figure 3.

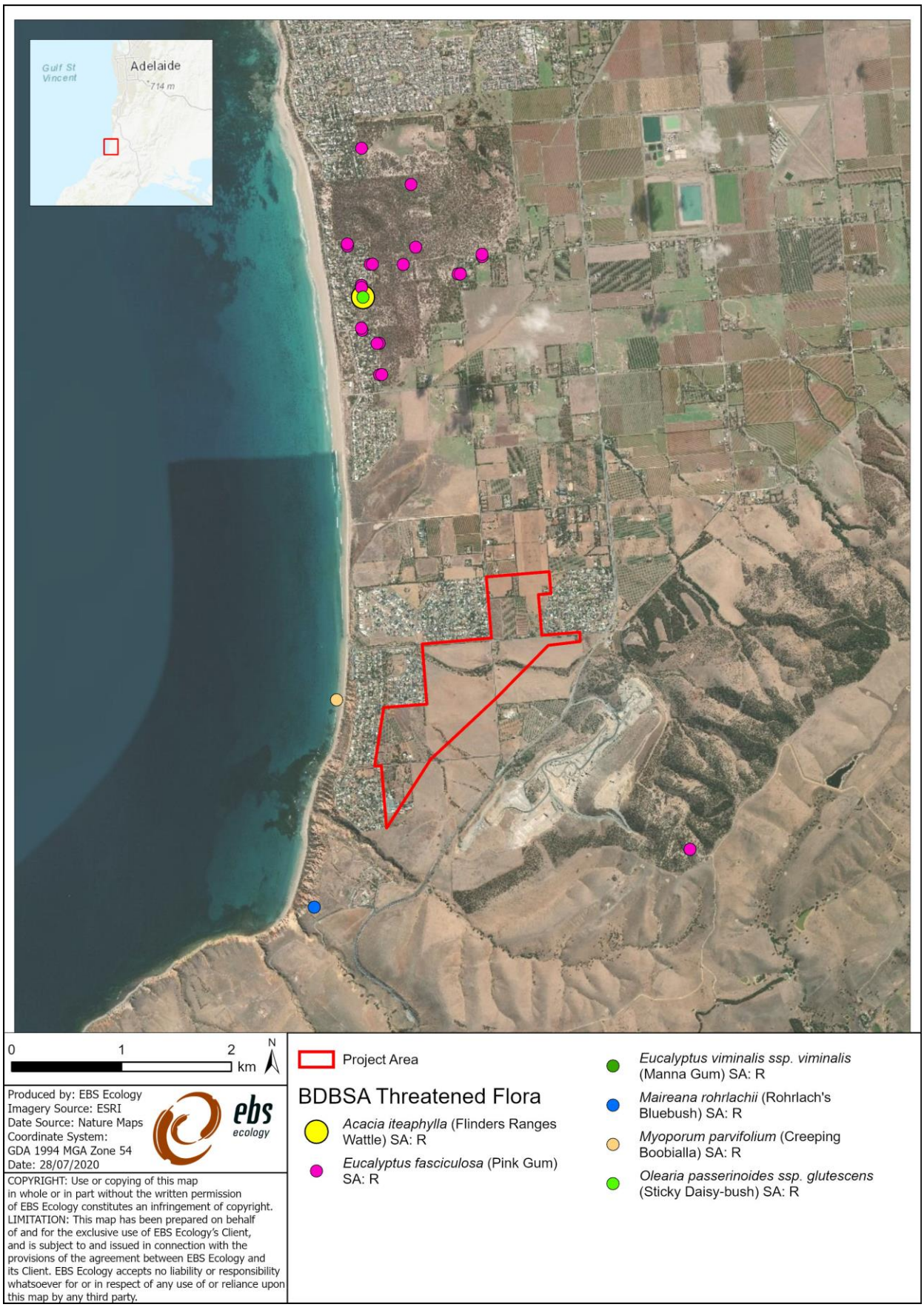


Figure 2. Reliable threatened flora BDBSA records within 5 km of the Project Area.

Figure 3. Reliable threatened fauna BDBSA records within 5 km of the Project Area.

5 FIELD ASSESSMENT RESULTS

5.1 Vegetation associations

A total of six broad vegetation associations (VA) were mapped within the Project Area (Table 6; Figure 4). Each VA is described below in Section 5.1.1 to 5.1.6.

Table 6. Broad vegetation associations mapped within the Project Area.

VA	Description	Area (ha)
1	Amenity Plantings	11.112
2	Horticulture (Olive Groves, Grape Vines, Fruit Trees)	18.371
3	Olive Escapees over *Oxalis pes-caprae* +/- *Cynara cardunculus* +/- *Echium plantagineum*	15.580
4	Revegetated Patch	4.290
5	Exotic Patch	2.738
6	Exotic Grassland / Pasture	76.812
	TOTAL	**128.903**

At the time of the field assessment, the understoreys of all VAs were dominated by *Oxalis per-caprae* (Soursob).

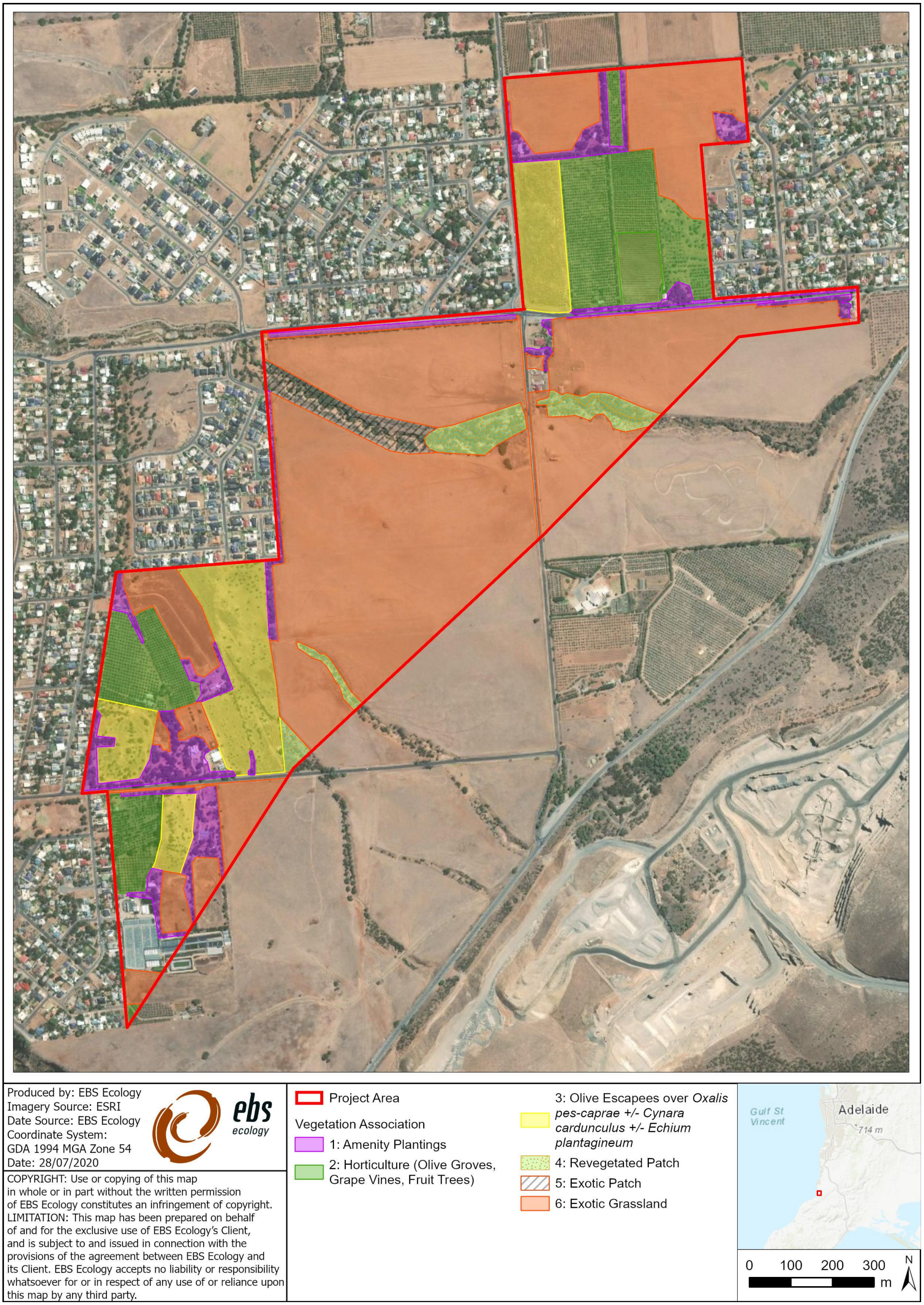


Figure 4. Broad vegetation associations mapped within the Project Area.

