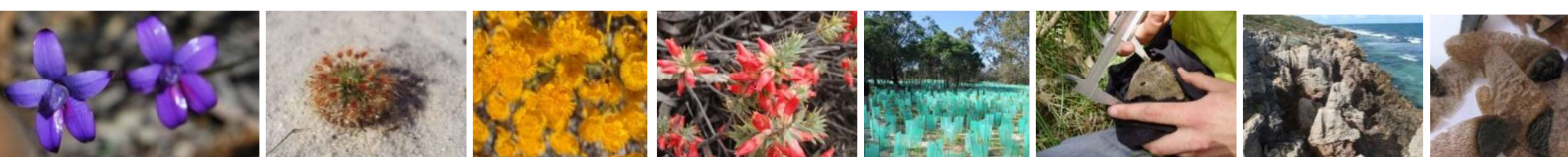




Natural Area
CONSULTING MANAGEMENT SERVICES

Shire of Lake Grace Detailed Flora and Basic Fauna Survey: Newdegate Waste Management Facility

Natural Area Holdings Pty Ltd
Whadjuk Country
57 Boulder Road, Malaga, WA, 6090
Ph: (08) 9249 7634
info@naturalarea.com.au
www.naturalarea.com.au



Acknowledgement of Country

Ngala kaaditj Noongar moort keyen kaadak nidja boodja.

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Executive Summary

The Shire of Lake Grace (the Shire) is proposing the extension of the current filling area of the Newdegate waste management facility. As such, a clearing permit application to the Department of Water and Environmental Regulation (DWER) is required. To support the clearing permit, the Shire has commissioned Natural Area Consulting Management Services (Natural Area) to undertake biological surveys within the proposed clearing site. Surveys included a detailed flora and vegetation survey and a basic fauna survey, including a targeted declared rare and priority listed species (DRF) search and black cockatoo habitat assessment.

The survey aimed to determine:

- flora and fauna species present (native and non-native)
- the extent and boundaries of vegetation type and condition
- the location of declared rare or priority flora, fauna and/or ecological communities
- the presence of threatened black cockatoo habitat.

The flora and vegetation survey within the site confirmed:

- a total of 114 flora species from 34 families present
- a total of 23 introduced (weeds) and 91 native flora species
- no priority or threatened flora species within the site
- one vegetation type occurred within the site, Mixed *Eucalyptus* Open Mallee Woodland
- vegetation condition across the site ranged from Completely Degraded to Excellent, with the majority of this site in Excellent condition (49.6%).

The fauna survey within the site confirmed:

- a total of 18 fauna species present
- 13 birds, two reptiles, and three mammals within the site
- two of the mammals were introduced species, Red Fox (**Vulpes vulpes*) and Feral Cats (**Felis catus*)
- no threatened black cockatoo habitat exists within the site, with the mallee *Eucalyptus* spp. trees present potentially providing low quality food sources
- good quality habitat within the site is present for reptiles (logs and leaf litter), invertebrates and small bird species in the form of differing vegetation structural layers which provide shelter, food sources and nesting capacity in the canopy of the mallees present.

As the flora and vegetation survey are to inform potential clearing permit applications outcomes of the survey were assessed against the ten Western Australian clearing principles. The clearing application may be at variance with two of the ten principles (principles A and E). As the site proposed clearing area occurs within an extensively cleared area, additional conditions may be assigned to a clearing permit when the application is assessed through the Department of Water Environment and Regulation (DWER), including the potential requirement for an offset.

Contents

Executive Summary	3
Contents	4
1.0 Introduction.....	6
1.1 Location	6
1.2 Scope	6
1.3 Objectives	6
2.0 Site Characteristics	9
2.1 Regional Context	9
2.2 Climate.....	9
2.3 Topography and Soils	9
2.4 Vegetation Association.....	11
2.5 Fauna Habitat	11
3.0 Methodology	12
3.1 Desktop and Literature Review	12
3.2 On-ground Flora Survey.....	12
3.2.1 Vegetation Type.....	13
3.2.2 Vegetation Condition.....	13
3.3 On-ground Fauna Survey	14
3.4 Limitations	14
4.0 Flora Survey Results.....	16
4.1 Desktop Survey.....	16
4.1.1 Significant flora.....	16
4.1.2 Threatened and Priority Ecological Communities	18
4.2 Flora Survey Results.....	18
4.2.1 Flora	18
4.2.2 Vegetation Type.....	20
4.2.3 Vegetation Condition.....	21
4.2.4 Threatened and Priority Communities	23
5.0 Fauna Survey Results.....	24
5.1 Desktop Survey	24
5.2 Fauna Survey Results	25
5.3 Fauna Habitat	27

6.0	Implications of Results.....	28
6.1	Flora and Vegetation	28
6.2	Significant Flora	28
6.3	Threatened Ecological Communities.....	28
6.4	Fauna	28
6.5	Assessment Against Clearing Principles	29
7.0	References.....	33
	Appendix 1: NatureMap Report 10 km	35
	Appendix 2: PMST Report 10km.....	44
	Appendix 3: Conservation Codes.....	53
	Appendix 4: Significant Flora Species Guide	55
	Appendix 5: Quadrat Data.....	76
	Appendix 6: Species List	81

1.0 Introduction

The Shire of Lake Grace (The Shire) is proposing the extension of the Newdegate waste management facility. As such, a clearing permit application to the Department of Water and Environmental Regulation (DWER) is required. To support the clearing permit, the Shire has commissioned Natural Area Consulting Management Services (Natural Area) to undertake biological surveys within the proposed clearing site. Surveys included a detailed flora and vegetation survey and a basic fauna survey, including a targeted declared rare and priority listed species (DRF) search and black cockatoo habitat assessment.

1.1 Location

The survey area is approximately 2.7 ha and is located within the Newdegate waste management facility property boundary, Lot 1 Whurr Road. The site occurs within the Shire of Lake Grace and approximately 5.8 km north-east of the Newdegate town centre (Figure 1). The survey site occurs outside of an environmentally sensitive area (Department of Water and Environmental Regulation 2022).

1.2 Scope

Activities undertaken by Natural Area included:

- Desktop database searches to identify potential conservation significant flora and fauna species, along with any threatened or priority ecological communities. Desktop searches include NatureMap, Protected Matters Search Tool (PMST), and Department of Biodiversity, Conservation and Attractions (DBCA) flora, fauna and communities database searches.
- Detailed flora and vegetation survey to determine the extent of the vegetation condition and type, as well as recording flora (native and introduced) species present, including a targeted search for the presence of threatened or priority species.
- Basic fauna survey to record opportunistic sightings and evidence of the presence of fauna and assess general fauna habitat.
- Black cockatoo habitat assessment to record sightings of threatened black cockatoo species, presence of potential breeding hollows, location of habitat trees (diameter at breast height (DBH) >500 mm) or evidence of their presence.
- Reporting findings, including assessment against the clearing principles and provision of maps representing site assessment outcomes.

1.3 Objectives

The objective of the survey was to collect sufficient data to adequately inform future clearing permit applications to DWER, as required by clearing provisions under the *Environmental Protection Act 1986* (WA) (EP Act) and *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (WA) ahead of the extension of Newdegate waste management facility.

The flora survey aimed to determine:

- the extent and boundaries of vegetation types and condition
- flora species (native and introduced) present
- the location of declared rare or priority flora and or ecological communities.

The fauna survey aimed to determine:

- the presence fauna presence through indicators such as tracks, scats, dens/warrens and calls
- fauna species (native and introduced) present
- presence of declared rare or priority fauna and potential habitat.



2.0 Site Characteristics

The characteristics of a site have a strong bearing on the flora, vegetation, fauna, and ecological communities present. Key characteristics of Lot 1 are outlined in this section.

2.1 Regional Context

According to the Interim Biogeographical Regionalisation of Australia (IBRA) descriptions, the site is located within the Western Mallee (MAL02) IBRA subregion. This region is characterised by gently undulating landscapes, with partially obstructed drainage (Beecham and Danks, 2001). The region can contain areas of exposed granite, sandplains and laterite pavements and salt lakes which can have a granite base (Beecham and Danks, 2001). Vegetation in this region comprises of areas of *Eucalyptus* woodlands mainly on fine-textured soils, with scrub-heath on sands and laterite soil types (Beecham and Danks, 2001). The region covers an area of approximately 4,763,963 ha (Beecham and Danks, 2001).

2.2 Climate

The climate experienced in the area is Mediterranean, with dry, hot summers and cool, wet winters. According to the Bureau of Meteorology (2021); Newdegate WA, site number 010692, the region has an average:

- rainfall of 365.6 mm pa, with rain falling predominantly between May and August
- maximum temperature ranging from 19.9 °C in winter to 31.3 °C in summer, with a maximum recorded temperature of 46.7 °C
- minimum temperatures ranging from 4.3 °C in winter to 14.1 °C in summer, with a minimum recorded temperature of -4.3 °C
- predominant wind directions include morning easterlies and westerly sea breezes during the summer months, with an average wind speed of 21.3 km/h and gusts of more than 100 km/h.

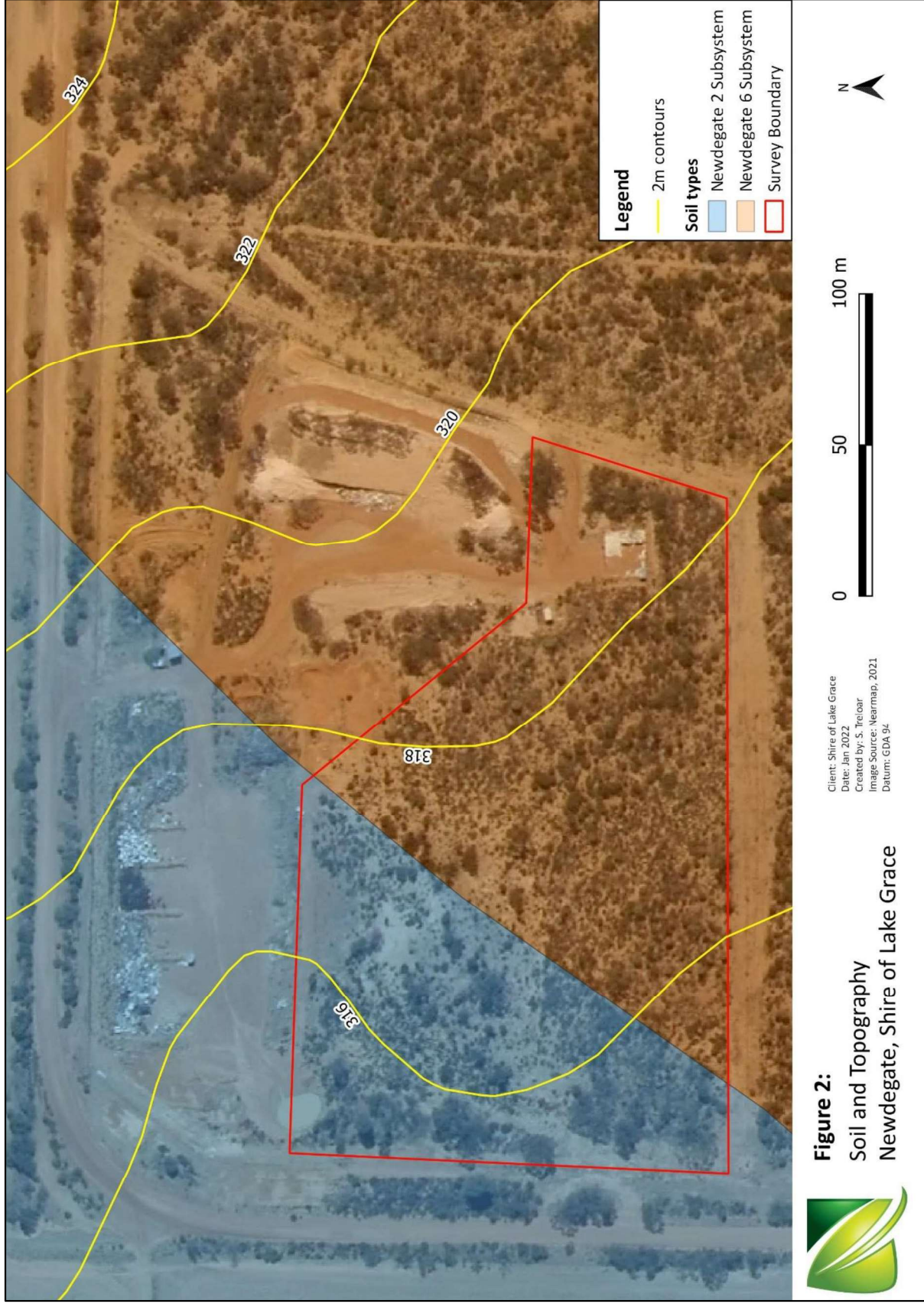
2.3 Topography and Soils

The site is elevated but relatively flat, with Australian Height Datum (AHD) ranging from 316 m in the south-west corner of the site to 318 m in the north-east corner of the site (Department of Primary Industries and Regional Development (DPIRD), 2021). Two soil types are present within the site, the Newdegate 2 Subsystem and Newdegate 6 Subsystem (Table 1 and Figure 2) (DPIRD, 2021).

Table 1: Soil types within survey area

Name	Symbol	Description
Newdegate 2 Subsystem	250Nw_2	Lower to upper slopes, broad crests and upland plains. Soils are mainly grey and yellow/brown sandy duplex soils, often alkaline with hard setting surfaces, and duplex sandy gravels.
Newdegate 6 Subsystem	250Nw_6	Areas of significant rock outcrop including monadnocks, and sheet rock. Associated soils include stony soils, yellow/brown deep sandy duplex soils, deep sands and red soils.

Source: DPIRD, 2021



2.4 Vegetation Association

One pre-European vegetation type exists within the site boundary, namely Hyden (HYDEN_945), which was identified using the NRInfo Portal (DPIRD, 2021). It is typified by large areas of mallee. The vegetation association Hyden_945 is described as a mosaic of medium woodlands which can contain Salmon Gum (*Eucalyptus salmonophloia*) and Shrublands containing mallee scrub, Redwood (*Eucalyptus transcontinentalis*) and Black Marlock (*Eucalyptus redunca*) (Government of Western Australia, 2019). Within the local government area of the Shire of Lake Grace, there is 15.15% remaining of the Hyden vegetation association 945 (Government of Western Australia, 2019).

2.5 Fauna Habitat

There is potential for the three threatened black cockatoos and their habitat to occur on site including, the Carnaby's Cockatoo (*Calyptorhynchus latirostris*) listed as endangered under the *EPBC Act 1999* (Cwlth), the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) and the Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) listed as vulnerable; all are listed as threatened under the *Biodiversity Conservation Act 2016* (WA). According to NationalMap the survey site does not occur within any areas listed as roosting, breeding or foraging areas by the threatened black cockatoos.

