Vegetation Assessment: Robe Golf Club and Surrounds

- FINAL
- 10 December 2013

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ROBE GOLF CLUB

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Sinclair Knight Merz
ABN 37 001 024 095
Level 5, 33 King William Street
Adelaide SA 5000 Australia
PO Box 8291
Station Arcade SA 5000 Australia
Tel: +61 8 8424 3800
Fax: +61 8 8424 3810
Web: www.globalskm.com

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Executive Summary

SKM undertook two assessments of vegetation condition and composition associated with a proposed development inclusive of the Robe Golf Course, following assessments undertaken by Anderson (2012) and Environmental and Biodiversity Services (EBS) (2008) on nearby allotments. Those assessments were undertaken in 2011 and 2006 respectively. The EBS (2008) assessment was for a different proposed development that is no longer proceeding (different proponent). In addition, DEWNR staff visited Section 285 in 2006. The primary aim of the SKM assessment was to clarify the current condition of vegetation within several proposed development and offset areas and to assess some new areas that had not previously been assessed.

The proposed development comprises expansion of an existing Golf Course as a requirement of safety, sustainability, community needs and regional tourism opportunities. In addition, the proposed development includes some residential allotments, however these are not proposed for Section 285.

Native vegetation throughout the study area (the Robe Golf course and 5 nearby Allotments) was relatively homogenous, with tall coastal shrubland communities comprising the majority of native vegetation. Sandy swales supported more open communities, however the species composition and structure align with shrubland associations, rather than sedgelands which are typically more common on heavier soils. Weeds were prevalent throughout the study area, including some species Declared under the *Natural Resources Management Act 2004* (NRM Act).

No flora species or vegetation communities of conservation significance, listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), or the South Australian *National Parks and Wildlife Act 1972* (NPW Act) were recorded within the study area during the field surveys. Records for the Little Dip Spider Orchid (EPBC, Endangered) occur 1.5 km south of Section 285, hence a search for this species and suitable habitat was undertaken in Spring 2013. The species was not located, but common orchids were located in the habitat defined as 'good condition' (SEB 8:1). Lack of leaf litter in vegetation of poor and moderate condition, as well as the presence of Bridal Creeper, Milkwort and Coastal Wattle (all known to impact Little Dip Spider Orchid habitat), throughout section 285 suggest that it is unlikely to occur in areas of poor to moderate quality vegetation in Section 285. It is therefore unlikely that any clearance of poor to moderate quality vegetation in section 285 would significantly impact the species, however it is recommended that the Commonwealth Department of the Environment are consulted to determine whether an EPBC referral may be required.

No fauna species of conservation significance, listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were identified, however historic records for Orange-bellied Parrot (EPBC, Critically Endangered, Listed Marine, Migratory) from 1934 do occur in the area. It is unlikely that the study area provides significant habitat for this species, however consultation with the Department of the Environment (DotE) would be required to determine whether a referral under the EPBC Act would be required for the Orange-bellied

Parrot. In addition, evidence of one fauna species, the Common Wombat, with a rating of Rare under the NPW Act was identified within the study area and surrounds. This species is locally common and was observed in good vegetation through to poor vegetation and existing residential peri-urban properties. Further discussion with the Department for Water Environment and Natural Resources (DEWNR) about the presence of this species is recommended.

Throughout the study area (5 allotments and Robe Gold Course) native vegetation was noted as being of moderate quality, and in many cases, edge effects, as a result of historic clearance or ongoing human disturbance, contribute to a poorer quality of overall vegetation. In addition, some patches of vegetation were observed to be in poorer condition than compared with assessments undertaken in 2006 and 2011 (DEWNR 2006, EBS 2008, Anderson 2012). This may be as result of ongoing impacts from exotic species, rabbits and anecdotal human activities (e.g. public rubbish dumping, off-road vehicle use and camping). If vegetation clearance for the purposes of development within some areas of the study area is approved by the NVC, Significant Environmental Benefits (SEBs), under the *Native Vegetation Act 1991* (NV Act) would apply. Several areas of high quality vegetation (with an SEB rating of 6:1 to 8:1) in Section 285 and Section 135 were identified as potential suitable SEB offsets. These areas are not proposed for clearance.

1. Introduction

SKM were contracted by MasterPlan SA Pty Ltd (MasterPlan) on behalf of Robe Golf Club Incorporated to conduct an assessment of native vegetation at a number of properties in Robe in the vicinity of the existing Robe Golf Course. Sites to be assessed were outlined in a brief from MasterPlan (Feb 2013) and the assessment was undertaken in accordance with the SA Native Vegetation Council (NVC) assessment requirements.

MasterPlan provided a figure of properties to be assessed and the priority of assessment given the timing of planning approval submissions (properties 1-8). In addition, a desktop review has briefly considered EPBC Protected Matters Search Tool findings and queries by key stakeholders through the statement of intent process. An overview of the site, historical aerial imagery and historical photos showing a lack of vegetation in some areas is provided in Appendix 1 (Background information).

The results of the study are required as part of feasibility assessments for both the expansion of the Golf Course and future development surrounding the Golf Course. In addition, the results are being used to guide the design options for expansion of the Robe Golf Course, and to assist in minimisation of vegetation clearance, particularly in the Section 285 owned by the Golf Club. The golf course expansion options being examined require amendments to the Robe Development Plan and include rezoning of some land parcels (including Section 285). Options under investigation may require the clearance of remnant native vegetation from Section 285 and other areas adjacent to the current golf course. In addition, some areas have been assessed for SEB offset potential.

There have been various changes and time constraints throughout the feasibility process to date. The original vegetation survey contract involved other allotments which are now part of a separate Development Plan Amendment (DPA) (i.e. Allotment 2, Davenport Street). As such, a preliminary survey of Section 285 was undertaken in February 2013, and a more detailed survey (using BushRAT 2013 techniques) was undertaken in Spring (September, 2013), as well as a search for Orchids, particularly the Little Dip Spider Orchid (See Section 6.5 for further discussion). In addition, anecdotal evidence was available from another consultant who was unable to complete reporting for a survey of Section 285 (the late B. Anderson). Both EBS (2008) and Anderson (2012) have also completed earlier surveys on some of the surrounding allotments for other proposed developments. Additional threatened species information relating to the project was also required for a presentation to stakeholders and interested parties.

This report describes and assesses the current condition of remnant vegetation on Section 285 and surrounding allotments that may or may not be involved in the golf course expansion. The study discusses the application of the Native Vegetation Act (1991) regarding a potential vegetation clearance application on Section 285 associated with the expansion of the Robe Golf Course. Brief discussions about the application of the Native Vegetation Act (1991) including the principles of clearance are also provided for surrounding allotments. In addition, desktop discussions about potential threatened species are provided and these have been updated from an earlier unpublished draft.

This report provides information to support a clearance application and address stakeholder concerns. SEB calculations will be undertaken by MasterPlan once final proposed vegetation clearance areas have been determined and are not part of the scope of this report

2. Legislative Summary

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) prescribes the Commonwealth's role in environmental assessment, biodiversity conservation and the management of protected areas. Under the environmental provisions of the EPBC Act, actions that are likely to have a significant impact on a matter of National Environmental Significance are identified as "controlled actions" and cannot be undertaken without referral to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) for consideration and approval under the EPBC Act.

The nine matters of national environmental significance identified in the EPBC Act are:

- World heritage properties;
- National heritage places;
- Wetlands of international importance (Ramsar wetlands);
- Threatened species and ecological communities;
- Migratory species as listed under international agreements (CAMBA, JAMBA and Bonn Convention);
- Commonwealth marine areas;
- The Great Barrier Reef Marine Park;
- Nuclear actions (including uranium mining); and
- A water resource, in relation to coal seam gas development and large coal mining development.

These identified environment and heritage values are provided protection under the EPBC Act from any activity that will have, or is likely to have, a significant impact on the values without the approval of the Federal Minister for Environment, Heritage and the Arts.

The EPBC Act is the overriding environmental legislation governing proposed activities and the proponent is required to comply with the EPBC Act to ensure protection of the environment and heritage values within its Estate.

National Parks and Wildlife Act 1972

The National Parks and Wildlife Act (1972) (NP&W Act) allows for the protection of habitat and wildlife through the establishment of parks and reserves (both on land and in State waters) and

provides for the use of wildlife through a system of permits allowing certain actions, i.e. keeping, selling, trading, harvesting, farming, hunting and the destruction of native species.

The NP&W Act assigns species to state conservation categories; *Endangered* (Schedule 7), *Vulnerable* (Schedule 8), and *Rare* (Schedule 9).

Native Vegetation Act 1991

The *Native Vegetation Act 1991* outlines incentives and assistance to land owners relative to the enhancement of native vegetation and acts to control the clearance of native vegetation.

The broad objectives of this Act relevant to the proposed development area include—

- The conservation, protection and enhancement of the native vegetation of the State and, in particular, remnant native vegetation, in order to prevent further—
    - reduction of biological diversity and degradation of the land and its soil; and
    - loss of quantity and quality of native vegetation in the State; and
    - loss of critical habitat; and
- The provision of incentives and assistance to landowners to encourage the commonly held desire of landowners to preserve, enhance and properly manage the native vegetation on their land;
- The limitation of the clearance of native vegetation to clearance in particular circumstances including circumstances in which the clearance will facilitate the management of other native vegetation or will facilitate the sustainable use of land for primary production;
- The encouragement of research into the preservation, enhancement and management of native vegetation; and
- The encouragement of the re-establishment of native vegetation in those parts of the State where native vegetation has been cleared or degraded.

Natural Resources Management Act 2004

The *Natural Resources Management Act 2004* is to assist in the achievement of ecologically sustainable development in the State by establishing an integrated scheme to promote the use and management of natural resources that recognises and protects the intrinsic values of natural resources.

3. Methodology

This study involved a brief desktop study of the study area for threatened species potential, as well as two field surveys. The first field survey (February 2013) was undertaken to complete requirements for an unfinished planning submission and provide preliminary vegetation composition and condition assessments for nearby allotments. The second survey (September 2013) was undertaken to search for Orchids and Orchid habitat and to refine vegetation composition and condition descriptions within Section 285.

3.1. Desktop study

The EPBC Act Protected Matters Search Tool (PMST) was queried prior to undertaking the field assessment, to determine whether any matters listed under the Act may be present within the study area. It should be noted that EPBC PMST database does not reflect actual historic records, but makes predictions based on potential habitat suitability and species ranges. Additionally, the Biological Database of South Australia (BDBSA) was queried to determine previous species records within the study area, including any species that may be listed under the EPBC Act, or the South Australian NPW Act.

