Construction Environmental Management Plan

PROPOSED GOLF COURSE EXTENSION

Robe Golf Club Incorporated

Allotment 3, Allotment 148 and Section 133, Hundred of Waterhouse, Robe

Prepared by:

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And

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1.0 PROJECT DESCRIPTION

Robe Golf Club wish to develop the golf course with additional golf holes to complete an 18 hole championship standard golf course, which assists in the provision of the recreational and social needs of the Robe community.

Robe Golf Club has engaged golf course architects Crafter and Mogford Golf Strategies, to provide design advice regarding the expansion of the golf course. The design of the golf course expansion as prepared by Crafter and Mogford Golf Strategies and dated 23 January 2017 has the following elements:

1. Concept plan for four complete new golf holes within Allotment 3, namely holes 8, 9, 10 and 11.

2. Portion of a new golf hole 7 within Allotment 3 and in part on the existing golf course and on private land namely Section 133.

3. A new golf hole, shown as hole 12, over portion of private land of Section 133 and Allotment 148 and within portion of Allotment 3.

4. Retention of the two former WWII radar huts within the golf course.

5. Construction of holes over existing topography of land, no major earthworks will take place within the cleared fairway corridors apart from some minor levelling for tees and minor reshaping of greens sites.

6. fairways will have existing small scale undulations retained post clearing with the use of a small size bunker raking machine to smooth these fine contours.

7. Retention of existing vegetation between golf holes.

8. Weed management of existing vegetation and revegetation of areas outside of fairway and primary turf areas.

9. Irrigation of fairways and primary turf areas.

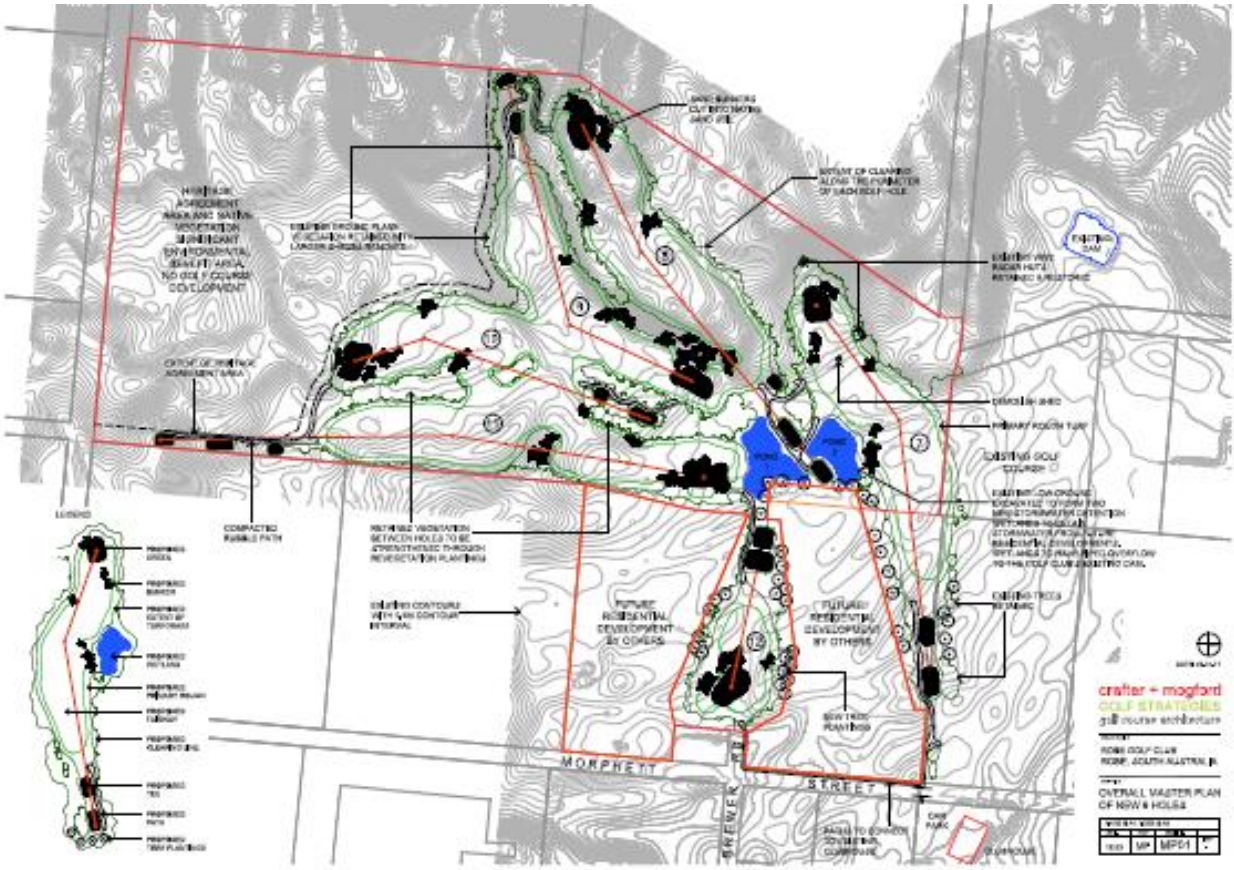
10. Inclusion of stormwater ponds as design features and for stormwater management for future adjacent residential development.