5.1.1 VA 1: Amenity Plantings

Table 7. Summary of VA 1: Amenity Plantings.

Area (ha)	11.112
Landform(s)	Roadsides and gardens of gently undulating plain.
Description	Mixed amenity plantings including indigenous native, non-indigenous native and exotic species along roadsides and within private properties.
Native flora	Regenerating *Enchylaena tomentosa* (Ruby Saltbush) and *Rhagodia parabolica* (Mealy Saltbush) in certain understoreys. Planted *Eucalyptus* spp. and *Acacia* spp., including *E. camaldulensis* (River Red Gum), *E. cladocalyx* (Sugar Gum), *E. leucoxylon* (SA Blue Gum), *A. cyclops* (Western Coastal Wattle), *A. iteaphylla* (Flinders Ranges Wattle), *A. paradoxa* (Kangaroo Thorn) and *A. pycnantha* (Golden Wattle), and *Allocasuarina verticillata* (Drooping Sheoak).
Threatened flora	Highly unlikely
Declared weeds (LSA Act)	*Asparagus asparagoides* (Bridal Creeper), *Chrysanthemoides monilifera* (Boneseed), *Cynara cardunculus* (Artichoke Thistle), *Lycium ferocissimum* (African Boxthorn), *Olea europaea* (Olive), *Opuntia* sp., *Pinus halepensis* (Aleppo Pine), *Rhamnus alaternus* (Blowfly Bush).
WoNS	*Asparagus asparagoides* (Bridal Creeper), *Chrysanthemoides monilifera* (Boneseed), *Lycium ferocissimum* (African Boxthorn), *Opuntia* sp.
Other exotic flora	*Acacia saligna* (Golden Wreath Wattle), *Avena barbata* (Bearded Oat), *Oxalis pes-caprae* (Soursob), *Pinus radiata* (Radiata Pine), *Scabiosa atropurpurea* (Pincushion), *Schinus molle* (Pepper-tree).
Habitat value	Moderate – Planted mature *Eucalyptus* spp. provide hollows. Planted *Eucalyptus* spp., *Acacia* spp., *A. verticillata* and *Pinus* spp. provide food resources and structural diversity.
Risk to native vegetation	Low
Subject to NV Act	Yes – regenerating native species in understorey
Condition	Poor

Figure 5. Amenity plantings of *Eucalyptus camaldulensis* (River Red Gum).

Figure 6. Amenity plantings of *Pinus halepensis* (Aleppo Pine).

5.1.2 VA 2: Horticulture (Olive Groves, Grape Vines, Fruit Trees)

Table 8. Summary of VA 2: Horticulture (Olive Groves, Grape Vines, Fruit Trees).

Area (ha)	18.371
Landform(s)	Level and gently undulating plains.
Description	Horticulture areas including olive groves, grape vines and fruit trees over dense exotic ground cover.
Native flora	Highly unlikely
Threatened flora	Highly unlikely
Declared weeds (LSA Act)	*Cynara cardunculus* (Artichoke Thistle), *Lycium ferocissimum* (African Boxthorn), *Olea europaea* (Olive), *Pinus halepensis* (Aleppo Pine).
WoNS	*Lycium ferocissimum* (African Boxthorn).
Other exotic flora	*Avena barbata* (Bearded Oat), *Oxalis pes-caprae* (Soursob).
Habitat value	Low
Risk to native vegetation	Very Low
Subject to NV Act	No
Condition	Very poor

5.1.3 VA 3: Olive Escapees over Oxalis pes-caprae +/- Cynara cardunculus +/- Echium plantagineum

Table 9. Summary of VA 3: Olive Escapees over *Oxalis pes-caprae* +/- *Cynara cardunculus* +/- *Echium plantagineum*.

Area (ha)	15.580
Landform(s)	Level and gently undulating plains.
Description	Previously cleared areas adjacent to Olive groves containing Olive escapees over dense exotic ground cover.
Native flora	Highly unlikely
Threatened flora	Highly unlikely
Declared weeds (LSA Act)	*Cynara cardunculus* (Artichoke Thistle), *Echium plantagineum* (Salvation Jane), *Lycium ferocissimum* (African Boxthorn), *Olea europaea* (Olive), *Pinus halepensis* (Aleppo Pine).
WoNS	*Lycium ferocissimum* (African Boxthorn).
Other exotic flora	*Avena barbata* (Bearded Oat), *Oxalis pes-caprae* (Soursob).
Habitat value	Low
Risk to native vegetation	Very Low
Subject to NV Act	No
Condition	Very Poor

Figure 7. Olive Escapees over *Oxalis pes-caprae* (Soursob) and scattered *Cynara cardunculus* (Artichoke Thistle).

5.1.4 VA 4: Revegetated Patch

Table 10. Revegetated Patch.

Area (ha)	4.290
Landform(s)	Draining lines of undulating plain.
Description	Revegetated areas including mixed indigenous and non-indigenous native species over dense exotic ground cover within and adjacent to drainage lines.
Native flora	Regenerating *Austrostipa* sp. (Spear-grass), *Atriplex semibaccata* (Climbing Saltbush), *Cyperus* sp. (Flat-sedge), *Enchylaena tomentosa* (Ruby Saltbush), *Enneapogon* sp. (Bottle-washers) and *Rhagodia parabolica* (Mealy Saltbush). Planted *Eucalyptus* spp. and *Acacia* spp., including *E. camaldulensis* (River Red Gum), *E. cladocalyx* (Sugar Gum), *E. leucoxylon* (SA Blue Gum), *E. microcarpa* (Grey Box), *A. paradoxa* (Kangaroo Thorn), *A. pycnantha* (Golden Wattle), *A. rupicola* (Rock Wattle), and *Allocasuarina verticillata* (Drooping Sheoak).
Threatened flora	Unlikely
Declared weeds (LSA Act)	*Asparagus asparagoides* (Bridal Creeper), *Crataegus monogyna* (Hawthorn), *Cynara cardunculus* (Artichoke Thistle), *Lycium ferocissimum* (African Boxthorn), *Marrubium vulgare* (Horehound), *Olea europaea* (Olive), *Pinus halepensis* (Aleppo Pine).
WoNS	*Asparagus asparagoides* (Bridal Creeper), *Lycium ferocissimum* (African Boxthorn).
Other exotic flora	*Avena barbata* (Bearded Oat), *Brassica* sp., *Foeniculum vulgare* (Fennel), *Nerium oleander* (Oleander), *Oxalis pes-caprae* (Soursob), *Phalaris aquatica* (Phalaris), *Piptatherum miliaceum* (Rice Millet), *Salvia verbenaca* (Wild Sage), *Scabiosa atropurpurea* (Pincushion), *Schinus molle* (Pepper-tree), *Tropaeolum majus* (Nasturtium).
Habitat value	Moderate – Planted mature *Eucalyptus* spp. provide hollows. Planted *Eucalyptus* spp., *Acacia* spp. and *A. verticillata* provide food resources and structural diversity.
Risk to native vegetation	Low
Subject to NV Act	Yes – regenerating native species in understorey.
Condition	Poor–Moderate

Figure 8. Revegetated Patch comprising *Eucalyptus* spp. and *Acacia* spp.

5.1.5 VA 5: Exotic Patch

Table 11. Summary of VA 5: Exotic Patch.

Area (ha)	2.738
Landform(s)	Draining line of undulating plain.
Description	Degraded drainage line dominated by Olives and other woody weeds over dense exotic ground cover.
Native flora	Unlikely
Threatened flora	Unlikely
Declared weeds (LSA Act)	*Asparagus asparagoides* (Bridal Creeper), *Crataegus monogyna* (Hawthorn), *Cynara cardunculus* (Artichoke Thistle), *Lycium ferocissimum* (African Boxthorn), *Olea europaea* (Olive).
WoNS	*Asparagus asparagoides* (Bridal Creeper), *Lycium ferocissimum* (African Boxthorn).
Other exotic flora	*Acacia saligna* (Golden Wreath Wattle), *Avena barbata* (Bearded Oat), *Brassica* sp., *Foeniculum vulgare* (Fennel), *Oxalis pes-caprae* (Soursob), *Phalaris aquatica* (Phalaris), *Piptatherum miliaceum* (Rice Millet), *Scabiosa atropurpurea* (Pincushion), *Tropaeolum majus* (Nasturtium).
Habitat value	Low
Risk to native vegetation	Very Low
Subject to NV Act	Unlikely
Condition	Very Poor

Figure 9. Exotic patch within a drainage line.