3.0 Methodology

3.1 Desktop and Literature Review

The desktop survey included reviewing online databases to gather contextual knowledge and determine preliminary site characteristics including:

- likely native and non-native flora and fauna species present
- current extent of native vegetation
- general floristic community types
- likely presence of threatened or priority flora and fauna species
- likely presence of any threatened or priority ecological communities.

The following databases were accessed to obtain relevant information:

- NatureMap (DBCA, 2021a) (Appendix 1)
- Protected Matters Search Tool (Department of Agriculture, Water, and the Environment (DAWE), 2021) (Appendix 2)
- FloraBase (DBCA, 2021b)
- threatened and priority flora, fauna and ecological community database searches (DBCA, 2021c).

Conservation code definitions for the State and Commonwealth are provided in Appendix 3. Summary sheets of threatened and priority flora potentially occurring in the area were created for quick reference in the field and to assist on-ground surveys are provided in Appendix 4.

3.2 On-ground Flora Survey

Natural Area ecologists Kylie Sadgrove and John Wei undertook the survey between November 23 to 25 2021, with key data recorded using Mappt software on a handheld tablet. Survey activities included:

- identification of flora species present by walking the site, including targeted declared rare and priority species indicated as potentially present during desktop assessments
- setting out a total of three quadrats 10 x 10 m quadrats (recording the middle and understorey), and 20 x 20 m quadrats in the same location to record overstorey as specified in the EPA technical guidance document (EPA, 2016) (Figure 6). Landscape characteristics were recorded including soil types/colour, aspect, slope, surface rock, topography, drainage, leaf litter depth, percentage cover, and percentage of bare ground and species composition (height and cover) within each quadrat
- recording vegetation type including dominant over, middle and understorey species and vegetation condition extent across the site
- the use of GPS to map significant species and boundaries of differing vegetation type and condition across the site
- determining the presence of any further threatened or priority listed flora species and/or ecological communities listed under the *Biodiversity and Conservation Act 2016* (WA) and/or the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth).

The flora and vegetation survey was conducted in accordance with *Technical Guidance-Flora and Vegetation Surveys for Environmental Impact Assessment* (Environmental Protection Authority (EPA), 2016), and

included a desktop review of literature and databases. Samples were collected in the field, or photographs taken of unfamiliar species to enable later identification.

3.2.1 Vegetation Type

Vegetation type was determined using the structural classes described in *Bush Forever Volume 2* (Government of Western Australia, 2000), and records dominant over, middle and understorey species. A tablet equipped with GPS mapping software (Mappt) was used to mark the change in vegetation type across the site. A description of the various structural classes is provided in Table 2.

Table 2: Vegetation structural classes

Life Form/Height Class	Canopy Percentage Cover			
	100 – 70%	70 – 30%	30 – 10%	10 – 2 %
Trees over 30 m	Tall closed forest	Tall open forest	Tall woodland	Tall open woodland
Trees 10 – 30 m	Closed forest	Open forest	Woodland	Open woodland
Trees under 10 m	Low closed forest	Low open forest	Low woodland	Low open woodland
Tree Mallee	Closed tree mallee	Tree mallee	Open tree mallee	Very open tree mallee
Shrub Mallee	Closed shrub mallee	Shrub mallee	Open shrub mallee	Very open shrub mallee
Shrubs over 2 m	Closed tall scrub	Tall open scrub	Tall shrubland	Tall open shrubland
Shrubs 1 – 2 m	Closed heath	Open heath	Shrubland	Open shrubland
Shrubs under 1 m	Closed low heath	Open low heath	Low shrubland	Low open shrubland
Grasses	Closed grassland	Grassland	Open grassland	Very open grassland
Herbs	Closed herbland	Herbland	Open herbland	Very open herbland
Sedges	Closed sedgeland	Sedgeland	Open sedgeland	Very open sedgeland

Source: Government of Western Australia, 2000

3.2.2 Vegetation Condition

Vegetation condition was assessed using the rating scale attributed to Keighery in *Technical Guidance-Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016). A tablet equipped with GPS mapping software (Mappt) was used to mark the vegetation condition across the site. Table 3 provides a description of the rating scale.

Table 3: Vegetation condition ratings

Category	Description
1 Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
2 Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.

Category	Description
3 Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
4 Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds, partial clearing, dieback and grazing.
5 Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
6 Completely Degraded	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Source: EPA, 2016

3.3 On-ground Fauna Survey

A basic fauna survey and black cockatoo habitat assessment was undertaken in conjunction with other survey activities. The fauna survey was completed in accordance with a Basic Fauna Survey as outlined in the Environmental Protection Authority (EPA) *Technical Guidance, Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA, 2020). A basic survey is defined as a low-intensity survey, which gathers broad fauna and habitat information including opportunistic fauna observations (EPA, 2020). The fauna survey included:

- recording opportunistic sightings of fauna species while traversing the site, either directly or indications of their presence (including scats, tracks, diggings, calls, and evidence of foraging in the form of chewed nuts). Two trail cameras were installed for two nights to target nocturnal or shy species
- recording boundaries of fauna habitat types present
- recording locations of evidence of feeding by black cockatoos in the form of chewed nuts and cones
- recording locations of potential habitat trees encountered with a diameter at breast height (DBH) greater than 500 mm which have the potential to provide habitat in the form of foraging, roosting and/or nesting for threatened black cockatoos.

3.4 Limitations

Several limitations associated with both desktop and on-ground flora and fauna surveys exist, including:

- database searches provide an indication of what flora species may be present, with on ground surveys required to confirm those present, this is negligible as a field survey was undertaken
- information on flora species provided on some databases include out-of-date species names, meaning that names need to be checked for currency and were updated as required
- on-ground surveys indicate species present at the time of the assessment, with species flowering at different times not always able to be identified, with not all species flowering every year

- the differing databases are reliant on information submitted via various reporting mechanisms, so all records of a particular species or ecological community within a specified area may not be complete
- some fauna species are highly mobile and may utilise the site as part of their range but may not be present within the site at the time of the survey
- certain fauna species are shy, difficult to observe or active at different times of the day and may not be observed even though they are present on site.

4.0 Flora Survey Results

4.1 Desktop Survey

NatureMap identified a total of 372 flora species which could potentially occur within a 10km radius of the survey area including:

- 331 dicotyledons
- two gymnosperms
- 39 monocotyledons.

4.1.1 Significant flora

A desktop survey of online databases indicated the potential for a total of 51 conservation significant species to occur within 10 km of the survey area (Table 4). NatureMap indicated 26 conservation significant flora species listed under the *Biodiversity Conservation Act 2016* (WA) as potentially occurring within a 10 km radius of the site (DBCA, 2021a) (Appendix 1). A review of the Protected Matters Search Tool (PMST) (DAWE, 2021) indicated 11 significant flora species listed under the *EPBC Act 1999* (Cwlth) as potentially occurring within a 10 km radius of the site (Appendix 2). A review of the DBCA (2021c) threatened and priority flora database indicated 44 threatened or priority species have been recorded within 10 km of the site.

Of the conservation significant species potentially occurring within the area, it was determined that the site conditions (soil type, drainage, location) may be suitable for 28 (highlighted green) of these species (Table 4). Conservation code descriptions are provided in Appendix 4.

Table 4: Threatened and Priority flora species listed by NatureMap, PMST and DBCA

Species Name	Cons Code	NatureMap	PMST	DBCA
<i>Acacia auratiflora</i>	EN/T		X	X
<i>Acacia depressa</i>	T	X		X
<i>Acacia drewiana</i> subsp. <i>minor</i>	P2	X		X
<i>Acacia lanuginophylla</i>	EN/T		X	X
<i>Acacia sclerophylla</i> var. <i>teretiuscula</i>	P1	X		X
<i>Acacia sedifolia</i> subsp. <i>pulvinata</i>	P3			X
<i>Acacia singula</i>	P3	X		X
<i>Banksia idiogenes</i>	P2	X		X
<i>Banksia rufa</i> subsp. <i>chelomacarpa</i>	P3	X		X
<i>Banksia xylothemelia</i>	P3	X		X
<i>Bentleya spinescens</i>	P4	X		X
<i>Borya</i> sp. <i>Wheatbelt</i>	P2			X
<i>Caladenia graniticola</i>	EN		X	
<i>Caladenia hoffmanii</i>	EN		X	

Species Name	Cons Code	NatureMap	PMST	DBCA
<i>Daviesia implexa</i>	P3	X		X
<i>Daviesia lineata</i>	P2			X
<i>Daviesia uncinata</i>	P3			X
<i>Duma horrida</i> subsp. <i>abdit</i>	CR		X	
<i>Eremophila veneta</i>	P4	X		X
<i>Eremophila verticillata</i>	EN/T		X	
<i>Eucalyptus mimica</i> subsp. <i>continens</i>	P1			X
<i>Eucalyptus mimica</i> subsp. <i>mimica</i>	P3	X		X
<i>Eucalyptus ornata</i>	P3	X		X
<i>Fitzwillia axilliflora</i>	P2	X		X
<i>Gastrolobium cruciatum</i>	P3	X		X
<i>Gastrolobium euryphyllum</i>	P1			X
<i>Grevillea involucrata</i>	EN/T	X	X	X
<i>Grevillea prostrata</i>	P4	X		X
<i>Guichenotia asteriskos</i>	P2	X		X
<i>Hydrocotyle muriculata</i>	P1	X		X
<i>Jacksonia debilis</i>	P1			X
<i>Leucopogon</i> sp. <i>Lake Magenta</i>	P1	X		X
<i>Mirbelia densiflora</i>	P3	X		X
<i>Olearia laciniifolia</i>	P2	X		X
<i>Persoonia brevirhachis</i>	P3	X		X
<i>Persoonia hakeiformis</i>	P2	X		X
<i>Ricinocarpos trichophorus</i>	EN		X	
<i>Rinzia affinis</i>	P4			X
<i>Roycea pycnophylloides</i>	EN		X	
<i>Styphelia</i> sp. <i>Dumblebung</i>	P3			X
<i>Synaphea bifurcata</i>	P3			X
<i>Synaphea cervifolia</i>	P2			X
<i>Synaphea</i> sp. <i>Jilakin Flat Rocks Rd</i>	P1			X
<i>Tetratheca aphylla</i>	VU		X	
<i>Tetratheca aphylla</i> subsp. <i>megacarpa</i>	T			X
<i>Thysanotus acerosifolius</i>	P2			X

Species Name	Cons Code	NatureMap	PMST	DBCA
<i>Thysanotus lavanduliflorus</i>	P1	X		X
<i>Tribonanthes purpurea</i>	T	X		X
<i>Verticordia integra</i>	P4	X		X
<i>Verticordia staminosa</i> var. <i>cylindracea</i>	EN/T		X	X
<i>Verticordia staminosa</i> var. <i>erecta</i>	T			X

4.1.2 Threatened and Priority Ecological Communities

A review of the PMST report identified one listed Threatened Ecological Community (TEC) that could potentially occur within 10 km of the site, Eucalypt Woodlands of the Western Australian Wheatbelt which is listed as critically endangered under the EPBC Act 1999 (DAWE, 2021). A review of the DBCA's ecological communities database also indicated that the Eucalypt Woodlands of the Western Australian Wheatbelt TEC has been previously recorded within the site boundary (DBCA, 2021c).

4.2 Flora Survey Results

4.2.1 Flora

A total of 114 flora species (taxa) were recorded from 34 families during the field survey, including 23 introduced (weeds) and 91 native species. The plant families which contained the most species were Myrtaceae, Asteraceae, Fabaceae and Poaceae. No priority or threatened flora species were identified within Lot 1 during the 2021 spring survey. An orchid species was recorded during the survey, *Diuris* sp. which was unable to be identified to species level as the plant had already senesced. It is considered unlikely that this species is conservation significant flora as there are no previous records of significant flora in this genus, within the region of the survey.

No Declared Pests and Weeds of National Significance (WoNS) were identified within the survey area.

Examples of native flora species are shown in Figure 3 and weed species in Figure 4. Quadrat data is listed in Appendix 5 with a complete flora species list provided in Appendix 6.



Dampiera eriocephala (Woolly-headed Dampiera)



Cheiranthra brevifolia



Eucalyptus tenera
(Common Southern Mallee)



Verticordia eriocephala
(Common Cauliflower)



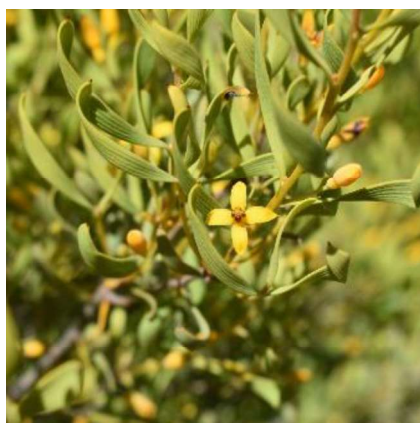
Anthotium rubriflorum
(Red Anthotium)



Grevillea didymobotrya subsp.
didymobotrya



Templetonia rossii



Persoonia quinquenervis



Eremophila drummondii
(Drummond's Eremophila)

Figure 3: Examples of native flora species recorded within the site



Smooth Cats-ear
(**Hypochaeris glabra*)



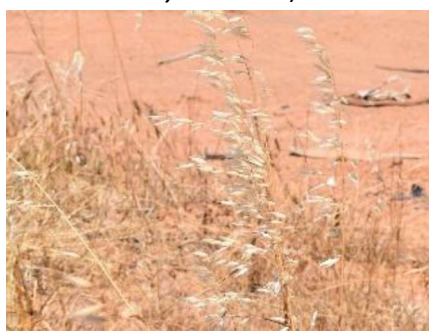
Iceplant (**Mesembryanthemum crystallinum*)



Umbrella Sedge (**Cyperus eragrostis*)



**Acacia iteaphylla*



Bearded Oat
(**Avena barbata*)



Black Berry Nightshade
(**Solanum nigrum*)

Figure 4: Examples of introduced flora species recorded within the site

4.2.2 Vegetation Type

One vegetation type was recorded within the survey area, Mixed *Eucalyptus* Open Mallee Woodland. This vegetation type consisted of an upper storey of mixed native Eucalypts over a middle storey of mixed native shrubs dominated by *Melaleuca hamata*, *Westringia* spp. and *Acacia* spp. over an understorey of native grasses (*Austrostipa* spp. and *Neurachne alopecuroides*) and native herbs (Figure 5).