11. Inclusion of fencing to restrict access to sensitive areas.

12. Paths designed and located to minimise effects on native vegetation by golfers and motorized golf carts, by:

    - clear signage designating paths;
    - paths following contours;
    - utilisation of road reserves;
    - minimising width of paths;
    - utilising compacted rubble on paths; and
    - motorised golf carts will have access limited to fairways and prescribed paths.

As shown on the Site Plan, the proposed golf course extension is proposed over portion of Allotment 3, portion of Section 133 and portion of Allotment 148.



2.0 SUBJECT LAND

2.1 Legal Description

The subject land comprises:

ALLOTMENT/SECTION	CERTIFICATE OF TITLE	SIZE	OWNERSHIP
Allotment 3, DP 112925 Hundred of Waterhouse	Volume 6180 Folio 821	21.4 hectares	Robe Golf Club Incorporated
Section 133, Hundred of Waterhouse	Volume 5253 Folio 358	3.24 hectares	Robe Country Club Pty Ltd
Allotment 148, Hundred of Waterhouse	Volume 5674 Folio 450	2.97 hectares	S G & N G Clements

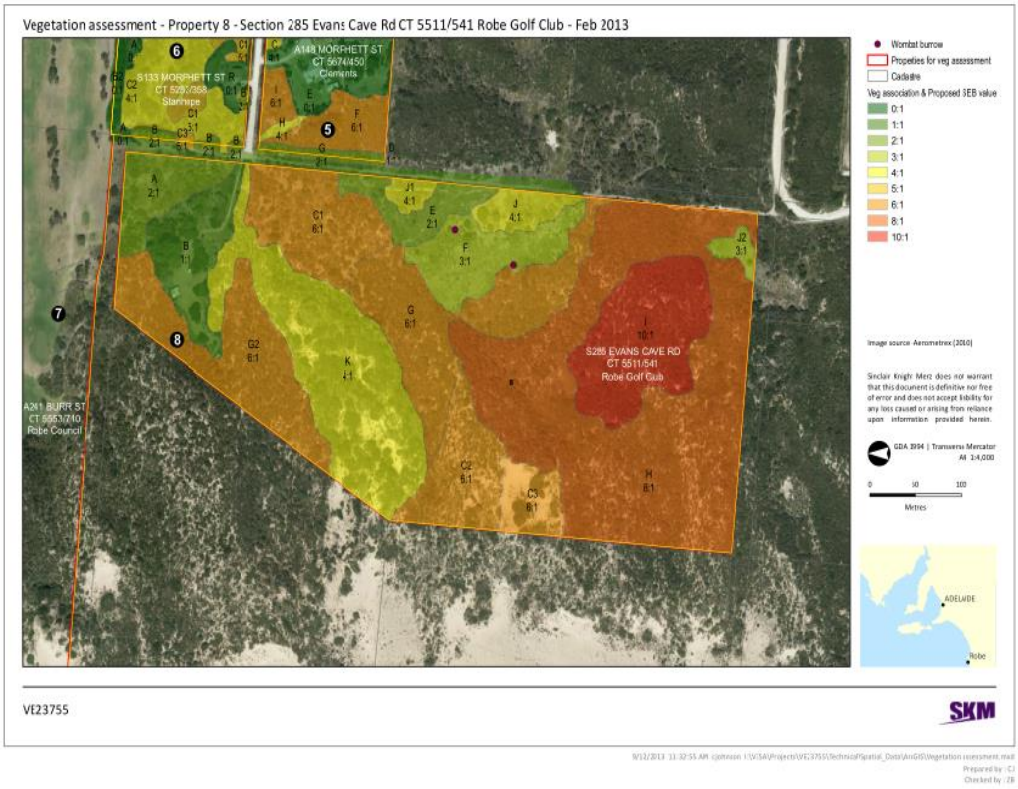
2.2 Project Region

A detailed assessment of the subject land was undertaken by SKM Jacobs. The SKM report formed the basis of the native vegetation application for clearance of native vegetation within the subject land to facilitate the golf course extension ('SKM Vegetation Assessment: Robe Golf Club and Surrounds Final, dated 10 December 2013'). Vegetation was assessed using BushRat methodology (DEWNR, 2013) and the subject land was described as follows:

2.2.1 Assessment of Section 285 (Now Allotment 3)

Section 285 was broadly described in the SKM report as:

> *"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" (page Section 5.1 page 17)."*



Extract from SKM Report – Appendix 2

Section 5.3.1 of the SKM report includes the following detailed assessment of Section 285.