5.1.6 VA 6: Exotic Grassland / Pasture

Table 12. Summary of VA 6: Exotic Grassland / Pasture.

Area (ha)	76.812
Landform(s)	Gently undulating and level plains with drainage lines dissecting in some areas.
Description	Pasture paddocks previously cleared and dominated by exotic grasses and broad leaf herbs.
Native flora	Highly unlikely
Threatened flora	Highly unlikely
Declared weeds (LSA Act)	Scattered *Cynara cardunculus* (Artichoke Thistle) observed in certain areas. Likely scattered *Lycium ferocissimum* (African Boxthorn) and *Olea europaea* (Olive).
WoNS	Likely scattered *Lycium ferocissimum* (African Boxthorn).
Other exotic flora	Pasture grasses
Habitat value	Low
Risk to native vegetation	Very Low
Subject to NV Act	Highly unlikely
Condition	Very Poor

5.2 Regulated and significant trees

A total of 74 trees protected under the Development Act were recorded within the Project Area (Table 13). This included 48 regulated and 26 significant trees. Photos of these trees are provided in *Attachment 1 – Photo File*. A further 19 trees were identified as possibly being regulated or significant. However, access restrictions meant these trees could not be assessed. The location of all regulated and significant trees, including those identified as possibly being regulated/significant, are mapped in Figure 10 to Figure 15.

It is also possible that regulated and/or significant trees occur in two locations within the Project Area that could not be assessed due to access restrictions:

- In the amenity vegetation in the very north of the Project Area, surrounding the small Olive grove and north of the large Olive grove and Olive escapees (Figure 4); and
- The strip of amenity vegetation running north-south behind the eastern boundary of the houses along Oriana Drive, Star Princess Court and Silver Cloud Grove, and extending south from Silver Cloud Drive (Figure 4).

The TPZs and SRZs presented in Table 13 are were calculated based on the Australian Standard AS4970-2009 Protection of Trees on Development Sites. Radius is measured from the centre of the stem at ground level. A TPZ should not be less than 2 m nor greater than 15 m (except where crown protection is required).

Table 13. Summary of the regulated (circumference >2 m) and significant (circumference >3 m; shaded green) trees recorded within the Project Area. Total circumferences and diameters are displayed for multi-stemmed trees.

Tree #	*Scientific name*	Common name	Stems (S/MS)	Circum-ference (m)	Diameter (m)	Buttress Diameter (m)	Tree Protection Zone (m)	Structural Root Zone (m)	Comments
1	*Eucalyptus cladocalyx*	Sugar Gum	S	2.55	0.815	0.835	9.78	3.07	
2	*Pinus halepensis*	Aleppo Pine	S	2.71	0.86	0.95	10.32	3.24	
3	*Eucalyptus cladocalyx*	Sugar Gum	S	2.03	0.65	0.71	7.8	2.87	
4	*Eucalyptus camaldulensis*	River Red Gum	MS	3.05	0.97	0.91	11.64	3.18	
5	*Pinus halepensis*	Aleppo Pine	MS	4.43	1.405	0.99	16.86	3.30	
6	*Pinus halepensis*	Aleppo Pine	S	2.67	0.85	0.94	10.2	3.22	
7	*Pinus halepensis*	Aleppo Pine	S	2.25	0.72	0.79	8.64	3.00	
8	*Pinus halepensis*	Aleppo Pine	MS	3.9	1.24	0.92	14.88	3.20	
9	*Pinus halepensis*	Aleppo Pine	S	2.23	0.71	0.8	8.52	3.01	
10	*Eucalyptus sp.*								Potential regulated/significant tree – access restricted
11	*Eucalyptus sp.*								Potential regulated/significant tree – access restricted
12	*Eucalyptus sp.*								Potential regulated/significant tree – access restricted
13	*Eucalyptus sp.*								Potential regulated/significant tree – access restricted
14	*Pinus halepensis*	Aleppo Pine	S	2.12	0.675	0.73	8.1	2.90	
15	*Pinus halepensis*	Aleppo Pine	S	2.26	0.72	0.85	8.64	3.09	
16	*Pinus halepensis*	Aleppo Pine	MS	2.2	0.7	0.7	8.4	2.85	
17	*Pinus halepensis*	Aleppo Pine	MS	2.25	0.72	0.87	8.64	3.12	
18	*Pinus halepensis*	Aleppo Pine	MS	2.18	0.695	0.8	8.34	3.01	
19	*Pinus halepensis*	Aleppo Pine	MS	3.1	0.99	0.955	11.88	3.25	
20	*Pinus halepensis*	Aleppo Pine	MS	3.27	1.04	0.91	12.48	3.18	
21	*Pinus halepensis*	Aleppo Pine	MS	3.35	1.065	1.08	12.78	3.42	
22	*Pinus halepensis*	Aleppo Pine	MS	3.15	1.005	0.78	12.06	2.98	
23	*Pinus halepensis*	Aleppo Pine	MS	2.75	0.88	0.87	10.56	3.12	
24	*Pinus halepensis*	Aleppo Pine	MS	2.35	0.745	0.76	8.94	2.95	
25	*Pinus halepensis*	Aleppo Pine	MS	3.02	0.96	0.91	11.52	3.18	

Tree #	*Scientific name*	Common name	Stems (S/MS)	Circum-ference (m)	Diameter (m)	Buttress Diameter (m)	Tree Protection Zone (m)	Structural Root Zone (m)	Comments
26	*Pinus halepensis*	Aleppo Pine	MS	2.2	0.7	0.97	8.4	3.27	
27	*Pinus halepensis*	Aleppo Pine	S	2.5	0.8	0.87	9.6	3.12	
28	*Pinus halepensis*	Aleppo Pine	MS	3.08	0.985	1.1	11.82	3.44	
29	*Pinus halepensis*	Aleppo Pine	S	2.05	0.65	0.75	7.8	2.93	
30	*Pinus halepensis*	Aleppo Pine	S	2.87	0.915	1.02	10.98	3.34	
31	*Pinus halepensis*	Aleppo Pine	S	2.2	0.7	0.77	8.4	2.97	
32	*Pinus halepensis*	Aleppo Pine	S	2.03	0.635	0.77	7.62	2.97	
33	*Pinus halepensis*	Aleppo Pine	MS	2.93	0.935	0.74	11.22	2.92	
34	*Pinus halepensis*	Aleppo Pine	S	2.01	0.64	0.68	7.68	2.81	
35	*Pinus halepensis*	Aleppo Pine	MS	2.17	0.69	0.58	8.28	2.63	
36	*Pinus halepensis*	Aleppo Pine	S	2.39	0.76	0.81	9.12	3.03	
37	*Pinus halepensis*	Aleppo Pine	S	2.54	0.81	0.87	9.72	3.12	
38	*Pinus halepensis*	Aleppo Pine	S	2.57	0.82	0.84	9.84	3.08	
39	*Pinus halepensis*	Aleppo Pine	MS	2.98	0.95	1.13	11.4	3.48	
40	*Pinus halepensis*	Aleppo Pine	S	2	0.635	0.75	7.62	2.93	
41	*Pinus halepensis*	Aleppo Pine							Potential regulated/significant tree – access restricted
42	*Pinus halepensis*	Aleppo Pine							Potential regulated/significant tree – access restricted
43	*Pinus halepensis*	Aleppo Pine	MS	2.72	0.87	0.82	10.44	3.04	
44	*Pinus halepensis*	Aleppo Pine	MS	2.95	0.94	0.75	11.28	2.93	
45	*Pinus halepensis*	Aleppo Pine	MS	2.98	0.95	0.82	11.4	3.04	
46	*Pinus halepensis*	Aleppo Pine	MS	2.4	0.92	0.82	11.04	3.04	
47	*Pinus halepensis*	Aleppo Pine	MS	2.86	0.92	0.85	11.04	3.09	
48	*Pinus halepensis*	Aleppo Pine	MS	3.01	0.96	0.81	11.52	3.03	
49	*Pinus halepensis*	Aleppo Pine	MS	2.41	0.765	0.72	9.18	2.88	
50	*Pinus halepensis*	Aleppo Pine	MS	4.13	1.31	1.06	15.72	3.39	
51	*Pinus halepensis*	Aleppo Pine	MS	2.83	0.9	0.84	10.8	3.08	
52	*Pinus halepensis*	Aleppo Pine	S	2.14	0.68	0.84	8.16	3.08	