3.2. Field Survey

The whole study area was initially surveyed on 18 and 19 February 2013 by Dr Zeta Bull and Elise Marchant (SKM field ecologists). Vegetation communities and individual species were recorded, and the condition of the vegetation was noted. Ad hoc notes regarding overall ecological condition and suitability of habitat for local fauna were also made.

Sites were divided into subareas based on species composition and condition, and using aerial imagery and GPS photos. Species lists were generated for sub areas during the site visit and condition was noted for each subarea and converted to a proposed SEB ratio.

In September (24 and 25) 2013 remnant vegetation on Section 285 adjacent to Robe Golf Club was surveyed further, mapped and assessed by SKM ecologists Rick Barratt and Dr Zeta Bull. Each area assessed was also surveyed for orchid presence or habitat. Final descriptions and discussions for Section 285 also draw on information from previous surveys by of both Section 285 and adjacent areas by the Native Vegetation Management Unit in 2006 (DEWNR, 2006), EBS in 2006 (EBS, 2008), Bob Anderson (2012), together with the earlier SKM survey in February this year.

The following methodology was used during the more detailed Orchid survey and BushRAT assessment of Section 285:

- Pre-mapping of vegetation communities ground truthed and adjusted during traverses on foot.
- Vegetation assessed using BushRat methodology (DEWNR, 2013) at 11 sites covering the range of communities and condition classes present. Species richness and relative abundance (cover) of all native and exotic species was recorded together with observations of vegetation structure, recruitment and indicators of disturbance. Information recorded at each site included:
    - Physical disturbance including past vegetation clearance, vehicle tracks, refuse dump sites, camping and sand mining
    - Weed invasion – particularly weeds with a high invasive rating
    - Intactness of vegetation strata – cover, density
    - Species richness and the mix of native versus exotic species
    - Litter levels and ground habitat structures
    - Feral animal presence

3.3. Vegetation condition / offset

The Native Vegetation Act (1991) provides several principles guiding the clearance of native vegetation in South Australia. An underlying assumption of the clearance principles is that a commensurate environmental offset will be put in place for any clearance undertaken. The extent of the required offset is based on the current condition of the vegetation. Based on these principles, offset ratios have been allocated for the majority allotments within the greater study area, as summarised in Table 3-1 below.

Table 3-1 SEB offset indicators (Allotments 148, 150, 241; Sections 133, 135)

Condition Indicators	Condition Rating	SEB Ratio[1]
<10% total indigenous cover, cleared land or residential land, exotic species (e.g. Pine)	Very Poor	0:1
10-19% total indigenous cover, primarily exotic species or highly disturbed, a small number of natives present	Very Poor	1:1
20-29% total indigenous cover, dominated by weeds, scattered s, degradation areas or patches of native vegetation, evidence of disturbance, including rubbish, tracks, animal pests; scope for regeneration but requires intensive management	Poor	2:1

Condition Indicators	Condition Rating	SEB Ratio[1]
30-39% total indigenous cover,	Poor	3:1
40-49% total indigenous cover, native vegetation with considerable disturbance, one or more strata depleted, retains basic structure with ability to regenerate, weed dominated, evidence of moderate disturbance (e.g. tracks, animal pests, rubbish)	Poor	4:1
50-59% total indigenous cover	Moderate	5:1
60-69% total indigenous cover, native vegetation with some disturbance, one or more strata depleted, ability to regenerate, considerable disturbance and weed infestation	Moderate	6:1
70-79% total indigenous cover	Good	7:1
80-89% total indigenous cover, native vegetation with little disturbance, all strata intact, minor disturbance only, non aggressive weeds present, some litter buildup	Good	8:1
>89% total indigenous cover, largely intact and in original condition, little or no signs of disturbance, little or no weed infestation, soil surface crust intact, substantial litter cover	Excellent	9:1
		10:1

[1] Offset indicator ratios as per Table 1 (DWLBC 2005) and EBS 2008

Parameters utilised to assign condition classes to remnant vegetation on Section 285 have been drawn from NVC guidelines, BushRAT benchmark communities and past assessments and these are listed in Table 3-2 below.

Table 3-2 Condition Indicators and Ratings (after DWLBC, 2005) used for Section 285

Condition Indicators	Condition Rating	SEB ratio
Intact vegetation as indicated by: • All strata intact and botanical composition close to original • Negligible disturbance – intact soil crusts, high litter levels • Weed free or isolated Invasiveness score 1 weeds[#] present	Excellent	10:1

Condition Indicators	Condition Rating	SEB ratio
Native vegetation with little disturbance as indicated by: • Vegetation structure intact (e.g. all strata intact); • Disturbance minor, only affecting individual species; • Only Invasiveness score 1 weeds[#] present; • Some litter build-up	Good	8:1
Native vegetation with some disturbance as indicated by: • Vegetation structure altered (e.g. one or more vegetation strata depleted); • Most seed sources available to regenerate original structure ; • Obvious signs of disturbance (e.g. tracks, bare ground); • Minor clearing (<10% of area); • Considerable weed infestation with Invasiveness score 2+ weeds[#]; • Evidence of some grazing (tracks, soil surface crust patchy)	Moderate	6:1
Native vegetation with considerable disturbance with as indicated by: • Vegetation structure substantially altered (e.g. one or more vegetation strata depleted) • Retains basic vegetation structure or the ability to regenerate it • Very obvious signs of long-term or severe disturbance • Weed dominated with some Invasiveness score 3+ weeds[#]; • Partial clearing (10 – 50% of area)	Poor	4:1
Weed-dominated with only scattered areas or patches of native vegetation as indicated by: • Vegetation structure no longer intact (e.g. removal of one or more vegetation strata); • Scope for regeneration, but not to a state approaching good condition without intensive management; • Dominated by weeds including Invasiveness score 3+ weeds[#] • Partial or extensive clearing (> 50% of area) • Evidence of heavy grazing (tracks, browse lines, species changes, no evidence of soil surface crust)	Very Poor	2:1
No native vegetation • Slashed exotic grass/herbs, bare ground • Only exempt native vegetation present	Cleared	0:1

[#]Weed Invasiveness scores as per BushRat Methodology, 2013

3.4. Limitations

The first field survey of all allotments was undertaken in February and as such, certain species (native and exotic) may have been present within the study area, but not detected due to dormancy. For example, species such as orchids, which generally have a very short flowering time,

are present above the soil surface for only a limited time each year. For the remainder of the year, such species lie dormant below the soil surface. Additionally, some native grasses are difficult to identify if the seed heads are not present. For this reason some species may have been missed or only identified to the genus level.

Based on the above and following interest from stakeholders a second survey was undertaken in September, with a primary aim to search for orchids and refine vegetation composition and condition boundaries and estimates using new BushRAT (2013) techniques. The second assessment was only undertaken for Section 285.

4. Desktop Review

4.1. Regional Information

Regional information has previously been described in EBS (2008) and Anderson (2012). In addition to this, a brief summary of background information from the Limestone Coast and Coorong Coastal Action Plan (Caton *et al.* 2011) is provided below.

The study area occurs in an area defined as Cell SE10 in the SE Coastal Action Plan. This broader area also includes key habitat areas to the south of the study area such as Lake Robe Game Reserve, Little Dip Conservation Park, Lake Eliza, Coastal vegetation from Cape Dombey to Nora Creina. Little Dip Conservation Park and Lake Robe Game Reserve comprise 2438.6 hectares of protected vegetation and habitat (Caton *et al.* 2011). A map showing the location and extent of Cell SE10 (which includes Robe) is provided in Appendix 1 (Background).

Focal conservation species in Cell SE10 include the Orange Bellied Parrot (OBP, EPBC listed Critically Endangered, Marine, Migratory) in dune areas. Existing threats to dune areas south of Robe include degradation by weeds (including garden escapees and pest animals), discharge of treated effluent from Robe STP, blown in litter from Council Rubbish dump (p375 Limestone Coast and Coorong Coastal Action Plan). In addition there is an existing pattern of transitional vegetation loss in this Cell through clearance, dune blowout and development (Caton *et al.* 2011).

Significant floristic communities in the entire Cell SE10 include *Leucopogon parviflorus/ Olearia axillaris* shrubland (>50% of known sites occur along the SE Coast), and *Olearia axillaris / Leucopogon parviflorus* shrubland (>50% of known sites occur along the SE coast).

Within the broader Limestone Coast to Coorong region, the Cells with the highest conservation priorities are SE15 (Coorong), SE7 (Canunda National Park), (SE5) Carpenter Rocks and (SE1) Picanninnie Ponds. The study area occurs in cell SE10 which has an overall medium conservation priority; 77% of this cell does not occur within protected areas. In addition, compared with other Cells in broader region, CellSE10 has a low rating for Orange Bellied Parrot habitat. Cell SE10 does have a high rating for threatened mammal habitat, which likely relates to the Common Wombat of which a large area of suitable habitat occurs, particularly in the nearby Little Dip Conservation Park (p 187-189, 576-578 Caton *et al.* 2011).

4.2. EPBC Act Protected Matters Search Tool

The EPBC Act Protected Matters Search Tool results are provided in Appendix 1 (Background). Potential results included 9 threatened species (5 birds, 2 mammals and 2 plants) and 10 bird

species with Migratory and / or Listed Marine status. As mentioned earlier, the EPBC PMST does not include details about records. A review of the BDBSA indicates that there are no recent records (within the last 20 years) for any of the above listed species.

There are 11 historical records for the Orange Bellied Parrot from 1926-1935 (78 years ago) which appear to be from the location of where the Cemetery is now (based on the associated GIS information). These records originated from South Australian Museum data and the method of observation for all 11 records is 'sign-slough/skin'. There is also a comment in the data that suggests the records were for a' Hybrid' of this species. The most recent regional record for the OBP was from the Coorong in 2010 (Bird.net.au 2012). See section 6.4 below for further discussion.

There are also historical (from more than 20 years ago) BDBSA records for some highly mobile EPBC listed Migratory species (e.g. Cattle Egret, 1983; Latham's Snipe 1976). If these species still visit the site, they are considered rare visitors and not directly reliant on the habitat the study area may provide.

As mentioned above, two EPBC listed plant species were identified with the EPBC PM search tool. The Little Dip Spider Orchid (*Caladenia richardsiorum,* EPBC Endangered*)* has potential to occur in the area. This species grows in a variety of habitat in association with Coastal Daisy Bush (*Olearia axillaris*) and Coast Beard-heath (*Leucopgon parviflorus*); Coastal Mallee *(Eucalyptus diversifolia)* and Dryland Tea-tree (*Melaleuca lanceolata)* and Drooping Sheoak (*Allocasuarina verticilata).* Understorey plants include Muntries (*Kunzea pomifera),* Bower Spinach *(Tetragonia implexicoma),* Swainson's Pea (*Swainsona lessertifolia*) and Coast Velvet-bush (*Lasionpetalum discolour) (DEH – fact sheet 2007).*

The Leafy Greenhood (*Pterostylis cuullat,* EPBC Vulnerable) is now considered extinct in the SE region (Croft et al, 1999 cited in EBS 2008).