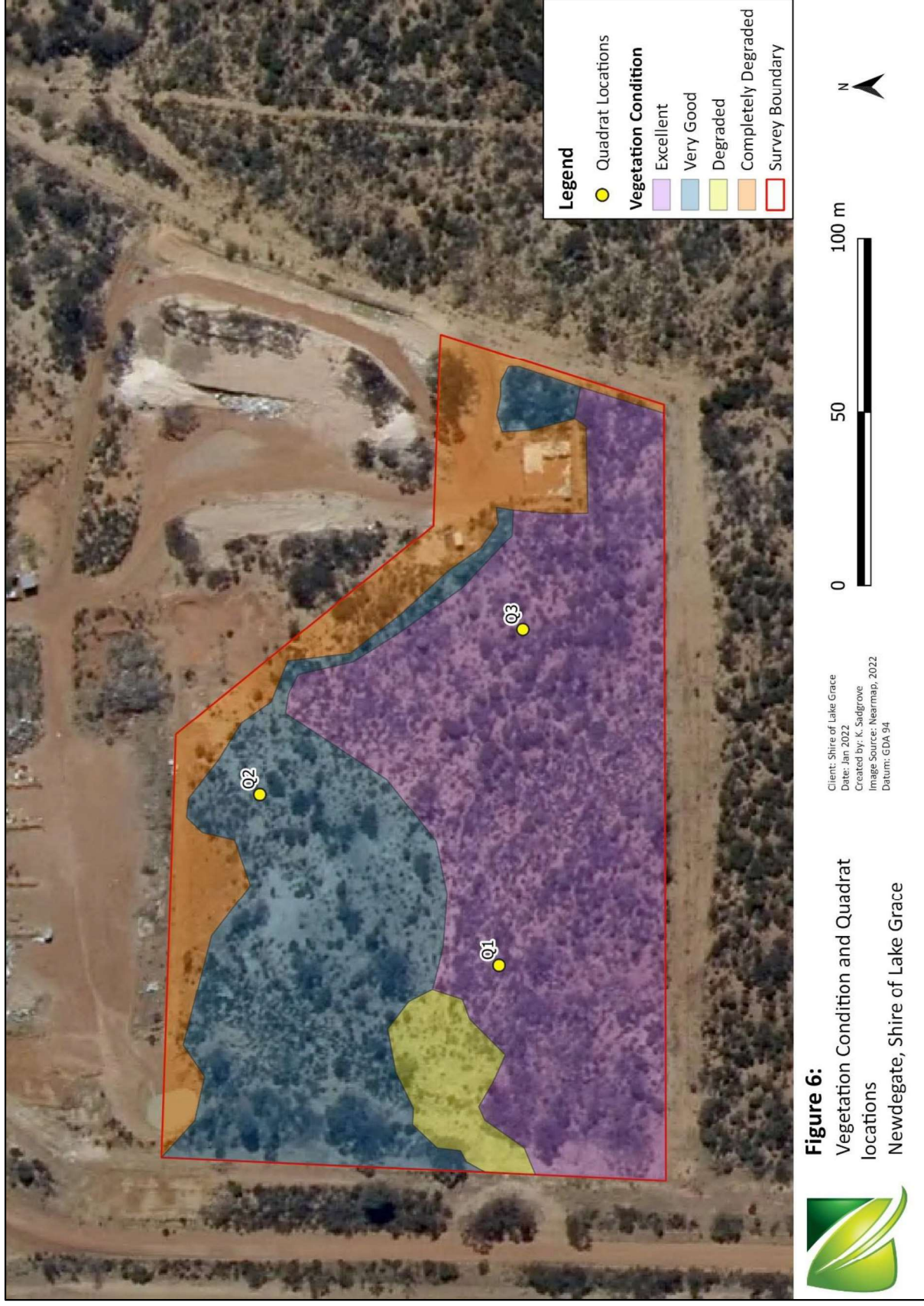
Figure 5: Vegetation type within survey area

4.2.3 Vegetation Condition

Vegetation condition on site ranged from Completely Degraded to Excellent (Table 5, Figure 6). The majority of the site is classified in Excellent (49.6%) and Very Good (30.7%) condition. The areas of the site in Completely Degraded condition contained areas of no native vegetation, high weed presence and have been subject to previous disturbances associated with landfilling activities.

Table 5: Vegetation condition within survey area

Vegetation Condition	Pristine	Excellent	Very Good	Good	Degraded	Completely Degraded	Total
Area (ha)	0	1.34	0.83	0	0.12	0.41	2.7
Area (%)	0	49.6	30.7	0	4.5	15.2	100



4.2.4 Threatened and Priority Communities

Eucalypt Woodlands of the Western Australian Wheatbelt were identified as potentially occurring within the survey area when the desktop analysis was undertaken. The Wheatbelt Woodlands TEC is recognised by the below key diagnostic features (Commonwealth of Australia, 2016):

- Occurs within the Eucalypt Woodlands of the WA Wheatbelt region of Western Australian, although this has some exceptions including, it does not include woodlands which are dominated by mallee trees.
- Patch size requirements for areas which are not located on roadsides:
 - A minimum of 2 ha in size:
 - high quality native vegetation with no more than 30% total vegetation cover of introduced (weed) species, or
 - introduced plant species account for over 30 to 50% total vegetation understorey cover AND mature trees are present, with at least 5 mature trees per half hectare. Mature trees are to have a diameter at breast height (DBH) of 30 cm or greater.
 - A minimum of 5 ha in size:
 - introduced (weed) species coverage of 30 to 50% total vegetation understorey, no less than 5 mature trees present per half hectare, or
 - introduced species account for over 50 to 70% total vegetation understorey cover and mature trees are present, with at least 5 such trees per half hectare.

The field survey determined that all the trees present within the survey boundary were mallees and therefore does not meet the requirement for this area to be classified as the Eucalypt Woodlands of the Western Australian Wheatbelt TEC. The key diagnostic features for at least 5 mature trees per hectare with a DBH of >30 cm was also not met on site. Although many species present are those classified as present within WA Wheatbelt Woodlands ecological communities and are identified in the species list provided in Appendix 6.

5.0 Fauna Survey Results

5.1 Desktop Survey

A desktop survey of online databases indicated the potential for a total of 18 conservation significant fauna species to occur within 10 km of the survey area (Table 6). NatureMap indicated four conservation significant species listed under the *Biodiversity Conservation Act 2016* (WA) as potentially occurring within a 10 km radius of the site (DBCA, 2021a) (Appendix 1). The Protected Matters Search Tool (PMST) indicated eight threatened species listed under the *EPBC Act 1999* (Cwlth) as potentially occurring within the 10 km radius of the site (DAWE, 2021) (Appendix 2). A review of the DBCA threatened and priority fauna species database indicated the potential for 14 conservation significant fauna species to occur within the 10 km radius of the site (DBCA, 2021c).

Both abiotic (soil, climate) as well as biotic (food resources, predator pressure) factors will determine the suitability of habitats for specific fauna assemblages, based on their ecological requirements. Evaluating the site locality, existing conditions and known home ranges, Natural Area determined that there is the potential for four bird species and one invertebrate species to be present within the survey site (highlighted green in Table 6).

Table 6: Threatened and Priority fauna species listed by NatureMap, PMST and DBCA

Lifeform	Species Name	Common Name	Cons Code	Nature Map	PMST	DBCA
Bird	<i>Calidris ferruginea</i>	Curlew Sandpiper	CR		x	
Bird	<i>Calidris ruficollis</i>	Red-necked Stint	IA	x		x
Bird	<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	EN		x	x
Bird	<i>Calyptorhynchus</i> sp.	White-tailed Black Cockatoo	MI			x
Bird	<i>Falco hypoleucos</i>	Grey Falcon	V		x	
Bird	<i>Falco peregrinus</i>	Peregrine Falcon	EN			x
Bird	<i>Leipoa ocellata</i>	Malleefowl	V		x	
Bird	<i>Platycercus icterotis xanthogenys</i>	Western Rosella (inland)	T			x
Bird	<i>Thinornis rubricollis</i>	Hooded Plover, Hooded Dotterel	P4	x		x
Mammal	<i>Bettongia penicillata ogilbyi</i>	Woylie	T	x		x
Mammal	<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	V		x	x
Mammal	<i>Myrmecobius fasciatus</i>	Numbat	E			x
Mammal	<i>Notamacropus irma</i>	Western Brush Wallaby	P4			x

Lifeform	Species Name	Common Name	Cons Code	Nature Map	PMST	DBCA
Mammal	<i>Parantechinus apicalis</i>	Dibbler	EN		x	
Mammal	<i>Phascogale calura</i>	Red-tailed Phascogale	S	x	x	x
Mammal	<i>Pseudomys occidentalis</i>	Western Mouse	P4			x
Mammal	<i>Pseudomys shortridgei</i>	Heath Mouse, Dayang, Heath Rat	EN		x	x
Invertebrate	<i>Hylaeus globuliferus</i>	Woolybush bee	P3			x

5.2 Fauna Survey Results

A total of 18 fauna species were recorded during the November 2021 survey, either directly or via indication of their presence (Table 7, Figure 7). Of the species observed, 13 were birds, two were reptiles, and three were mammals. The mammals included two introduced species, the Red Fox (**Vulpes vulpes*) and Feral Cat (**Felis catus*). The Red Fox and Feral Cats are a category C3 declared pest under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) (WA) and is required to be managed by the landholder/manager to limit their impact. Several cats at different stages of development (adults and kittens) were observed through direct observations and on trail cameras.

Table 7: Fauna observations within the survey site. * denotes introduced species

Family	Species Name	Common Name
Birds		
Meliphagidae	<i>Anthochaera carunculata</i>	Red Wattlebird
Motacillidae	<i>Anthus australis</i>	Australian Pipit
Artamidae	<i>Artamus cinereus</i>	Black-faced Woodswallow
Psittaculidae	<i>Barnardius zonarius</i>	Australian Ringneck
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush
Corvidae	<i>Corvus coronoides</i>	Australian Raven
Artamidae	<i>Cracticus nigrogularis</i>	Pied Butcherbird
Cacatuidae	<i>Eolophus roseicapilla</i>	Galah
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark
Artamidae	<i>Gymnorhina tibicen</i>	Australian Magpie
Meliphagidae	<i>Lichmera indistincta</i>	Brown Honeyeater
Psittaculidae	<i>Neophema elegans</i>	Elegant Parrot
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail
Reptile		
Scincidae	<i>Tiliqua rugosa</i>	Bobtail

Family	Species Name	Common Name
Varanidae	<i>Varanus sp.</i>	(Diggings and scratches on Eucalypts)
Mammal		
Macropodidae	<i>Macropus fuliginosus melanops</i>	Western Grey Kangaroo (scat)
Canidae	* <i>Vulpes vulpes</i>	Red Fox
Felidae	* <i>Felis catus</i>	Feral Cat (minimum 2 adults and several kittens)



Elegant Parrot
(*Neophema elegans*)



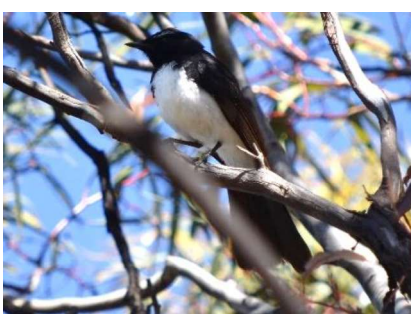
Varanus sp. digging



Bobtail
(*Tiliqua rugosa rugosa*)



Black-faced Woodswallow
(*Artamus cinereus*)



Willie Wagtail
(*Rhipidura leucophrys*)



Red Wattlebird
(*Anthochaera carunculata*)



Western Grey Kangaroo
(*Macropus fuliginosus melanops* - scat)



Feral Cat
(**Felis catus*)



Red Fox
(**Vulpes vulpes* - scat)

Figure 7: Fauna species observed, including direct and indirect indication of presence. *Denotes introduced species

5.3 Fauna Habitat

A cockatoo habitat assessment was undertaken to determine if the survey area contained potential habitat for threatened black cockatoos and the presence of foraging habitat for these species. The assessment found no suitable habitat trees within the survey area as there were no trees that met the habitat tree size requirements of diameter at breast height (DBH) of greater than 500 mm. *Eucalyptus* sp. (all classified as mallee) are present throughout the survey with the potential for low quality foraging sources to be present. No signs of foraging by black cockatoos were observed within the survey boundary and no individuals or other signs of their presence were observed during the survey. Based on distant observation, the adjacent reserve to the survey area appears to contain larger Eucalypt trees which may provide suitable habitat.

Good quality habitat within the site is present for reptiles, invertebrates and small bird species in the form of differing vegetation structural layers which provide shelter, food sources and nesting capacity in the canopy of the mallees present (Figure 8). Logs and leaf litter were also present within the site which provides habitat for reptiles and invertebrates.



Figure 8: Nesting of bird species within the survey site

6.0 Implications of Results

6.1 Flora and Vegetation

Natural Area's November 2021 survey recorded a total of 114 flora species (taxa) from 34 families which includes 23 (20.2%) introduced (weed) species and 91 (79.8%) native species. One vegetation type was present across the entire survey area, Mixed *Eucalyptus* Open Mallee Woodland. Vegetation condition across the site ranged from Completely Degraded to Excellent, with the majority of the site in Excellent (49.6%) and Good (30.7%) condition. Areas within the site classified as Completely Degraded contained areas of no native vegetation, high weed presence and have been subject to previous disturbances associated with landfilling activities.

6.2 Significant Flora

No threatened or priority flora species were identified during the November 2021 survey. The DBCA searches did not identify any threatened or priority species within the site boundary (DBCA 2021c) with the closest record occurring 1.5 km to the south. An orchid species was recorded during the survey, *Diuris* sp. which was unable to be identified to species level as the plant had already senesced. It is considered unlikely that this species is conservation significant flora as there are no previous records for this genus, within the region of the survey.

6.3 Threatened Ecological Communities

Eucalypt Woodlands of the Western Australian Wheatbelt was identified as potentially occurring within the survey area through the DBCA database search and the PMST results. As the results of the field survey determined that all the trees present within the survey boundary were mallees and therefore do not meet the requirement for this area to be classified as the Eucalypt Woodlands of the Western Australian Wheatbelt TEC.

6.4 Fauna

A total of 18 fauna species were recorded during the survey, including 13 birds (all native), two reptiles (both native), and three mammals (one native, two introduced). The two introduced mammals, the Red Fox (*Vulpes vulpes*) and Feral Cat (*Felis catus*), are listed as category C3 declared pests under the *BAM Act 2007* (WA) and require control by landowners and/or managers to reduce harmful impacts of the organism, reduce its number and contain the spread of the species. It is recommended to control the populations of feral cats within the site to limit the impact of these species on small mammals and reptiles and to prevent the spread into the adjacent reserve. Survey observations found no conservation significant or priority native fauna species or signs of their presence at the time of the survey.

