APPENDIX F

Eco Logical (2017) Biological Report – Bush Forever 492

ecological AUSTRALIA

Vegetation Condition, Floristic Community Mapping and Weed Mapping in the City of Cockburn

Prepared for
City of Cockburn

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Cover photo	[Clockwise from top left] Abandoned car, flowering *Banksia menziesii*, *Crinia* sp., Little Rush Lake Reserve © Eco Logical Australia 2016

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Contents

List of figures

List of tables

Abbreviations

BoM	Bureau of Meteorology
DPaW	Department of Parks and Wildlife
DRF	Declared Rare Flora
ELA	Eco Logical Australia

ESRI	Environmental Systems Research Institute
IBRA	Interim Biogeographic Regionalisation for Australia
km	Kilometres
LSNA	Locally Significant Natural Area
NAIA	Natural Area Initial Assessment
PBP	Perth Biodiversity Project
PEC	Priority Ecological Community
TEC	Threatened Ecological Community
The City	City of Cockburn
WoNS	Weed of National Significance

1 Introduction

1.1 Project background

The City of Cockburn (the City) vegetation community, condition and weed mapping program is part of an ongoing project to progressively assess the condition and values of the City's reserves to guide long-term management and enhancement of biodiversity values in natural areas. By achieving this, the City can observe changes over time in regards to vegetation condition and floristic community types, to ensure that vegetation quality throughout the City is maintained or improved wherever possible. Weed mapping will allow the City to identify weed cover throughout conservation reserves, provide information on the success of control methods and to identify any new outbreaks of significant weed species.

A vegetation condition assessment, floristic community identification and weed mapping was undertaken within 16 reserves in the City of Cockburn. These assessments were based on the Perth Biodiversity Project (PBP) Natural Area Initial Assessment (NAIA) Templates, Field Assessments A and B. An Assessment Summary and Viability Estimates were completed for each reserve. This assessment provides an initial basis for prioritising sites for protection and management based on their relative ecological values and shows which Local Significant Criteria are met by a natural area. Any natural area confirmed as meeting one or more of the ecological criteria in the Assessment Summary are then referred to as being a Locally Significant Natural Area (LSNA).

The study area is located on the Swan Coastal Plain, approximately 25 kilometres (km) south of Perth, Western Australia. This study assessed 16 individual conservation reserves within the City of Cockburn (study area) covering a total area of 136.89 ha (**Figure 1**). The 16 conservation reserves assessed as part of this study are listed in **Table 1**. The field survey was completed from 10 November to 1 December, 2016.

The City commissioned Eco Logical Australia (ELA) to undertake vegetation community, condition and weed mapping of the study area. This scope included:

- Weed mapping of targeted species;
- Mapping and assessment of bushland and natural areas in accordance with the PBP NAIA Templates (Assessment A and B); and
- A report outlining the project background, survey methodology, survey results (including the NAIA templates and figures), assessment summary and viability estimates, and a discussion of findings.

Table 1: Conservation reserves assessed in the City of Cockburn 2016

Baler Reserve	4.08
Banksia Eucalypt Woodland Park	40.92
Beeliar Reserve	1.34
Brandwood Reserve	3.21
Classon Park	2.82
Cocos Park Reserve	2.04

Coojong Park	1.06
Doherty Reserve	2.42
Emma Treeby Reserve	7.08
Frankland Park	24.27
Freshwater Reserve	4.39
Heatherlea Park	1.70
Little Rush Lake Reserve	39
Marshwood Reserve	1.15
Mather Reserve	3.05
Monticola Gardens	0.9
Total	**139.41**

Figure 1: Location of Surveyed Reserves

1.2 Climate

The Swan Coastal Plain experiences a warm, Mediterranean climate with hot dry summers and mild wet winters (Mitchell et al. 2002). Climatic data is based on records from nearby Bureau of Meteorology (BoM) weather stations. The closest weather station is Jandakot Aero (station number 009172, rainfall data 1972 - current) which is located east of the study area.

The area receives an annual average rainfall of 818 mm, with most rainfall occurring during the winter months of June, July and August (155.3 mm, 173.1 mm and 126.5 mm respectively) (BoM 2016). Jandakot Aero weather station received a total of 274.8 mm of rainfall for the three months prior to the survey, which is above the historical average the for the same period (259.2 mm; BoM 2016). **Table 2** presents local rainfall data for the twelve months prior to the survey.