4.3. BDBSA – fauna records

BDBSA records for the study area include historical records 7 EBPC listed species and 34 species listed under the NPW Act. It should be noted that the BDBSA records for this site only go up to 2007. It is noted that one of the species listed as having an EPBC Act rating in the BDBSA, the Common Wombat (*Vombatus ursinus*), actually only has a NPW Act rating in South Australia. The species that has the EPBC rating is the Bass Strait Common Wombat (*Vombatus ursinus ursinus*). The threatened species that have previous records for the site and the details are provided below

in Table 4-1. The full list of species, including GPS coordinates is in Appendix 1 (Background). In addition, there are records for 9 pest fauna species (see Appendix 1, Background). A spatial distribution of BDBSA records for EPBC fauna and flora only, is also provided in Appendix 1.

Table 4-1 Previous BDBSA records for threatened species in the study area

Species	Common Name	EPBC	NPW	Date Range of Records	Number of records
Neophema chrysogaster	Orange-bellied Parrot	CE	E	1900 -1934	11
Diomedea exulans	Wandering Albatross	ssp	V	1985	1
Sternula nereis	Fairy Tern	VU	E	1989-2004	4
Vombatus ursinus	Common Wombat		R	1899?	1
Rostratula australis	Australian Painted Snipe	VU	V	1900	1
Thalassarche melanophris	Black-browed Albatross	VU	V	1970	1
Halobaena caerulea	Blue Petrel	VU		1978	1
Antechinus minimus	Swamp Antechinus		E	1979	1
Accipiter novaehollandiae	Grey Goshawk		E	1933-2002	2
Calidris alba	Sanderling		R	1977	1
Stagonopleura bella	Beautiful Firetail		R	1900-1935	15
Dasyornis broadbenti	Rufous Bristlebird		R	1900-1989	15
Ardenna carneipes	Flesh-footed Shearwater		R	1900	1
Neophema elegans	Elegant Parrot		R	1969	1
Haematopus fuliginosus	Sooty Oystercatcher		R	1933	1
Pluvialis fulva	Pacific Golden Plover		R	1930-1934	3
Egretta garzetta	Little Egret		R	1999	1
Gallinago hardwickii	Latham's Snipe		R	1925-1976	4
Actitis hypoleucos	Common Sandpiper		R	1982-1998	2
Ardea ibis	Cattle Egret		R	1983	12
Myiagra inquieta	Restless Flycatcher		R	1989	1
Ardea intermedia	Intermediate Egret		R	1969-2003	2
Arenaria interpres	Ruddy Turnstone		R	1926	2
Haematopus longirostris	Australian Pied Oystercatcher		R	1989	1
Rattus lutreolus	Swamp Rat		R	1968	1
Stipiturus malachurus polionotum	Southern Emu-wren (South East ssp)		R	1937	1
Egretta sacra	Eastern Reef Egret		R	1900-1997	3
Petroica boodang	Scarlet Robin		ssp	1989	1
Pomatostomus temporalis	Grey-crowned Babbler		ssp	1926-2003	6
Strepera versicolor	Grey Currawong		ssp	1923-2007	4
Neophema chrysostoma	Blue-winged Parrot		V	1923	2
Antechinus flavipes	Yellow-footed Antechinus		V	1949	1
Lewinia pectoralis	Lewin's Rail		V	1918-1981	5
Thinornis rubricollis	Hooded Plover		V	1918-1998	9

Conservation ratings are as follows: CE = Critically Endangered, Ssp = subspecies has rating only, E = Endangered, VU and V = Vulnerable, R = Rare.

4.4. BDBSA – flora records

BDBSA flora records are provided in Appendix 1 (Background). There are numerous records for the Little Dip Spider Orchid, however none occur within the study area. The most recent records from 2000, 2001, 2004 and 2009 occur approximately 1.5 km south of the southern end of Section 285. Given the proximity of records and coastal habitat there may be potential for the species to occur, hence a search was undertaken during Spring 2013 (see results). It is possible that an EPBC referral would still be required, but this would need to be confirmed with an officer from DotE (DEWNR pers. Com).

5. Survey Results

5.1. Study Area Summary

The broader region has previously been described by EBS (2008) and by Anderson (2012) for other development purposes. The SKM assessment reviewed some of these previously assessed areas to obtain current condition and species data. Additional patches of vegetation were also assessed. Table 5-1 below summarises site details and historical assessment details.

- **Table 5-1 Site Details and Historical Assessment Details**

Site	Broad Description	Source
Section 285, Evans Cave Road, CT 5511/541 – Robe Golf Club	Low coastal sand dunes and sandy swales, with patchy Coast Beard-heath / Coastal Daisy-bush shrubland. Significant areas in the east are highly disturbed by past vegetation clearance, human activities and weed invasion. Remnant vegetation to the south and west of the site ranges from good condition to poor condition	DEWNR 2006, EBS 2008, Anderson 2012 (unpub), SKM February / September 2013
Allotment 150, Davenport Street, CT 5792/679 - Johns	Disturbed coastal shrubland, with a moderate to high weed infestation ratio. Additionally, planted exotic Yate (*Eucalyptus cornuta*) and exotic pines were noted, particularly around boundaries and adjacent to fairway greens.	SKM February 2013, EBS 2008
Section 135, Morphett Street, CT 5671/129 – Robe Golf Club	This property has offset potential. No clearance is proposed for this property. Comprises intact coastal shrubland in moderate to good condition. Area A was significantly more subject to weed invasion than Area B, in particular Polygala infestation along the eastern boundary.	SKM February 2013, EBS 2008
Section 148, Brewer Road, CT 5674/450 - Clements	Comprises patchy, disturbed coastal shrubland vegetation, along with highly disturbed roadside patches, and planted Yate (*Eucalyptus cornuta*) and exotic pine trees. Vegetation ranges from exempt/poor to moderate condition.	SKM February 2013, EBS 2008
Section 133, Morphett Street, CT 5253/358 - Stanhope	Comprises patchy, disturbed coastal shrubland vegetation, with road reserve edges that are highly weed infested as well as exotic Cyperss Pines. Vegetation ranges from exempt/ poor to moderate condition.	SKM February 2013, EBS 2008
Allotment 241, Burr Street, CT5553/710, Robe Council (leased by Robe Golf Club)	The Council-owned portion comprises disturbed coastal shrubland vegetation, with some areas of planted exotic species, including exotic pine species. Weeds, particularly understorey species, are prevalent in the area, similar to the other sections. Vegetation ranges from exempt/ poor to moderate condition.	SKM February 2013

Site	Broad Description	Source
Allotment 2 Davenport Street, CT 5929/163 – Robe Golf Course; and Allotment 72, Hately Crescent CT 5751/315 – DC Robe (only southwest corner assessed).	The site ranges from planted, exotic ornamental trees, dividing various fairways, to small patches of disturbed coastal shrubland with a moderate to high infestation of exotic species is some areas. Coastal shrubland varies in quality. Good quality vegetation is buffered by moderate to poor quality vegetation, but is subject to edge effects and further weed encroachment.	Anderson (2012); SKM February 2013 survey. *For background only, not part of 'the study area' for this report.*

5.2. Vegetation Communities

Native vegetation occurring within the study area generally comprises tall coastal shrubland, with many areas subject to edge effects occurring as a result of historic clearance and disturbance. Weeds are prevalent throughout much of the study area, including some plants Declared under the *Natural Resources Management Act 2004* (NRM Act).

Vegetation observed was generally of moderate condition, which reflects the proximity to disturbed and developed areas. The Coastal Action Plan (Caton *et al*. 2011) indicates that species diversity in the key communities observed within the area is generally higher than what was recorded during the field survey. The poorer diversity observed within the major vegetation communities is indicative of the overall poorer quality and strata integrity, and the proximity of the vegetation in many cases to previously disturbed or cleared zones, roads, tracks and residential areas.

Larger patches of vegetation in better condition also exist within the study area, generally occurring within denser stands of coastal shrubland. Dominant coastal species vary and include: *Olearia axillaris* (Coast Daisy-bush), *Leucopogon parviflorus* (Coast Beard-heath) *Acacia longifolia sophorae* (Coastal Wattle), *Bursaria spinosa* (Christmas Bush), and *Myoporum insulare* (Common Boobialla). These patches of vegetation are not subject to as many edge effects as the poorer quality vegetation.

Each site was divided in sub areas based on vegetation type and condition. Summary of site description, condition (e.g. SEB rating score), number of species and condition, offset suitability comments and photos for each site are provided below in Section 5.3. Maps for each site and a site overview are provided in Appendix 2 (Field survey results). A map of the photo locations and a reference table for photo numbers for the February 2013 survey is provided in Appendix 2. BushRAT field sheets for Section 285 are also provided in Appendix 2.

5.3. Site Assessments

5.3.1. Section 285

Section 285 comprises a coastal sand dunes system and sandy swales that support a patchy cover vegetation cover dominated by *Leucopogon parviflorus* (Coast Beard-heath) / *Olearia axillaris* (Coast Daisy-bush) shrubland and open shrubland communities. Vegetation cover varies from almost absent on the unstable dune crests near the coast through to dense shrubland on dune flanks and swales in the central portions of the project area. Significant portions in the east have been highly disturbed by past vegetation clearance, human activity and weed invasion and here remnant vegetation ranges from more open shrubland regrowth dominated by native species through to exotic herbfield / grassland with only scattered native plants.

Past and contemporary disturbance has resulted in changes to the structure and species composition of the remnant shrubland community and four vegetation assemblages reflecting different condition classes have been identified and mapped (Appendix 2). Table 5-2 summarises the areas and characteristics of the communities which are described below.