> *"Section 285 comprises a coastal sand dunes system and sandy swales that support a patchy 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."

The following table has been extracted from the SKM report.

Table 1 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	Milkwort, False Caper, Brome Grass	BRC	17	7

Community / condition class	~ Area (Ha)	Description	Highly invasive Weeds or dominant	Sites	Native Species	Exotic Species
		Moderately dense canopy Patchy litter layer No orchids present	Hare Tail Grass	BRE	16	6
			False Caper, Hare Tail Grass	BRF	11	3
				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

The following extracts from the SKM December 2013 report describe the identified communities.

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 2).

Plate 1 Dense old-growth tall shrubland

Plate 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.

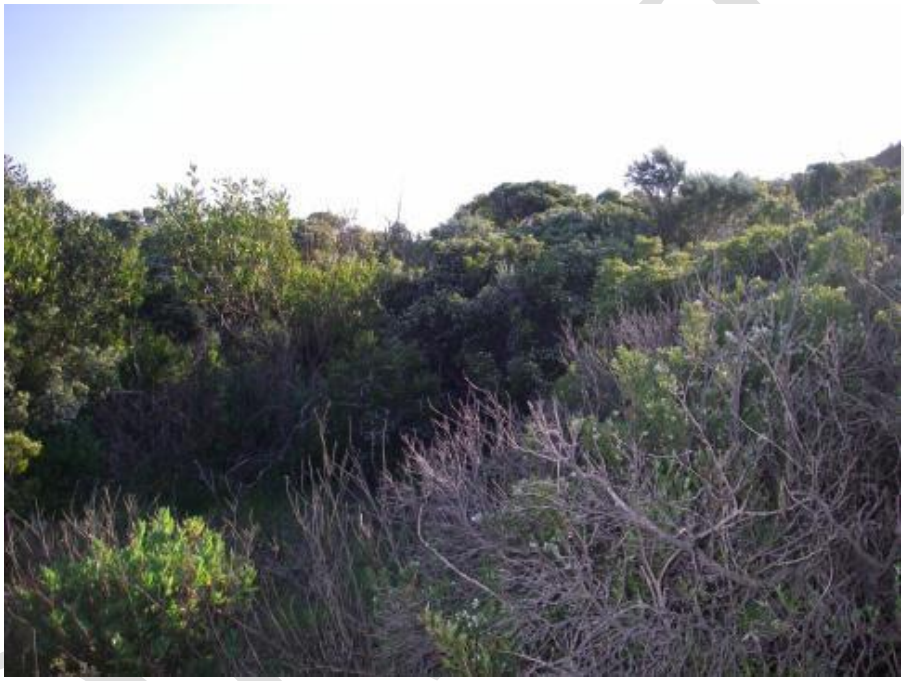


Plate 2 Sand dunes supporting coast tall shrubland in moderate condition with reduced height of shrub layer and lacking dense litter levels

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.

Plate 3 Dune foot slopes and sandy swale with reduced shrub cover and exotic grasses dominant in the understorey

Plate 4 Coastal shrubland in poor condition – vehicular tracks are common throughout

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 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 6 Cleared areas with scattered patches of native shrubs and understorey of exotic grasses

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

2.2.2 Assessment of Section 133

Section 5.3.2 of the SKM report notes that the property has previously been cleared, currently contains two residential properties and exotic pine trees on two boundaries. The vegetation was assessed as very poor to moderate.

The report includes the following summary of Section 133, in relation to defined subsections A/A2, B/B2, C1, C2, C3 and R – residential area.

Extract from SKM Report – Appendix 2

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, Kikuyu, 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), and Pigface (Carpobrotus modestus)*

Area B *comprises highly disturbed coastal shrubland with planted exotic Cypress 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.*

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 overstorey, 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), Cocksfoot (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.

2.2.3 Assessment of Allotment 148

Section 5.3.2 of the SKM report notes that this allotment contains residential uses and large areas that have been disturbed or cleared in the past. The allotment has defined subsections A, B, C, D, E, F, G, H, I and have been assessed as follows.

Extract from SKM Report – Appendix 2

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*

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.*

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.*

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.

***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).

***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'.*

***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.

3.0 CONSTRUCTION ENVIRONMENT MANAGEMENT PLAN

3.1 Objective of the CEMP

The objective of the CEMP is to describe the potential environmental issues related to the proposed works and the measures which will be undertaken to manage or mitigate any detrimental impacts. The key environmental issues associated with construction of the golf course extension are:

- Air Quality and Dust Control;
- Cultural Heritage and Archaeology;
- Water Quality, Erosion and Sedimentation (SEDMP);
- Storage, Hazardous Substances and Materials;
- Noise;
- Traffic;
- Weeds and pest management; and
- Flora and fauna.