The cockatoo habitat assessment found no potential habitat for nesting or roosting within the survey area as all trees present across the site did not meet the habitat tree size requirements of diameter at breast height (DBH) of 500 mm and greater. These trees may provide low quality food sources for threatened black cockatoos that are likely in the region although no evidence of feeding by cockatoo was recorded at the time of the assessment. Based on distant observation, the adjacent reserve to the survey area appears to contain larger Eucalypt trees which may provide more suitable habitat of a higher quality. The survey site does contain good quality habitat for reptiles, invertebrates and small bird species.

6.5 Assessment Against Clearing Principles

An assessment of information obtained during the 2021 survey has been made against the Western Australian clearing principles. It is suggested that the clearing application may be at variance to two of the ten clearing principles, principles A and E (Table 8). The proposed clearing occurs within the Western Australian Wheatbelt which is an area that has already been extensively cleared, the site has Excellent vegetation condition, has a high diversity of species, if clearing of the site is approved additional requirements/conditions may be placed on the clearing permit.

Table 8: Assessment against clearing principles

Clearing Principle	Comment
A Native vegetation should not be cleared if it comprises a high level of biological diversity.	The proposed area may be at variance with this principle: ▪ a total of 114 flora species were identified, including 91 (79.8%) native species and 23 (20.2 %) introduced species, this shows a high flora diversity for the site ▪ one vegetation type was determined within the survey site, Mixed Eucalyptus Open Woodland ▪ the majority of the site was in Excellent condition (49.6%) and Good condition (30.7%) ▪ during the November 2021 survey by Natural Area, no conservation significant flora was identified within the survey boundary and no records of conservation significant flora are recorded in DBCA database searches (DBCA 2021c).
B Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	The proposed area to be cleared is not likely to be at variance with this principle: ▪ a total of 18 fauna species were recorded during the November 2021 survey, no conservation significant fauna was identified during the survey ▪ no habitat trees for threatened black cockatoos with a diameter at breast height (DBH) >500 mm were present within the site, and no evidence of feeding was recorded during the survey. ▪ <i>Eucalyptus</i> sp. (all classified as mallee) trees are present throughout the survey site which potentially provides low quality foraging sources for black cockatoos.
C Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	The proposed area to be cleared is not likely to be at variance with this principle: ▪ no conservation significant flora was identified during Natural Area's November 2021 survey ▪ no rare or priority flora was identified as occurring within the site through DBCA (2021c) database searches with the closest record occurring approximately 1.5 km south of the southern boundary of the site.
D Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.	The proposed area to be cleared is not considered to be at variance with this principle: ▪ No threatened or priority ecological communities were identified during the November 2021 survey, although through desktop analysis and results of DBCA database search the did identify the area as potentially occurring within the Eucalypt Woodlands of the Western Australian Wheatbelt TEC

Clearing Principle	Comment
E Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	▪ All Eucalypt trees present within the site are mallees and therefore does not meet the requirements to be classified as Eucalypt Woodlands of the Western Australian Wheatbelt The proposed area to be cleared is likely to be at variance with this principle: ▪ The site is located within the WA Wheatbelt which has been extensively cleared for agricultural purposes. ▪ The site is located immediately adjacent to a reserve which covers approx. 27 ha, although in the wider landscape context it has been extensively cleared.
F Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	The proposed area to be cleared is not likely to be at variance with this principle: ▪ No water course or wetland and associated riparian vegetation was identified as occurring within the site during the 2021 survey. ▪ Adjacent to the survey area within the active landfill operating portion there is a main made water storage pond which at the time of the survey contained water. ▪ The closest wetland/waterbodies to the site are Lake Stubbs, occurring approx. 2.8 km to the west and approx. 1.5 km to the south is the start of the salt lake system which surrounds the town of Newdegate.
G Native Vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The proposed area to be cleared is not likely to be at variance with this principle as it is not expected to cause further land degradation with the surrounding landscape subjected to current agricultural practices and the norther portion of Lot 1 already comprising of an active landfill and waste collection facility.
H Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	The proposed area to be cleared is not likely to be at variance with this principle as it is not expected to have an impact on adjacent environmental values or nearby conservation reserve. ▪ Land use surrounding the site consists of agricultural land which has been previously cleared for farming purposes ▪ Immediately adjacent to the site is an unclassified vegetated area with clearing of vegetation not expected to have negative impacts on this area.

Clearing Principle	Comment
I Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	The area to be cleared is not likely to be at variance with this principle as it is not expected to cause deterioration in water quality of surface or groundwater. ▪ No surface water was present within the proposed clearing are during the 2021 survey. ▪ The northern proportion of Lot 1 is currently operating as a waste collection and landfilling facility. ▪ Adjacent to the survey area within the active landfill operating portion of Lot 1 there is a main made water storage pond present.
J Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	The area to be cleared is not likely to be at variance with this principle as portions of Lot 1 already comprising of an active landfill and waste collection facility with the expansion of this facility should take into account water runoff management. Flooding is not expected to occur as the current landfill site is located adjacent to a larger vegetated portion of land on two side and a road reserve on the other two.

7.0 References

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Appendix 1: NatureMap Report 10 km

NatureMap Species Report

Created By Guest user on 11/11/2021

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 119° 03' 42" E, 33° 03' 07" S
Buffer 10km
Group By Species Group

Species Group	Species	Records
Amphibian	1	1
Bird	48	131
Bryopsid (Moss)	2	3
Dicotyledon	331	581
Fungus	2	3
Gymnosperm	2	3
Invertebrate	4	6
Lichen	1	1
Mammal	5	19
Monocotyledon	39	58
Reptile	5	5
TOTAL	440	811

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Amphibian				
1.	25401 <i>Crinia pseudinsignifera</i> (Bleating Froglet)			
Bird				
2.	24559 <i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
3.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
4.	24312 <i>Anas gracilis</i> (Grey Teal)			
5.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
6.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
7.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
8.	<i>Barnardius zonarius</i>			
9.	24359 <i>Burhinus grallarius</i> (Bush Stone-curlew)			
10.	24788 <i>Calidris ruficollis</i> (Red-necked Stint)		IA	
11.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
12.	<i>Chroicocephalus novaehollandiae</i>			
13.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
14.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
15.	25592 <i>Corvus coronoides</i> (Australian Raven)			
16.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
17.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
18.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
19.	24322 <i>Cygnus atratus</i> (Black Swan)			
20.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			
21.	24650 <i>Drymodes brunneopygia</i> (Southern Scrub-robin)			
22.	<i>Elanus axillaris</i>			
23.	<i>Eolophus roseicapillus</i>			
24.	24567 <i>Epthianura albifrons</i> (White-fronted Chat)			
25.	25727 <i>Fulica atra</i> (Eurasian Coot)			
26.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
27.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
28.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
29.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
30.	24557 <i>Leipoa ocellata</i> (Malleefowl)		T	
31.	24573 <i>Lichenostomus cratitius</i> (Purple-gaped Honeyeater)			
32.	25659 <i>Lichenostomus leucotis</i> (White-eared Honeyeater)			
33.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
34.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
35.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
36.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
37.	25682	<i>Pardalotus striatus</i> (Striated Pardalote)			
38.	48061	<i>Petrochelidon nigricans</i> (Tree Martin)			
39.	48071	<i>Phylidonyris niger</i> (White-cheeked Honeyeater)			
40.	25720	<i>Platycercus icterotis</i> (Western Rosella)			
41.	24681	<i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)			
42.	25722	<i>Polytelis anthopeplus</i> (Regent Parrot)			
43.	24683	<i>Pomatostomus superciliosus</i> (White-browed Babbler)			
44.	25614	<i>Rhipidura leucophrys</i> (Willie Wagtail)			
45.	30948	<i>Smicromis brevirostris</i> (Weebill)			
46.	25705	<i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
47.	24331	<i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
48.	48135	<i>Thinornis rubricollis</i> (Hooded Plover, Hooded Dotterel)		P4	
49.	24852	<i>Tyto alba</i> subsp. <i>delicatula</i> (Barn Owl)			

Bryopsid (Moss)

50.	32461	<i>Campylopus bicolor</i> var. <i>bicolor</i>			
51.	32338	<i>Campylopus introflexus</i>	Y		

Dicotyledon

52.	16106	<i>Acacia acanthaster</i>			
53.	16159	<i>Acacia acanthoclada</i> subsp. <i>acanthoclada</i>			
54.	15468	<i>Acacia assimilis</i> subsp. <i>atroviridis</i>			
55.	3238	<i>Acacia bidentata</i>			
56.	3244	<i>Acacia brachyclada</i>			
57.	3259	<i>Acacia chrysopoda</i>			
58.	12253	<i>Acacia consobrina</i>			
59.	16169	<i>Acacia deficiens</i>			
60.	3292	<i>Acacia densiflora</i>			
61.	3295	<i>Acacia depressa</i> (Echidna Wattle)		T	
62.	3301	<i>Acacia dielsii</i>			
63.	11829	<i>Acacia drewiana</i> subsp. <i>minor</i>		P2	
64.	12257	<i>Acacia enervia</i> subsp. <i>explicata</i>			
65.	3324	<i>Acacia erinacea</i>			
66.	3349	<i>Acacia glaucoptera</i> (Flat Wattle)			
67.	3366	<i>Acacia hemiteles</i>			
68.	3389	<i>Acacia intricata</i>			
69.	3408	<i>Acacia lasiocalyx</i> (Silver Wattle, Willyurwur)			
70.	3416	<i>Acacia leptopetala</i>			
71.	11448	<i>Acacia leptospermoides</i> subsp. <i>leptospermoides</i>			
72.	3440	<i>Acacia merrallii</i>			
73.	3451	<i>Acacia multispicata</i>			
74.	3511	<i>Acacia redolens</i>			
75.	11765	<i>Acacia sclerophylla</i> var. <i>teretiuscula</i>		P1	
76.	14141	<i>Acacia singula</i>		P3	
77.	3589	<i>Acacia uncinella</i>			
78.	3590	<i>Acacia unifissilis</i>			
79.	3596	<i>Acacia viscifolia</i>			
80.	7817	<i>Actinobole uliginosum</i> (Flannel Cudweed)			
81.	6204	<i>Actinotus humilis</i>			
82.	6208	<i>Actinotus superbus</i>			
83.	1783	<i>Adenanthos flavidiflorus</i>			
84.	4905	<i>Alyogyne hakeifolia</i>			
85.	29108	<i>Andersonia</i> sp. <i>Kulin</i> (J.M. Powell 2588)			
86.	7836	<i>Angianthus tomentosus</i> (Camel-grass)			
87.	7412	<i>Anthotium rubriflorum</i> (Red Anthotium)			
88.	6336	<i>Astroloma serratifolium</i> (Kondrung)			
89.	20726	<i>Astus subroseus</i>			
90.	11525	<i>Atriplex paludosa</i> subsp. <i>baudinii</i>			
91.	5356	<i>Baeckea muricata</i>			
92.	32542	<i>Banksia erythrocephala</i> var. <i>erythrocephala</i>			
93.	32497	<i>Banksia idiogenes</i>		P2	
94.	32095	<i>Banksia rufa</i> subsp. <i>chelomacarpa</i>		P3	
95.	1851	<i>Banksia sphaerocarpa</i> (Round-fruit Banksia)			
96.	11868	<i>Banksia sphaerocarpa</i> var. <i>caesia</i>			
97.	1856	<i>Banksia violacea</i> (Violet Banksia)			
98.	32015	<i>Banksia xylothemelia</i>		P3	
99.	5388	<i>Beaufortia micrantha</i> (Little Bottlebrush, Small-leaved Beaufortia)			
100.	3150	<i>Bentleya spinescens</i>		P4	
101.	34276	<i>Beyeria sulcata</i> var. <i>brevipes</i>			
102.	34297	<i>Beyeria sulcata</i> var. <i>gracilis</i>			
103.	34257	<i>Beyeria sulcata</i> var. <i>sulcata</i>			

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
104.	3160	<i>Billardiera lehmanniana</i> (Kurup)			
105.	7856	<i>Blennospora drummondii</i>			
106.	4409	<i>Boronia coerulescens</i>			
107.	11274	<i>Boronia coerulescens</i> subsp. <i>spinescens</i>			
108.	15966	<i>Boronia inornata</i> subsp. <i>leptophylla</i>			
109.	30234	<i>Bossiaea barbarae</i>			
110.	7871	<i>Brachyscome ciliaris</i>			
111.	7878	<i>Brachyscome iberidifolia</i>			
112.	7882	<i>Brachyscome perpusilla</i>			
113.	7883	<i>Brachyscome pusilla</i>			
114.	2846	<i>Calandrinia calyptata</i> (Pink Purslane)			
115.	2853	<i>Calandrinia eremaea</i> (Twining Purslane)			
116.	7903	<i>Calotis hispidula</i> (Bindy Eye)			
117.	2953	<i>Cassytha melantha</i> (Large Dodder-laurel)			
118.	5491	<i>Chamelaucium ciliatum</i>			
119.	15130	<i>Chamelaucium pauciflorum</i> subsp. <i>pauciflorum</i>			
120.	35676	<i>Chamelaucium</i> sp. Merredin (G.J. Keighery & N. Gibson 6320)			
121.	16087	<i>Clematis delicata</i>			
122.	6343	<i>Coleanthera myrtoides</i>			
123.	4561	<i>Comesperma scoparium</i> (Broom Milkwort)			
124.	16857	<i>Conospermum amoenum</i> subsp. <i>amoenum</i>			
125.	1861	<i>Conospermum brownii</i> (Blue-eyed Smokebush)			
126.	8824	<i>Conospermum croniniae</i>			
127.	6345	<i>Conostephium drummondii</i>			
128.	7419	<i>Coopernookia strophiolata</i>			
129.	3137	<i>Crassula colorata</i> (Dense Stonecrop)			
130.	11563	<i>Crassula colorata</i> var. <i>colorata</i>			
131.	3139	<i>Crassula exserta</i>			
132.	4800	<i>Cryptandra leucopogon</i>			
133.	9076	<i>Cryptandra myriantha</i>			
134.	4809	<i>Cryptandra pungens</i>			
135.	6747	<i>Cyanostegia angustifolia</i> (Tinsel-flower)			
136.	6956	<i>Cyphanthera microphylla</i>			
137.	7438	<i>Dampiera eriocephala</i> (Woolly-headed Dampiera)			
138.	7439	<i>Dampiera fasciculata</i> (Bundled-leaf Dampiera)			
139.	7449	<i>Dampiera juncea</i> (Rush-like Dampiera)			
140.	41025	<i>Dasymalla terminalis</i> (Native Foxglove)			
141.	8977	<i>Daviesia aphylla</i>			
142.	48322	<i>Daviesia implexa</i>		P3	
143.	6755	<i>Dicrastylis corymbosa</i>			
144.	4755	<i>Dodonaea bursariifolia</i>			
145.	4775	<i>Dodonaea pinifolia</i>			
146.	4778	<i>Dodonaea ptarmicaefolia</i>			
147.	4780	<i>Dodonaea stenozyga</i>			
148.	11247	<i>Dodonaea viscosa</i> subsp. <i>angustissima</i>			
149.	2510	<i>Enchylaena lanata</i>			
150.	12064	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i> (Barrier Saltbush)			
151.	14895	<i>Eremophila decipiens</i> subsp. <i>decipiens</i>			
152.	16807	<i>Eremophila densifolia</i> subsp. <i>pubiflora</i>			
153.	7200	<i>Eremophila drummondii</i>			
154.	7215	<i>Eremophila glabra</i> (Tar Bush)			
155.	17175	<i>Eremophila glabra</i> subsp. <i>albicans</i>			
156.	12929	<i>Eremophila veneta</i>		P4	
157.	4331	<i>Erodium aureum</i>	Y		
158.	4332	<i>Erodium botrys</i> (Long Storksbill)	Y		
159.	19508	<i>Eucalyptus calycogona</i> subsp. <i>calycogona</i>			
160.	18092	<i>Eucalyptus dissimulata</i> subsp. <i>dissimulata</i>			
161.	15804	<i>Eucalyptus dolichocera</i>			
162.	12377	<i>Eucalyptus extensa</i>			
163.	18521	<i>Eucalyptus flocktoniae</i> subsp. <i>flocktoniae</i>			
164.	5666	<i>Eucalyptus grossa</i> (Coarse-leaved Mallee)			
165.	5686	<i>Eucalyptus kondininensis</i> (Kondinin Blackbutt)			
166.	11423	<i>Eucalyptus loxophleba</i> subsp. <i>gratae</i> (Lake Grace Gum)			
167.	13037	<i>Eucalyptus loxophleba</i> subsp. <i>lissophloia</i>			
168.	11295	<i>Eucalyptus loxophleba</i> subsp. <i>loxophleba</i> (York Gum)			
169.	19637	<i>Eucalyptus mimica</i> subsp. <i>mimica</i>		P3	
170.	13513	<i>Eucalyptus myriadena</i> subsp. <i>myriadena</i>			
171.	18490	<i>Eucalyptus neutra</i>			
172.	13524	<i>Eucalyptus olivina</i>			
173.	5732	<i>Eucalyptus ornata</i> (Silver Mallet)		P3	