- **Table 5-2 Summary of Section 285 (September 2013 Survey)**

Community / condition class	~ Area (Ha)	Description	Highly invasive Weeds or dominant	Sites	Native Species	Exotic Species
1. Coastal tall shrubland / good condition	8.4	*Leucopogon parviflorus* / *Olearia axillaris* +/- *Acacia longifolia ssp sophorae* tall shrubland. old growth, dense canopy 2 to 3 metres tall deep litter and moss layer common orchids present	Bridal Creeper, Milkwort	BRH	23	9
2. Coastal tall shrubland in moderate condition	3.3	*Leucopogon parviflorus* / *Olearia axillaris* +/- *Acacia longifolia ssp sophorae* tall shrubland Moderately dense canopy Patchy litter layer No orchids present	Bridal Creeper, Milkwort, Hare Tail Grass	BRG	18	7
			Bridal Creeper, Milkwort, Brome Grass	BRG2 (near B)	14	6
			Hare Tail, Bridal Creeper, False Caper	BRG3	18	7
3. Coastal tall open shrubland in poor condition	4.3	*Leucopogon parviflorus* / *Olearia axillaris* +/- *Acacia longifolia ssp sophorae* tall shrubland old growth, dense canopy 2 to 3 metres tall deep litter and moss layer orchids present	Bridal Creeper, False Caper	BRA	17	9
		Leucopogon parviflorus / *Olearia axillaris* +/- *Acacia longifolia ssp sophorae* tall shrubland Moderately dense canopy Patchy litter layer	Milkwort, False Caper, Brome Grass	BRC	17	7
			Hare Tail Grass	BRE	16	6
			False Caper, Hare Tail	BRF	11	3

		No orchids present	Grass	BRJ	16	3
4. Very open shrubland in poor condition	2.4	Very open shrubland, reduced native species diversity, significant patches of bare ground	Bridal Creeper, False Caper, Sour Sob	BRK	10	9
5. Highly degraded herb field/grassland with emergent Cypress	1	Cleared with scattered Cypress and Radiata Pine, sheds, tracks, old bunker.	Pinus Radiata, Cypress Pine, False Caper	BRB	19	10

Type 1 - Coastal dunes and sandy swales with tall shrubland in good condition

Coastal sand dunes and sandy swales with *Leucopogon parviflorus* (Coast Beard-heath) / *Olearia axillaris* (Coast Daisy-bush) +/- *Acacia longifolia ssp sophorae* (Coastal Wattle) tall shrubland forming a typically dense canopy 2 to 3 metres tall. Other shrub species present include *Adriana quadripartite* (Coast Bitter-bush), *Rhagodia candolleana* (Seaberry Saltbush), *Beyeria Leschenaultii* (Pale Turpentine-bush) and *Senecio odoratus var odoratus* (Scented Groundsel) together with perennial vines *Muehlenbeckia gunnii* (Climbing Lignum), *Cassytha pubescens* (Snotty Gobble) and *Clematis microphylla* (Old Man's Beard). Understorey species include *Lepidosperma gladiatum* (Coast Sword-sedge), *Ficinia nodosa* (Knobby Club-rush) and *Carpobrotus modestus* (Pigface) with orchid species such as *Glossodia sp* (Pink Cockatoo) and *Pterostylis pedunculate* (Maroonhood) found under the shrub canopy in deep leaf litter. Scattered patches of perennial weed species *Polygala myrtifolia* (Milkwort) and Declared/Weed of National Significance *Asparagus asparagoides* (Bridal Creeper) occur throughout. Other exotic annual grasses and herbs including *Lagurus ovatus* (Hare's-tail Grass), *Rostraria pumila* (Tiny Bristle-grass) and *Euphorbia peplus* (Petty Spurge) are found in the more open areas.

This community is characterised by old-growth tall shrubland with widespread deep leaf litter and moss cover, no evidence of past vegetation clearance and low current disturbance levels (see **Plate 5-1** and Plate 5-2).

- **Plate 5-1 Dense old-growth tall shrubland**

- **Plate 5-2 Deep litter and moss layer typical of coastal tall shrubland in good condition (note Maroon Hood orchid (*Pterostylis pedunculate*) in centre)**

Type 2 - Coastal tall shrubland in moderate condition

This community is found in a belt on the margins of sand dunes and swales between the old-growth (good condition) shrubland and the more highly disturbed areas in the north east of Section 285. Areas assessed in moderate condition support a similar mix of shrub species to the good condition community, however the shrub layer is not as tall and displays a more open structure. The community also lacks the very old growth and dense litter and moss cover of the previous assemblage. Patches of invasive perennial weeds including Bridal Creeper (Declared and WoNS) and Milkwort were more prevalent and no orchids were recorded in these areas. See Plate 5-3.

- **Plate 5-3 Sand dunes supporting coast tall shrubland in moderate condition with reduced height of shrub layer and lacking dense litter levels**

Type 3 / 4 - Coastal tall open shrubland in poor condition

Areas of coastal tall open to very open shrubland in poor condition are found in dune foot slopes and sandy swales near the eastern boundary of Section 285 and at two locations of past sand mining in the west of the allotment. The dune footslopes and swales have been significantly disturbed and now support *Leucopogon parviflorus* (Coast Beard-heath) / *Olearia axillaris* (Coast

Daisy-bush) +/- *Acacia longifolia ssp sophorae* (Coastal Wattle) tall very open shrubland. The average shrub overstorey height is approximately 2 metres however large shrubs typically cover less than 10 percent of the area. Smaller shrub species including *Exocarpus syrticola* (Coast Ballart) and *Pimelea serypllifolia* (Thyme Rice-flower) dominate in the open patches, together with scattered patches of *Lepidosperma gladiatum* (Coast Sword-sedge). More open areas support the prostrate shrub *Kunzea pomifera* (Muntries) and *Poa poiformis* (Coast Tussock Grass) in the understorey together with introduced grasses and herbs including *Lagurus ovatus* (Hare's-tail Grass), *Ehrharta villosa* (Pyp Grass), *Bromus diandrus* (Great Brome) and Declared Weed *Euphorbia terracina* (False Caper (See Plate 5-4). Invasive perennial weeds, including the Declared Bridal Creeper and invasive Milkwort are also scattered throughout. The sandy swales are adjacent to a public road and have been regularly accessed for many years for camping, off-road four wheel driving and old tracks are common throughout (See Plate 5-5). Rubbish is regularly dumped in these areas. Two wombat burrows are also present in these degraded areas (see Appendix 2, February Survey results). No wombat scats were observed during the September survey. Wombats occur throughout this region and are known to utilise multiple burrow systems over wide ranging areas and follow food resources.

The two dunal areas subject to past sand mining support a very open shrubland community with reduced native species diversity (compared to non-mined shrubland communities) and significant patches of bare ground (See Plate 5-6).

- **Plate 5-4 Dune foot slopes and sandy swale with reduced shrub cover and exotic grasses dominant in the understorey**

- **Plate 5-5 Coastal shrubland in poor condition – vehicular tracks are common throughout**

- **Plate 5-6 Former sand mining area – note more open shrubland structure and bare patches**

Type 5 - Highly Degraded – exotic herbfield/grassland (very poor and exempt)

Sandy swales dominated by exotic herbfield/ grasslands with remnant vegetation limited to sparse and patchy cover of shrubs including *Acacia longifolia ssp sophorae* (Coastal Wattle), Coast Bitter-bush, *Bursaria spinosa* (Christmas Bush) and *Leucopogon parviflorus* (Coast Beard-heath). *Kunzea pomifera* (Muntries), *Lepidosperma gladiatum* (Coast Sword-sedge) and *Carpobrotus modestus* (Pigface) are patchily present however the understorey is dominated by introduced grasses and herbs including *Bromus diandrus* (Great Brome) *Lagurus ovatus* (Hare's-tail Grass) and *Euphorbia terracina* (False Caper).

Large emergent Cypress and Radiata Pines are present in these areas which continue to be highly disturbed with large areas slashed, numerous tracks, vegetation dumping sites and the old radar huts and small storage sheds (See Plate 5-7 and 5-8). Milkwort and Bridal creeper are common in the remaining vegetated patches.

- **Plate 5-7 Cleared areas with scattered patches of native shrubs and understorey of exotic grasses**

- **Plate 5-8 Cleared areas with scattered patches of native shrubs and understorey of exotic grasses**

5.3.2. Other Allotment Areas

The SEB determination provided below are based on a rapid assessment of key biological features at each site. It is an indication of the offset ratio applicable to the habitat as observed in Summer/Autumn 2013. The final decision on offset ratios rests with the Native Vegetation Council (NVC). Summary statistics for these areas are provided in Table 5-3, maps showing subarea locations are provided in Appendix 2.

- **Table 5-3 Species totals for each assessed patch**

Site	Native Species	Exotic Species	SEB Ratio
Section 133			
A	3	14	0:1
A2	3	10	1:1
B	8	5	2:1
B2	0	1	0:1
C1	17	12	5:1
C2	10	6	4:1
C3	5	2	5:1
Section 135 –offset area			
A	10	11	6:1
B	11	8	8:1
Allotment 148			
A	2	2	4:1
B	1	3	0:1
C	6	2	4:1
D	3	4	6:1
E (residential)	5 (some planted)	4	0:1 /N/A
F	11	6	6:1
G (road reserve)	1	3	0:1
H	6	6	4:1
I	6	6	6:1
Allotment 150			
A	4	7	1:1
B	16	10	4:1
C/C2	9	6	C 6:1, C2 4:1
D	4	4	1:1
E	8	7	4:1
F	10	7	6:1
Allotment 241			

Site	Native Species	Exotic Species	SEB Ratio
A	0	1	N/A
B	5	2	2:1
C	15	3	4:1
D	10	4	6:1
E	No	Yes	N/A

Section 133, Morphett Street CT 5253/358 - Stanhope

This property has previously been cleared (see background aerial imagery Appendix 1), has two residential properties and exotic pine trees on two boundaries. Vegetation ranges from very poor to moderate (as per Table 3-1 above). The site has been broadly divided into the following subsections (A/A2, B/B2, C1, C2, C3 and R – residential area). Evidence of rabbit presence was throughout the property. The property is only fenced on the northern boundary.

Area A comprises road reserve and or boundary areas which are dominated by exotic understorey species and bare earth. These areas do not constitute native vegetation and do not comprise intact strata. Dominant weed species were Wild Oats (*Avena barbata*), Hare's Tail Grass (*Lagurus ovatum*), Mustard (*Sisymbrium orientale*), Scabiosa (*Scabiosa atropurpureum*), Salvation Jane (*Echium plantagineum*), Onion Weed (*Asphodelus fistulosus*) and Century Plant (*Agave americana*). Other weeds present in these areas include Bridal Creeper (*Asparagus asparagoides),* False Caper (*Euphorbia terracina*), Gazania, Kikuya, African Boxthorn (*Lycium ferocissimum*), Milkwort (*Polygala myrtifolia*)

Area A2 comprises a mix of very sparse and disturbed low coastal shrubland subject to edge effects, bare earth and a variety of weeds (including Bridal Creeper, and Wild Oats). Native species include emergent Coastal Wattle (*Acacia longifolia ssp. sophorae*), Muntries (*Kunzea pomifera*), Pigface (*Carpobrotus modestus*)

Photo 4126 (B left, A centre, C1 background;

Photo 4125 (A – NW corner of allotment)

NW corner)	
	
Photo 4128 (SW corner of allotment)	Photo 4129
	
Photo 413, – juvenile century plants in road reserve.	Photo 4136 (Morphett Street)

Area B comprises highly disturbed coastal shrubland with planted exotic Cyperus pines with scattered emergent Coastal Wattle (*Acacia longifolia* ssp. *sophorae*) and scattered emergent Drooping She-oak (*Allocasuarina verticillata*). The understorey stratum is not intact and is dominated by Seaberry Saltbush (*Rhagodia candolleana*) and Muntries (*Kunzea pomifera*), with scattered Pigface (*Carpobrotus rossii*), Sword-sedges (*Lepidosperma gladiatum)*, Dodder-laurel (*Cassytha melantha*) and Knobby Club Rush (*Ficinia nodosa*).