Table 2: Local rainfall data for 2015/2016

Rainfall (mm) 2015-2016	18.6	19.0	28.2	5.2	18.6	62.2	137.0	104.8	149.6	141.0	74.0	59.8	818.0
Mean rainfall (mm) 1972-2015	28.3	10.6	14.2	16.0	16.2	42.8	108.0	155.3	173.1	126.5	86.4	46.3	823.5

1.3 Literature review and conservation significant flora and fauna

A NatureMap search was conducted to obtain a list of conservation significant flora species that have previously been recorded within the City of Cockburn. This list of conservation significant flora species includes species listed under the federal *Environment Protection and Biodiversity Act 1999* (EPBC Act) and the state *Wildlife Conservation Act 1950* (WC Act) as well as Priority species listed by the Department of Parks and Wildlife (DPaW). The species and their preferred habitat is presented in **Table 3**.

Table 3: Conservation significant flora previously recorded in the City of Cockburn

Acacia lasiocarpa var. *bracteolata* long peduncle variant (G.J. Keighery 5026)	-	P1	Grey or black sand over clay. Swampy areas, winter-wet lowlands
Amanita carneiphylla	-	P3	Deeply rooting in sandy soil, solitary or in small scattered groups
Amanita drummondii	-	P3	Grey-white sand to sandy clay over laterite
Amanita fibrillopes	-	P3	Sandy lateritic gravel.

Amanita griseibrunnea	-	P2	Near-coastal limestone ridges, outcrops and cliffs.
Amanita quenda	-	P1	Occurs in sandy soil in Paperbark/Eucalypt or *Kunzea* peaty swamplands.
Amanita wadjukiorum	-	P3	Occurs nearby woody plants and near degraded vegetation on sandy lateritic gravel.
Amanita wadulawitu	-	P2	Sand over limestone
Aponogeton hexatepalus	-	P4	Occurs in mud in freshwater ponds, rivers, claypans.
Austrostipa mundula	-	P3	Sand over limestone
Byblis gigantea	-	P3	Occurs in sandy-peat swamps, seasonally wet areas.
Caladenia huegelii	EN	T	Grey or brown sand, clay loam
Cyathochaeta teretifolia	-	P3	Grey sand, sandy clay. Swamps, creek edges
Dampiera triloba	-	P3	Peaty sand
Diuris micrantha	VU	T	Winter-wet swamps, in shallow water
Diuris purdiei	EN	T	Sand to sandy clay soils, in areas subject to winter inundation, and amongst native sedges and dense heath
Dodonaea hackettiana	-	P4	Sand. Outcropping limestone
Drakaea elastica	EN	T	White or grey sand. Low-lying situations adjoining winter-wet swamps
Drakaea micrantha	VU	T	Occurs in infertile grey sands, in *Banksia*, Jarrah and Common Sheoak woodland or forest.

Drosera occidentalis subsp. *occidentalis*	-	P4	Occurs on sandy and clayey soils, on swamps and winter-wet depressions.
Grevillea olivacea	-	P4	White or grey sand. Coastal dunes, limestone rocks
Hibbertia spicata subsp. *leptotheca*	-	P3	Near-coastal limestone ridges, outcrops & cliffs
Hydrocotyle striata	-	P1	Occurs on clay in springs and winter-wet creeklands
Jacksonia gracillima	-	P3	Grey sand, seasonally wet area
Jacksonia sericea	-	P4	Occurs on calcareous and sandy soils
Microtis quadrata	-	P4	Sand, wet flats
Ornduffia submersa	-	P4	Occurs on seasonally inundated grey soil over laterite, flat open depressions
Phlebocarya pilosissima subsp. *pilosissima*	-	P3	White or grey sand, lateritic gravel
Pimelea calcicola	-	P3	Occurs on sand over coastal limestone ridges
Pithocarpa corymbulosa	-	P3	Gravelly or sandy loam. Amongst granite outcrops
Schoenus capillifolius	-	P3	Occurs on brown mud, claypans.
Schoenus pennisetis	-	P3	Grows on grey or peaty sand, sandy clay on swamps and winter-wet depressions
Stylidium aceratum	-	P2	Sandy soils on swamp heathland
Stylidium longitubum	-	P4	Sandy clay, clay. Seasonal wetlands
Stylidium paludicola	-	P3	Grows on peaty sand over clay in winter-wet habitats