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174.	12893	<i>Eucalyptus phaenophylla</i>			
175.	12892	<i>Eucalyptus phaenophylla</i> subsp. <i>phaenophylla</i>			
176.	5745	<i>Eucalyptus pileata</i> (Capped Mallee)			
177.	13525	<i>Eucalyptus quadrans</i>			
178.	5772	<i>Eucalyptus sheathiana</i> (Ribbon-barked Gum)			
179.	29671	<i>Eucalyptus</i> sp. Fraser Range (D. Nicolle 2157)			
180.	14189	<i>Eucalyptus sporadica</i>			
181.	12879	<i>Eucalyptus subtilis</i> (Narrow-leaved Mallee)			
182.	13027	<i>Eucalyptus tenera</i>			
183.	18293	<i>Eucalyptus urna</i>			
184.	37820	<i>Eutaxia neurocalyx</i> subsp. <i>papillosa</i>			
185.	12623	<i>Fitzwillia axilliflora</i>		P2	
186.	20488	<i>Gastrolobium cruciatum</i>		P3	
187.	19732	<i>Gastrolobium melanocarpum</i>			
188.	10981	<i>Gastrolobium parviflorum</i>			
189.	3924	<i>Gastrolobium spinosum</i> (Prickly Poison)			
190.	3927	<i>Gastrolobium stowardii</i>			
191.	33620	<i>Glischrocaryon angustifolium</i>			
192.	12624	<i>Gnephosis angianthoides</i>			
193.	7991	<i>Gnephosis drummondii</i>			
194.	8003	<i>Gnephosis tridens</i>			
195.	10777	<i>Gompholobium gompholobioides</i>			
196.	3951	<i>Gompholobium marginatum</i>			
197.	12522	<i>Goodenia glareicola</i>			
198.	12523	<i>Goodenia helmsii</i>			
199.	7517	<i>Goodenia incana</i> (Hoary Goodenia)			
200.	17656	<i>Goodenia laevis</i> subsp. <i>humifusa</i>			
201.	12577	<i>Goodenia tripartita</i>			
202.	7562	<i>Goodenia viscida</i> (Viscid Goodenia)			
203.	1946	<i>Grevillea acacioides</i>			
204.	1962	<i>Grevillea beardiana</i> (Red Combs)			
205.	1971	<i>Grevillea cagiana</i> (Red Toothbrushes)			
206.	13453	<i>Grevillea didymobotrya</i> subsp. <i>didymobotrya</i>			
207.	1991	<i>Grevillea disjuncta</i>			
208.	14095	<i>Grevillea dolichopoda</i>			
209.	2002	<i>Grevillea eryngioides</i> (Curly Grevillea)			
210.	8832	<i>Grevillea excelsior</i> (Flame Grevillea)			
211.	19435	<i>Grevillea hookeriana</i> subsp. <i>hookeriana</i>			
212.	2018	<i>Grevillea huegelii</i>			
213.	2024	<i>Grevillea involucrata</i> (Lake Varley Grevillea)		T	
214.	13419	<i>Grevillea pilosa</i> subsp. <i>pilosa</i>			
215.	2074	<i>Grevillea prostrata</i> (Pallarup Grevillea)		P4	
216.	17745	<i>Grevillea shuttleworthiana</i> subsp. <i>canarina</i>			
217.	15766	<i>Grevillea shuttleworthiana</i> subsp. <i>obovata</i>			
218.	15767	<i>Grevillea shuttleworthiana</i> subsp. <i>shuttleworthiana</i>			
219.	2104	<i>Grevillea teretifolia</i> (Round Leaf Grevillea)			
220.	2105	<i>Grevillea tetragonoloba</i>			
221.	2115	<i>Grevillea umbellulata</i>			
222.	17714	<i>Guichenotia asteriskos</i>		P2	
223.	5014	<i>Guichenotia sarotes</i>			
224.	2142	<i>Hakea commutata</i>			
225.	2145	<i>Hakea corymbosa</i> (Cauliflower Hakea)			
226.	12228	<i>Hakea horrida</i>			
227.	2171	<i>Hakea laurina</i> (Pincushion Hakea, Kodjet)			
228.	2179	<i>Hakea marginata</i>			
229.	2181	<i>Hakea meisneriana</i>			
230.	2184	<i>Hakea multilineata</i> (Grass Leaf Hakea)			
231.	2193	<i>Hakea pandanica</i>			
232.	19131	<i>Hakea scoparia</i> subsp. <i>scoparia</i>			
233.	31013	<i>Halgania anagalloides</i> var. <i>Southern</i> (A.E. Orchard 1609)			
234.	6872	<i>Hemigenia teretiuscula</i>			
235.	19935	<i>Hibbertia ancistrotricha</i>			
236.	5124	<i>Hibbertia exasperata</i>			
237.	5143	<i>Hibbertia lineata</i>			
238.	20349	<i>Hibbertia psilocarpa</i>			
239.	12742	<i>Hyalosperma demissum</i>			
240.	6229	<i>Hydrocotyle diantha</i>			
241.	6235	<i>Hydrocotyle muriculata</i>		P1	
242.	11546	<i>Hydrocotyle plifera</i> var. <i>glabrata</i>			
243.	6239	<i>Hydrocotyle rugulosa</i>			

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244.	14437	<i>Isopogon scabriusculus</i> subsp. <i>scabriusculus</i>			
245.	14436	<i>Isopogon scabriusculus</i> subsp. <i>stenophyllus</i>			
246.	19995	<i>Isopogon</i> sp. <i>Newdegate</i> (D.B. Foreman 771)			
247.	2238	<i>Isopogon teretifolius</i> (Nodding Coneflower)			
248.	4012	<i>Jacksonia furcellata</i> (Grey Stinkwood)			
249.	4024	<i>Jacksonia racemosa</i>			
250.	6778	<i>Lachnostachys bracteosa</i>			
251.	5047	<i>Lasiopetalum rosmarinifolium</i>			
252.	4959	<i>Lawrencia squamata</i>			
253.	7575	<i>Lechenaultia formosa</i> (Red Leschenaultia)			
254.	2352	<i>Leptomeria preissiana</i>			
255.	5852	<i>Leptospermum nitens</i>			
256.	6383	<i>Leucopogon cuneifolius</i>			
257.	6386	<i>Leucopogon dielsianus</i>			
258.	6391	<i>Leucopogon fimbriatus</i>			
259.	41769	<i>Leucopogon</i> sp. <i>Lake Magenta</i> (K.R. Newbey 3387)		P1	
260.	6488	<i>Limonium lobatum</i>	Y		
261.	6509	<i>Logania micrantha</i>			
262.	34736	<i>Lysinema pentapetalum</i>			
263.	2537	<i>Maireana brevifolia</i> (Small Leaf Bluebush)			
264.	2542	<i>Maireana erioclada</i>			
265.	2550	<i>Maireana marginata</i>			
266.	4077	<i>Medicago minima</i> (Small Burr Medic)	Y		
267.	15063	<i>Melaleuca acuminata</i> subsp. <i>acuminata</i>			
268.	12384	<i>Melaleuca adenostyla</i>			
269.	5870	<i>Melaleuca adnata</i>			
270.	18527	<i>Melaleuca brophyi</i>			
271.	19289	<i>Melaleuca condylosa</i>			
272.	12387	<i>Melaleuca ctenoides</i>			
273.	5916	<i>Melaleuca halmaturorum</i>			
274.	19486	<i>Melaleuca hamata</i>			
275.	19081	<i>Melaleuca johnsonii</i>			
276.	5922	<i>Melaleuca lanceolata</i> (Rottnest Teatree, Moonah)			
277.	41120	<i>Melaleuca marginata</i>			
278.	5947	<i>Melaleuca pauperiflora</i> (Boree)			
279.	15664	<i>Melaleuca pauperiflora</i> subsp. <i>pauperiflora</i>			
280.	5956	<i>Melaleuca pungens</i>			
281.	5957	<i>Melaleuca quadrifaria</i>			
282.	20290	<i>Melaleuca scalena</i>			
283.	5969	<i>Melaleuca spicigera</i>			
284.	5981	<i>Melaleuca thyoides</i>			
285.	18126	<i>Melaleuca tuberculata</i> var. <i>macrophylla</i>			
286.	5985	<i>Melaleuca undulata</i> (Hidden Honey-myrtle)			
287.	2813	<i>Mesembryanthemum crystallinum</i> (Iceplant)	Y		
288.	2814	<i>Mesembryanthemum nodiflorum</i> (Slender Iceplant)	Y		
289.	44594	<i>Microcybe ambigua</i>			
290.	18045	<i>Microcybe multiflora</i> subsp. <i>baccharoides</i>			
291.	18046	<i>Microcybe multiflora</i> subsp. <i>multiflora</i>			
292.	20140	<i>Micromyrtus triptycha</i> subsp. <i>triptycha</i>			
293.	12630	<i>Millotia major</i>			
294.	4088	<i>Mirbelia densiflora</i>		P3	
295.	4091	<i>Mirbelia floribunda</i> (Purple Mirbelia)			
296.	29418	<i>Monoculus monstrosus</i>	Y		
297.	12637	<i>Olearia laciniifolia</i>		P2	
298.	8140	<i>Olearia muelleri</i> (Goldfields Daisy)			
299.	8146	<i>Olearia ramosissima</i> (Much-branched Daisy Bush)			
300.	18255	<i>Opercularia vaginata</i> (Dog Weed)			
301.	46313	<i>Orianthera flaviflora</i>			
302.	33256	<i>Oxalis bowiei</i> (Bowie Wood Sorrel)	Y		
303.	4358	<i>Oxalis purpurea</i> (Largeflower Wood Sorrel)	Y		
304.	2964	<i>Papaver hybridum</i> (Rough Poppy)	Y		
305.	4345	<i>Pelargonium havlasae</i>			
306.	14082	<i>Persoonia brevihachis</i>		P3	
307.	2259	<i>Persoonia coriacea</i> (Leathery-leaf Persoonia)			
308.	2265	<i>Persoonia hakeiformis</i>		P2	
309.	2270	<i>Persoonia quinquenervis</i>			
310.	2281	<i>Persoonia trinervis</i>			
311.	2286	<i>Petrophile brevifolia</i>			
312.	14395	<i>Petrophile glauca</i>			
313.	2308	<i>Petrophile seminuda</i>			