Tree #	*Scientific name*	Common name	Stems (S/MS)	Circum-ference (m)	Diameter (m)	Buttress Diameter (m)	Tree Protection Zone (m)	Structural Root Zone (m)	Comments
53	*Eucalyptus cladocalyx*	Sugar Gum							Potential regulated/significant tree – access restricted
54	*Eucalyptus sp.*								Potential regulated/significant tree – access restricted
55	*Eucalyptus camaldulensis*	River Red Gum							Potential regulated/significant tree – access restricted
56	*Pinus halepensis*	Aleppo Pine							Potential regulated/significant tree – access restricted
57	*Eucalyptus camaldulensis*	River Red Gum	S	2.65	0.84	1	10.08	3.31	
58	*Pinus halepensis*	Aleppo Pine	MS	2.45	0.78	0.77	9.36	2.97	
59	*Eucalyptus camaldulensis*	River Red Gum	S	2.8	0.89	1.01	10.68	3.32	
60	*Eucalyptus camaldulensis*	River Red Gum	S	2.33	0.74	0.86	8.88	3.11	
61	*Eucalyptus cladocalyx*	Sugar Gum							Potential regulated/significant tree – access restricted
62	*Eucalyptus cladocalyx*	Sugar Gum							Potential regulated/significant tree – access restricted
63	*Eucalyptus camaldulensis*	River Red Gum	S	2.3	0.73	0.85	8.76	3.09	
64	*Eucalyptus sp. 1*		S	3.94	1.255	1.2	15.06	3.57	
65	*Eucalyptus sp. 1*		S	3.94	1.255	1.2	15.06	3.57	Estimated based on Tree 64 due to Boxthorn in understorey
66	*Eucalyptus cladocalyx*	Sugar Gum	MS	3.24	1.03	1.01	12.36	3.32	
67	*Eucalyptus cladocalyx*	Sugar Gum	MS	4.85	1.54	1.15	18.48	3.51	
68	*Eucalyptus cladocalyx*	Sugar Gum	S	3.11	0.99	0.98	11.88	3.28	
69	*Eucalyptus camaldulensis*	River Red Gum	S	3.3	1.05	1.1	12.6	3.44	
70	*Eucalyptus camaldulensis*	River Red Gum	S	2.15	0.68	0.79	8.16	3.00	
71	*Eucalyptus camaldulensis*	River Red Gum	S	2	0.64	0.62	7.68	2.71	
72	*Eucalyptus camaldulensis*	River Red Gum	S	2.39	0.76	0.73	9.12	2.90	
73	*Eucalyptus camaldulensis*	River Red Gum	S	2.32	0.74	0.78	8.88	2.98	
74	*Eucalyptus camaldulensis*	River Red Gum	S	4.05	1.29	1.3	15.48	3.69	
75	*Eucalyptus camaldulensis*	River Red Gum	S	3.14	1	1.09	12	3.43	
76	*Eucalyptus camaldulensis*	River Red Gum							Potential regulated/significant tree – access restricted

Tree #	*Scientific name*	Common name	Stems (S/MS)	Circum-ference (m)	Diameter (m)	Buttress Diameter (m)	Tree Protection Zone (m)	Structural Root Zone (m)	Comments
77	*Eucalyptus camaldulensis*	River Red Gum							Potential regulated/significant tree – access restricted
78	*Eucalyptus cladocalyx*	Sugar Gum	S	2.28	0.725	0.78	8.7	2.98	
79	*Eucalyptus camaldulensis*	River Red Gum	S	3.1	0.99	1.01	11.88	3.32	
80	*Eucalyptus leucoxylon*	SA Blue Gum							Potential regulated/significant tree – access restricted
81	*Eucalyptus camaldulensis*	River Red Gum							Potential regulated/significant tree – access restricted
82	*Eucalyptus sp. 1*								Potential regulated/significant tree – access restricted
83	*Eucalyptus cladocalyx*	Sugar Gum	MS	3.75	1.2	1.3	14.4	3.69	
84	*Cupressus macrocarpa*		S	3.4	1.08	1.19	12.96	3.56	
85	*Eucalyptus cladocalyx*	Sugar Gum	S	4.4	1.4	1.55	16.8	3.98	
86	*Eucalyptus cladocalyx*	Sugar Gum	S	3.35	1.07	1.13	12.84	3.48	
87	*Eucalyptus cladocalyx*	Sugar Gum	S	2.26	0.72	0.8	8.64	3.01	
88	*Eucalyptus cladocalyx*	Sugar Gum	S	2	0.64	0.69	7.68	2.83	
89	*Eucalyptus cladocalyx*	Sugar Gum	S	2.67	0.84	0.78	10.08	2.98	
90	*Eucalyptus cladocalyx*	Sugar Gum	S	3.08	0.98	1.06	11.76	3.39	
91	*Eucalyptus cladocalyx*	Sugar Gum	MS	4.37	1.39	1.37	16.68	3.78	
92	*Eucalyptus sp.*								Potential regulated/significant tree – access restricted
93	*Eucalyptus sp.*								Potential regulated/significant tree – access restricted

Stems
S: Single-stemmed. MS: Multi-stemmed.

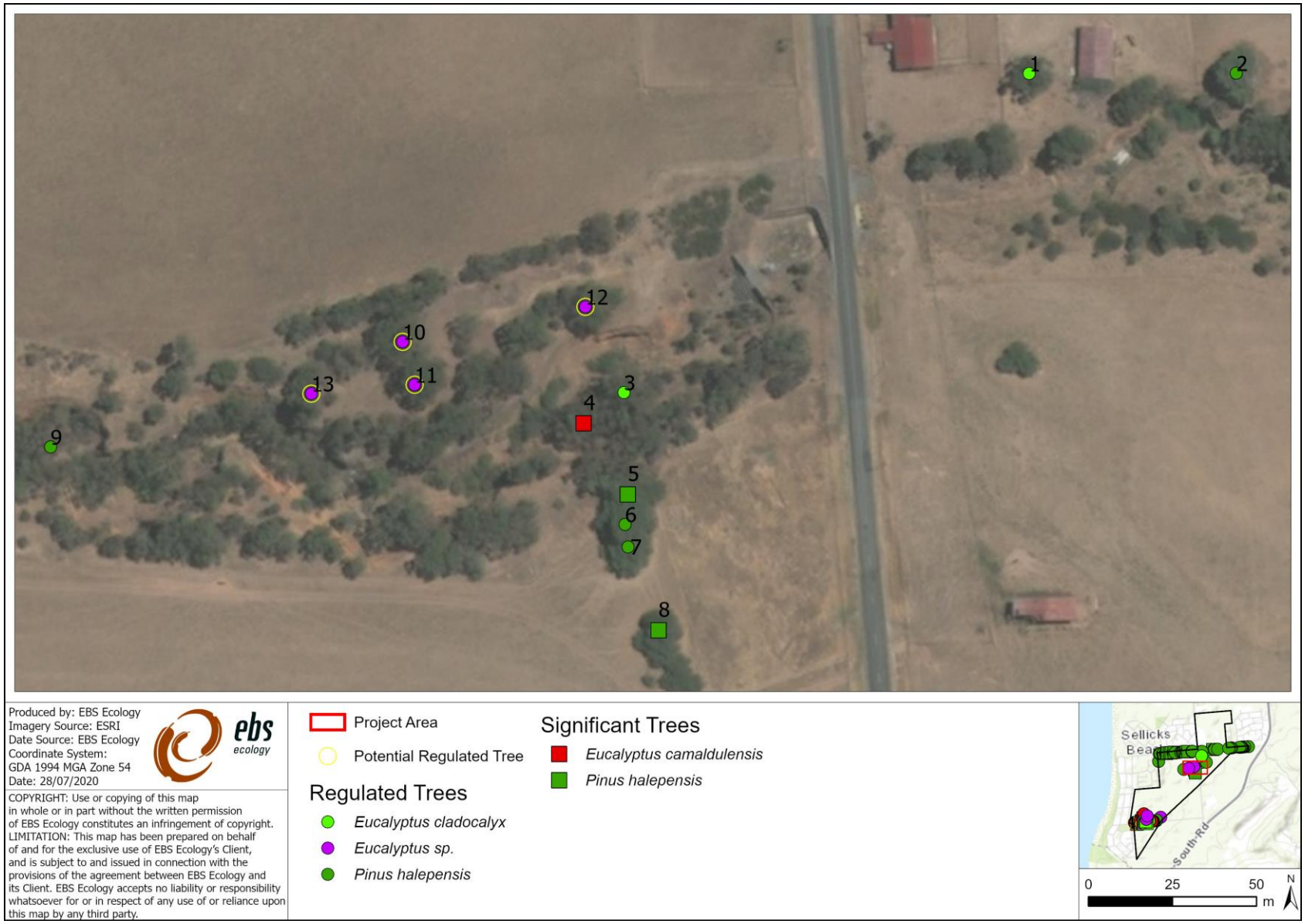


Figure 10. Regulated and significant trees mapped within the Project Area (map 1/6).