Synaphea sp. Fairbridge Farm (D. Papenfus 696)	CR	T	Occurs on grey, clayey sand with lateritic pebbles in low woodland areas near winter flats.
Thelymitra variegata	-	P2	Sandy clay, sand, laterite
Tripterococcus sp. Brachylobus (A.S. George 14234*)*	-	P4	Winter-wet flats
Verticordia lindleyi subsp. *lindleyi*	-	P4	Winter-wet depressions

[1]Vu = Listed as 'Vulnerable' and En = 'Endangered' under the EPBC Act, [2]T = Threatened Flora under the WC Act and P = Priority Flora listed by DPaW. Source: FloraBase (DPaW 2016a), NatureMap (DPaW 2016b)

A NatureMap search was conducted to obtain a list of conservation significant fauna species that have been previously recorded in the City of Cockburn. This search was processed to assist with completion of the conservation significant fauna section of the NAIA templates. A list of conservation significant fauna species from the NatureMap search is presented in **Table 4**.

Table 4: Conservation significant fauna previously recorded in the City or Cockburn

Actitis hypoleucos	Common Sandpiper	M	S5	IA
Apus pacificus	Fork-tailed Swift	M	S5	IA
Ardea ibis	Cattle Egret	M	S5	IA
Ardea modesta	Eastern Great Egret	M	S5	IA
Arenaria interpres	Ruddy Turnstone	M	S5	IA
Botaurus poiciloptilus	Australasian Bittern	EN	S2	-
Calidris acuminata	Sharp-tailed Sandpiper	M	S5	IA
Calidris alba	Sanderling	M	S5	IA

Calidris canutus	Red Knot	M	S5	IA
Calidris ferruginea	Curlew Sandpiper	VU	S3	-
Calidris melanotos	Pectoral Sandpiper	M	S5	IA
Calidris ruficollis	Red-necked Stint	M	S5	IA
Calidris subminuta	Long-toed Stint	M	S5	IA
Calidris tenuirostris	Great Knot	CR	S3	-
Calyptorhynchus banksii subsp. *naso*	Forest Red-tailed Black-Cockatoo	VU	S3	-
Calyptorhynchus baudinii	Baudin's Cockatoo	VU	S3	-
Calyptorhynchus latirostris	Carnaby's Cockatoo	EN	S2	-
Charadrius dubius	Little Ringed Plover	M	S5	IA
Charadrius leschenaultii	Greater Sand Plover	VU, M	S3	IA
Charadrius rubricollis	Hooded Plover	-	-	P4
Dasyurus geoffroii	Chuditch	VU	S3	-
Falco peregrinus	Peregrine Falcon	-	S7	-
Falsistrellus mackenziei	Western False Pipistrelle	-	-	P4
Hydromys chrysogaster	Water-rat	-	-	P4
Isoodon obesulus	Southern Brown Bandicoot, Quenda	-	-	P4
Leioproctus contrarius	Bee	-	-	P3
Lerista lineata	Perth Slider	-	-	P3
Limosa lapponica	Bar-tailed Godwit	M	S3	IA
Limosa limosa	Black-tailed Godwit	M	S5	IA

Macropus irma	Western Brush Wallaby	-	-	P4
Merops ornatus	Rainbow Bee-eater	M	S5	IA
Myrmecobius fasciatus	Numbat	VU	S2	-
Neelaps calonotos	Black-striped Snake	-	-	P3
Neopasiphae simplicior	Bee	CR	S2	-
Numenius madagascariensis	Eastern Curlew	CR	S3	-
Numenius phaeopus	Whimbrel	-	S5	IA
Oceanites oceanicus	Wilson's Storm Petrel	-	S5	IA
Oxyura australis	Blue-billed Duck	-	-	P4
Phaethon rubricauda	Red-tailed Tropicbird	M	S5	P4, IA
Phascogale tapoatafa subsp. *tapoatafa*	Southern Brush-tailed Phascogale	VU	S3	-
Plegadis falcinellus	Glossy Ibis	M	S5	IA
Pluvialis fulva	Pacific Golden Plover	M	S5	IA
Pluvialis squatarola	Grey Plover	M	S5	IA
Setonix brachyurus	Quokka	VU	S3	-
Stercorarius longicaudus	Long-tailed Skua	M	S5	IA
Stercorarius parasiticus	Arctic Skua	M	S5	IA
Stercorarius pomarinus	Pomarine Skua	M	S5	IA
Sterna dougallii	Roseate Tern	M	S5	IA
Sterna hirundo subsp. *hirundo*	Common Tern	M	S5	IA
Synemon gratiosa	Graceful Sunmoth	-	-	P4

