

Randell Park Vegetation Assessment

### Version 2

## Prepared by EBS Ecology for City of Mitcham Council

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Front cover photo: Grey Box Woodland, Randell Park.



## **ABBREVIATION OF TERMS**

DEWNR	Department of Environment, Water and Natural Resources (previously known as DENR)
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
EBS	EBS Ecology
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
NV Act	Native Vegetation Act 1991
NVC	Native Vegetation Council
SEB	Significant Environmental Benefit
ssp.	subspecies
spp.	species (plural)
TEC	Threatened Ecological Community
WONS	Weed of National Significance (as listed by the Australian Government)



## **EXECUTIVE SUMMARY**

EBS Ecology was contracted by the City of Mitcham Council to undertake a vegetation assessment within Randell Park, to assist the design and planning of a proposed shared use trail network within the park.

The assessment consisted of three components:

- determine if the areas of *Eucalyptus microcarpa* (Grey Box) Grassy Woodland and derived Native Grasslands qualified as the nationally threatened ecological community (TEC) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- assess the vegetation type and condition along proposed trail alignments and calculate Significant Environmental Benefit (SEB) offset requirements for potential vegetation clearance under the *Native Vegetation Act 1991* (NV Act).
- assess the vegetation type and condition of three general areas under the requirements of the NV Act.

The dominant overstorey within the park was *Eucalyptus microcarpa* (Grey Box). All areas containing *Eucalyptus microcarpa* (Grey Box) and derived native grasslands meet criteria for listing as the nationally threatened ecological community.

Should future works be undertaken that may impact on the EPBC Act listed threatened ecological community, an EPBC Act referral may be required. Advice should first be sought from the Department of the Environment (DOE).

Seven different vegetation associations with varying condition ratings were identified during the assessment. The Burnell Connector survey area and trail alignment contained *Eucalyptus microcarpa* woodland with a 4:1 SEB condition rating. The East Ridge Connector alignment contained four different vegetation associations:

- Eucalyptus microcarpa woodland, with a SEB condition rating varying from 4:1 to 5:1
- Eucalyptus leucoxylyn woodland, with a SEB condition rating of 4
- Exotic Pinus halepensis forest, with a SEB condition rating varying from 0:1 to 1:1
- Eucalyptus microcarpa woodland +/- Eucalyptus leucoxylon and +/- Pinus halepensis, with a SEB condition rating of 4:1

The Grassland Contour Link contained two vegetation associations; mixed plantation with a SEB condition rating of 0:1 and mixed native plantation, with a SEB condition rating of 1:1. Finally, the Cliff Top Link contained two vegetation association; *Eucalyptus microcarpa* low woodland, with a SEB condition varying from 5:1 to 6:1 and *Eucalyptus microcarpa* woodland with a SEB condition varying from 6:1 to 7:1.

The total SEB offset required for the proposed clearance of vegetation along the surveyed trail alignments is 2.26 hectares or \$26,412 payment into the Native Vegetation Fund.

Applications to clear native vegetation must be submitted to Native Vegetation Council (NVC) and the Department of Environment, Water and Natural Resources (DEWNR) for assessment (DEWNR 2012).



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## **1** INTRODUCTION

### 1.1 Objectives

EBS Ecology was contracted by the City of Mitcham Council in November 2013 to undertake a vegetation assessment within Randell Park. The assessment was intended to assist the Council in the design and planning of a proposed shared use trail network. The assessment consisted of three components:

- Part one determine if the vegetation within Randell Park qualified as the *Eucalyptus microcarpa* Grassy Woodlands and derived Native Grasslands threatened ecological community.
- Part two assess the vegetation association and condition along the proposed trail alignment and assign SEB values for potential vegetation clearance. Areas of erosion potential were also noted.
- Part three assess the vegetation association and condition of three general areas under the requirements of the NV Act.

### 1.2 Project area

Randell Park is a recreational park, located approximately seven kilometres south to south-east of the Adelaide Central Business District within the City of Mitcham Council area (Figure 1). A significant portion of the Park is made up of Bush for Life conservation sites, with a series of trails running through the area. The park's approximate boundaries are:

- Anderson Avenue and Parkers Road to the west
- Old Belair Road to the north and east
- Belair Road to the south.





Figure 1 Showing location of Randell Park, Mitcham SA



## 2 COMPLIANCE AND LEGISLATIVE SUMMARY

### 2.1 Environment Protection and Biodiversity Conservation Act 1999

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

- World Heritage properties
- National Heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and ecological communities
- migratory species protected under international agreements
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions (including uranium mines).

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

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

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



### 2.2 Native Vegetation Act 1991

Any clearance of native vegetation in South Australia (unless under exemption) needs approval from the Native Vegetation Council (NVC). Under the *Native Vegetation Act 1991* (NV Act), the NVC considers applications to clear native vegetation under ten principles. Native vegetation should not be cleared if it is significantly at odds with these principles:

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



# 3 METHODS

## 3.1 Field survey

The field survey was undertaken by Julia Bignall and Erin Barber on the 11<sup>th</sup> and 12<sup>th</sup> of November. The survey was conducted during spring to optimise the biodiversity assessment of the site.

The survey consisted of three components:

- 1. Threatened ecological community assessment within two 20 x 20 m quadrats selected for high native species richness
- 2. Trail corridor vegetation survey along the East Ridge Connector (1000 m) and the Burnell Connector (260m) to five metres either side of the flagged alignment
- Ramble vegetation survey throughout the Cliff Top Link area (1009 m<sup>2</sup>), Burnell Connector area (1032 m<sup>2</sup>) and Grassland Contour Link (299 m<sup>2</sup>).