Figure 11. Regulated and significant trees mapped within the Project Area (map 2/6).

Figure 12. Regulated and significant trees mapped within the Project Area (map 3/6).

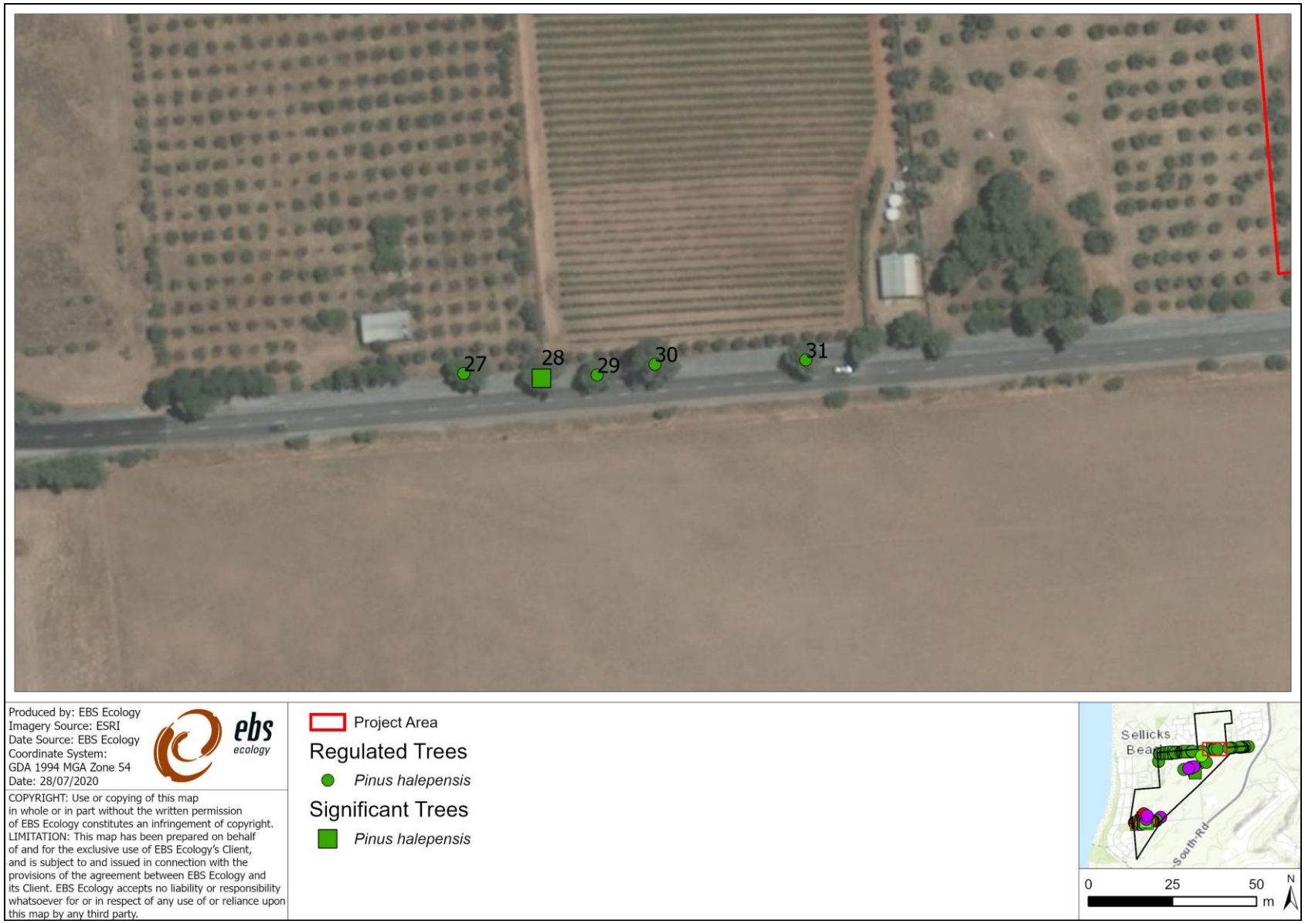


Figure 13. Regulated and significant trees mapped within the Project Area (map 4/6).

Figure 14. Regulated and significant trees mapped within the Project Area (map 5/6).

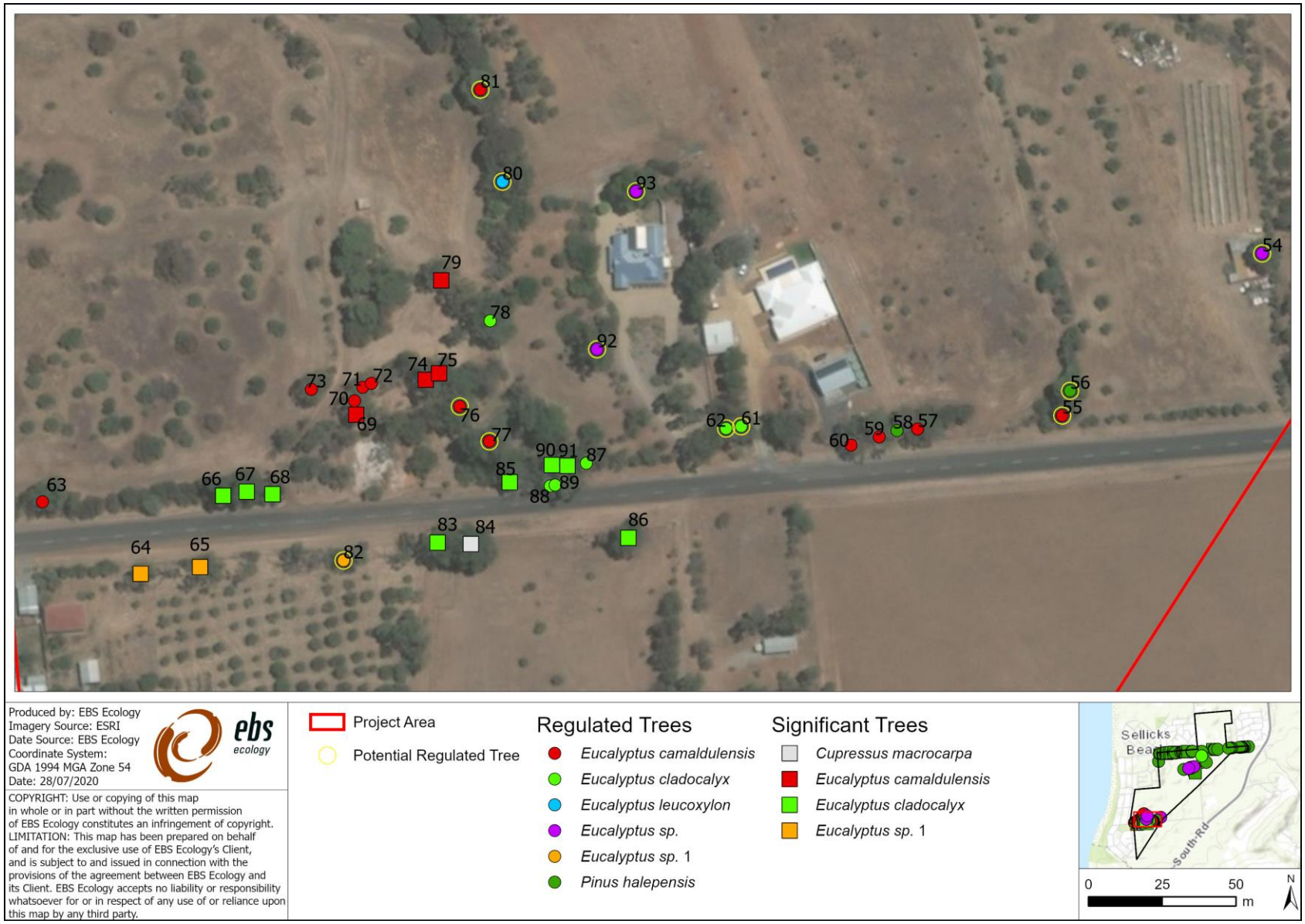


Figure 15. Regulated and significant trees mapped within the Project Area (map 6/6).