SEB Comments: Exotic pines dominate.

Area B2 contains exotic pines with no native understorey.

Photo 4130 (SW corner of S133, Area B2)

Photo 4133 – rubbish near roadside

Photo 4144

Area C1 and C2 comprises tall coastal shrubland in various conditions (C1 5:1, C2 4:1). This land has been cleared in the past. Areas mapped as C1 are denser and contain greater diversity and cover of native species (particularly near the old pump shed), but weeds are still present in the overstorey and the understorey. Areas mapped as C2 are very open, with very sparse overystorey, bare earth and scattered Radiata pine, Milkwort, Salvation Jane, and False Caper. Coastal Sword Sedge was not present in areas mapped as C2.

In general the overstorey is currently dominated by Coastal Wattle (*Acacia longifolia* ssp. *sophorae*), Coast Beard-heath (*Leucopogon parviflorus*) and Christmas Bush (*Bursaria spinosa*). Coastal Cherry (*Exocarpus syrticola*), and exotic Radiata Pine (*Pinus radiata*) and Myrtle-leaf Milkwort (*Polygala myrtifolia*) were also present within the overstorey stratum.

The understorey included bare patches of earth and was dominated by Coast Muntries (*Kunzea pomifera*), Coast Bitter Bush (*Adriana quadripartita*) and Pigface (*Carpobrotus rossii*). Old Man's Beard (*Clematis microphylla*) and Dodder-laurel (*Cassytha melantha*) were scattered throughout the understorey (more prevalent in the denser C1 areas). Exotic species present within the understorey stratum include Wild Oats (*Avena barbata*), Hare's Tail Grass (*Lagurus ovatum*), Cock's Foot (*Dactylis glomerata*) as well as scattered African Boxthorn (*Lycium ferocissimum*) and

Milkwort.

Area C3 comprised a very small dense isolated patch of Coastal Sword-sedges (*Lepidosperma gladiatum*), and emergent Christmas Bush (*Bursaria spinosa*), Coastal Daisy Bush (*Olearia axillaris*), Sea Box (*Alyxia buxifolia*) with scattered Flax lily (*Dianella brevicaulis*). Exotic species in this small patch included Milkwort and Hare's Tail Grass.

SEB Comments: condition varies from 0:1 to 5:1 within this allotment, edge effects from surrounding patches, road reserves, road access, and residential areas. Northern and Western boundaries contain exotic Cypress pines.

Photo 4131

Photo 4134

Photo 4135

Photo 4138

Photo 4139 (eastern side of property, road that leads to house). C1 left, A2 middle, C2 right.

Photo 4140 (A2/edge of C2)

Allotment 150, Davenport Street CT 5792/679 – Johns

This Allotment has been divided into subareas A, B, C, D, E.

Area A comprises planted Yate (*Eucalyptus cornuta*), with a highly degraded understorey comprising native and exotic species. Native species include Wallaby Grass (*Austrodanthonia sp*.), Seaberry Saltbush (*Rhagodia candolleana*) and Coastal Wattle (*Acacia longifolia ssp. sophorae*). Exotic species include Wild Oats (*Avena barbata*), Couch Grass (*Cynodon dactylon*), Sow thistle (*Sonchus sp*.), Myrtle-leaf Milkwort (*Polygala myrtifolia*) and Mustard (*Sisymbrium orientale*).

SEB comments: scattered planted Eucalypts and native/exotic understory.

Photo 4044, NE corner adjacent golf course

Photo 4063, northern plantings adjacent golf course

Photo 4062

Area B is a coastal shrubland community over mixed understorey of exotic and native species. The overstorey is dominated by Coastal Wattle (*Acacia longifolia* ssp. *sophorae*), Coast Beard-heath (*Leucopogon parviflorus*), Coastal Daisy (*Olearia axillaris*) and Christmas Bush (*Bursaria spinosa*). Exotic Myrtle-leaf Milkwort (*Polygala myrtifolia*) and African Boxthorn (*Lycium ferocissimum*) occur throughout the overstorey stratum.

The understorey stratum is dominated by exotic Hare's Tail Grass (*Lagurus ovatum*), and native Seaberry Saltbush (*Rhagodia candolleana*) and Spear Grass (*Austrostipa* sp.). Sedges are also common throughout the understorey, predominantly Coast Sword-sedge (*Lepidosperma gladiatum*). Coast Bitter Bush (*Adriana quadripartita*) is scattered throughout the understorey. Exotic species have invaded the understorey stratum, including Mustard (*Sisymbrium orientale*), Scabiosa (*Scabiosa atropurpureum*), Wild Oats (*Avena barbata*), Couch Grass (*Cynodon dactylon*),

SEB comments: highly disturbed with greater coverage of exotic species, rubbish and edge effects.

Photo 4058, looking west, Milkwort

Photo 4059, rubbish looking south, Milkwort

Photo 4060, looking east, towards industrial area

Photo 4061, looking north (towards 'A'), Milkwort

Area C is a coastal shrubland community, similar in species composition to Area B, however fewer weeds were noted within the overstorey and understorey strata. Myrtle-leaf Milkwort (*Polygala myrtifolia*) and African Boxthorn (*Lycium ferocissimum*) were noted as the primary weeds at the site.

Area C was divided into 2 sections (C 6:1, C2 4:1). Area C2 was noted to support a greater abundance of weeds, but still supports the same species diversity of natives to Area C. Myrtle-leaf Milkwort (*Polygala myrtifolia*) and African Boxthorn (*Lycium ferocissimum*) were noted in greater abundance in C2 compared with Area C.

Photo 4057 looking east from track, note Boxthorn (C2)

Photo 4088, 4;1 area, looking back at Davenport Street from northeastern corner of Section 135 (edge of C2)

Area D comprises planted exotic pines, with a limited understorey. Understorey species include exotic Wild Oats (*Avena barbata*), Couch Grass (*Cynodon dactylon*) and Myrtle-leaf Milkwort (*Polygala myrtifolia*). Native Coastal Wattle (*Acacia longifolia* ssp. *sophorae*) and native Seaberry Saltbush (*Rhagodia candolleana*) were also present within the understorey stratum.

SEB comment: Not intact stratum, exotic pines with native understorey, edge of golf course.

Photo 4064

Photo 4065

Area E is a patch of highly disturbed coastal shrubland. The overstorey stratum comprises Coast Beard-heath (*Leucopogon parviflorus*) and Coastal Wattle (*Acacia longifolia* ssp. *sophorae*), with Myrtle-leaf Milkwort (*Polygala myrtifolia*) also present.

The understorey stratum is dominated by exotic Hare's Tail Grass (*Lagurus ovatum*), Mustard (*Sisymbrium orientale*) and Couch Grass (*Cynodon dactylon*) however also supports native Pig Face (*Carpobrotus rossii*) and scattered Coast Sword-sedge (*Lepidosperma gladiatum*) and *Senecio* spp.

SEB comments: highly disturbed with edge effects, adjacent mown grass area.

Photo 4066 edge of club rooms car park

Photo 4067

Photo 4068 old golf hole, emergent Muntries in grass area (Area G on the right)

Area F is a disturbed coastal shrubland community, with Coastal Wattle (*Acacia longifolia*ssp. *sophorae*) and Coast Beard-heath (*Leucopogon parviflorus*) dominating the overstorey stratum. Christmas Bush (*Bursaria spinosa*) and exotic, planted cyperus pines were also present. The understorey stratum was dominated by Muntries (*Kunzea pomifera*) and exotic Hare's Tail Grass (*Lagurus ovatum*), with Wild Oats (*Avena barbata*) and scattered Coast Sword-sedge (*Lepidosperma gladiatum*) also present.

SEB comments: coverage and diversity of natives versus exotics similar to 'C'.

Photo 4069

Photo 4070

Photo 4071

Photo 4072

Area G is Mown Grass with very minor patches of Muntries, Hair Tail Grass and Plantain. SEB is 0:1.

Area R is residential, 0:1.

Section 135, Morphett Street CT 5671/129, Robe Golf Club

This area was assessed for SEB offset potential. There are no plans to clear this area.

Area A is a patch of Tall coastal shrubland, similar to other patches observed within the area. The overstorey was dominated by Coastal Wattle (*Acacia longifolia* ssp. *sophorae*) and Coast Beard-heath (*Leucopogon parviflorus*), with scattered Coast Daisy (*Olearia axillaris*), and exotic Myrtle-leaf Milkwort (*Polygala myrtifolia*). The understorey was dominated by Muntries (*Kunzea pomifera*), Pigface (*Carpobrotus rossii*), Dodder-laurel (*Cassytha melantha*), Sedges (*Lepidosperma* sp.), Knobby Club-rush (*Ficinia nodosa*) and Coast Bitter Bush (*Adriana quadripartita*). Exotic species in the understorey include Wild Oats (*Avena barbata*), Hare's Tail Grass (*Lagurus ovatum*) and Gazania (*Gazania linearis*). This vegetation type primarily occurs around the edge of the property (e.g. Section 135). Fresh wombat scats were noted along the track that runs along the eastern edge of the property

This property could be used as an SEB offset. Management strategies could include:

- Rubbish removal, manage edge effects, removal of scattered *Polygala* throughout the edges, patrol for onion weed (some plants near driveway of neighbouring property). Bush care methods of weed control would be less invasive. Staged removal of *Polygala* is suggested, given that it is utilised as a habitat resource by fauna (particularly birds).

Photo 4079, (wombat scat on eastern track)

Photo 4082, southern track (left), eastern track (right).

	
Photo 4080, track running east west from Morphett Street.	Photo 4085, *Polygala* infestation adjacent eastern track (parallel with Davenport Street).
Photo 4087, *Polygala* infestation adjacent eastern track	
	
Photo 4077 (area B)	Photo 4078

Area B is very similar to Area A in terms of species composition however fewer weeds were noted. Vegetation was very dense, hence species were observed from the roadside at higher elevation. Area B occurs 2-3 metres from the road and track edges. Taller Coastal Wattle (*Acacia longifolia*ssp. *sophorae*) was noted, along with Christmas Bush (*Bursaria spinosa*) and Coastal Daisybush (*Olearia axillaris)* within the overstorey stratum. Wallaby Grass (*Austrodanthonia*sp.) was present within the understorey stratum. Additionally, a greater abundance of sedges was

noted in the understorey at Area B compared with Area A. Coverage of native species was also denser in Area B.