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314.	4500	<i>Phebalium filifolium</i> (Slender Phebalium)			
315.	4504	<i>Phebalium tuberculatum</i>			
316.	18509	<i>Philotheca rhomboidea</i>			
317.	11282	<i>Pimelea brevifolia</i> subsp. <i>brevifolia</i>			
318.	11402	<i>Pimelea imbricata</i> var. <i>piliger</i>			
319.	19744	<i>Pittosporum angustifolium</i>			
320.	7299	<i>Plantago debilis</i>			
321.	8177	<i>Podolepis lessonii</i>			
322.	8181	<i>Podolepis tepperi</i>			
323.	8182	<i>Podotricha angustifolia</i> (Sticky Longheads)			
324.	8187	<i>Pogonolepis muelleriana</i>			
325.	6923	<i>Prostanthera semiteres</i>			
326.	4725	<i>Psammomoya choretoides</i>			
327.	2732	<i>Ptilotus holosericeus</i>			
328.	2760	<i>Ptilotus spathulatus</i>			
329.	11254	<i>Rhagodia preissii</i> subsp. <i>preissii</i>			
330.	13294	<i>Rhodanthe laevis</i>			
331.	13252	<i>Rhodanthe pygmaea</i>			
332.	13309	<i>Rhodanthe spicata</i>			
333.	48433	<i>Salicornia blackiana</i>			
334.	30434	<i>Salsola australis</i>			
335.	7644	<i>Scaevola spinescens</i> (Currant Bush, Maroon)			
336.	2609	<i>Sclerolaena diacantha</i> (Grey Copperburr)			
337.	8207	<i>Senecio glossanthus</i> (Slender Groundsel)			
338.	17558	<i>Senna artemisioides</i> subsp. <i>x artemisioides</i>			
339.	19897	<i>Senna</i> sp. <i>Pallinup River</i> (J.W. Green 4847)			
340.	3070	<i>Sisymbrium irio</i> (London Rocket)	Y		
341.	7013	<i>Solanum hoplopetalum</i> (Thorny Solanum)			
342.	7030	<i>Solanum plicatile</i>			
343.	8230	<i>Sonchus asper</i> (Rough Sowthistle)	Y		
344.	48456	<i>Stylidium amphora</i>			
345.	7713	<i>Stylidium dichotomum</i> (Pins-and-needles)			
346.	34968	<i>Stylidium involucreatum</i>			
347.	7765	<i>Stylidium neglectum</i> (Neglected Stylidium)			
348.	9304	<i>Stylidium zeicolor</i> (Maize Triggerplant)			
349.	49144	<i>Styphelia</i> sp. <i>Dumbleyung</i> (A.J.G. Wilson 146)			
350.	7043	<i>Symonanthus aromaticus</i>			
351.	16761	<i>Synaphea interioris</i>			
352.	19056	<i>Synaphea</i> sp. <i>Jilakin Flat Rocks Rd</i> (R. Butcher et. al RB200)			
353.	15534	<i>Synaphea spinulosa</i> subsp. <i>major</i>			
354.	33236	<i>Tecticornia halocnemoides</i> (Shrubby Samphire)			
355.	33319	<i>Tecticornia indica</i> subsp. <i>bidens</i>			
356.	31718	<i>Tecticornia lepidosperma</i>			
357.	33297	<i>Tecticornia pergranulata</i> subsp. <i>pergranulata</i> (Blackseed Samphire)			
358.	31716	<i>Tecticornia syncarpa</i>			
359.	46437	<i>Tetrapora preissiana</i>			
360.	6931	<i>Teucrium eremaeum</i>			
361.	19397	<i>Teucrium filifolium</i> subsp. <i>glandular</i> (W. Rogerson 233)			
362.	6937	<i>Teucrium sessiliflorum</i> (Camel Bush)			
363.	6268	<i>Trachymene cyanopetala</i>			
364.	6280	<i>Trachymene pilosa</i> (Native Parsnip)			
365.	4383	<i>Tribulus terrestris</i> (Caltrop)	Y		
366.	9008	<i>Urodon dasyphyllus</i> (Mop Bushpea)			
367.	38388	<i>Ursinia anthemoides</i> subsp. <i>anthemoides</i>	Y		
368.	12388	<i>Verticordia acerosa</i> var. <i>preissii</i>			
369.	6073	<i>Verticordia chrysantha</i>			
370.	12422	<i>Verticordia eriocephala</i> (Common Cauliflower)			
371.	6082	<i>Verticordia grandiflora</i> (Claw Featherflower)			
372.	12430	<i>Verticordia huegelii</i> var. <i>stylosa</i>			
373.	6090	<i>Verticordia humilis</i>			
374.	12432	<i>Verticordia inclusa</i>			
375.	12435	<i>Verticordia integra</i>		P4	
376.	6109	<i>Verticordia picta</i> (Painted Featherflower)			
377.	15267	<i>Verticordia roei</i> subsp. <i>roei</i>			
378.	15617	<i>Verticordia serrata</i> var. <i>serrata</i>			
379.	7386	<i>Wahlenbergia gracilentia</i> (Annual Bluebell)			
380.	13331	<i>Waitzia acuminata</i> var. <i>acuminata</i>			
381.	9247	<i>Westringia rigida</i> (Stiff Westringia)			
382.	6660	<i>Wilsonia rotundifolia</i> (Round-leaf Wilsonia)			

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Fungus				
383.	<i>Boletus sp.</i>			
384.	<i>Uromycladium tepperianum</i>			
Gymnosperm				
385.	92 <i>Callitris canescens</i>			
386.	97 <i>Callitris roei</i> (Roe's Cypress Pine)			
Invertebrate				
387.	<i>Aname mainae</i>			
388.	<i>Lampona foliifera</i>			
389.	<i>Nephila edulis</i>			
390.	<i>Nicodamus mainae</i>			
Lichen				
391.	45299 <i>Jackelixia elixii</i>			
Mammal				
392.	24162 <i>Bettongia penicillata</i> subsp. <i>ogilbyi</i> (Woylie, Brush-tailed Bettong)			T
393.	24135 <i>Macropus robustus</i> subsp. <i>erubescens</i> (Euro, Biggada)			
394.	24085 <i>Oryctolagus cuniculus</i> (Rabbit)	Y		
395.	24098 <i>Phascogale calura</i> (Red-tailed Phascogale, Kenngoor)			S
396.	24108 <i>Sminthopsis crassicaudata</i> (Fat-tailed Dunnart)			
Monocotyledon				
397.	1061 <i>Anarthria polyphylla</i>			
398.	17237 <i>Austrostipa elegantissima</i>			
399.	17239 <i>Austrostipa exilis</i>			
400.	17241 <i>Austrostipa hemipogon</i>			
401.	17257 <i>Austrostipa variabilis</i>			
402.	1267 <i>Borya constricta</i>			
403.	253 <i>Bromus rubens</i> (Red Brome)	Y		
404.	15344 <i>Caladenia dimidia</i>			
405.	1587 <i>Caladenia douthchiae</i>			
406.	18023 <i>Caladenia horistes</i>			
407.	18026 <i>Caladenia pendens</i> subsp. <i>pendens</i>			
408.	19279 <i>Caladenia pulchra</i>			
409.	1614 <i>Caladenia roei</i> (Ant Orchid)			
410.	1617 <i>Caladenia sigmoidea</i>			
411.	1444 <i>Conostylis petrophiloides</i>			
412.	48255 <i>Diuris brachyscapa</i>			
413.	15436 <i>Diuris porrifolia</i>			
414.	899 <i>Gahnia ancistrophylla</i> (Hooked-leaf Saw Sedge)			
415.	1194 <i>Juncus radula</i>			
416.	1306 <i>Laxmannia paleacea</i>			
417.	929 <i>Lepidosperma carphoides</i> (Black Rapier Sedge)			
418.	41647 <i>Lepidosperma sanguinolentum</i>			
419.	<i>Lepidosperma sp.</i>			
420.	492 <i>Neurachne alopecuroidea</i> (Foxtail Mulga Grass)			
421.	516 <i>Parapholis incurva</i> (Coast Bargrass)	Y		
422.	1669 <i>Prasophyllum cyphochilum</i> (Pouched Leek Orchid)			
423.	16688 <i>Prasophyllum gracile</i>			
424.	1689 <i>Pterostylis mutica</i> (Midget Greenhood)			
425.	12216 <i>Pterostylis roensis</i>			
426.	1697 <i>Pterostylis scabra</i> (Bronze Shell Orchid)			
427.	116 <i>Ruppia polycarpa</i>			
428.	40431 <i>Rytidosperma acerosum</i>			
429.	40427 <i>Rytidosperma setaceum</i>			
430.	1002 <i>Schoenus nanus</i> (Tiny Bog Rush)			
431.	14626 <i>Schoenus sp. A1</i> Boorabbin (K.L. Wilson 2581)			
432.	1337 <i>Thysanotus lavanduliflorus</i>			P1
433.	1343 <i>Thysanotus patersonii</i>			
434.	1484 <i>Tribonanthes purpurea</i> (Granite Pink)			T
435.	<i>Urochilus sanguineus</i>			
Reptile				
436.	24918 <i>Crenadactylus ocellatus</i> subsp. <i>ocellatus</i> (Clawless Gecko)			
437.	41403 <i>Diplodactylus calcicolus</i> (South Coast Gecko)			
438.	25131 <i>Lerista distinguenda</i>			
439.	25259 <i>Pseudonaja affinis</i> subsp. <i>affinis</i> (Dugite)			
440.	25203 <i>Tiliqua occipitalis</i> (Western Bluetongue)			

Name	ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Conservation Codes					
T - Rare or likely to become extinct					
X - Presumed extinct					
IA - Protected under international agreement					
S - Other specially protected fauna					
1 - Priority 1					
2 - Priority 2					
3 - Priority 3					
4 - Priority 4					
5 - Priority 5					

¹ For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.



Appendix 2: PMST Report 10km



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 10/11/21 12:40:28

[Summary](#)

[Details](#)

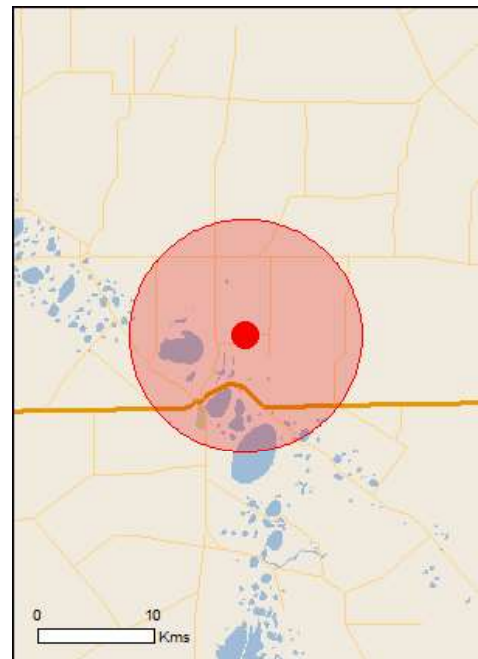
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	19
Listed Migratory Species:	6

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	11
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	11
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities

[[Resource Information](#)]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Eucalypt Woodlands of the Western Australian Wheatbelt	Critically Endangered	Community likely to occur within area

Listed Threatened Species

[[Resource Information](#)]

Name	Status	Type of Presence
------	--------	------------------

Birds

[Calidris ferruginea](#)

Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
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[Calyptorhynchus latirostris](#)

Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
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[Falco hypoleucos](#)

Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
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[Leipoa ocellata](#)

Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
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Mammals

[Dasyurus geoffroii](#)

Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area
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[Parantechinus apicalis](#)

Dibbler [313]	Endangered	Species or species habitat may occur within area
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[Phascogale calura](#)

Red-tailed Phascogale, Red-tailed Wambenger, Kenngoor [316]	Vulnerable	Species or species habitat likely to occur within area
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[Pseudomys shortridgei](#)

Heath Mouse, Dayang, Heath Rat [77]	Endangered	Species or species habitat likely to occur within area
-------------------------------------	------------	--

Plants

[Acacia auratiflora](#)

Orange-flowered Wattle [64824]	Endangered	Species or species habitat may occur within area
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[Acacia lanuginophylla](#)

Woolly Wattle [55575]	Endangered	Species or species habitat likely to occur within area
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Name	Status	Type of Presence
Caladenia graniticola Pingaring Spider-orchid, Granite Spider-orchid [84996]	Endangered	Species or species habitat may occur within area
Caladenia hoffmanii Hoffman's Spider-orchid [56719]	Endangered	Species or species habitat may occur within area
Duma horrida subsp. abdita Remote Thorny Lignum [87538]	Critically Endangered	Species or species habitat may occur within area
Eremophila verticillata Whorled Eremophila [7032]	Endangered	Species or species habitat likely to occur within area
Grevillea involucreata Lake Varley Grevillea [4631]	Endangered	Species or species habitat may occur within area
Ricinocarpos trichophorus Barrens Wedding Bush [19931]	Endangered	Species or species habitat likely to occur within area
Roycea pycnophylloides Saltmat [21161]	Endangered	Species or species habitat likely to occur within area
Tetralathea aphylla Bungalbin Tetralathea [2915]	Vulnerable	Species or species habitat may occur within area
Verticordia staminosa var. cylindracea Granite Featherflower [55823]	Endangered	Species or species habitat likely to occur within area

Listed Migratory Species [\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land

[\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name

Commonwealth Land -

Listed Marine Species

[\[Resource Information \]](#)

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat known to occur within area

Extra Information

Invasive Species

[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.05179 119.06243

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

Appendix 3: Conservation Codes

Western Australia

Conservation Code	Name	Description
T	Threatened	Flora or fauna that is rare or likely to become extinct, ranked according to their level of threat using IUCN Red List criteria (Schedules 1-3 of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice)
CR	Critically endangered	Species considered to be facing an extremely high risk of extinction within the wild in the immediate future
EN	Endangered	Species considered to be facing a very high risk of extinction in the wild in the near future
VU	Vulnerable	Species considered to be facing a high risk of extinction in the wild in the medium-term future
EX	Extinct Species	Species where 'there is no reasonable doubt that the last member of the species has died (Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice or the Wildlife Conservation (Rare Flora) Notice)
EW	Extinct in the Wild	Species that are known to only survive in cultivation, in captivity, or as a naturalised population well outside its past range; and it has not been recorded in its known or expected habitat at appropriate seasons anywhere in its past range, despite surveys over a timeframe appropriate to its life cycle and form
MI	Migratory Species	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth (Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice)
CD	Conservation Dependent	Species of special conservation interest (conservation dependent fauna), being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened (Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice)
OS	Specially Protected	Fauna otherwise in need of special protection to ensure their conservation (Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice)
P	Priority Species	Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or

Conservation Code	Name	Description
		flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.
P1	Priority One	Poorly known species – Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either very small or on lands not managed for conservation, such as road verges, urban areas, farmland, active mineral lease and under threat of habitat destruction or degradation.
2	Priority Two	Poorly known species – Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, such as national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves and similar.
3	Priority Three	Poorly known species – Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat
4	Priority Four	Rare or near threatened and other species in need of monitoring.