5.3 Flora

A total of 48 flora species were recorded within the Project Area (Table 14). This included 19 native and 39 weed species. Of the 19 native species recorded, only six were naturally occurring, regenerating the certain understoreys of VAs 1 and 4 (Table 14).

5.3.1 Threatened flora

No nationally threatened flora species were recorded within the Project Area. One State Rare species, *Acacia iteaphylla* (Flinders Ranges Wattle) was recorded in VA 1 (Table 14). Planted individuals of this species occurred along the northern side of Gulf View Road, within 150 m from the western boundary of the Project Area. This species is discussed further in Section 6.1.1.

5.3.2 Significant weeds

Of the 39 weed species recorded within the Project Area, 12 were declared under the LSA Act and four were WoNS (Table 14).

Table 14. Flora species recorded within the Project Area. Naturally occurring native species that were regenerating in certain understoreys of VAs 1 and 4 are shaded green.

Scientific name	Common name	Conservation status		Weed status
		Aus	SA	
Acacia cyclops	Western Coastal Wattle			
Acacia iteaphylla	Flinders Ranges Wattle	R		
Acacia paradoxa	Kangaroo Thorn			
Acacia pycnantha	Golden Wattle			
Acacia rupicola	Rock Wattle			
Acacia saligna	Golden Wreath Wattle			*
Allocasuarina verticillata	Drooping Sheoak			
Asparagus asparagoides f.	Bridal Creeper			D, WoNS, *
Atriplex semibaccata	Berry Saltbush			
Austrostipa sp.	Spear-grass			
Avena barbata	Bearded Oat			*
Brassica sp.				*
Callistemon sp.	Bottlebrush			
Chrysanthemoides monilifera ssp. monilifera	Boneseed			D, WoNS, *
Crataegus monogyna	Hawthorn			D, *
Cupressus macrocarpa	Monterey Cypress			*
Cynara cardunculus ssp. flavescens	Artichoke Thistle			D, *
Cyperus sp.	Flat-sedge			
Echium plantagineum	Salvation Jane			D, *
Enchylaena tomentosa var. tomentosa	Ruby Saltbush			
Enneapogon sp.	Bottle-washers/Nineawn			
Eucalyptus camaldulensis ssp. camaldulensis	River Red Gum			
Eucalyptus cladocalyx ssp. cladocalyx	Sugar Gum			

Scientific name	Common name	Conservation status		Weed status
		Aus	SA	
Eucalyptus leucoxylon ssp. leucoxylon	South Australian Blue Gum			
Eucalyptus microcarpa	Grey Box			
Eucalyptus sp.				
Foeniculum vulgare	Fennel			*
Lycium ferocissimum	African Boxthorn			D, WoNS, *
Marrubium vulgare	Horehound			D, *
Malva sp.	Mallow			*
Melaleuca uncinata	Broombush			
Nerium oleander	Oleander			*
Olea europaea ssp. europaea	Olive			D, *
Opuntia sp.				D, WoNS, *
Oxalis pes-caprae	Soursob			*
Phalaris aquatica	Phalaris			*
Pinus halepensis	Aleppo Pine			D*
Pinus radiata	Radiata Pine			*
Piptatherum miliaceum	Rice Millet			*
Plantago sp.	Plantain			*
Rhagodia parabolica	Mealy Saltbush			
Rhamnus alaternus	Blowfly Bush			D, *
Rosa canina	Dog Rose			D, *
Salvia verbenaca var.	Wild Sage			*
Scabiosa atropurpurea	Pincushion			*
Schinus molle	Pepper-tree			*
Tropaeolum majus	Nasturtium			*
Vicia sativa ssp. cordata				*

Conservation status
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.

Weed status
***: Introduced. D: Declared under the *Landscape South Australia Act 2019*. WoNS: Weed of National Significance.**

5.4 Fauna

A total of 21 fauna species were recorded within the Project Area (Table 15). This included 20 bird, four of which were introduced, and one amphibian species. No nationally or State threatened fauna species were recorded.

5.4.1 Habitat

The majority of the habitat in the Project Area was of low value (116.35 ha) (Figure 16). This included certain amenity plantings (VA 1) (e.g. sparse/weedy areas), horticulture areas (VA 2), Olive escapee areas (VA 3), the exotic patch (VA 5) and exotic grasslands/pastures (VA 6) (Figure 4).

Certain amenity plantings (VA 1) and revegetated patches (VA 4) provided moderate habitat value (11.529 ha) (Figure 16). This included areas with planted *Pinus halepensis* and *Allocasuarina verticillata*

trees, which provide food resources for the State Vulnerable Yellow-tailed Black Cockatoo (*Zanda funerea whiteae*) (discussed further in Section 6.1.2), and revegetated areas containing mixed Eucalyptus and Acacia species providing structural diversity, nesting and roosting sites, and food resources.

The large *Eucalyptus camaldulensis* and *E. cladocalyx* trees planted in a low-lying area north of Gulf View Road, approximately 200 m from the western boundary of the Project Area, were mapped as high value habitat (1.024 ha) (Figure 16). These trees were classed as having high value based on the high availability of nesting sites, roosting sites, hollows and food resources.

Table 15. Fauna species recorded within the Project Area.

*	Scientific name	Common name	Conservation status	
			Aus	SA
	AVES	**Birds**		
	Anthochaera carunculata	Red Wattlebird		
	Cacatua galerita	Sulphur-crested Cockatoo		
*	*Columba livia*	Feral Pigeon		
	Corvus coronoides	Australian Raven		
	Corvus mellori	Little Raven		
	Egretta novaehollandiae	White-faced Heron		
	Eolophus roseicapilla	Galah		
	Grallina cyanoleuca	Magpielark		
	Gymnorhina tibicen	Australian Magpie		
	Hirundo neoxena neoxena	Welcome Swallow		
	Ocyphaps lophotes	Crested Pigeon		
*	*Passer domesticus domesticus*	House Sparrow		
	Phylidonyris novaehollandiae	New Holland Honeyeater		
	Platycercus elegans fleurieuensis	Adelaide Rosella (southern MLR)		
	Ptilotula penicillata	White-plumed Honeyeater		
	Rhipidura leucophrys leucophrys	Willie Wagtail		
*	*Sturnus vulgaris vulgaris*	Common Starling		
	Trichoglossus haematodus	Rainbow Lorikeet		
*	*Turdus merula merula*	Common Blackbird		
	Zosterops lateralis	Silvereye		
	AMPHIBIA	**Amphibians**		
	Crinia signifera	Common Froglet		