The locations of the survey areas and TEC assessment quadrats are shown in Figure 2.





Figure 2 Locations of survey areas and TEC assessment quadrats



#### 3.1.1 Part one – Threatened ecological community assessment

The following steps were taken to determine if the area met criteria for listing as the *Eucalyptus macrocarpa* Grassy Woodlands and derived Native Grasslands threatened ecological community under the EPBC Act.

#### <u>Step 1:</u>

Use the key diagnostic characteristics to determine whether the community qualifies as a *Eucalyptus microcarpa* Grassy Woodland.

The key diagnostic characteristics are:

- 1. In South Australia the community must occur in the Flinders-Lofty Block Bioregion
- 2. The structure of the ecological community is typically Woodland to Open Forest.
- The tree canopy is dominated (≥ 50% canopy crown cover) by Eucalyptus microcarpa (Grey Box). Other tree species may be present in the canopy and, in certain circumstances, may be co-dominant with Grey Box but are never dominant on their own.
- 4. The mid layer comprises shrubs of variable composition and cover, from absent to moderately dense. The mid layer usually has a crown cover of less than 30% with local patches up to 40% crown cover.
- 5. The ground layer also is highly variable in development and composition, ranging from almost absent to mostly grassy to forb-rich. Ground layer flora commonly present include one or more of the graminoid genera (Grass family): *Austrodanthonia, Austrostipa, Elymus, Enteropogon, Dianella* and *Lomandra*; and one or more of the chenopod genera: *Atriplex, Chenopodium, Einadia, Enchylaena, Maireana, Salsola* and *Sclerolaena.*
- Derived grasslands are a special state of the ecological community, whereby the canopy and mid layers have been mostly removed to <10% crown cover but the native ground layer remains largely intact, with 50% or more of the total vegetation cover being native.

#### Step 2:

Use the Condition Thresholds (Figure 3) to determine whether the patch qualifies as a Nationally Threatened Ecological Community.

The assessment process involves the selection of a sampling site for the patch considered to contain the *Eucalyptus microcarpa* Grassy Woodland ecological community. According to the EPBC Listing Advice, "The area with the most apparent 'richness' of native species in the understorey should be selected to determine estimates of native species richness and cover." The sampling quadrat should be at least 20 x 20m (600 m<sup>2</sup>). Two quadrats were selected representing areas of high species richness and cover to ensure a comprehensive assessment (Figure 2)



Category and rationale	Thresholds
Criteria that are broadly applicable	<ul> <li>1a. The minimum patch size is 0.5 hectare;</li> <li>AND</li> <li>1b. The canopy layer contains Grey Box (<i>E. microcarpa</i>) as the dominant or co-dominant tree species;</li> <li>AND</li> <li>1c. The vegetative cover<sup>6</sup> of non-grass weed<sup>7</sup> species in the ground layer is less than 30% at any time of the year.</li> </ul>
<u>Additional criteria</u> that apply to smaller woodland patches (0.5 to <2 ha in area) with tree crown cover >10%	<ul> <li>2a. At least 50% of the vegetative cover in the ground layer comprises perennial native <u>species</u> at any time of the year;</li> <li>AND</li> <li>2b. 8 or more perennial native <u>species</u><sup>8</sup> (6 or more in the Flinders Lofty Block Bioregion of South Australia) are present in the mid and ground layers at any time of the year.</li> </ul>
<u>Additional criteria</u> that apply to larger woodland patches with a well developed canopy (2 ha or more in area)	<ul> <li>3a. At least 8 trees/ha are hollow bearing or have a diameter at breast height of 60 cm or more<sup>9</sup>;</li> <li>AND</li> <li>3b. at least 10% of the vegetative ground cover comprises perennial native grasses at any time of the year;</li> </ul>
	OR
	<ul> <li>4a. At least 20 trees/ha have a diameter at breast height of 12 cm or more;</li> <li>AND</li> <li>4b. at least 50% of the vegetative cover in the ground layer comprises perennial native <u>species</u>.</li> </ul>
Additional criteria that apply to patches where the canopy is less developed or absent (derived grassland) (≥0.5 ha in area)	<ul> <li>5a. Woodland density does not meet criteria 3a or 4a, or is a derived grassland with clear evidence that the site formerly was a woodland with a tree canopy dominated or co-dominated by <i>E. microcarpa</i>;</li> <li>AND</li> <li>5b. At least 50% of the vegetative cover in the ground layer is made up of perennial native <u>species</u> at any time of the year;</li> <li>AND</li> <li>5c. 12 or more native species are present in the ground layer at any time of the year.</li> </ul>

<sup>&</sup>lt;sup>6</sup> Vegetative cover excludes mosses and lichens. Patches of bare ground or leaf litter are also not included.

<sup>9</sup> Dead trees are included, if present up to 50% of the total tree count.

Figure 3 Condition thresholds for the Eucalyptus microcarpa Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia ecological community



<sup>&</sup>lt;sup>7</sup> A weed is defined here as a plant species that is not native to Australia and the species has established viable self-sustaining populations in a region.

<sup>&</sup>lt;sup>8</sup> Relevant growth-forms to include are: grasses, other graminoids, forbs and shrubs less than 4 metres tall. Shrubs that are 4 metres or more in height and non-vascular plants (mosses and lichens) are not included.