Source: DBCA, 2020

Commonwealth

Category	Description
Critically Endangered	Species facing an extremely high risk of extinction in the wild in the immediate future
Endangered	Species facing a very high risk of extinction in the wild in the near future
Vulnerable	Species facing a high risk of extinction in the wild in the medium term

Source: DBCA, 2019

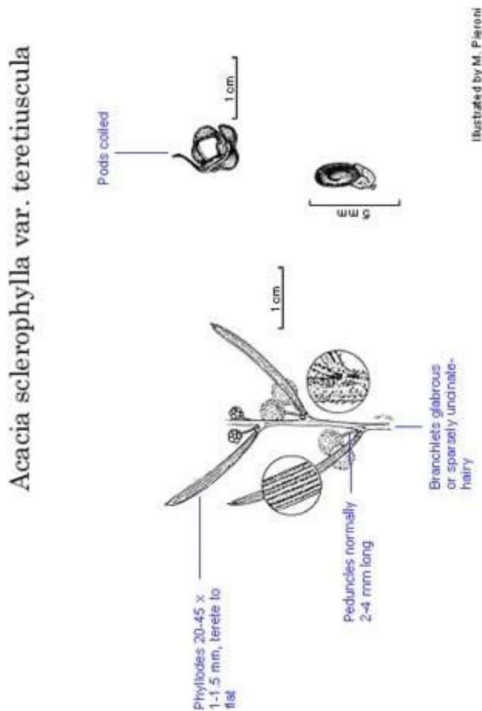
Appendix 4: Significant Flora Species Guide

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <i>Acacia auratiflora</i> D. Papenfuss		Spreading shrub, 0.3-1 m high, to 2 m wide. Fl. Yellow.	Jul to Aug.	Sandy clay, clay, clayey loam. Plains, wet depressions.	E	Unlikely – habitat not suitable
 <i>Acacia depressa</i> Photos: S.D. Hopper & L. Sweedman	Echidna Wattle	Prostrate, dense, prickly shrub, 0.02-0.15 m high. Fl. Yellow.	Dec or Jan.	Lateritic gravelly soils. Low hills & rises.	T	Habitat may be suitable

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
  <i>Acacia drewniana</i> subsp. <i>minor</i> Photos: S.J. Patrick		Spreading shrub, 0.15-0.5 m high. Fl. yellow	May to Jul.	Sandy & gravelly soils.	P2	Habitat may be suitable
  <i>Acacia lamuginopylla</i> Photos: S.D. Hopper & M.S. Graham		Dense shrub, 0.5-1.2 m high. Fl. Yellow.	Jul to Oct.	White/grey sand, clayey sand, gravelly soils. Flats, along drainage lines.	E	Unlikely – habitat not suitable

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <i>Acacia sedifolia</i> subsp. <i>pulvinata</i>		Dense, rounded, resinous shrub, 0.75-1.8 m high.	Fl. yellow, Jul to Aug.	Gravelly sand or clay. Laterite hills, gravelly ridges.	P3	Habitat may be suitable
 <i>Acacia sclerophylla</i> var. <i>teretiuscula</i>		Spreading, much-branched shrub, 0.25-2.5 m high. Fl. Yellow.	Sep to Oct.	Clay & loamy soils.	P1	Unlikely – habitat not suitable

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species		Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <i>Acacia singula</i>	 Photos: G.F. Craig		Shrub, 0.35-2 m high.	Fl. Yellow. Aug to Oct.	Gravelly sand over laterite, white or yellow sand. Rises, hilltops.	P3	Habitat may be suitable
 <i>Banksia idiogenes</i>	 Photos: M. Pieroni		Tufted, non-lignotuberous shrub, to 0.5(-0.7) m high. Fl. white/cream & red.	Aug.	Sandy loam over gravel.	P2	Habitat may be suitable

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <i>Banksia rufa</i> subsp. <i>chelomacarpa</i>						
  Photos: M. Pieroni		Prostrate shrub, to 0.45 m high. Fl. Yellow.	Jul to Oct.	Sandy loam over gravel.	P3	Habitat may be suitable
 <i>Banksia xylothemelia</i>						
 Photos: M. Pieroni		Often sprawling, lignotuberous shrub, to 1 m high, sometimes suckering. Fl. Yellow.	Sep to Oct.	Sandy loam, usually over laterite. Sandplains.	P3	Habitat may be suitable

Species		Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <i>Bentleya spinescens</i> Photos: M. Hancock, K. Dixon & S.D. Hopper	  Photos: M. Hancock, K. Dixon & S.D. Hopper		Spiny rhizomatous, perennial, herb or shrub, 0.05-0.2 m high, 0.02-0.2 m wide. Fl. white-cream-green.	Sep to Oct.	Sandy clay.	P4	Unlikely – habitat not suitable
		Borya sp. Wheatbelt					
 <i>Caladenia graniticola</i> Photos: I. & M. Greeve	  Photos: I. & M. Greeve		Tufted perennial, herb, to 0.3 m high. Fl. White.	Sep.	Dark brown sandy loam over granite. Rock outcrops.		Habitat may be suitable
			Tuberous, perennial, herb, to 0.21 m high, plant usually single flowered. Fl. green-yellow	Oct.	Gritty sandy clay, granite. Near low exposed rock outcrops.	E	Habitat may be suitable

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <i>Caladenia hoffmanii</i>		  Photos: A.P. Brown, S.D. Hopper & S.J. Patrick				
		Tuberous, perennial, herb, 0.13-0.3 m high. Fl. green & yellow & red.	Aug to Oct.	Clay, loam, laterite, granite. Rocky outcrops and hillsides, ridges, swamps and gullies.	E	Habitat may be suitable
P3						
 <i>Daviesia implexa</i>		 Photos: J.A. Cochrane				
		Erect, bushy shrub, 0.6-2 m high. Fl. yellow/orange & red/brown.	Aug to Sep.	White or yellow sand, sometimes over lateritic gravel. Undulating plains, low sand ridges.		Habitat may be suitable

Species		Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
			Intricate, many-stemmed shrub, 0.2-0.7 m high. Fl. yellow & brown.	Dec or Jan.	Gravelly lateritic sand, loamy sand. Undulating plains.	P3	Unlikely – habitat not suitable
<i>Daviesia uncinata</i>		Photos: J.A. Cochrane					
<i>Duma horrida</i> subsp. <i>abdita</i>		No info.		CE			

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species		Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <i>Eremophila veneta</i>	 Photos: J. Start, E. Holland & M. Hancock	Metallic-flowered Eremophila	Spreading or straggly shrub, 0.3-1.2 m high, to 1.8 m wide. Fl. green & yellow & purple.	Oct to Nov.	Clay to loam, white/grey sand. Plains & flats, slopes.	P4	Unlikely – habitat not suitable
		Whorled Eremophila	Low spreading shrub, up to 0.8 m high, to 1 m wide. Fl. purple-violet.	Nov to Dec.	Clay loam, loam over limestone.	E	Unlikely – habitat not suitable
 <i>Eremophila verticillata</i>	 Photos: S.D. Hopper						

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
<i>Eucalyptus mimica</i> subsp. <i>continens</i>	Hooded Mallet	(Mallee) or tree, 2-6 m high, bark smooth. Fl. Cream.	Jan.	Sand, sandy clay. Flats, moist areas.		Habitat may be suitable
<i>Eucalyptus mimica</i> subsp. <i>mimica</i>	Newdegate Mallet	Upright, spreading (mallee), 3.5-8 m high, bark smooth, grey-brown to shiny coppery with detached brown curls at the base.		White to brown sandy clay, pink to white clayey loam. Flats, near salt lakes.	P3	Unlikely – habitat not suitable
<i>Eucalyptus ornata</i>	Ornamental Silver Mallet	Tree, 6-10 m high, bark smooth, grey. Fl. white.		Laterite. Ridges.	P3	Habitat may be suitable
<i>Fitzwillia axilliflora</i>		Ascending to erect annual, herb, 0.03-0.135 m high. Fl. White.	Sep to Nov.	Sand, clay loam. Margins of salt lakes, saline flats.	P2	Unlikely – habitat not suitable
<i>Gastrolobium cruciatum</i>		Spreading shrub, to 0.5 m high. Fl. Yellow & red.	Sep.	Sand & clayey sand with gravel, rocky loams, laterite. Flats, gently undulating areas.	P3	Unlikely – habitat not suitable
<i>Gastrolobium euryphyllum</i>		Slender, erect, glaucous shrub, to 2.5 m high. Fl. orange-yellow.	Sep to Dec or Jan.	Sand over laterite. Rolling sand dunes.		Unlikely – habitat not suitable

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species		Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
  <i>Grevillea involucreta</i>	  Photos: A.S. George & S.D. Hopper	Lake Varley Grevillea	Prostrate to low-domed open shrub, 0.15-0.3 m high, up to 2 m wide. Fl. pink/pink-red.	Jun or Oct.	Gravelly sand.	E	Habitat may be suitable
	  <i>Grevillea prostrata</i>	Pallarup Grevillea	Loose, prostrate shrub, 0.04-0.1 m high, 0.8-1.2 m wide. Fl. cream-white/pink-red.	Aug to Dec or Jan.	White, grey or yellow sand, gravel. Sandplains.	P4	Habitat may be suitable
  Photos: M.Graham & M.Hancock			Erect, compact shrub, ca 0.35 m high. Fl. White.	Sep to Oct.	Sandy clay or loam with gravel.	P2	Unlikely – habitat not suitable
<i>Guichenotia asteriskos</i>							

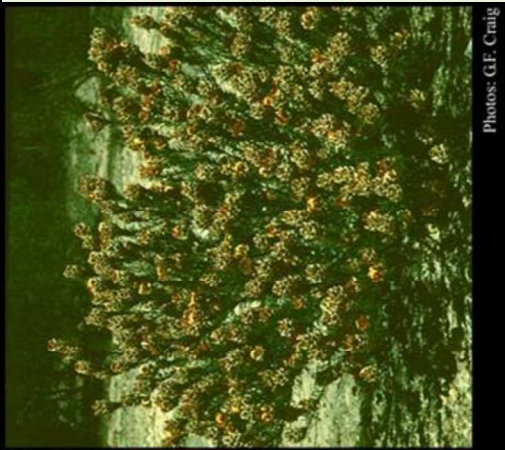
Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
<i>Hydrocotyle muriculata</i>		Low spreading to prostrate annual, herb. Fl. yellow	Sep.	Margins of salt lakes & flats.	P1	Unlikely – habitat not suitable
 <i>Jacksonia debilis</i>						
 <i>Leucopogon</i> sp. Lake Magenta		Prostrate shrub. Fl. yellow & red.	Sep to Oct.	White or grey clayey sand.	P1	Unlikely – habitat not suitable
		No info.			P1	

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <i>Mirbelia densiflora</i>						
 Photos: G.F. Craig		Erect or straggling shrub, 0.2-1 m high. Fl. yellow-orange.	Oct or Jan.	Stony loam, loamy sand. Small ridges, breakaways, undulating plains.	P3	Habitat may be suitable
<i>Olearia laciniifolia</i>		Erect, few-stemmed shrub, 0.6-1.2 m high. Fl. blue/purple & white/yellow.	May to Sep.	White sand. Around playa lakes.	P2	Unlikely – habitat not suitable

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <i>Persoonia breviflora</i>		Erect, often spreading shrub, 0.3-2 m high. Fl. Yellow.	Aug to Oct.	White or yellow sand, gravelly sandy soils.	P3	Habitat may be suitable
 <i>Persoonia hakeiformis</i>		Erect, spreading to decumbent shrub, 0.3-1.8 m high. Fl. Yellow.	Oct to Dec or Jan.	Gravelly clay loam or sand over laterite. Lateritic ridges.	P2	Habitat may be suitable

Photos: S.J. Patrick

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
  		Erect, openly branching shrub, 0.3-1 m high. Fl. White.	May or Aug to Sep.	Sandy clay, loam. Breakaways, among sandstone rocks.	E	Unlikely – habitat not suitable
<i>Ricinocarpos trichophorus</i>						
<i>Rinzia affinis</i>	Two-flowered Rinzia	Rounded or erect shrub, 0.2-0.7 m high. Fl. white/pink.	Jul to Nov.	Yellow sand, loam or sand with lateritic pebbles. Hills.	P4	Habitat may be suitable

Species		Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <i>Roycea pycnophylloides</i>		Saltmat	Perennial, herb, forming densely branched, silvery mats to 1 m wide.	Sep.	Sandy soils, clay. Saline flats.	E	Unlikely – habitat not suitable
	 Photos: P. Roberts & L. Sweedman						
<i>Styphelia</i> sp. Dumbleyung			No info.			P3	

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
  <i>Synaphea bifurcata</i> Photos: A. Waters		Bushy shrub, 0.3-0.5 m high. Fl. Yellow.	Sep to Nov.	Clay-loam or sand over laterite.	P3	Unlikely – habitat not suitable
    <i>Synaphea cervifolia</i> Photos: S.J. Patrick		Shrub, to 0.3 m high. Fl. Yellow.	Jun to Oct.	Sandy clay & gravel.		Unlikely – habitat not suitable

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
<i>Synaphea</i> sp. Jilakin Flat Rocks Rd		Under shrub, to 0.4 m high. Fl. Yellow.	Sep.	Red-brown clayey sand, sandy loam, gravel, laterite. Slopes, road verges, regrowth areas.	P1	Habitat may be suitable
 <i>Tetratheca aphylla</i> Photo: A.P. Brown	Bungalbin	Erect, spreading, leafless shrub, to 0.6 m high. Fl. pink/pink-purple.	Sep to Oct.	Yellow sand, red to brown loams, yellow clay loam, gravel, banded ironstone, laterite. Slopes, valleys, ridges, rock outcrops, cliffs.	V	Habitat may be suitable
	<i>Tetratheca aphylla</i> subsp. <i>megacarpa</i>	Shrub, to 0.35 m high.		Yellow sand, brown sandy loam, yellow-brown clay loam, gravel, laterite. Rises and ridges.	T	Habitat may be suitable
<i>Thysanotus acerosifolius</i>		Caespitose perennial, herb (with tuberous roots), to 0.3 m high. Fl. Purple.	Dec.	Sand, laterite, clayey loam. Sandplains.	P2	Habitat may be suitable

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species		Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
 <i>Thysanotus lavanduliflorus</i> Photos: N.H. Brittan			Caespitose perennial, herb (with tuberous roots), to 0.25 m high. Fl. Purple.	Nov to Dec.	Sand, sandy loam.		Habitat may be suitable
		Granite Pink	Tuberous, perennial, herb, 0.03-0.04 m high. Fl. pink-purple.	Aug.	Seasonally wet soils in moss swards & herbfields among granite rocks.	T	Habitat may be suitable
 <i>Tribonanthes purpurea</i> Photo: S.D.Hopper							

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species		Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
  <i>Verticordia integra</i>	 Photos: E.A. George		Spindly shrub, 0.5-1 m high. Fl. Yellow.	Oct to Dec.	Sandy soils over laterite.	P4	Habitat may be suitable
  <i>Verticordia staminosa</i> var. <i>cylindracea</i>	  Photos: E.A. Bernalt, E.A. George & M. Pieroni		Spreading shrub, 0.3-0.8 m high. Fl. green-yellow/brown.	Jul to Oct.	Soil pockets. Granite outcrops.	E	Habitat may be suitable

Shire of Lake Grace

Detailed flora and basic fauna survey – Newdegate waste management facility extension

Species	Common Name	Description	Flowering Period	Habitat Type	Cons Code	Likelihood
   <i>Verticordia staminosa</i> var. <i>erecta</i> Photos: E.A. Berndt		Erect, compact shrub, 0.15-1 m high. Fl. green-yellow/yellow-brown.	Jul to Oct.	Soil pockets. Granite outcrops.	T	Habitat may be suitable

Appendix 5: Quadrat Data

Quadrat No.:	Q1
Survey Date:	23/1/2021
Personnel:	KS JW
Latitude:	-33.0522
Longitude:	119.0613
Topography:	Flat
Aspect:	Flat
Slope:	0%
Soil:	Yellow sandy-loam
Gravel:	0%
Rock:	0%
Leaf Litter:	1%
Bare Ground:	30%
Drainage:	Well
Condition:	Excellent



Notes: Mixed *Eucalyptus* Open Woodland.