This area was very dense, hence only the edges of tracks were assessed.

Offset comments: as per Area A. This site has great potential for regeneration if weed control methods are staged and low impact (e.g. bushcare). Rabbit control (in consideration of wombat presence) may also be useful. This should be coordinated with local SE NRMB programs.

	
Photo 4073	Photo 4074
	
Photo 4075, (Area A in foreground, B behind)	Photo 4076

Section 148, Brewer Road, CT 5674/450, Clements

This allotment contains two residential areas and large areas that have been disturbed or cleared in the past. The allotment was divided into the subareas for assessment (A, B, C, D, E, F, G, H, I)

Area A comprises the edge of a track and does not represent intact vegetation strata. Native species that were present included Coastal Wattle (*Acacia longifolia* ssp. *sophorae*) and Christmas Bush (*Bursaria spinosa*), as well as the exotic Mustard (*Sisymbrium orientale*) in the understorey.

SEB comments: roadside, edge effects, thin patch

Photo 4089, Area A, looking up Morphett Rd from southeastern corner of property

Photo 4090, Area B

Area B is a highly disturbed patch comprising solely exotic flora. Species recorded were Mustard (*Sisymbrium orientale*), Hare's Tail Grass (*Lagurus ovatum*), Wild Oats (*Avena barbata*), as well as an exotic Proteaceae family member, and one unknown exotic species. This area is larger than appears on the aerial photo. There is soil disturbance, cleared patches and piles of rubbish/debris.

Photo 4091, Area B (mostly), with Area C to the left of the photo.

Photo 4124, (another section of B looking south, C in background)

Area C is a disturbed patch of coastal shrubland, with the overstorey dominated by Coastal Wattle (*Acacia longifolia* ssp. *sophorae*) and Christmas Bush (*Bursaria spinosa*). Coast Bitter Bush (*Adriana quadripartita*) forms a basic, scattered midstorey shrub layer, and Muntries (*Kunzea pomifera*) dominates the understorey stratum.

Photo 4092, western edge of Area C (on the right) and area E on the left

Photo 4094

Area D forms a modified, open low shrubland, with a grassy understorey. Shrubs comprise Coast Bitter Bush (*Adriana quadripartita*). The understorey stratum comprises predominantly Wild Oats (*Avena barbata*) with Mustard (*Sisymbrium orientale*), and native Wallaby Grass (*Austrodanthonia* species). A Century Plant (*Agave americana*) also occurs adjacent this patch in area C.

SEB Comments: Area D is within area C, vegetation is in better condition with greater coverage of native species and less edge effects.

Photo 4121 (4:1 – edge effects, area C)

Photo 4122, (D is on the left, area C is immediately adjacent road. Century plants both side of road.

Photo 4123, (6:1 Area D)

Area E Residential with large pine 0:1, cleared areas, new old and new plantings, lots of rabbit diggings and scats. Wombat scats were also seen in this highly modified area (on the dirt track).

Area E comprises plantings of Western Australian Yate (*Eucalyptus cornuta*), with scattered Dryland Tea-tree (*Melaleuca lanceolata*) (some planted). The understorey comprises Muntries (*Kunzea pomifera*), with exotic Hare's Tail Grass (*Lagurus ovatum*), Mustard (*Sisymbrium orientale*) and Wild Oats (*Avena barbata*).

Photo 4093

Area F comprises a tall coastal shrubland patch. The overstorey stratum is dominated by Coastal Wattle (*Acacia longifolia* ssp. *sophorae*), Coast Beard-heath (*Leucopogon parviflorus*), Christmas Bush (*Bursaria spinosa*), Coast Daisy Bush (*Olearia axillaris*) and the exotic Myrtle-leaf Milkwort (*Polygala myrtifolia*). The understorey stratum is dominated by Hare's Tail Grass (*Lagurus ovatum*), Dodder-laurel (*Cassytha melantha*), sedges (*Lepidosperma* species), Correa (*Correa reflexa*) and Muntries (*Kunzea pomifera*). Some areas along the edge of this patch are only 2:1.

Area G comprises a roadside strip, supporting entirely exotic species. Species comprise Hare's Tail Grass (*Lagurus ovatum*), Wild Oats (*Avena barbata*) and Mustard (*Sisymbrium orientale*). No native species were present in this section. This area is adjacent to the area 'D' of Section 285 (road and road reserve), which was given a rating of 1:1. The exact widths of these areas require further defining, once clearance areas are determined, 'G' is likely part of Section 285 'D'.

	
Photo 4095, Area F/G (2:1 section on edge of road); looking east)	Photo 4096, Area F/G(roadside section) (0:1 Section looking North)

Areas H and I are tall coastal shrubland.

Area H comprises a tall coastal shrubland community. Species composition closely resembles that found at Area F. However, weeds were more abundant at Area H, and strata were more open, suggesting previous clearances and/or impacts.

Area I featured a very similar species composition to Area F and Area H, with proposed SEB ratios related to coverage and fewer weeds noted than Area H.

	
Photo 4116 (area I) note Polygala presence	Photo 4117 (edge of area I)

Allotment 241, CT5553/710, Robe Council (leased by Golf Club)

Area A comprises planted pine trees and does not represent native, or intact vegetative strata. Area E also comprises exotic species.

SEB rating NA/0:1

Photo 4160, Area A right of photo (Area E centre of photo)

Area B is a highly modified isolated small patch of coastal shrubland, comprising Common Boobialla (*Myoporum insulare*), Christmas Bush (*Bursaria spinosa*) and Coast Beard-heath (*Leucopogon parviflorus*) in the overstorey stratum, with Couch Grass (*Cynodon dactylon*) and Mustard (*Sisymbrium orientale*) comprising the understorey stratum. The strata do not represent complete, intact strata.

SEB/Offset Comments: isolated, highly modified

Area C comprises a more intact patch of coastal shrubland compared with Area B, featuring greater species diversity. The overstorey comprises Common Boobialla (*Myoporum insulare*), Coast Beard-heath (*Leucopogon parviflorus*), Coastal Wattle (*Acacia longifolia* ssp. *sophorae*) and Christmas Bush (*Bursaria spinosa*). Midstorey species include Coastal Cherry (*Exocarpos syrticola*) and Coast Daisy Bush (*Olearia axillaris*), along with exotic African Boxthorn (*Lycium ferocissimum*). The understorey stratum comprises sedges (*Lepidosperma* species), Muntries (*Kunzea pomifera*), Seaberry Saltbush (*Rhagodia candolleana*), Dodder-laurel (*Cassytha melantha*), Wallaby Grass (*Austrodanthonia* species) and Coast Daisy (*Senecio* species). Additionally, Hare's Tail Grass (*Lagurus ovatum*) was common throughout the understorey stratum.

SEB/Offset Comments: has diversity and coverage, but edge effects as adjacent Golf Course lawn and tracks and in the vicinity of residential area and contains garden escapees.

	
Photo 4155	Photo 4151
Area D Area D comprises the same species composition as Area C, however with the inclusion in the overstorey stratum of the exotic Myrtle-leaf Milkwort (*Polygala myrtifolia*). This patch has some tracks dissecting it. SEB/Offset Comments: this area is subject to edge effects of existing golf course and tracks and adjacent residential.	
	
Photo 4149,	Photo 4158, note exotic creeper
	Photo 4154, top of course between edge of C and D

5.4. SEB calculations

The offset ratios determined above for each of the vegetation areas assessed enables SEB offsets for the proposed development can be calculated. However, given the exact layout of the proposed development is not yet finalised, it is not possible at this stage to provide a total SEB offset requirement for the development. Information provided here will enable the developer to design a layout which minimises impact upon high quality vegetation, and therefore which minimises the SEB offset requirements for the project.

5.5. Plant Species

A total of 87 species were recorded within the study area, including 51 native and 36 introduced species. No species of national, state or regional conservation significance were recorded during the field survey.

Appendix 1 (Background) contains a list of floral species previously recorded near the study area (BDBSA flora) and Appendix 2 (Field results) lists species recorded during these surveys. A summary of the 21 weed species identified in the February 2013 Survey, their status and comments is provided in Appendix 2.

6. Discussion

6.1. Principles of Native Vegetation Act

Proposed clearance of native vegetation that is protected under the NV Act is subject to assessment of Principles of Clearance as listed under the Act. If the proposed clearance activities are considered to be seriously at variance with the principles of the Act, clearance is generally not permitted to proceed. In most circumstances, including where clearance has been permitted, a Significant Environmental Benefit will also need to be achieved to offset clearance of the remnant vegetation. Table 6-1 to 6-6 below illustrate the principles of native vegetation clearance under the Act, and whether parts of the study area would be considered to be at variance with these principles. Further discussion for Section 285 is provided in Section 6.2.

- **Table 6-1 Summary of Assessed Patches and Clearance Principles for Section 135 (OFFSET ONLY)**

Clearance Principle	Details of Principle	Area	
		A	B
A	It comprises a high level of diversity of plants	Y	Y
B	It has significance as a habitat for wildlife	Y	Y
C	It includes plants of a rare, vulnerable or endangered species	N	N
D	The vegetation comprises the whole, or a part, of a plant community that is rare, vulnerable or endangered	N	N
E	It is significant as a remnant of vegetation in an area which has been extensively cleared	N	N
F	It is growing in, or in association with, a wetland environment	N	N
G	It contributes significantly to the amenity of the area in which it is growing or is situated	Y	Y

- **Table 6-2 Summary of Assessed Patches and Clearance Principles for Section 133**

Clearance Principle	Details of Principle	Area		
		A	B	C
A	It comprises a high level of diversity of plants	N	N	N
B	It has significance as a habitat for wildlife	N	N	Y
C	It includes plants of a rare, vulnerable or endangered species	N	N	N
D	The vegetation comprises the whole, or a part, of a plant community that is rare, vulnerable or endangered	N	N	N
E	It is significant as a remnant of vegetation in an area which has been extensively cleared	N	N	N
F	It is growing in, or in association with, a wetland environment	N	N	N
G	It contributes significantly to the amenity of the area in which it is growing or is situated	N	N	Y

Table 6-3 Summary of Assessed Patches and Clearance Principles for Section 148

Clearance Principle	Details of Principle	Area								
		A	B	C	D	E	F	G	H	I
A	It comprises a high level of diversity of plants	N	N	N	Y	N	Y	N	N	Y
B	It has significance as a habitat for wildlife	N	N	N	Y	N	Y	N	Y	Y
C	It includes plants of a rare, vulnerable or endangered species	N	N	N	N	N	N	N	N	N
D	The vegetation comprises the whole, or a part, of a plant community that is rare, vulnerable or endangered	N	N	N	N	N	N	N	N	N
E	It is significant as a remnant of vegetation in an area which has been extensively cleared	N	N	N	N	N	N	N	N	N
F	It is growing in, or in association with, a wetland environment	N	N	N	N	N	N	N	N	N
G	It contributes significantly to the amenity of the area in which it is growing or is situated	N	N	N	N	N	Y	N	Y	Y