#### 3.1.2 Part two – Trail corridor vegetation survey

Trail corridor vegetation surveys were undertaken along the East Ridge Connector (1000 m) and the Burnell Connector (260 m) to five metres either side of the flagged alignment. The survey identified vegetation associations, flora species (including exotic species) and vegetation condition. The condition of the vegetation was assessed based on the percentage of native and exotic species in the understorey, disturbance, and intactness of vegetation stratum, as per criteria adopted by the Native Vegetation Council (Table 1). Vegetation associations were assigned individual SEB ratios which were used to calculate a SEB offset amount for potential vegetation clearance. In addition, the trail corridor vegetation survey also recorded:

- Threatened flora species present within the trail corridor
- Areas subject to erosion
- Areas of extensive weed infestation
- Fauna species opportunistically sighted
- Potential fauna habitat

#### 3.1.3 Part three – Ramble vegetation survey

Ramble surveys were conducted within three general areas; the Grassland Contour Link (299 m<sup>2</sup>), the Burnell Connector Area (1032 m<sup>2</sup>) and the Cliff Top Link (1009 m<sup>2</sup>). The survey recorded vegetation associations, flora species (including exotic species) and vegetation condition. Vegetation condition was identified through assigning SEB values, which were used to calculate a SEB offset amount for potential vegetation clearance within the general survey areas. The ramble vegetation survey also recorded:

- Threatened flora species present within the trail corridor
- Areas subject to erosion
- Areas of extensive weed infestation
- Fauna species opportunistically sighted
- Potential fauna habitat



#### Table 1 Assessment criteria for the condition of vegetation communities.

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



#### Randell Park Vegetation Assessment

Condition	SEB ratio	% indigenous cover	Overstorey condition description	Understorey condition description	Indicators	NVC Interim Policy (1.2.11)	
				areas small. Substantial invasion of aliens resulting in significant competition, but native understorey* persists; for example, may be a low proportion of native species and a high native cover, or a high proportion of native species and low native cover.	strata depleted). Most seed sources available to regenerate original structure. Obvious signs of disturbance (e.g. tracks, bare ground). Minor clearing (<10% of area). Considerable weed infestation with some aggressive weeds. Evidence of some grazing	vegetation with moderate but not severe weed infestation amongst the understorey flora. Clearance is not seriously at variance with the Principles.	
	6:1		Dominant overstorey stratum is largely intact – any condition+	Moderate but not severe weed infestation amongst the understorey flora.	(tracks, soil surface crust patchy).		
Good	7:1	70-79% Original overstorey stratum is still dominant and intact – any condition+		Understorey only slightly modified. High proportion of native species and native cover in the understorey*; reasonable representation of probable pre- European vegetation.	Vegetation structure intact (e.g. all strata intact). Disturbance minor, only affecting individual species. Only non-aggressive weeds present. Some litter build-up.	Where the proposed clearance is of mostly intact overstorey and understorey vegetation, weed infestation is moderate to low, but the original vegetation is still dominant.	
	8:1	80-89%	Original overstorey stratum is still dominant and intact – any condition+	Understorey only slightly modified. High proportion of native species and native cover in the understorey*; reasonable representation of probable pre- European vegetation.		Clearance is assessed by the NVC to be at variance with the Principles.	
Excellent 9:1	<b>9:1</b> > 89%		Original vegetation is still dominant and intact. Overstorey individuals in good condition and represent a mature stand.	Diverse vegetation with very little weed infestation.Understorey largely undisturbed, minimal loss of plant species diversity. Very	All strata intact and botanical composition close to original. Little or no signs of disturbance. Little or no weed	Where the proposed clearance is of diverse vegetation with very little weed infestation. Clearance is assessed by the	
	10:1		Original vegetation is still dominant and intact. Overstorey individuals in good condition and represent a mature stand, with high habitat value (e.g. hollows).	little or no sign of alien vegetation in the understorey*; resembles probable pre- European condition.	infestation. Soil surface crust intact. Substantial litter cover.	NVC to be seriously at variance with the Principles.	

\* Or all strata if the upper and lower strata are difficult to distinguish.

+ Ratio assessment will largely depend upon condition of understorey associated with an intact overstorey stratum.

Adapted from Guide to Roadside Vegetation Survey Methodology for South Australia (Stokes et al. 1998) and Guidelines for a Native Vegetation Significant Environmental Benefit Policy (DWLBC 2005)

### 3.2 Limitations

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

Some plant species may have gone undetected during the surveys, e.g. if they were dormant, inconspicuous or lacked distinguishable features such as flowers or seed. These limitations, whilst recognised, can be said for any chosen survey period.

Prior to the survey, brush cutting had been undertaken within sections of the Burnell Connector and East Ridge Connector. As a result, the extent of native grasses and herbs in the understory was difficult to determine and increased the difficulty of species identification. It was presumed that the composition of the brush cut areas was similar to the surrounding uncut areas and contained a predominantly exotic understorey.



## 4 RESULTS

### 4.1 Native Vegetation Act 1991 clearance principles

The principles of clearance of native vegetation outlined under the NV Act have been addressed for the proposed clearance at Randell Park below. These principles have been addressed based on the understanding that the clearance associated with development of the shared use trail network will impact the understory only. Native vegetation should not be cleared if it is found to be significantly at odds with the principles of clearance of native vegetation. The following principles of clearance of native vegetation are outlined under the NV Act:

#### 1. it contains a high level of diversity of plant species

Assessment of this principle considers whether the number of plant species present in the application area is high, moderate or low by comparing the number of species present on site with the nearby undisturbed areas supporting the same vegetation association. The diversity of plant species in the areas outlined for potential clearance was compared to the areas selected for the TEC assessment (containing high species richness). Compared with the reference site, the diversity within the areas outlined for potential clearance was found to be low (<50%). The proposed clearance is not at variance with this principle.