Species	Cover (%)	Height (m)
<i>Acacia sulcata</i>	5	0.4
<i>Allocasuarina huegeliana</i>	0.2	0.3
<i>Austrostipa elegantissima</i>	1	0.3
<i>Austrostipa hemipogon</i>	0.5	1
<i>Austrostipa variabilis</i>	0.2	0.3
<i>Comesperma scoparium</i>	0.1	0.2
<i>Crassula colorata</i> var. <i>colorata</i>	0.1	0.1
<i>Cryptandra myriantha</i>	1	0.3
<i>Ericomyrtus serpyllifolia</i>	4	0.4
<i>Eucalyptus myriadena</i>	25	8
<i>Grevillea acacioides</i>	10	1.5
<i>Lepidosperma fimbriatum</i>	2	0.5
<i>Leptomeria preissiana</i>	0.5	1.5
<i>Leptospermum erubescens</i>	10	2
<i>Levenhookia pusilla</i>	0.1	0.1
<i>Melaleuca hamata</i>	10	2
<i>Neurachne alopecuroidea</i>	20	0.5

Species	Cover (%)	Height (m)
<i>Panaetia lessonii</i>	0.1	0.1
<i>Rytidosperma caespitosum</i>	0.1	0.3
<i>Styphelia serratifolia</i>	0.5	0.3
<i>Thysanotus patersonii</i>	1	0.5
<i>Verticordia chrysanthella</i>	5	0.4
<i>Verticordia eriocephala</i>	0.2	0.3
<i>Verticordia picta</i>	1	0.3
<i>Westringia cephalantha</i> var. <i>caterva</i>	0.5	0.2

Quadrat No.:	Q2
Survey Date:	24/11/2021
Personnel:	KS JW
Latitude:	-33.0516
Longitude:	119.0618
Topography:	Flat
Aspect:	Flat
Slope:	0%
Soil:	Brown clay-loam
Gravel	5%
Rock:	0%
Leaf Litter:	2%
Bare Ground:	45%
Drainage:	Well
Condition:	Very Good

Notes: Mixed *Eucalyptus* Open Woodland.

Species	Cover (%)	Height (m)
<i>Acacia multispicata</i>	1	0.4
<i>Austrostipa elegantissima</i>	0.5	0.4
<i>Austrostipa hemipogon</i>	0.1	0.3
<i>Beyeria sulcata</i> var. <i>gracilis</i>	2	0.3
<i>Cryptandra myriantha</i>	3	0.2
<i>Boronia inornata</i> subsp. <i>leptophylla</i>	0.5	0.5
<i>Cassutha melantha</i>	10	1
<i>Cooperhooikia strophiolata</i>	0.5	0.2
<i>Daviesia incrassata</i> subsp. <i>teres</i>	20	1
<i>Eremophila drummondii</i>	1	0.5
<i>Eucalyptus tenera</i>	50	6
<i>Gastrolobium parviflorum</i>	1	0.4
<i>Hakea scoparia</i> subsp. <i>scoparia</i>	1	0.5
<i>Lepidosperma sanguinolentum</i>	0.1	0.3
<i>Leptomeria preissiana</i>	1	1.5
<i>Phebalium filifolium</i>	0.5	0.3
<i>Westringia cephalantha</i> var. <i>caterva</i>	6	0.3
<i>Westringia rigida</i>	5	0.3

Quadrat No.:	Q3
Survey Date:	25/11/2021
Personnel:	KS JW
Latitude:	-33.0522
Longitude:	119.0624
Topography:	Flat
Aspect:	Flat
Slope:	0%
Soil:	Brown clay-loam
Gravel:	0%
Rock:	0%
Leaf Litter:	1%
Bare Ground:	30%
Drainage:	Well
Condition:	Excellent

Notes: Mixed *Eucalyptus* Open Woodland.

Species	Cover (%)	Height (m)
<i>Austrostipa elegantissima</i>	5	0.5
<i>Austrostipa hemipogon</i>	0.1	0.5
<i>Austrostipa variabilis</i>	0.1	0.5
<i>Beyeria sulcata</i> var. <i>gracilis</i>	1	0.4
<i>Blennospora drummondii</i>	0.1	0.1
<i>Cheiranthra brevifolia</i>	1	0.5
<i>Crassula colorata</i> var. <i>colorata</i>	0.1	0.1
<i>Cryptandra myriantha</i>	5	0.5
<i>Diuris</i> sp.	0.1	0.2
<i>Ericomyrtus serpyllifolia</i>	2	0.5
<i>Eucalyptus myriadena</i>	30	8
<i>Gastrolobium parviflorum</i>	5	0.3
<i>Grevillea acuaria</i>	1	0.5
<i>Lepidosperma sanguinolentum</i>	0.5	0.5
<i>Levenhookia pusilla</i>	0.1	0.1
<i>Lobelia cleistogamoides</i>	0.1	0.1
<i>Melaleuca hamata</i>	40	2
<i>Neurachne alopecuroidea</i>	10	0.2
<i>Podothea angustifolia</i>	2	0.5

Species	Cover (%)	Height (m)
<i>Rytidosperma caespitosum</i>	0.1	0.2
<i>Schoenus nanus</i>	0.1	0.1
<i>Thysanotus patersonii</i>	0.2	0.5
<i>Trachymene cyanopetala</i>	0.1	0.1
<i>Westringia cephalantha</i> var. <i>caterva</i>	5	0.3

Appendix 6: Species List

The complete flora list for the site is provided in the table below. *Denotes introduced species.

Family	Species	Common Name	WA Wheatbelt Woodland TEC Species
Fabaceae	<i>Acacia acanthaster</i>		
Fabaceae	<i>Acacia acanthoclada</i> subsp. <i>acanthoclada</i>		
Fabaceae	<i>Acacia chrysopoda</i>		
Fabaceae	<i>Acacia hemiteles</i>		
Fabaceae	<i>Acacia iteaphylla</i> *		
Fabaceae	<i>Acacia merrallii</i>		X
Fabaceae	<i>Acacia multispicata</i>		
Fabaceae	<i>Acacia saligna</i>	Orange Wattle	
Fabaceae	<i>Acacia sulcata</i>		
Poaceae	<i>Aira cupaniana</i> *	Silvery Hairgrass	
Casuarinaceae	<i>Allocasuarina campestris</i>		X
Casuarinaceae	<i>Allocasuarina huegeliana</i>	Rock Sheoak	X
Asteraceae	<i>Angianthus tomentosus</i>	Camel-grass	
Goodeniaceae	<i>Anthotium rubriflorum</i>	Red Anthotium	
Chenopodiaceae	<i>Atriplex semibaccata</i>	Berry Saltbush	
Poaceae	<i>Austrostipa elegantissima</i>		X
Poaceae	<i>Austrostipa hemipogon</i>		X
Poaceae	<i>Austrostipa variabilis</i>		
Poaceae	<i>Avena barbata</i> *	Bearded Oat	
Euphorbiaceae	<i>Beyeria sulcata</i> var. <i>gracilis</i>		
Asteraceae	<i>Blennospora drummondii</i>		X
Rutaceae	<i>Boronia inornata</i> subsp. <i>leptophylla</i>		
Boryaceae	<i>Borya sphaerocephala</i>	Pincushions	X
Brassicaceae	<i>Brassica tournefortii</i> *	Mediterranean Turnip	
Poaceae	<i>Bromus diandrus</i> *		
Myrtaceae	<i>Callistemon citrinus</i> *	Kings Park Special 'Bottlebrush	
Cupressaceae	<i>Callitris preissii</i> *	Rottneest Island Pine	X
Lauraceae	<i>Cassytha melantha</i>	Large Dodder-laurel	

Family	Species	Common Name	WA Wheatbelt Woodland TEC Species
Gentianaceae	<i>Centaurium tenuiflorum</i> *		
Pittosporaceae	<i>Cheiranthra brevifolia</i>		
Polygalaceae	<i>Comesperma scoparium</i>	Broom Milkwort	
Goodeniaceae	<i>Cooperookia strophilata</i>		
Crassulaceae	<i>Crassula colorata</i>	Dense Stonecrop	
Crassulaceae	<i>Crassula colorata</i> var. <i>colorata</i>		
Rhamnaceae	<i>Cryptandra myriantha</i>		
Poaceae	<i>Cynodon dactylon</i> *	Couch	
Cyperaceae	<i>Cyperus eragrostis</i> *	Umbrella Sedge	
Goodeniaceae	<i>Dampiera eriocephala</i>	Woolly-headed Dampiera	
Fabaceae	<i>Daviesia incrassata</i> subsp. <i>teres</i>		
Hemerocallidaceae	<i>Dianella revoluta</i>	Blueberry Lily	
Orchidaceae	<i>Diuris</i> sp.	(No Threatened or Priority species in the region)	
Chenopodiaceae	<i>Enchylaena lanata</i>		X
Scrophulariaceae	<i>Eremophila drummondii</i>	Drummond's Eremophila	
Scrophulariaceae	<i>Eremophila phillipsii</i>		
Myrtaceae	<i>Ericomyrtus serpyllifolia</i>		
Myrtaceae	<i>Eucalyptus myriadena</i>		X
Myrtaceae	<i>Eucalyptus rigidula</i>		
Myrtaceae	<i>Eucalyptus sheathiana</i>		X
Myrtaceae	<i>Eucalyptus tenera</i>	Common Southern Mallee	X
Fabaceae	<i>Gastrolobium parviflorum</i>		X
Asteraceae	<i>Gazania linearis</i> *		
Haloragaceae	<i>Glischrocaryon aureum</i>	Common Popflower	
Goodeniaceae	<i>Goodenia helmsii</i>		
Proteaceae	<i>Grevillea acacioides</i>		
Proteaceae	<i>Grevillea acuaria</i>		X
Proteaceae	<i>Grevillea didymobotrya</i> subsp. <i>didymobotrya</i>		
Proteaceae	<i>Grevillea huegelii</i>		X
Proteaceae	<i>Grevillea pectinata</i>	Comb-leaved Grevillea	

Family	Species	Common Name	WA Wheatbelt Woodland TEC Species
Proteaceae	<i>Hakea scoparia</i>		
Proteaceae	<i>Hakea scoparia</i> subsp. <i>scoparia</i>		
Asteraceae	<i>Hypochaeris glabra</i> *	Smooth Cats-ear	
Cyperaceae	<i>Lepidosperma costale</i>		
Cyperaceae	<i>Lepidosperma fimbriatum</i>		
Cyperaceae	<i>Lepidosperma sanguinolentum</i>		
Santalaceae	<i>Leptomeria preissiana</i>		X
Myrtaceae	<i>Leptospermum erubescens</i>	Roadside Teatree	X
Myrtaceae	<i>Leptospermum nitens</i>		
Stylidiaceae	<i>Levenhookia pusilla</i>	Midget Stylewort	
Campanulaceae	<i>Lobelia cleistogamoides</i>		
Poaceae	<i>Lolium rigidum</i> *	Wimmera Ryegrass	
Chenopodiaceae	<i>Maireana brevifolia</i>	Small Leaf Bluebush	X
Malvaceae	<i>Malva parviflora</i> *	Marshmallow	
Myrtaceae	<i>Melaleuca hamata</i>		X
Myrtaceae	<i>Melaleuca johnsonii</i>		
Myrtaceae	<i>Melaleuca marginata</i>		X
Myrtaceae	<i>Melaleuca tuberculata</i> var. <i>macrophylla</i>		
Aizoaceae	<i>Mesembryanthemum crystallinum</i> *	Iceplant	
Orchidaceae	<i>Microtis media</i>	Tall Mignonette Orchid	
Asteraceae	<i>Monoculus monstrosus</i> *		
Poaceae	<i>Neurachne alopecuroidea</i>	Foxtail Mulga Grass	X
Asteraceae	<i>Onopordum acanthium</i> *	Scotch Thistle	
Asteraceae	<i>Osteospermum sp.</i> *		
Asteraceae	<i>Ozothamnus lepidophyllus</i>	Scaly-leaved Everlasting	
Asteraceae	<i>Panaetia lessonii</i>		
Poaceae	<i>Parapholis incurva</i> *	Coast Barbgrass	
Proteaceae	<i>Persoonia quinquenervis</i>		
Rutaceae	<i>Phebalium filifolium</i>		X
Asteraceae	<i>Podotheca angustifolia</i>	Sticky Longheads	X
Lamiaceae	<i>Prostanthera semiteres</i>		

Family	Species	Common Name	WA Wheatbelt Woodland TEC Species
Poaceae	<i>Rytidosperma caespitosum</i>		X
Santalaceae	<i>Santalum acuminatum</i>	Quandong	X
Cyperaceae	<i>Schoenus nanus</i>	Tiny Bog Rush	
Chenopodiaceae	<i>Sclerolaena diacantha</i>	Grey Copperburr	X
Solanaceae	<i>Solanum nigrum</i> *	Black Berry Nightshade	
Asteraceae	<i>Sonchus asper</i> *	Rough Sowthistle	
Poaceae	<i>Stenotaphrum secundatum</i> *	Buffalo Grass	
Stylidiaceae	<i>Stylidium dichotomum</i>	Pins-and-needles	
Stylidiaceae	<i>Stylidium involucratum</i>		
Ericaceae	<i>Styphelia serratifolia</i>		
Fabaceae	<i>Templetonia rossii</i>		
Myrtaceae	<i>Tetrapora preissiana</i>		
Asparagaceae	<i>Thysanotus patersonii</i>		X
Araliaceae	<i>Trachymene cyanopetala</i>		X
Araliaceae	<i>Trachymene pilosa</i>	Native Parsnip	X
Asteraceae	<i>Ursinia anthemoides</i> *	Ursinia	
Myrtaceae	<i>Verticordia chrysantha</i>		
Myrtaceae	<i>Verticordia chrysanthella</i>		
Myrtaceae	<i>Verticordia eriocephala</i>	Common Cauliflower	
Myrtaceae	<i>Verticordia picta</i>	Painted Featherflower	
Myrtaceae	<i>Verticordia roei</i> subsp. <i>roei</i>		
Asteraceae	<i>Waitzia acuminata</i>	Orange Immortelle	X
Asteraceae	<i>Waitzia acuminata</i> var. <i>albicans</i>		
Lamiaceae	<i>Westringia cephalantha</i> var. <i>caterva</i>		
Lamiaceae	<i>Westringia rigida</i>	Stiff Westringia	