Table 6-4 Summary of Assessed Patches and Clearance Principles for Section 150

Clearance Principle	Details of Principle	Area					
		A	B	C/C2	D	E	F
A	It comprises a high level of diversity of plants	N	N	N	N	N	N
B	It has significance as a habitat for wildlife	N	Y	Y	N	Y	Y
C	It includes plants of a rare, vulnerable or endangered species	N	N	N	N	N	N
D	The vegetation comprises the whole, or a part, of a plant community that is rare, vulnerable or endangered	N	N	N	N	N	N
E	It is significant as a remnant of vegetation in an area which has been extensively cleared	N	N	N	N	N	N
F	It is growing in, or in association with, a wetland environment	N	N	N	N	N	N
G	It contributes significantly to the amenity of the area in which it is growing or is situated	N	Y	Y	N	Y	Y

- **Table 6-5 Summary of Assessed Patches and Clearance Principles for Section 285 (see 6.2 for discussion)**

Clearance Principle	Details of Principle	Area				
		1	2	3	4	5
A	It comprises a high level of diversity of plants	Y	Y	N	N	N
B	It has significance as a habitat for wildlife	Y	Y	Y	N	N
C	It includes plants of a rare, vulnerable or endangered species	?	N	N	N	N
D	The vegetation comprises the whole, or a part, of a plant community that is rare, vulnerable or endangered	N	N	N	N	N
E	It is significant as a remnant of vegetation in an area which has been extensively cleared	N	N	N	N	N
F	It is growing in, or in association with, a wetland environment	N	N	N	N	N
G	It contributes significantly to the amenity of the area in which it is growing or is situated	Y	Y	N	N	N

- **Table 6-6 Summary of Assessed Patches and Clearance Principles Allotment 241**

Clearance Principle	Details of Principle	Area			
		A	B	C	D
A	It comprises a high level of diversity of plants	N	N	N	N
B	It has significance as a habitat for wildlife	N	N	Y	Y
C	It includes plants of a rare, vulnerable or endangered species	N	N	N	N
D	The vegetation comprises the whole, or a part, of a plant community that is rare, vulnerable or endangered	N	N	N	N
E	It is significant as a remnant of vegetation in an area which has been extensively cleared	N	N	N	N
F	It is growing in, or in association with, a wetland environment	N	N	N	N
G	It contributes significantly to the amenity of the area in which it is growing or is situated	N	N	Y	Y

6.2. Section 285

Intact Strata

Section 27(2) of the Native Vegetation Act (1991) states that the (Native Vegetation) Council cannot give its consent to the clearance of native vegetation under subsection (1)(a) if the vegetation comprises or forms part of a stratum of native vegetation that is substantially intact (namely, the stratum has not been seriously degraded by human activity during the immediately preceding period of 20 years).

The areas assessed to be in Poor and Very Poor condition in Section 285 have been substantially modified by past vegetation clearance and on-going human disturbance including vehicle tracks, dumping, camping and recreational activity and weed invasion from adjacent urban, residential, industrial, and recreation areas, including tracks leading to a Water Treatment Plant and rubbish dump. This is particularly evident in the sandy swale areas in the north east of the allotment where a network of tracks is evident in old aerial photos (Appendix 1) and the impacts persist through changes to the structure and species composition of vegetation communities today. These areas now range from open shrubland through to herbfield and grassland communities and support a reduced native species richness, understorey dominated by exotic species and do not include intact strata.

The areas assessed to be in Moderate condition have reduced cover, density and height of the shrub overstorey and have sparse plant litter levels. It is considered that only areas assessed to be in Good condition contain intact strata.

Principles of Clearance

The Native Vegetation Council cannot grant give consent to clear native vegetation that is seriously at variance with the Principles of Clearance (Section 29(1)(b). The application of this to remnant vegetation on Section 285 will ultimately depend on the location and extent of proposed vegetation clearance. The broad application of the principles is discussed below.

Native plant species diversity

Communities assessed to be in Poor and Very Poor condition comprised between 11 and 17 native species which is below average for this community in the South East Region (Oppermann, 1999). Sites in communities assessed to be in Moderate and Good condition comprised 20 and 23 native species respectively which is slightly above the average species richness (19 species) for this community in the region (Oppermann, 1999).

Habitat for Wildlife

The areas assessed to be in Poor or Very Poor condition have been highly disturbed and modified and are dominated by exotic plant species. Plant litter levels are low and they contain limited on-ground habitat structures and trees with hollows are absent. These areas are not considered to represent important habitat for wildlife. The remaining areas of Section 285 assessed to be in Moderate to Good condition would provide habitat for wildlife typical for coastal shrublands of the region.

Threatened Plant Species or Plant Communities

No threatened plant species or communities were recorded during any field surveys of Section 285 however the coastal shrubland assessed to be in Good condition are similar to communities where the Endangered Little Dip Spider-Orchid (*Caladenia richardsiorum)* has been recorded within 5 kilometres of the project area. The remaining areas of Section 285 lack the plant litter levels that are required for this, and other orchid species (Dixon, 2009).

Remnancy

Section 285 lies within the Beachport Environmental Association (Laut, 1977) which retains approximately 43 percent of the original native vegetation cover. Areas assessed to be in Poor and Very Poor condition have been highly modified and are not considered to represent significant remnants of coastal shrubland communities. The remaining vegetation is considered to be representative of remnant coastal dune vegetation in within the region.

Wetland Environment

The site is located 500m from the coastal marine environment and distant from any of the major freshwater wetlands in the region.

Amenity

Past extensive vegetation clearance has occurred in the region and local area. Vegetation of moderate to good condition would contribute to the amenity of the area, however vegetation in poor condition and increasing weed infestations do not contribute to the amenity of the area. The expansion the golf course would increase available public open space, increase visibility of the better quality coastal vegetation, remove weed infested areas, and remove access for illegal camping and rubbish dumping activities that threaten the good quality areas.

Erosion and Salinity

It is possible, but unlikely that the clearance of vegetation may contribute to soil erosion, salinity, or flooding. Providing clearance and development is staged and strictly controlled; and that suitable management prescriptions, including water runoff and effluent management programmes, are established and rigorously implemented. The site does not affect any drainage lines or watercourses.

Underground Water

The clearance of vegetation is unlikely to cause deterioration in the quality of surface or underground water. As per comments above, if development occurs, then runoff and seepage must be controlled as part of the conditions of approval under the DA so as not to jeopardise surface or sub-surface water quality. A pipeline has already been installed that utilises water from the nearby Robe Water Treatment Plant. This pipeline runs adjacent Section 285 and supplies the existing Golf Course.

Sustainability

If clearance is approved the land will be used for a purpose which is sustainable, provided sustainable development (ESD) principles and WSUD principles are applied to the development (of golf greens). E.g. the proponent aims to use local provenance native plants, reducing the ongoing impacts of weed invasion, reducing water requirements and improving available habitat for local fauna, also adding amenity value. The golf greens will assist in dune stabilisation and will allow natural percolation of rain water to the water table.

6.3. General Fauna

A number of local bird species were opportunistically recorded during the field visit (see Appendix 2 – field results). None of these species were of national conservation significance.

Limited fauna habitat opportunities were observed throughout the study area. Certain areas of vegetation that were more complete, i.e. comprised relatively intact strata, and were identified as providing habitat opportunities for native fauna (e.g. areas in moderate to good condition). However, much of the vegetation observed throughout the study area does not comprise complete vegetation communities and intact strata. Various Sections and Allotments have been subject to previous clearance and are currently subject to edge effects, including a high abundance of weeds present within the understorey and overstorey strata. Whilst the vegetation

in the study area would provide habitat and resources for local fauna, it is not likely to be 'significantly' important to the local fauna. Evidence of both wombats and rabbits was observed in vegetation of good condition as well as highly degraded areas and within residential properties on tracks. If a portion of vegetation was to be cleared there is a substantial amount vegetation in close proximity to the wider study area that fauna could retreat to. In addition, rehabilitation of poor or moderate areas (as part of SEB offset requirements) may actually benefit local fauna, particularly if there was a focus on rabbit control and control of Declared weeds and the highly invasive Milkwort (*Polygala*).

6.4. Fauna of conservation significance

Orange-bellied Parrot

Previous reports have indicated that the Orange-bellied Parrot may use habitat within the study area. This was highlighted most recently in the DEWNR review of Anderson (2012) for proposed development of Allotment 2 (not part of this report). The most recent information available from DotE through the SPRAT (Species Profile and Threats Database) (2010) indicates that the Orange-bellied Parrot is still expected to use habitat within the Coorong National Park, and near Carpenter Rocks (a significant overwintering site for the parrot), both in the broader region of the study area (Caton *et al*. 2011). However key breeding habitat for the OPB is known for Tasmania (at Melaleuca in the Southwest National Park). Preferred nesting is in hollows of Smithton Peppermint (*Eucalyptus* nitida) Eucalypt forest near Buttongrass in Tasmania. There are fewer than 50 wild individuals of this species left, with another 160-170 birds in captivity (Parks & Wildlife Service Tasmania 2012, OBP Blog 2011, Healesville Sanctuary 2013).

The distribution of BDBSA fauna and flora records with EPBC ratings is provided in Appendix 1 (Background). It should be noted that some of the records are historical/very old (e.g. Orange-bellied Parrot) and records are also included for Marine species (like whales) in terrestrial locations, hence the reliability of the location data for those records is poor. As mentioned earlier, there were 11 historical records for the Golf Club and surrounds, dating back 78 years. These records were all for 'sign/slough/skin' not actual birds. EBS 2008 also provided OBP records within 50 km of site (Robe 1997, Nora Creina 2002).

The OBP spends winter in coastal Victoria and can overwinter in South Australia, with the most recent record for SA being in the Coorong back in 2010 (one individual, bird.net.au).

Key food sources for this species include seeds of sedges, heath plants and buttongrass, seeds of *Boronia* and the everlasting daisy *Helichrysum pumilum,* however their diet is known to vary according to season and habitat. The OPB recovery plan (2006) lists key food species, including

saltmarsh. Key saltmarsh locations in SA include Canunda National Park, southern Coorong NP, Lake Bonney, Nora Creina, Robe (site is distant from the study area), Butchers Gap, Blackford Drain and Woods Well. In SA the OBP is known to feed on Sea Rocket, Winter Grass, Glasswort Spp, Sea-blite, Hogweed and Boronia (Appendix 2 OBP Recovery Plan 2006). These species do not occur in the study area. In addition, it was noted that OBP will eat Coast Beard-heath, but this is known to be a rare preference for the bird (Appendix 2 of DPIW 2006).