#### 2. it is an important wildlife habitat

The proposed clearance is likely to have a minor impact on foraging habitat potentially used by rare or threatened species. Randell Park may also provide a refuge area for native fauna species as well as a corridor for movement between other areas of native vegetation. The proposed clearance is not likely to have a significant impact on the habitat value of Randell Park.

#### 3. it includes rare, vulnerable or endangered plant species

While no threatened flora species were observed during the field survey, several state listed species have previously been recorded within the area (Living Atlas of Australia 2013). The proposed clearance is not likely to:

- lead to a long-term decrease in the size of a population
- reduce the area of occupancy of the species
- fragment an existing population into 2 or more populations
- adversely affect habitat critical to the survival of a species
- modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline
- interfere with the recovery of the species

The proposed clearance at Randell Park is not at variance with this principle.



#### 4. the vegetation comprises a plant community that is rare, vulnerable or endangered

The vegetation outlined for potential clearance comprises a part of the Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia nationally threatened ecological community. The proposed clearance is not likely to:

- lead to a long-term adverse affect on a plant community
- reduce the extent of a community
- fragment an occurrence of the community
- adversely affect habitat critical to the survival of the community
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for the community's survival
- result in invasive species that are harmful to the TEC becoming established in an occurrence of the community
- interfere with the recovery of a plant community

The proposed clearance at Randell Park will not have a significant impact on the TEC and therefore, is not at variance with this principle.

#### 5. it is a remnant of vegetation in an area which has been extensively cleared

Randell Park is currently a conserved area, consisting of mainly remnant vegetation, within a cleared suburban landscape. The total remnant fragment area of Randell Park is approximately 1-10 hectares, with a proposed clearance amount of less than 10%. Based on these areas, the proposed clearance at Randell Park is at variance with this principle.

#### 6. it is growing in, or association with, a wetland environment

The vegetation within Randell Park is not growing in, or association with, a wetland environment. There are no wetlands within, or in the immediate area surrounding Randell Park. The proposed clearance is not at variance with this principle.

#### 7. it contributes to the amenity of the area

With regards to the amenity value of Randell Park, comments made by the City of Mitcham Council wll be those regarded by the NVC. In general, Randell Park makes a significant contribution to the amenity of the area as a highly utilised recreational area. The development of a shared use trial network is likely to improve the park's amenity. Vegetation clearance is likely to have a minor impact on amenity.

#### 8. the clearance of vegetation is likely to contribute to soil erosion, salinity, or flooding

The Native Vegetation Council will seek the view of the Regional NRM Board for the NRM region where the native vegetation is situated and have regard to the board's recommendations (if any) in relation to the application. In addressing these issues the NRM Board will consider whether the vegetation contributes to the prevention of erosion, salinity or flooding and protects groundwater or soil quality. EBS



Ecology believes that the clearance of vegetation within the understory is likely to improve soil erosion issues through the development of a formal shared use trail network. Salinity and flooding issues within the park are considered not likely to be affected by the clearance.

9. the clearance of vegetation is likely to cause deterioration in the quality of surface or underground water

Anderson's Gully Creek runs through the eastern section of Randell Park but was not observed to be flowing at the time of the field survey. Vegetation clearance is not considered likely to impact the creek line. Randell Park does not contain, or is immediately surrounded by, any significant waterways which may be affected by the clearance. The quality of underground water is not likely to be impacted by the clearance.

10. after clearance, the land is to be used for a purpose which is unsustainable

The proposed land use within Randell Park after clearance is for recreational purposes. This activity is considered to be sustainable.

The proposed vegetation clearance at Randell Park is not significantly at odds with the principles of clearance of native vegetation outlined under the NV Act.

#### 4.2 Field survey

#### 4.2.1 Part one – Threatened Ecological Community assessment

The vegetation assessed at Randell Park represented a *Eucalyptus microcarpa* Grassy Woodland and Derived Native Grassland Ecological Community (Figure 4 & Figure 5). The vegetation in both quadrats satisfied the key diagnostic characteristics outlined by DSEWPaC and met the appropriate condition thresholds for EPBC Act listing (Table 2 & Table 3).

A total of 34 flora species (21 native and 13 exotic) were recorded within quadrat one. Quadrat two contained 26 flora species (16 native and ten exotic). Flora species recorded during part one are listed in (Appendix 1 – Part one species list).