This CEMP provides guidance in relation to:

- minimising environmental impacts during site works;
- identification and implementation of measures to minimise potential impacts to offsite receptors during earthworks, importation and removal of soil; and
- establishing and implementing practices to inform site workers regarding potential environmental impacts and agreed procedures to mitigate impacts

3.2 Environmental Management Structure and Responsibility

The implementation of this CEMP is the responsibility of the Robe Golf Club Incorporated and its contractors. Robe Golf Club may at times delegate responsibility for individual items to its sub-contractors; however, retains overall responsibility for implementation of this CEMP and any changes required should the understanding of site conditions change.

A Site Supervisor will be appointed who is responsible for the implementation of the CEMP, the implementation of mitigation measures in the event of non-conformances and conducting site inspections on a daily basis.

The construction contractor will be responsible for emergency response and incident management during the construction process. The likelihood of emergencies is considered to be minimal and similar to other infrastructure and earthmoving contracts undertaken by the construction contractor.

3.3 Minimum Management Obligations

Unless otherwise stated, the following minimum obligations apply to the development area.

Essential commitments

The following are to be complied with at all times:

- no fertiliser application or artificial feeding within areas outside of the proposed clearing line;
- no soil disturbance outside of the proposed clearing line;
- no cropping;
- no dumping of rubbish, unwanted machinery or plant material;
- no new dams or drainage alterations, other than ponds for stormwater management;
- no rock removal outside of the proposed clearing line; and
- no unnecessary vehicle access (beyond that which is required to manage the biodiversity value of the site).

Grazing of native animals

Control of native herbivores (e.g. kangaroos) must be conducted under permit from the SA Department for Water, Environment and Natural Resources.

Controlling Declared Pests

Control and, if possible, eradication of declared plants and animals pursuant shall be undertaken pursuant to section 174(1) of the *Natural Resources Management Act 2004*. All weed and pest control methods must:

- minimise off target damage;
- minimise soil disturbance; and
- comply with the *Native Vegetation Act* 1991 and the *Natural Resources Management Act 2004.*

Supplementary planting

All supplementary planting must be:

- with species indigenous to the local area;
- seed or plant material collected from as close as possible to the planting site; and
- representative of the structure and composition of the pre-European vegetation community.

Stock grazing

Stock are to be permanently excluded from the development area at all times.

Fencing

Where fencing is only to standard to delineate the location of the Heritage/SEB Area outside of the site of the development of the golf holes (e.g. one plain wire fence) or there is an unfenced boundary (e.g. a site borders a conservation reserve), the boundary needs to be monitored for stock access.

If stock are able to access the area at any time, a fence will need to be constructed or upgraded. Such fencing must be maintained in a stock proof condition.

Standing/fallen timber

Standing and fallen timber are important habitat for a range of native plant and animal species and their retention in areas other than the fairways and primary rough is required. Woodcutting for firewood or fence posts is not permitted.

Fire prevention

All reasonable steps will be taken to prevent fire on their land. All works must be compliant with the *Native Vegetation Act 1991* and the *Natural Resources Management Act 2004*.

3.4 Golf Course Construction Techniques

Techniques to be engaged during the construction of the golf course include:

- initial construction of golf holes occurring in the Autumn period, extending into Winter and complete by Spring;
- 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;
- 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. Further, this also allows a more natural appearance of the clearing edge rather than an artificial straight line, thereby improving visual amenity;
- construction of the irrigation system. It is proposed that the irrigation would be put in place by clearing a construction line along the centre line of the golf holes prior to the final vegetation clearance. The irrigation capability is important to minimise the sand erosion hazard. At the time of proposed construction, the availability of water from the common effluent ponds is at its maximum and will be supplemented by seasonal rainfall;
- prior to starting works on new golf holes, previous holes will have irrigation operational and sowing/laying/planting of turfgrass completed;

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

- disposal methodology of cleared vegetation will be discussed further with 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 will also be collected to propagate local provenance plants for replanting around the golf course and any future residential developments that may be integrated with the golf course. Care will need to be taken to avoid seed spread from present exotic species;

- undertake weed control of retained patches of vegetation, particularly in Allotment 3 (Section 285) and provide a buffer from edge effects of existing areas of poorer quality (e.g. road reserves);

- fencing of the southern portion of Allotment 3 which is to be included in a Heritage Agreement to restrict access;

- fence vegetation that is retained to allow regeneration and to protect wombat burrows (where appropriate). Use fencing with one or two wire lines will allow local fauna free access;

- dune stabilisation fencing (including log and wire fencing and access control) with shade cloth or similar adjacent any areas adjacent exposed dunes;