Throscodectes xiphos	Cricket	-	-	P1
Tringa glareola	Wood Sandpiper	M	S5	IA
Tringa nebularia	Common Greenshank	M	S5	IA
Tyto novaehollandiae subsp. *novaehollandiae*	Masked Owl (southern subsp.)	-	-	P3

CR = listed as Critically Endangered under the EPBC Act, WC Act and/or the IUCN red list.
EN = listed as Endangered under the EPBC Act, WC Act and/or the IUCN red list.
VU = listed as Vulnerable under the EPBC Act, WC Act and/or the IUCN red list.
M = listed as Migratory species under the EPBC Act.
IA = Migratory birds protected under an international agreement
P1 = Priority 1: poorly known species occurring on threatened land (land not managed for conservation)
P3 = Priority 3: known from few specimens or records and need urgent survey and evaluation of conservation status.
P4 = Priority 4: not currently threatened but could if present circumstances change. Usually found on conservation lands.
S2 = Schedule 2: Fauna that is rare or likely to become extinct as endangered fauna (EN)
S3 = Schedule 3: Fauna that is rare or likely to become extinct as vulnerable fauna (VU)
S5 = Schedule 5: Migratory birds protected under an international agreement (IA)
S7 = Schedule 7: Other specially protected fauna (OS)

2 Field survey methods

2.1 Study team and timing of survey

The field survey was conducted by Senior Botanist and Ecology Manager Joel Collins, and Botanist Sarah Dalgleish. The survey team's qualifications and relevant experience are listed in **Table 5**. The survey was undertaken during spring and summer from 10 November to 1 December 2016.

Table 5: Field staff qualifications

Joel Collins	BAgri Hort (Hons)	Scientific licence: SL011816 Declared Rare Flora (DRF) permit: 14-1516	Extensive flora surveys throughout the south-west of WA and the Swan Coastal Plain.
Sarah Dalgleish	BSc Environmental Management (Hons)	Flora scientific collection licence No. SL011820 DRF collection licence No. 12-1617	Five years' experience undertaking flora surveys in WA and the Swan Coastal Plain.

2.2 Vegetation community and condition mapping

Mapping and assessment was undertaken using the PBP NAIA Templates. The vegetation communities were assessed and mapped based on dominant species present, landform, vegetation structural classes and soil type. Vegetation condition was described using the Keighery (1994) condition scale. The NAIA Field Assessment templates A and B were completed for each reserve.

Assessment template A required the following information to be recorded from each reserve:

- Delineation and mapping of each vegetation community based on 10 m x 10 m quadrats, including species inventory;
- Inventory of weed species and distribution patterns;
- Fauna and fungi, with consideration of fauna habitat values, with particular emphasis on Black Cockatoos and Bandicoots;
- Vegetation health and condition;
- Disturbance factors and threatening processes;
- Management infrastructure and recommendations for management; and
- Social significance values and surrounding land uses.

Assessment template B was only completed if a Threatened Ecological Community (TEC) or Threatened species was recorded.

Each vegetation community was mapped based on a minimum of one quadrat per vegetation community. The quadrats were located in the best condition vegetation within each community. All native taxa within the quadrat were identified and recorded. Taxa that could not be identified in the field were collected for submission to the City.

The north-west corner of each quadrat was permanently marked with a stainless steel fence dropper with a yellow cap. Quadrat photos were taken from the permanent north-west marker. Two maps of each reserve were produced detailing vegetation condition and vegetation communities.

2.3 Weed mapping

Weed species were recorded using point and/or density data for specified weed species in categories of Woody, Bulbous, Grass and Other, as shown in **Table 6**. Where density mapping applied, four density categories were used: <5 %, 6 – 30 %, 31 – 60 % and > 61 %.

Weed species encountered that were not on the target list and are currently listed as Declared under the *Biosecurity and Agriculture Management Act 2007* or as a Weed of National Significance (WoNS) were also recorded and mapped.

The weed mapping included:

- Field inspection to identify presence of weeds and to determine the need for collection of either point or density data for each weed species; and
- Development of five weed maps for each reserve, comprising:
  - one each of the four weed types; Woody, Bulbous, Grass, and Other; and
  - one combined % weed cover.