Figure 4 Quadrat one – *Eucalyptus microcarpa* Grassy Woodland and Derived Native Grassland Ecological Community



Figure 5 Quadrat two – *Eucalyptus microcarpa* Grassy Woodland and Derived Native Grassland Ecological Community



Table 2 Quadrat one -	Condition threshold	d results for the	Eucalvotus micro	carpa TEC assessment

Satisfies key diagnostic characteristics (Y/N)	Criteria that are broadly applicable			Additional criteria that apply to smaller woodland patches (0.5 to <2 ha in area) with tree crown cover >10%***		Additional criteria that apply to larger woodland patches with a well developed canopy (2 ha or more in area)***				Potential for Commonwealth referral (Y/N)
	1a	1b	1c	2a	2b	3a	3b	4a	4b	
Y	Y	Y	Y	N/A	N/A	N/A	N/A	Y	Y	Y

#### Table 3 Quadrat two - Condition threshold results for the Eucalyptus microcarpa TEC assessment

Satisfies key diagnostic characteristics (Y/N)	Criteria that are broadly applicable			Additional criteria that apply to smaller woodland patches (0.5 to <2 ha in area) with tree crown cover >10%***		Additional criteria that apply to larger woodland patches with a well developed canopy (2 ha or more in area)***				Potential for Commonwealth
	1a	1b	1c	2a	2b	3a	3b	4a	4b	referral (Y/N)
Y	Y	Y	Y	N/A	N/A	N/A	N/A	Y	Y	Y

\*Must answer Yes in this column to proceed with assessment of other criteria

\*\*Must satisfy both 1 a, b and c to proceed with assessment of other criteria

\*\*\*Must satisfy 2 a and b OR 3 a and b OR 4 a and b

1 Vegetative cover excludes mosses and lichens. Patches of bare ground or leaf litter are also not included.

2 A weed is defined here as a plant species that is not native to Australia and the species has established viable self-sustaining populations in a region.

3 Relevant growth-forms to include are: grasses, other graminoids, forbs and shrubs less than 4 metres tall. Shrubs that are 4 metres or more in height and non-vascular plants (mosses and lichens) are not included.

4 Dead trees are included, if present up to 50% of the total tree count.



#### 4.2.2 Parts two and three – Trail corridor and ramble vegetation surveys

The trail corridor vegetation survey and ramble vegetation survey identified a combined total of 89 flora species (49 native and 40 exotic) (Appendix 2 – Part two and three species list). No threatened flora species were observed during the trail corridor and ramble surveys. Predominant invasive species recorded were *Olea europaea ssp.* (Olive), *Pinus halepensis* (Aleppo Pine), *Avena barbata* (Wild Oats), *Ehrharta* sp. (Veldt Grass) and *Plantago* sp. (Plantain). Significant infestations of *Olea europaea ssp.* (both established plants and scattered seedlings) were observed throughout the Grassland Contour Link. Areas of the East Ridge Connector alignment contained significant infestations of *Pinus halepensis and Olea europaea ssp.* Three Weeds of National Significance (as listed by the Australian Government) (WONS), *Asparagus asparagoides f.* (Bridal Creeper), *Chrysanthemoides monilifera ssp. monilifera* (Boneseed) and *Genista monspessulana* (Montpellier Broom) were observed within Randell Park (DSEWPaC 2012b).

Vegetation associations and their relative SEB values are presented in Table 4and mapped in Figure 2. In some cases, vegetation associations possess the same vegetation structure but were assigned different SEB values due to varying degrees of weed cover. The *Eucalyptus microcarpa* low woodland association was assigned an SEB value of 5:1 for one area and six for another (Figure 6 & Figure 7). The *Eucalyptus microcarpa* woodland association was given SEB values ranging from four to seven (Figure 8 & Figure 9), while values for the Exotic *Pinus halepensis* forest ranged from zero to two (Figure 10 & Figure 11).





Figure 6 Eucalyptus microcarpa low woodland – 5:1 SEB



Figure 7 Eucalyptus microcarpa low woodland – 6:1 SEB



Figure 8 Eucalyptus microcarpa woodland – 4:1 SEB



Figure 9 Eucalyptus microcarpa woodland – 7:1 SEB



Figure 10 Exotic Pinus halepensis forest – 0:1 SEB



Figure 11 Exotic Pinus halepensis forest – 2:1 SEB



Based on the SEB condition ratios presented Table 4 and the size of the area to potentially be cleared, SEB offset amounts were calculated (Table 5).

#### Required SEB

Should all the native vegetation within the 'proposed extent of impact area' be cleared, the total SEB offset area required is 2.26 ha. Therefore the total SEB offset amount required for clearance associated with the surveyed sections of the proposed trails are as follows;

Burnell connector:	\$7,528 payment or 0.64 hectares.
East ridge connector:	\$9,035.55 payment or 0.77 hectares.
Cliff top link:	\$9,562.38 payment or 0.82 hectares.
Grassland contour link:	\$285.80 payment or 0.02 hectares.

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

(land value per ha x required SEB in ha) + (management fee per ha x area cleared) =

payment into NV Fund

Where:

- Land value (Local Government Area values updated annually by Valuation SA) = \$11519 (Mitcham Council area)
- Required SEB = 2.26 hectares
- Management fee = \$800 per ha (flat rate calculated by the Native Vegetation Council)
- Area cleared = 0.54 hectares

In the event that vegetation clearance is limited only to the understorey layer for the purpose of trail construction (i.e. no damage to trees), the Native Vegetation Council may consider a lesser SEB offset to be sufficient, in line with the percentage of native vegetation cover in the understorey (Peter Farmer, DEWNR Native Vegetation Unit, pers. comm. November 2013). Further advice should be sought from the NVC during the application process.



Table 4 Overall summary of vegetation associations and condition.