- sand bunkers constructed during the development of the fairways would be shaped as part of the construction process of each hole and each bunker would be hydroseeded as part of the turfing process to prevent sand erosion during establishment. After grow-in of each hole is completed and the hole is being readied for golfer play, the grass within each bunker can be then removed;

- sustainable irrigation systems will be installed. Minor trenching approximately 600 millimetres in depth is required for this installation. The system will be designed with perimeter half-circle sprinklers to irrigate away from adjacent native vegetation at the edges of the maintained golf holes. Irrigation water will be acquired from the effluent ponds to the south of Allotment 3. Currently there are easements for drainage (irrigation) from the effluent ponds to the existing golf course within Allotment 3. The existing trenches would be utilised and extended as required;

- following the final installation and commissioning of the irrigation system, all golf features are to be fine finished in preparation for turfing;

- turfing is a process where stabilising species will be initially planted before the final desired species are established. For example, the fairways will be over-sown with perennial rye-grass and cereal rye to minimize wind erosion;

- Final Turf is proposed as follows:

  - golf fairways: to be row planted with couch grass;
  - roughs: hydroseeded with a mix of fescues / couch/rye grass (or as suitable easily established grasses); and
  - greens: turf will be laid or hydro-seeded with bent grass;

- perimeters to golf holes will incorporate native dune grasses (e.g. *Austrodanthonia* and Coast Sword Sedge) and low plant species (eg Muntries) using only local provenance species. Local indigenous plants will be sourced from local nurseries, such as Teeluk Nursery (Kingston);

- establish turfgrass and grow-in with regular irrigation, mowing, fertilizing and top-dressing as required; and

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

3.5 Environmental Aspects

The potential environmental impacts along with mitigation strategies to minimise potential impacts are outlined below.

3.5.1 Air Quality and Dust Control

Air Quality and Dust Control	
Objective	Avoid and/or minimise air quality impacts during construction.
Legislation/Policy	*Environment Protection Act 1993.* *Environment Protection Regulations 2009.* *Environment Protection (Air Quality) Policy 1994.*

Potential Impacts	Dust from earthmoving (excavation and filling) of the golf course holes. Exhaust fumes from construction vehicles.
Mitigation	Construction of golf holes occurring in the Autumn period, extending into Winter and complete by Spring. Stagger hole development. Install irrigation system prior to hole construction. The development does not involve haulage of fill material, but rather shaping of landform. Stockpiling will be minimised. Stockpiling of material cut will be short-term (maximum of 2 weeks). Any stockpiled material will be fenced with temporary fencing to minimise windblown material to the urban areas of Robe. Works that are likely to generate dust will cease when conditions are dry or windy to the extent they would release dust off site. Dust controls would include the use of suppressants including water spraying as required. Water spraying would extend to driveways, stockpiles and the golf holes, as required. All vehicles and equipment operated on the site will comply with regulatory emission standards.

3.5.2 Cultural Heritage and Archaeology

There are no items of European or Indigenous heritage significance on the subject land.

Cultural Heritage and Archaeology	
Objective	Manage the works to prevent or minimise impacts to sites or artefacts of indigenous heritage.
Legislation/Policy	*Native Title (South Australia) Act 1994.* *Aboriginal Heritage Act 1988.* *Heritage Act 1993.* *Heritage Places Act 1993.*
Potential Impacts	Damage to sites or artefacts of indigenous heritage.
Mitigation	Should any archaeological occurrences be located during the course of the works the Robe Golf Club and the construction contractor must report such an occurrence to the appropriate Aboriginal organisations and AARD in accordance with *the Aboriginal Heritage Act 1988.* All work is to cease that may negatively impact on the sites integrity until it has been assessed by an appropriately qualified Cultural Heritage professional with representation from the Indigenous recognised Aboriginal stakeholders.

3.5.3 Water Quality, Erosion, Sand Dune Drift

Water Quality, Erosion, Sand Dune Drift and Sedimentation	
Objective	Minimise erosion and sediment laden stormwater from leaving the site. Minimise erosion of sand dunes and drift of dunes. Protection of vegetation to minimise potential erosion and sand dune drift.
Legislation/Policy	*Environment Protection Act 1993.* *Environment Protection Regulations 2009.* *Environment Protection (Water Quality) Policy 2003.* *Stormwater Pollution Prevention, Code of Practice for the Building and Construction Industry.*
Potential Impacts	Soil erosion can create scarring of the landscape, contaminate watercourses, lead to loss of vegetation and damage infrastructure. Contamination of surface water, including stormwater systems and public nuisance due to soil and materials on public roads.
Mitigation	Stagger construction of golf holes and clearance of vegetation. Minimise vegetation loss to within the proposed 'clearing line'. Earthworks for cleared fairway will be limited to minor levelling for tees and minor reshaping of greens sites. Avoid earthworks and vegetation clearance on elevated western dunes.