Conservation status

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.**

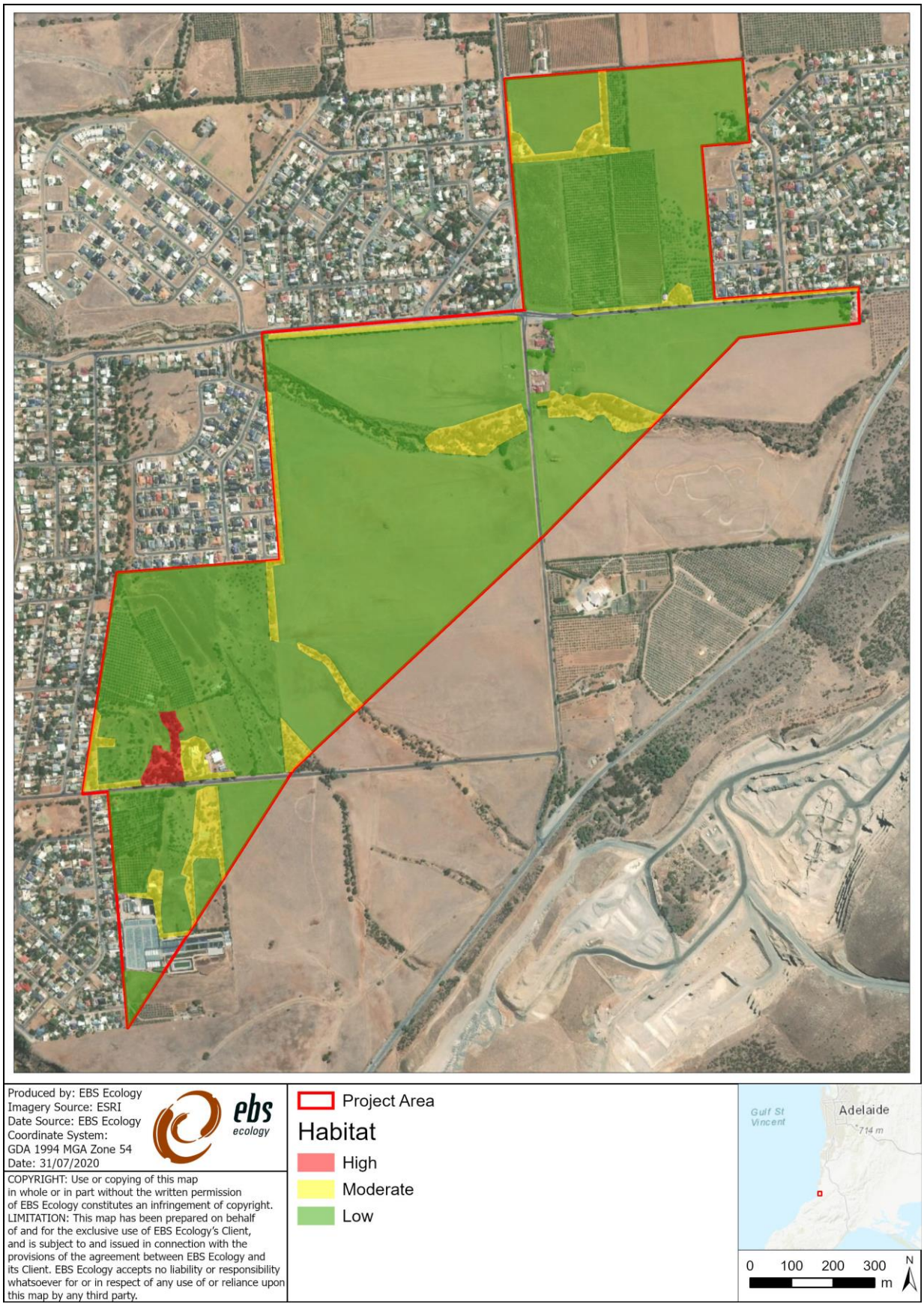


Figure 16. Low, moderate and high value habitat within the Project Area.

6 DISCUSSION

The Project Area is largely dominated by disturbed and modified ecosystems in very poor to poor condition and of low habitat value (VA 1 (sparse/weedy areas), VA 2, VA 3, VA 5 and VA 6). Development of these areas is considered to have a negligible impact on native vegetation and flora species, and generally a low impact on fauna species.

In contrast, although they contain planted native vegetation, development of VA 1 (denser, less weedy areas) and VA 4 will likely have a localised impact of common fauna species, and potentially threatened fauna species. Retention of these areas will provide biodiversity and amenity value and relief in a developed landscape.

Native flora was only observed regenerating in certain understoreys of VAs 1 and 4, but cannot be ruled out in additional locations within these and other VAs, which could not be directly accessed. Additional native flora may also be detected once the dense ground cover of *Oxalis pes-caprae* dies off.

6.1 Threatened flora and fauna

6.1.1 Threatened flora

The State Rare *Acacia iteaphylla* (Flinders Ranges Wattle) was recorded within the Project Area, with planted individuals observed along the northern side of Gulf View Road, within 150 m from the western boundary of the Project Area. These planted individuals were well outside of the natural distribution of this species (Gawler Ranges east to southern Flinders Ranges and Northern Lofty Ranges). Therefore, the individuals were not considered to be protected under the NPW Act.

6.1.2 Threatened fauna

The nationally Vulnerable and State Rare Grey-headed Flying Fox (*Pteropus Poliocephalus*) was considered highly likely to occur within the Project Area. Additional to several recent BDBSA records near the Project Area (Figure 3), the primary food source of this species is blossom from Eucalypts and related genera, with introduced tree species in urban areas also utilised (DAWE 2020b), both of which occur throughout the Project Area. The removal of these trees from the Project Area would likely have localised impacts on this species. However, the impacts are unlikely to be significant with respect to the population in the context of the wider landscape. The habitat present is unlikely to be critical to the survival of this species.

The State Rare Elegant Parrot (*Neophema elegans*) was considered likely to occur within the Project Area. This species prefers open woodland, grassland, saltmarsh and rough pasture (*Menkhorst* et al. 2019). Based on the condition of the potential habitat for this species within the Project Area, it is considered to be marginal habitat.

Although the State Vulnerable Yellow-tailed Black Cockatoo (*Zanda funerea whiteae*) was not identified in the desktop assessment or recorded during the field assessment, this species may potentially occur within the Project Area. This is based on a BDBSA record in 2010 that was excluded as the spatial reliability was

not entered, and the presence of suitable habitat in planted *Pinus halepensis* and *Allocasuarina verticillata* trees which provide food resources for this species.

6.2 Linkage opportunities

The main linkage opportunity exists between the large creek line running through the centre of the Project Area and Sellicks Creek to the west of the Project Area, and the vegetated hills face areas east of the Project Area. This creek line already contains sections that have been revegetated with the planted native species being well established. However, the understorey is dominated by weed species. Further revegetation and the removal of weeds in this areas would expand on the rehabilitation project undertaken in Sellicks Creek, which has provided the following benefits:

- Biodiversity / environmental – removal of weeds, revegetation of local native plants and incorporation of ponds to enhance local native flora and fauna;
- Amenity – the creation of a visually pleasing environment and provision of safe access through a network of paths, footbridge and gently sloping creek embankments;
- Water quality – incorporation of sedimentation pond and macrophyte filter zone (reed bed), treatment of urban stormwater flows to ensure cleaner water is discharged to the sea and a design to prevent erosion; and
- Stormwater management – ponds and native reeds to limit flow speeds and a design to allow for the safe passage of 1 in 100 year storm flows.

Other linkage opportunities exist in the two smaller creek lines running northwest from Gulf View Road. These creek lines have been subject to revegetation and provide important linkages between the vegetated hills face areas east of the Project Area and amenity areas of moderate habitat value. Retention of these areas along with further vegetation and the removal of weeds will provide biodiversity and amenity value amongst any future development.

7 RECOMMENDATIONS

Based on the high-level ecological assessment, the following recommendations are made:

- Undertake an assessment(s) under the NV Act or *Native Vegetation Regulations 2017* to ensure no regenerating native vegetation is cleared without appropriate assessment, approval and offset. This should include more intensive searches of vegetation patches of interest;
- Avoid and/or minimise clearance of any native vegetation, revegetated areas and/or important amenity vegetation/habitat identified in the Project Area;
- Consider off target damage and/or indirect impacts to roadside vegetation in any future developments;
- Consider indirect impacts to fauna as result of develop (e.g. increased vehicle strike) and implement design features to avoid/minimise these impacts;
- Undertake an assessment(s) under the Development Act for any regulated and/or significant trees requiring clearance, bearing in mind that addition regulated/significant trees may occur in areas where access was restricted during the current field assessment;
- Retain, extend and improve Revegetation Patches (VA 4);
- Maintain and improve linkage between the vegetated hills face areas east of the Project Area and Sellicks Creek and important amenity areas within the Project Area; and
- Implement management actions that maintain good weed hygiene to avoid introducing or spreading declared weeds and WoNS.

8 REFERENCES

Department of Agriculture, Water and the Environment (DAWE) (2020a) Protected Matters Search Tool. Available at: http://www.environment.gov.au/webgis-framework/apps/pmst/pmst-coordinate.jsf. Department of Agriculture, Water and the Environment, Canberra [Accessed 13/07/2020].

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9 APPENDICES

Appendix 1. Summary of relevant Commonwealth and State legislation.

Legislation	Summary	Relevance
Commonwealth		
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 (MNES). The nine MNES to which the EPBC Act applies 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); and • A water resource, in relation to coal seam gas development and large coal mining development.	Under the EPBC Act, actions that have, or are likely to have, a significant impact on a matter of national environmental significance require approval from the Australian Government Minister for the Environment. The Minister will decide whether assessment and approval is required under the EPBC Act. An action is defined broadly in the EPBC Act and includes: a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things. The significant impact guidelines provide overarching guidance on determining whether an action is likely to have a significant impact on a matter of national environmental significance protected by the EPBC Act. The MNES relevant to the Project include: • Listed threatened species and ecological communities. Also, of relevance is the protection of the environment, where actions proposed are on, or will affect Commonwealth land and the environment.
South Australia		
National Parks and Wildlife Act 1972	The *National Parks and Wildlife Act 1972* (NPW Act): • Allows for the protection of habitat and wildlife through the establishment of parks and reserves (both on land and in State waters); • Provides for the protection of native flora and fauna; • Identifies flora and fauna species considered to be of conservation significance (under Schedules 7, 8, and 9 of the Act); and • Provides for the use of approved wildlife through a system of permits allowing certain actions, i.e. keeping and selling (s.58), harvesting (s.60G), farming (s.60C), hunting (s.68A), releasing (s.55) and undertaking scientific research (s.53) on/of native fauna species, and for the taking of plants (s.49).	A person must not "take" a native plant, protected animal or the eggs of a protected animal without approval (s.48A). Significant penalties apply. To take a native plant means to remove the plant or part of the plant, from the place in which it is growing; or to damage the plant. To take a protected animal means to remove, hunt, catch, restrain, kill or injure an animal, or attempt to do so. A person may take non-prescribed plant species from private land with the consent of the owner; however, these species may also be covered under the *Native Vegetation Act 1991*. There are a number of non-complying activities in parks and reserves that result in penalty (parts 4-6).
Development Act 1993	The *Development Act 1993* (Development Act) provides for matters that are relevant to the use, development and management of land and buildings, including by providing a planning system to regulate development within the State, rules with respect to the design, construction and use of buildings, and other initiatives to facilitate the development of infrastructure, facilities and environments that will benefit the community. The Act and the *Development Regulations 2008* provide provision for the protection of 'regulated trees' and 'significant trees'.	The State Planning Strategy establishes the broad vision for sustainable land use and the built development of SA. The Planning Strategy informs and guides local council development plans. No development can be undertaken without an appropriate Development Approval being obtained from the relevant authority after an application and assessment process. Any activity that damages a 'regulated tree' or 'significant tree' is 'development', and as such requires a development