Vegetation association	Condition	Estimated %age native understorey cover^	Length (m)	Area (m²)*
Grass land contour link				
Mixed plantation	0:1	<10 %	34	68
Mixed native plantation	1:1	10 %	116	232
	Grass lar	nd contour link total	150	300
Cliff top link				
Eucalyptus microcarpa low woodland	5:1	20 %	350	700
Eucalyptus microcarpa low woodland	6:1	30 %	230	460
Eucalyptus microcarpa woodland	6:1	30 %	80	160
Eucalyptus microcarpa woodland	7:1	50 %	70	140
		Cliff top link total	730	1460
Burnell connector				
Eucalyptus microcarpa woodland	4:1	10 %	803	1606
	Bur	nell connector total	803	1606
East ridge connector				
Eucalyptus microcarpa woodland	4:1	10 %	115	230
Eucalyptus leucoxylon woodland	4:1	10 %	205	410
Exotic Pinus halepensis forest	1:1	10 %	100	200
Exotic Pinus halepensis forest	0:1	<10 %	35	70
Eucalyptus microcarpa low woodland	5:1	20 %	425	850
Exotic Pinus halepensis forest	2:1	20 %	65	130
Mixed native plantation (Eucalyptus camaldulensis)+/- Eucalyptus microcarpa +/- Pinus halepensis	4:1	<10%	55	110
	East ri	dge connector total	1000	2000

^estimated %age native understorey cover is provided to inform SEB offset calculations, should the NVC determine that a lesser amount is payable if clearance is limited to understorey vegetation.

\* Area has been calculated for a 1 metre wide trail with 500mm disturbance either side of the alignment.



#### Table 5 Vegetation clearance and SEB calculations

Vegetation association	SEB ratio	Total estimated clearance (ha)	Management fee (\$)	Land value per ha (\$)^	Required SEB (ha)	SEB payment into NV Fund (\$)
Eucalyptus microcarpa woodland	4:1	0.02	800	11,519	0.09	\$1,078.15
Eucalyptus leucoxylyn woodland	4:1	0.04	800	11,519	0.16	\$1,921.92
Exotic Pinus halepensis forest	1:1	0.02	800	11,519	0.02	\$246.38
Exotic Pinus halepensis forest	0:1	0.01	800	11,519	0.00	0
Eucalyptus microcarpa low woodland	5:1	0.09	800	11,519	0.43	\$4,963.58
Exotic Pinus halepensis forest	2:1	0.01	800	11,519	0.03	\$309.89
Eucalyptus microcarpa woodland +/- Eucalyptus leucoxylyn +/- Pinus halepensis	4:1	0.01	800	11,519	0.04	\$515.64
Eucalyptus microcarpa woodland	4:1	0.16	800	11,519	0.64	\$7,528.29
Eucalyptus microcarpa low woodland	5:1	0.07	800	11,519	0.35	\$4,087.65
Eucalyptus microcarpa low woodland	6:1	0.02	800	11,519	0.10	\$1,118.62
Eucalyptus microcarpa woodland	6:1	0.05	800	11,519	0.28	\$3,216.04
Eucalyptus microcarpa woodland	7:1	0.01	800	11,519	0.10	\$1,140.06
Mixed plantation	0:1	0.01	800	11,519	0.00	0
Mixed native plantation	1:1	0.02	800	11,519	0.02	\$285.80
Total		0.54 ha			2.26 ha	\$26,412.02

^ based on site values as at 2009



Fauna species opportunistically observed during the survey are listed in (Appendix 3 – Opportunistic fauna sightings)

Areas of significant erosion observed during the trail corridor and ramble surveys were mapped (Figure 2). EBS staff noted during the surveys that eastern end of the proposed Burnell Track alignment was very steep and was likely to result in erosion issues if constructed. Existing erosion observed along the proposed Burnell track alignment is shown in Figure 12.



Figure 12 Erosion observed along the proposed Burnell track alignment



## 5 **RECOMMENDATIONS**

It is recommended that an EPBC referral be submitted for the project should works potentially impact on areas of *Eucalyptus microcarpa* Woodland and/or derived grasslands. Further advice can be sought from the Australian Government Department of the Environment.

Approvals need to be sought from the Native Vegetation Council in regards to any clearing or trimming of native vegetation clearance associated with the shared use trail network. DEWNR and the NVC assess all applications to clear native vegetation in South Australia. In most situations, when a clearance application is approved, conditions are attached to ensure that the clearance is offset by restoration work that provides a significant environmental benefit (DEWNR 2012). Prepare a native vegetation management plan for assessment and approval of the SEB. Any queries regarding the clearance of native vegetation and the SEB offset requirements should be directed to the Native Vegetation Council Secretariat.

In the interest of reducing the risk of erosion, it is recommended that the alignment of the proposed Burnell track be re-considered.

It is understood that vegetation clearance associated with the shared trail upgrade will be limited to understorey vegetation. Should any trees require removal for the trail works, it should be noted that additional to the requirements under the *Native Vegetation Act 1991* (outlined above), Significant Tree Regulations under the *Development Act 1993* will also apply.

Seek relevant approvals from the Native Vegetation Council for any clearance or trimming of native vegetation.



# 6 **REFERENCES**

Department of Environment, Water and Natural Resources (2012) Significant Environmental Benefit, accessed 28 November 2013 < http://www.environment.sa.gov.au/managing-natural-resources/Native\_vegetation/Managing\_native\_vegetation/Significant\_environmental\_benefit>

Department of Sustainability, Environment, Water, Population and Communities (2012a) *Grey Box* (*Eucalyptus microcarpa*) *Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia:* a guide to the identification, assessment and management of a nationally threatened ecological community Environment Protection and Biodiversity Conservation Act 1999. Commonwealth of Australia, Australia.