	Avoid vehicle movement on elevated western dunes during construction and post construction. Locate and construct pathways following contours and not on exposed elevated western dunes. Stabilise exposed areas of western dunes via revegetation with indigenous species. Utilise existing driveways and former road reserves on site for movement of vehicles during construction. Restrict vehicle access (including golf buggies) to elevated western dunes. Erect dune stabilisation fencing (including log and wire fencing and access control) with shade cloth or similar adjacent any areas adjacent exposed dunes. Any new driveways that are required will be constructed with appropriate all weather surface treatment for utilisation during construction. Implement sediment controls, such as sediment fencing, hay bales filters, diversion swales and sediment basins, to minimise risk of sediment from earthworks exiting the site. Stabilise the cleared/constructed golf holes via turfing, which is a process where stabilising species are planted before the final desired species are established. For example, the fairways will be over-sown with perennial rye-grass and cereal rye to minimise wind erosion prior to sowing of final turf species. Prior to leaving site, any vehicles driving on the public road should have tyres, wheel arches and tailgates brushed down of dirt or mud. Given the earthworks does not require movement of materials to and from

	the site, it is unlikely that additional treatment of vehicles would be required.

The development is to be undertaken in accordance with the Soil Erosion and Drainage Management Plan and Construction Phase/Irrigation Plan (to be completed and approved prior to construction).

3.5.4 Storage, Hazardous Substances and Materials

Storage, Hazardous Substances and Materials	
Objective	Avoid and/or minimise impacts associated with the release of hazardous substances or materials.
Legislation/Policy	*Environment Protection Act 1993.* *Environment Protection Regulations 2009.* *EPA Guidelines for Bunding and Spill Management.*
Potential Impacts	Contamination of the environment with hazardous substances and/or materials.
Mitigation	Storage of hazardous materials is not proposed during construction of the development. Emergency procedures in the event of a spill of fuel during construction will be documented. Spill kits will be located on site to be used in the event that there is an incident associated with the operation of the airbase and appropriate personnel will be trained in the use of this equipment.

3.5.5 Noise

Noise	
Objective	Avoid and/or minimise noise and vibration emissions during construction works.
Legislation/Policy	*Environmental Protection Act 1993.* *Environment Protection Regulations 2009.* *Environment Protection (Noise) Policy 2007.* *AS2436 – 1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites.*
Potential Impacts	Noise pollution leading to loss of amenity for adjoining residents. Vibration from movement of large machinery and compaction creating nuisance to adjoining residents.
Mitigation	Ensure all equipment is well maintained. Restrict hours of work to 9am to 6pm on Sunday or other public holidays and 7am to 6pm on any other day. If generators or such noisy machinery is utilised, locate this equipment as far as practical from the nearest residential premises not located on the site. Plant and equipment not in use to be shut down. Maintain complaints register and respond to any complaints received. Construction activities to be undertaken must be compliant with requirements of Environment Protection (Noise) Policy 2007.

3.5.6 Traffic

Traffic	
Objective	Avoid and/or minimise impacts associated with construction traffic moving to and from the site on nearby sensitive receptors including residential dwellings and/or wildlife.
Legislation/Policy	*Road Traffic Act 1961.* *Road Traffic (Road Rules – Ancillary and Miscellaneous Provisions) Regulations 1999.*
Potential Impacts	Disturbance to nearby sensitive receptors including residential dwellings and/or wildlife along the route to and from site. Possible property damage through vibration impacts along haul route to and from construction site. Accelerated deterioration of local road network. Increased potential for wildlife vehicle strike on haul roads to and from site.
Mitigation	Utilise local sealed roads (as far as practicable) for transportation of vehicles to and from the site. Minimise movement of construction vehicles to and from the site outside of the hours of 7am to 6pm.

3.5.7 Weeds and pest management

Weeds & Pest Plants	
Objective	Avoid the spread of weeds and pest plants.
Legislation/Policy	*Native Vegetation Act 1991.* *Native Vegetation Regulations 2003.* *Environment Protection and Biodiversity Conservation Act 1999.* *Natural Resources Management Act 2004.* *National Parks and Wildlife Act 1972.*
Potential Impacts	Potential spread of weeds and pest plants.
Mitigation	Any controlled weeds and pest plants within the development site to be removed or destroyed prior to construction commencing. Should any controlled weeds or pest plants be identified, prevent their transmission by vehicles by cleaning vehicles before exiting the site. Any incoming or outgoing material will be checked for pest or weed species prior to being transported to and from the subject site. Locate equipment and materials storage areas in locations devoid of native vegetation. Replacement/rehabilitation of disturbed pasture immediately following earthworks works.