		approval. Specifically, development approval is required for removal, killing or destruction, branch or limb lopping, ringbarking or topping, or any other substantial damage to a regulated or significant tree, including to its root system other than maintenance pruning. Significant fines apply.
Native Vegetation Act 1991	The *Native Vegetation Act 1991* (NV Act) provides protection for native vegetation in South Australia and sets out a process for applying to clear vegetation. The *Native Vegetation Regulations 2017* allow certain clearance activities to be exempt from the Act. The *Native Vegetation (Credit for Environmental Benefits) Regulations 2015* relate to Credit and Third Party Significant Environmental Benefit (SEB) Offsets and the SEB Register. This NV Act applies on public and private land throughout South Australia, with the exception of some areas of metropolitan Adelaide. Native vegetation refers to any naturally occurring local plant species that is indigenous to South Australia, from small ground covers and native grasses to large trees and water plants. It also includes naturally occurring regrowth and in certain circumstances, dead trees. In some circumstances, the management of native vegetation is protected by legislation. The Native Vegetation Council (NVC) is responsible for providing advice and making decisions about the removal and re-establishment of native vegetation in line with the Act. The NVC will take into account the impacts of the proposed clearance and may grant consent, refuse consent or grant consent subject to certain conditions. Applications will usually be denied when the vegetation is considered an 'intact stratum', meaning it has not been seriously degraded by human activity within the last 20 years. A net environment benefit is generally conditional on an approval being granted.	Approval is required for the clearance of native vegetation. Clearance activities include but are not limited to: • The killing, destruction or removal of whole plants; • The removal of branches, limbs, stems or trunks (including brushcutting and woodcutting); • The burning, poisoning and slashing of native vegetation; • Any other substantial damage to native vegetation including activities such as drainage for reclamation of wetlands or flooding of land; and • Grazing by animals (in some circumstances). When assessing an application to clear native vegetation, the NVC must consider the principles of clearance as set out in the Act, except where the vegetation has been considered exempt under the *Native Vegetation Regulations 2017*. Significant penalties apply if a person clears native vegetation without consent. The NVC can also take civil enforcement proceedings in the District Court for an order that the native vegetation be re-instated. The Act also provides the opportunity for landholders to enter into voluntary "Heritage Agreement(s)" to ensure vegetation on private land is protected for perpetuity.
Landscape South Australia Act 2019	The *Landscape South Australia Act 2019* (LSA Act) promotes and facilitates integrated and sustainable management of all natural resources (water, soil, biodiversity, etc.), and provides for arrangements to involve the community in the development and implementation of regional initiatives to improve the management of the natural resources. Key components of the Act include: • The establishment of eight new regional landscape boards, and a new metropolitan board, Green Adelaide, to administer the Act and partner with government and regional communities; • Facilitate the sustainable management of the SA's landscapes to promote prosperous long-term businesses, thriving native species and ecosystems, and resilient communities; and • Requirement to control 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. An owner of land who is, or is likely to be, in breach of the general statutory duty under the Act resulting or likely to result in land degradation may be required to prepare an action plan. Failure to comply with a notice requiring preparation of an action plan is an offence. An landscape board authority or a State authorised officer may issue a reparation order in certain circumstances where a person has caused harm to a landscape and repair is necessary. Enforcement action in the Environment, Resources and Development Court can be taken if necessary.

Note: this summary is not intended to be a substitute for particular legal advice and does not address the legal implications of every set of circumstances.

Appendix 2. IBRA bioregion, subregion, and environmental association summary.

Flinders Lofty Block IBRA bioregion	
Temperate to arid Proterozoic ranges, alluvial fans and plains, and some outcropping volcanics, with the semi arid to arid north supporting native cypress, black oak (belah) and mallee open woodlands, Eremophila and Acacia shrublands, and bluebush/saltbush chenopod shrublands on shallow, well-drained loams and moderately-deep, well-drained red duplex soils. The increase in rainfall to the south corresponds with an increase in low open woodlands of *Eucalyptus obliqua* and *E. baxteri* on deep lateritic soils, and *E. fasciculosa* and *E. cosmophylla* on shallower or sandy soils.	
Mount Lofty Ranges IBRA subregion	
This subregion extends from north of the Fleurieu Peninsula to the Barossa Valley, and is predominantly an undulating to low hilly upland with steeper marginal ranges and hills. The Barossa Valley is the lowest area in this subregion and represents a structural basin. The rest of the subregion consists of hilly uplands on sandstone and shale with northerly trending strike ridges and dissected lateritic tableland remnants. Low open woodland commonly dominated by *Eucalyptus obliqua* and *E. baxteri* are found in higher rainfall areas on deep, lateritic soils. Shallower or sandy soils support *E. fasciculosa*, *E. cosmophylla* and in the northern part of the region *E. goniocalyx*. *E. leucoxylon* dominates the woodlands on podzolised soils in the lower rainfall areas, *E. viminalis ssp. cygnetensis* dominate the wetter and cooler woodlands and *E. odorata* characterises drier sites. Eucalypts give way to drooping sheoak (*Allocasuarina verticillata*) in the most arid woodlands and in coastal situations on shallow rocky soils.	
Remnant vegetation	Approximately 15% (46,342 ha) of the subregion is mapped as remnant native vegetation, of which 27% (12,706 ha) is formally conserved.
Landform	Hills and valleys; alternating subparallel hilly ridges and valleys with a general N-S trend in north. In south, hilly dissected tableland.
Geology	Dissected lateritized surface in south.
Soil	Hard setting loams with red clayey subsoils, Highly calcareous loamy earths, Hard setting loams with mottled yellow clayey subsoil, Coherent sandy soils, Cracking clays.
Vegetation	Eucalyptus woodlands with a shrubby understorey.
Conservation significance	129 species of threatened fauna, 270 species of threatened flora. 4 wetlands of national significance.
Aldinga IBRA environmental association	
Remnant vegetation	Approximately 3% (902 ha) of the association is mapped as remnant native vegetation, of which 44% (399 ha) is formally conserved.
Landform	Fans with areas of calcrete on the surface, merging into a gently undulating plain with occasional laterite-capped tableland remnants.
Geology	Cliffs alternate with beaches and dunes along the coastline.
Soil	Hard pedal red duplex soils, grey self-mulching cracking clays, hard pedal mottled-yellow duplex soils, sandy pedal mottled yellow soils and whitish calcareous sands.
Vegetation	Tussock sedgelands, open heath of coast daisy bush and coast beard heath and low woodland of pink gum.
Conservation significance	77 species of threatened fauna, 53 species of threatened flora. 2 wetlands of national significance.
Mt Wilson IBRA environmental association	
Remnant vegetation	Approximately 6% (980 ha) of the association is mapped as remnant native vegetation, of which 4% (37 ha) is formally conserved.

Landform	Steep ridges and hills on interbedded metasediments and limestone, with beaches and coastal cliffs.
Geology	Metasediments, limestone, sand and alluvium.
Soil	Hard pedal red duplex soils, mottled-yellow duplex soils, sandy pedal mottled-yellow duplex soils and whitish sands.
Vegetation	Open forest of messmate stringybark, woodland of SA blue gum and low shrubland of coast cushion bush.
Conservation significance	17 species of threatened fauna, 32 species of threatened flora. 0 wetlands of national significance.

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