Department of Sustainability, Environment, Water, Population and Communities (2012b), Weeds of National Significance, accessed 28 November 2013 <http://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html>

Living Atlas of Australia (2013), Explore your area – Anderson Avenue, Mitcham (1 km radius), accessed 9 December 2013 < http://biocache.ala.org.au/explore/your-area>



# 7 APPENDICES

## 7.1 Appendix 1 – Part one species list

#### Table 1. Flora species observed within the Threatened Ecological Community assessment quadrats

*	Scientific name	Common name	Conservation status		Quadrat		
			Aus	SA	1	2	
	Acacia acinacea	Wreath Wattle				Y	
	Acacia paradoxa	Kangaroo Thorn			Y		
	Acacia pycnantha	Golden Wattle			Y	Y	
*	Aira sp.	Hair-grass			Y		
	Allocasuarina verticillata	Drooping Sheoak			Y		
*	Anagallis arvensis	Pimpernel			Y	Y	
*	Asparagus asparagoides f.				Y	Y	
	Austrostipa elegantissima	Feather Spear-grass			Y	Y	
	Austrostipa nodosa	Tall Spear-grass			Y		
	Austrostipa sp.	Spear-grass			Y	Y	
*	Avena barbata	Bearded Oat			Y	Y	
*	Briza maxima	Large Quaking-grass			Y	Y	
*	Bromus hordeaceus ssp. hordeaceus	Soft Brome			Y	Y	
	Bulbine bulbosa	Bulbine-lily			Y	Y	
	Calostemma purpureum	Pink Garland-lily			Y		
*	Chrysanthemoides monilifera ssp. monilifera	Boneseed			Y		
	Compositae sp.	Daisy Family			Y		
	Convolvulus remotus	Grassy Bindweed			Y		
	Dianella revoluta var.				Y		
	Dianella revoluta var. revoluta	Black-anther Flax-lily				Y	
	Dodonaea viscosa ssp. spatulata	Sticky Hop-bush			Y	Y	
*	Ehrharta longiflora	Annual Veldt Grass			Y	Y	
	Einadia nutans ssp.	Climbing Saltbush			Y		
	Eucalyptus microcarpa	Grey Box			Y	Y	
*	Gomphocarpus cancellatus	Broad-leaf Cotton-bush				Y	
	Gonocarpus elatus	Hill Raspwort			Y	Y	
	Kennedia prostrata	Scarlet Runner				Y	
	Lomandra densiflora	Soft Tussock Mat-rush			Y		
	Lomandra sp.	Mat-rush				Y	
*	Moraea flaccida	One-leaf Cape Tulip			Y	Y	
*	Olea europaea ssp.	Olive			Y		



*	Scientific name	Common name	Conservation status		Quadrat		
			Aus	SA	1	2	
	Olearia ramulosa	Twiggy Daisy-bush			Y	Y	
	Pultenaea largiflorens	Twiggy Bush-pea			Y	Y	
	Rytidosperma setaceum	Small-flower Wallaby-grass			Y		
	Rytidosperma sp.					Y	
	Scaevola albida	Pale Fanflower				Y	
*	Silene sp.	Catchfly			Y		
*	Sonchus oleraceus	Common Sow-thistle			Y		
*	Trifolium angustifolium	Narrow-leaf Clover				Y	
*	Trifolium campestre	Hop Clover				Y	
	Vittadinia sp.	New Holland Daisy			Y		
*	Vulpia myuros f.	Fescue			Y		
	Wahlenbergia sp.	Native Bluebell			Y	Y	

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



### 7.2 Appendix 2 – Part two and three species list

_	· · ·	<u>_</u>					-	
			Conse sta	rvation tus		Ar	ea	
*	Scientific name	Common name	Aus	SA	Grassland Contour Link	Cliff Top Link	Burnell Connector	East Ridge Connector
	Acacia acinacea	Wreath Wattle				Y		
	Acacia paradoxa	Kangaroo Thorn			Y	Y		
	Acacia pycnantha	Golden Wattle				Y	Y	Y
*	Agapanthus praecox ssp. orientalis						Y	
*	Aira sp.	Hair-grass				Y		
	Allocasuarina verticillata	Drooping Sheoak			Y		Y	
*	Anagallis arvensis	Pimpernel				Y	Y	
*	Arctotheca calendula	Cape Weed			Y	Y		
	Arthropodium strictum	Common Vanilla-lily				Y		
*	Asparagus asparagoides f.				Y	Y	Y	Y
	Astroloma humifusum	Cranberry Heath				Y	Y	Y
	Austrostipa elegantissima	Feather Spear-grass				Y		
	Austrostipa scabra ssp. falcata	Slender Spear-grass				Y	Y	
	Austrostipa sp.	Spear-grass			Y			
*	Avena barbata	Bearded Oat			Y	Y	Y	Y
*	Briza maxima	Large Quaking-grass			Y	Y	Y	Y
*	Briza minor	Lesser Quaking- grass			Y		Y	Y
*	Bromus diandrus	Great Brome			Y		Y	Y
*	Bromus hordeaceus ssp. hordeaceus	Soft Brome			Y	Y	Y	Y
*	Bromus rubens	Red Brome			Y	Y	Y	Y
	Bulbine bulbosa	Bulbine-lily				Y	Y	

Table 2. Flora species observed during the trail corridor and ramble vegetation surveys.