3.5.8 Flora and fauna

Flora and Fauna	
Objective	Minimise impacts to flora and fauna including vegetation clearance and to manage the works so as to avoid damage to retained vegetation and fauna.
Legislation/Policy	*Native Vegetation Act 1991.* *Native Vegetation Regulations 2003.* *Environment Protection and Biodiversity Conservation Act 1999.* *Natural Resources Management Act 2004.* *National Parks and Wildlife Act 1972.*
Potential Impacts	Potential impact of construction works on native vegetation located within the locality of the construction area. Potential disturbance to fauna located in areas to be cleared. Potential disturbance to fauna residing in habitats adjacent works area. Potential increase in prevalence of pest animals.
Mitigation	Minimise the development footprint of the golf holes. Undertake removal of native vegetation in accordance with approval granted *under Native Vegetation Act 1991.* Vegetation to remain following construction should be protected from damage through fencing during the construction phase.

	Locate equipment and materials storage areas in locations devoid of native vegetation. All rehabilitation to be undertaken in accordance with Native Vegetation conditions. Avoid and/or relocate fauna effected by the construction. Fence vegetation that is retained to allow regeneration and to protect wombat burrows (where appropriate). Use fencing with one or two wire lines will allow local fauna free access. Provide sealed bins for site waste to discourage pest fauna from foraging on the site. Minimise noise, vibration and air quality impacts to prevent disturbance to fauna residing adjacent works area.

3.6 Active Management

This section details the specific management activities that will be undertake during construction and over a period of 5 years to improve and maintain the condition of the native vegetation within the development area.

3.6.1 Action Table

This table lists the **management threats/issues** for the development area, their 5 year **objectives** (i.e. the intended outcomes upon completion of the active management period), **actions to be undertake to address them** and the **timing** of those actions. *A summary of weed control methods is included in Appendix 3.*

Threat/issue	**10-yr objective**	**Proposed actions**	**Timing**
Polygala myrtifolia *(Myrtle-leaf Milkwort)*	Substantially reduce weed infestation	Remove isolated plants first. Hand pull or dig out seedlings and small plants in winter or spring, removing the entire root. Spot spray when plants have good foliage cover. Spot spray is most effective on seedlings, plants under 2m and fresh regrowth. For mature plants, cut as close as possible to the ground and paint the base with herbicide or drill and fill. Apply when there is good foliage cover. Follow up treatment may be required	Ongoing
Asparagus asparagoides (Bridal Creeper)	Substantially reduce weed infestation	Enhance the effectiveness of the introduced biological control rust fungus with spore water when the Bridal Creeper is actively growing. Use other biological controls when available. **Where there are dense infestations spot spraying will be undertaken**	Winter - spring
(Lycium ferocissimum) *African Boxthorn*	Eradicate weed infestation	Remove isolated plants first. Hand pull or dig out seedlings and small plants in winter or spring, removing the entire root. Spot spray when plants have good foliage cover. Spot spray is most effective on seedlings, plants under 2m and fresh regrowth. For mature plants, cut as close as possible to the ground and paint the base with herbicide Follow up treatment may be required	Ongoing
Euphorbia terracina (False Caper)	Reduce and control the population	Large individual weeds should be hand pulled where possible. Due to the prevalence of these species in the area spot spraying will be the main method of control.	Spring and summer

Sonchus spp. (Sowthistle) *Sisymbrium orientale (Mustard)*			
Kikuyu and couchgrass	Stop the ingress of exotic turfgrass into native vegetation area	Maintain a control line with herbicide between the established rough adjacent to the fairways and the native vegetation	Ongoing
Rostraria pumila (Tiny Bristle-grass) *Lagurus ovatus* (Hares Tail grass) *Euphorbia peplus* (Petty spurge)	Reduce and control the population	Minor weeds such as these listed generally grow on open and disturbed ground. The main areas of these weeds occur where the fairways will be established. Revegetation of the remnant areas between the golf holes will help control this category of weeds with competition. Where major numbers occur spot spraying will be used.	Ongoing
Rabbits	Reduce and control the population	Bait with either 1080 or Pindone poison bait. Three free feeds (oats with no poison) will be laid prior to baiting, with a three or four day interval between each feed. Baits will be laid within the rabbit feeding areas.	Ongoing
Pinus sp (Radiata Pine and Aleppo Pine)	Eradicate weed infestation	Remove isolated plants first. Hand pull or dig out seedlings and small plants in winter or spring, removing the entire root. Spot spray when plants have good foliage cover. Spot spray is most effective on seedlings, plants under 2m and fresh regrowth. For mature plants, cut as close as possible to the ground and paint the base with herbicide or drill and fill. Apply when there is good foliage cover. Follow up treatment may be required	Ongoing
Cypress Pine	Eradicate weed infestation	Remove isolated plants first. Hand pull or dig out seedlings and small plants in winter or spring, removing the entire root. Spot spray when plants have good foliage cover. Spot spray is most effective on seedlings, plants under 2m and fresh regrowth. For mature plants, cut as close as possible to the ground and paint the base with herbicide or drill and fill. Apply when there is good foliage cover. Follow up treatment may be required	Ongoing