The study area is not in a key breeding, key migration or key overwintering area for the OPB. If a small proportion of vegetation was cleared for the proposed development > 3000 hectares would be available in SA for rare and occasional overwintering habitat. SEB offset requirements may result in improving available coastal habitat through weed control (particularly Polygala and Bridal Creeper), rabbit control and revegetation with local coastal species.

It is not considered likely that the Orange-bellied Parrot is directly reliant upon vegetation occurring within the study area. The vegetation recorded within the study area is considered to generally be of poorer quality than surrounding habitat areas (e.g. Little Dip Conservation Park). Vegetation at the southern end of Section 285 is reflective of better quality vegetation as it is located adjacent to an intact, coastal shrubland community. However, many patches of vegetation recorded during the site assessment displayed species diversity considered below average (compared with more suitable habitat which occurs south of Section 285, as shown in Coastal Action Plan, page 101), and were subject to significant edge effects including infestation by many invasive weed species. Additionally, the vegetation within the study area is situated in close proximity to intact vegetation of better habitat quality which is considered more suitable for avifauna, as well as being close to the nearby Little Dip Conservation Park, which supports vegetation communities that are far more intact and diverse.

The study area was not deemed significant for other fauna of conservation significance, due to the above-listed reasons. In addition, no fauna of national conservation significance were observed during the field assessment. The SE Coastal Action plan (page 111), classes the study area within a moderate priority area, with the higher priority areas primarily occurring south of the site.

As mentioned earlier, an EPBC referral may still be required for new development in the area. It is recommended that the Department of the Environment are consulted to see whether this would be necessary.

Common Wombat

During the February field visit evidence for presence of the Common wombat *Vombatus ursinus,* rated as 'Rare' under the NPW Act was found throughout the various vegetation patches. Two active wombat burrows were located in vegetation of poor condition in Section 285 in February 2013. Fresh scats were located at the entrance to both burrows, in addition fresh scats were observed in all of the other Allotments and Sections along access tracks both near good vegetation (e.g. Section 135) and in residential sites devoid of any vegetation (e.g. Allotment 148, area E). This suggests the wombats occupy a wide range within the study area. During September 2013, no fresh wombat scats were observed in Section 285. This species is however locally common and known to occur throughout the surrounding areas, particularly in better quality habitat within Little Dip Conservation Park and Heritage Area south of Section 285. If any vegetation clearance is approved in Section 285, further consultation would be required with DEWNR Parks staff regarding the range and population of wombats occurring in the study area. Although they are solitary, they can share burrows and territories are related to food resources.

If vegetation clearance for the Golf course expansion is approved it is unlikely that the local Wombat population would be significantly impacted. Wombats are mobile species and are capable of moving away from an area if there is disturbance. Wombats are locally common and wide spread throughout the area surrounding the proposed development. There are vast expanses of habitat for wombats to retreat to and they currently occur within residential areas, adjacent an industrial area and Little Dip Conservation Park. Staged vegetation clearance for the purposes of the Golf Course expansion would also minimize any impacts.

6.5. Flora of conservation significance

The Little Dip Spider Orchid (LDSO) is endemic to SE South Australia. It is highly localised and poorly conserved. It is known to occur in coastal areas between Kingston and Canunda, often near salt lakes. It occurs in a variety of habitats from exposed cliffs to coastal mallee, closed forests and low coastal shrublands, often in leaf litter of the inland side of dunes. Key populations are described in

Key threats: include grazing (feral and native animals), weed invasion (habitat competition) and habitat fragmentation (DEH 2007, Dickson et al. 2009). Grazing by rabbits and warren construction is noted as a significant threat for the LDSO (Dickson et al 2009). It is likely that grazing and warren construction by wombats in the SE would also threaten LDSO. Weed invasion is a serious threat to all orchids. Both Bridal Creeper and Milkwort are known to be of particular concern to sub populations of the LDSO (Dickson et al 2009). In addition, the Coast Wattle (*Acacia*

longifolia var. *sophorae*), an Australian species of debated natural distribution, is a threat the LDSP and other threatened SE orchids (Dickson et al 2009). The dense growth habitat of the Coastal Wattle appears to be detrimental to the survival of ground flora. For example, research has found a significant decline in the understorey diversity of native species following invasion by Coast Wattle (McMahon *et al.* 1996, cited in Dickson et al 2009). The Coastal wattle has also been known to compromise the survival of other threatened orchids in the SE region (Carr 1993 cited in Dickson et al 2009).

Historical BDBSA records occur within the area, south of the study area, but not within the study area. To date the LDSO has not been observed by landowners on Section 285 during Spring or by other studies / surveys in the surrounding allotments (DEWNR 2006, EBS 2008, Anderson 2012). Several BDBSA records exist approximately 1.5 km south of end of Section 285 (in a Heritage Agreement Area).

During the recent survey of Section 285 in Spring, the LDSO was not observed, however habitat for common orchid species (Maroonhood, *Pterostylis pedunculate* and Cockatoo Orchid , *Glossidia sp*.) was observed. This habitat was in dense tall coastal shrubland, with leaf litter, but also contained threats to the LDSO (Bridal Creeper, Milkwort and Coastal Wattle). Whilst it is unlikely that a key population occurs on Section 285, it is possible that individual plants may occur in the dense vegetation (e.g. the vegetation in 'good condition'). A large expanse of similar vegetation occurs south and south east of Section 285 and immediately adjacent the nearby Little Dip CP.

An EBPC referral may be required, however given that Section 285 is unlikely to support a significant population of LDSO, particularly given the presence of weed species that are highly invasive to orchids and the presence of the Coastal Wattle. It is therefore unlikely that staged clearance of vegetation in poor to moderate condition for the expansion of the Golf Course is likely to impact the LDSO as a species. In addition, activities that are likely to be required as part of SEB offsets (e.g. protection of good quality vegetation, weed control and rabbit control) may provide local benefits to individual LDSO plants if they occur in the good quality vegetation, particularly in the south and south west of Section 285 and the nearby Section 135. Further consultation with DotE staff would be recommended.

7. Recommendations

The following recommendations are provided based on the assessment of vegetation and habitat conditions within the study site and knowledge of sustainable Golf Course expansion techniques, provided by Crafter + Mogford (Golf Course Architects):

1. Avoid clearing vegetation of good condition through planning, design and low impact construction methods.

2. When constructing or altering golf holes, stagger works, e.g. where clearance of vegetation is required construct a maximum of two holes at time. This will prevent exposure of large areas of cleared land, reducing impacts from dust and wind erosion.

3. Prior to starting works on new golf holes, previous holes should have irrigation installed and operational and laying/planting of turfgrass completed.

4. Prior to clearance the extent of clearing line would be marked on site by the golf course architect using surveyors' flagging tape. This will enable the final clearing line to take into account any particular stands of vegetation that might be retained, while also allowing a natural appearing clearing edge to be made rather than an artificial straight line for visual amenity.

5. Where possible, some low dune native plant species within cleared areas could be carefully dug up by excavator bucket and transplanted in appropriate locations along the edges of the golf holes (depending on species likelihood of survival).

6. Where larger shrubs are removed during the clearing process they would be pulled out using a small excavator with a claw bucket. Each shrub would be pulled out with as much of its roots as possible and sand would be shaken off the roots and returned into the hole, avoiding the need for large stockpiles.

7. Disposal methodology of cleared vegetation to be would be discussed further with Council and the NVC / DEWNR staff. In some locations it could be beneficial to mulch this material and spread the mulch (with seed material) to regenerate native vegetation in areas of the site that have native vegetation of poorer condition. Seed could also be collected to propagate local provenance plants for the replanting around the golf course and any future residential developments that may be integrated with the golf course. Care would need to be taken to avoid seeds from the exotic species that are present.

8. The management plan for the site should include weed control of retained patches of vegetation, particularly in Section 285, and to provide a buffer from edge effects of existing areas of poorer quality (e.g. road reserves).

9. No major earthworks should take place within the cleared hole corridors apart from some minor levelling for tees, minor excavation for bunkers, and minor reshaping of greens sites. As per the CEMP for the site.

10. Fairways should have existing small scale undulations retained post clearing with the use of a small-size bunker raking machine to smooth these fine contours.

11. Install sustainable irrigation systems. Minor trenching approximately 600mm in depth is required for this installation. The system should be designed with perimeter half-circle sprinklers to irrigate away from adjacent native vegetation at the edges of the maintained golf holes. Irrigation water may be acquired from the dam to the south of the Section 285 (consider any impacts of trenching of lines or use of existing pipes).

12. Following the installation and commissioning of the irrigation system, all golf features are to be fine finished in preparation for turfing.

13. Turfing of the golf holes, with fairways row planted with couchgrass, roughs hydroseeded with a mix of fescues and couch, and greens hydroseeded with bentgrass.

14. Plant native dune grasses (e.g. *Austrodanthonia* and Coast Sword Sedge) and low plant species (e.g. Muntries) into the perimeters of the golf holes. Using only local provenance species. Local coast care or land care groups could be involved.

15. Establish turfgrass and grow-in with regular irrigation, mowing, fertilizing and top-dressing as required.

16. Open holes for play following successful completion of grow-in. In the cooler maritime climate of Robe the establishment of the couchgrass fairways will take the longest time and this is likely to require more than one summer's growth.

17. Consideration of impacts to environment from any paths for walking and golf buggies.

18. Maintain and improve condition of native vegetation and monitor and control weeds as required, particularly in Section 285. It should be noted that weed control programs and regimes should be established in conjunction with local SE NRMB officers. Some exotic species can be utilised by native fauna (e.g. Orange Bellied Parrot use of African Boxthorn

to roost, Ehmke 2009 cited in Caton *et al.* 2011), hence control programs may need to be staged if it was determined likely that threatened species were utilising exotic species.

19. Fence vegetation that is retained to allow regeneration and to protect wombat burrows (where appropriate). Use fencing with one or two wire lines that will allow local fauna continue to move through without getting caught.

20. Consult with DEWNR re: wombats, likely population density within the area, potential depth and length of existing burrow systems and potential to relocate, given large degree of wombat habitat in surrounding area.

21. Consult with DSEWPaC regarding the need to submit an EPBC referral for the Orange – bellied Parrot and the Little Dip Spider Orchid for any clearing required in Section 285. It is unlikely that a referral would be required for Allotment 2 and 72, given the current condition and proximity to residential area, however it suggested that consultation with DSEWPaC be undertaken to avoid any delays in future development plans.

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