			Conse sta	rvation Itus		Ar	ea	
*	Scientific name	Common name	Aus	SA	Grassland Contour Link	Cliff Top Link	Burnell Connector	East Ridge Connector
	Bursaria spinosa ssp.	Bursaria					Y	
*	Centaurea calcitrapa	Star Thistle			Y			
*	Centranthus ruber ssp. ruber	Red Valerian					Y	
	Cheilanthes austrotenuifolia	Annual Rock-fern				Y		
	Chloris truncata	Windmill Grass			Y			
*	Chrysanthemoides monilifera ssp. monilifera	Boneseed			Y	Y	Y	
	Chrysocephalum sp.	Everlasting				Y		
	Convolvulus remotus	Grassy Bindweed				Y		Y
*	Crataegus monogyna	Hawthorn			Y			Y
*	Cynosurus echinatus	Rough Dog's-tail Grass				Y		
*	Dactylis glomerata	Cocksfoot				Y		
	Dianella brevicaulis	Short-stem Flax-lily						Y
	Dianella revoluta var.				Y	Y	Y	Y
	Dodonaea viscosa ssp. spatulata	Sticky Hop-bush				Y		
*	Echium plantagineum	Salvation Jane			Y			
*	Ehrharta calycina	Perennial Veldt Grass			Y	Y	Y	Y
	Eucalyptus camaldulensis ssp.	River Red Gum						Y
	Eucalyptus leucoxylon ssp.	South Australian Blue Gum			Y			Y
	Eucalyptus microcarpa	Grey Box				Y	Y	Y
*	Euphorbia peplus	Petty Spurge						Y



			Conse sta	rvation Itus		Ar	ea	
*	Scientific name	Common name	Aus	SA	Grassland Contour Link	Cliff Top Link	Burnell Connector	East Ridge Connector
	Exocarpos cupressiformis	Native Cherry				Y		
	Exocarpos cupressiformis	Native Cherry					Y	
*	Fumaria capreolata	White-flower Fumitory					Y	
*	Genista monspessulana	Montpellier Broom					Y	
*	Gomphocarpus cancellatus	Broad-leaf Cotton- bush			Y	Y		
	Gonocarpus elatus	Hill Raspwort				Y	Y	
	Hardenbergia violacea	Native Lilac				Y	Y	
*	Holcus sp.	Fog					Y	
*	Hordeum Ieporinum	Wall Barley-grass			Y			
*	Hypochaeris radicata	Rough Cat's Ear					Y	
	Juncus Bufonius	Toad Rush						Y
*	Lactuca serriola f.				Y			
*	Lathyrus tingitanus	Tangier Pea					Y	
	Lepidium sp.	Peppercress						Y
*	Linum trigynum	French Flax					Y	
*	Lolium rigidum	Wimmera Ryegrass			Y		Y	
	Lomandra densiflora	Soft Tussock Mat- rush				Y	Y	Y
*	Medicago polymorpha var. polymorpha	Burr-medic					Y	
*	Moraea flaccida	One-leaf Cape Tulip			Y	Y	Y	Y
	Moraea setifolia	Thread Iris						Y
	Myoporum montanum	Native Myrtle				Y		
*	Olea europaea ssp.	Olive			Y	Y	Y	Y
	Olearia ramulosa	Twiggy Daisy-bush				Y	Y	

			Conse sta	rvation Itus		Ar	ea	
*	Scientific name	Common name	Aus	SA	Grassland Contour Link	Cliff Top Link	Burnell Connector	East Ridge Connector
	Olearia ramulosa	Twiggy Daisy-bush						Y
	Oxalis perennans	Native Sorrel			Y		Y	
*	Oxalis pes-caprae	Soursob			Y			Y
*	Phalaris aquatica	Phalaris					Y	Y
*	Pinus halepensis	Aleppo Pine			Y			
	Pittosporum angustifolium	Native Apricot						Y
*	Plantago lanceolata var.	Ribwort			Y	Y	Y	Y
*	Rhamnus alaternus	Blowfly Bush			Y		Y	
	Rumex sp.	Dock			Y			
	Rytidosperma caespitosum	Common Wallaby- grass			Y	Y	Y	Y
	Rytidosperma setaceum	Small-flower Wallaby-grass				Y		Y
	Scaevola albida	Pale Fanflower						Y
ł	Silene sp.	Catchfly					Y	
*	Sonchus oleraceus	Common Sow-thistle				Y	Y	Y
	Themeda triandra	Kangaroo Grass			Y	Y		Y
*	Trifolium angustifolium	Narrow-leaf Clover			Y	Y	Y	Y
*	Trifolium campestre	Hop Clover			Y	Y	Y	Y
*	Trifolium hirtum	Rose Clover			Y		Y	Y
*	Tropaeolum majus	Nasturtium					Y	
*	Vicia sativa ssp. nigra	Narrow-leaf Vetch			Y			
*	Vulpia myuros f.	Fescue				Y	Y	Y
	Wahlenbergia sp.	Native Bluebell				Y		
	Wahlenbergia stricta ssp. stricta	Tall Bluebell				Y		
*	Watsonia meriana var. bulbillifera	Bulbil Watsonia						Y
(	) eb	S av						20
	1		(					

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



## 7.3 Appendix 3 – Opportunistic fauna sightings

*	Scientific name	Common name	Conservation status		
			Aus	SA	
*	Columba livia	Feral Pigeon (Rock Dove, Common Pigeon)			
*	Sturnus vulgaris	Common Starling			
	Dacelo novaeguineae	Laughing Kookaburra			
	Anthochaera carunculata	Red Wattlebird			
	Phascolarctos cinereus	Koala			
	Rhipidura albiscapa	Grey Fantail			

Appendix 3. Fauna species recorded during the Randell Park survey

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





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