Scale insects affecting marginal and solitary vegetation	Control pest for health of vegetation	Isolated plants and plants at the margins, particularly Sea Box and Coastal Beard Heath, are susceptible to scale insect attack and will be addressed with pest oil application.	Ongoing
Cassytha spp. (Laurel Dodder)	Control the population	While Cassytha is a native species it can locally take over and smother areas of vegetation that seriously affects plant survival. Currently physical i.e. manual removal is the only recognised measure of control but selective herbicide control is being investigated.	Ongoing
Lack of vegetation	Improve native vegetation density in areas retained within the development area. Manage minor areas of moving sand on dune crest	A committed program of native vegetation enhancement will be undertaken in the overall development of the golf course and the protection of the heritage area at the surrounding area of the planned golf course. This will involve weed management but also an ongoing tubestock planting program of locally sourced species appropriate to the immediate plant association in which the planting occurs. There is at least one minor area of blown sand at the crest of the dune between the planned 8th green and the 9th tee. This will be addressed with sand stabilisation measures. There may be opportunities to undertake work with the local Coastcare Group on the area immediately west of Allotment 3 (Section 285) to stabilise sand movement that may encroach onto Allotment 3.	Ongoing
New weeds or pests	Prevent any new weeds or pests becoming established.	Monitor sites for any new weeds or pests. If observed, receive advice and subsequently plan and implement a control program.	Ongoing

3.7 Revegetation

This table describes the objectives of the revegetation, the species to be planted, the means of planting (tubestock or direct seeding) and the intended densities to be established.

Intended revegetation goal / objectives			
Maintain and enhance the remnant areas of vegetation within and adjacent to the planned development of the golf course. Species enhancement will be relevant to the immediate plant association in which the enhancement is undertaken. Tubestock will be the major method of enhancement.			
Botanical Name	**Common Name**	**Direct-seed or tube stock? D/T**	**No. of plants to be established (whole of site or per Ha)**
CANOPY			
Bursaria spinosa	Christmas Bush	T	As required
Myoporum insulare	Boobialla	T	As required
SUBCANOPY			
Alyxia buxifolia	Sea Box	T	As required
Leucopogon parviflorus	Coast Beard-heath	T	As required
Olearia axillaris	Coast Daisy-bush	T	As required
SHRUB LAYER			
Adriana quadripartite	Coast Bitter-bush	T	As required
Rhagodia candolleana	Seaberry saltbush	T	As required
GROUND LAYER			
Lepidosperma gladiatum	Coast Sword-sedge	T	As required
Ficinia nodosa	Knobby Club-rush	T	As required
Kunzea pomifera	Muntries	T	As required

3.8 Works Calendar

		Year of management plan implementation									
Threat/issue	**10 Year management objective**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Human Traffic	Maintain vegetation vigour with restrictive access and enhancement program		x	x	x	x	x	x	x	x	x
Sand drift	Rigorous monitoring and control programs will be top priority	x	x	x	x	x	x	x	x	x	x
Rabbits	Undertake eradication program	x	x	x	x	x	x	x	x	x	x
Milkwort, Boxthorn, Pine trees and woody weeds	Maintain eradication and control programs	x	x	x	x	x	x	x	x	x	x
Kikuyu and Couchgrass	Maintain herbicide control line adjacent to native vegetation	x	x	x	x	x	x	x	x	x	x
Lack of vegetation on retained areas between fairways	Protect sensitive areas and maintain active enhancement program		x	x	x	x	x	x	x	x	x
Scale insect infestation	Monitor outbreaks and control	x	x	x	x	x	x	x	x	x	x
Cassytha and Tetragonia spp	Monitor and control where these species where they are smothering vegetation	x	x	x	x	x	x	x	x	x	x
Golf Cart Access	Strict access regulations around use will be enforced		x	x	x	x	x	x	x	x	x

Broadleaf weeds (bridal creeper, mustard, sow thistle, etc.)	Regular monitoring and eradication with regular control measures	x	x	x	x	x	x	x	x	x	x
New weeds and pests	Monitor areas to prevent establishment	x	x	x	x	x	x	x	x	x	x
Managing Adjacent Heritage Area	Compliance with Management Plan	x	x	x	x	x	x	x	x	x	x

3.9 Management Plan Map

This map delineating the extent of development area, any existing infrastructure within the area (e.g. fences or watering points), the location of management issues (e.g. weeds infestations, rabbit warrens, Phytophthora infestations, unfenced boundaries or rubbish dumping) and the location of works to be undertaken (e.g. fences to be constructed or upgraded or revegetation to be undertaken).

** To be completed and approved with final CEMP ****