The following guidelines were used for point and density mapping:

- Scattered individuals in a small area - less than ten per 100 m² were recorded as a point;
- Scattered individuals in a large area - more than 20 per 400 m² plus were recorded as a density;
- Clumps of Bulbous weeds (e.g. African Cornflag) were recorded as a single point per clump;
- Rhizomatous grasses (Couch, Kikuyu and Buffalo) were mapped as a single unit; and
- *Fumaria* and *Lachenalia* species were mapped as a single unit.

The following methods were used to determine the combined % weed cover figures:

- Weed cover ranges and percentages were assigned a numerical value in order to allow for the summation of covers:
  - <5% = 2.5;
  - 6-30% = 18.5;
  - 31-60% = 45.5; and
  - >61% = 79.5.
- A union process was undertaken in ArcMap 10.2 to ‘intersect’ all weed cover polygons with each other. This created unique polygons for every overlap area yet retained all the original cover values.
- A dissolve was undertaken on the “Shape_Area” field in order to aggregate each unique polygon. The statistics feature of the dissolve tool was set to the numerical cover field and a ‘sum’ statistics type was utilised. This summed all numerical cover values together for each group of unique polygons resulting from the union, ultimately providing a single polygon with a summed cover value for each weed cover polygon.

Encountered target weed species were recorded by taking a point location using an Android Nexus 7 tablet of each individual and/or a centroid location for a group of individuals. The Android Nexus 7 tablets can have errors in accuracy of between 3-20 m (subject to availability of satellites on the day). When a large population was encountered the population boundary was mapped on a hard copy map and later digitised to record a polygon. The software used to collect the point data was the ArcGIS Collector app, which has been developed by Environmental Systems Research Institute (ESRI).

Table 6: Weed species targeted within the 16 reserves in the City of Cockburn

Grass weeds	**Ammophila arenaria*	Marram Grass
	**Cenchrus* sp.	Buffel Grass, Burr Grass
	**Cortaderia selloana*	Pampas Grass
	**Cynodon dactylon*	Couch
	**Ehrharta calycina*	Perennial Veldt Grass
	**Ehrharta villosa*	Pyp Grass
	**Eragrostis curvula*	African Lovegrass
	**Hyparrhenia hirta*	Tambookie Grass
	**Cenchrus clandestinum*	Kikuyu
	**Cenchrus setaceum*	Fountain Grass
	**Stenotaphrum secundatum*	Buffalo
	**Thinopyrum distichum*	Sea Wheat
Woody weeds	**Acacia longifolia*	Sydney Golden Wattle
	**Ficus carica*	Edible Fig
	**Leptospermum laevigatum*	Victorian Tea Tree
	**Melaleuca nesophila*	Mindiyed
	**Melia azedarach*	Cape Lilac
	**Olea europea*	Olive
	**Schinus terebinthifolius*	Japanese Pepper

Bulbous weeds	**Asphodelus fistulosus*	Onion Weed
	**Chasmanthe floribunda*	African Cornflag
	**Ferraria crispa*	Black Flag
	**Freesia hybrid*	Freesia
	**Gladiolus caryophyllaceus*	Gladiolus
	**Lachenalia reflexa*	Yellow Soldiers
	**Lachenalia* sp.	Soldiers
	**Moraea flaccida*#	One-Leaf Cape Tulip
	**Trachyandra divaricata*	Dune Onion Weed
	**Watsonia bulbilifera*	Watsonia
	**Zantedeschia aethiopica*#	Arum Lily
Other weeds	**Anredera cordifolia*	Potato Creeper, Madeira Vine
	**Asparagus asparagoides*#	Bridal Creeper
	**Cakile maritima*	Sea Rocket
	**Carpobrotus edulis*	Pigface
	**Cirsium vulgare*	Spearthistle
	**Echium plantagineum*	Paterson's Curse
	**Euphorbia paralias*	Sea Spurge
	**Euphorbia terracina*	Geraldton Carnation
	**Foeniculum vulgare*	Fennel
	**Fumaria bastardii, F. capreolata, F. muralis*	Fumitory
	**Gomphocarpus fruticosus*	Narrow Leaf Cotton Bush

	**Lupinus cosentinii*	Sandplain Lupin
	**Juncus acutus*	Spiny Rush
	**Pelargonium capitatum*	Rose Pelargonium
	**Opuntia stricta*	Prickly Pear
	**Persicaria maculosa*	Redshank
	**Raphanus raphanistrum*	Wild Radish
	**Ricinus communis*	Castor Oil
	**Rubus discolour*	Blackberry
	**Tetragonia decumbens*	Sea Spinach
	**Tribulus terrestris*	Caltrop
	**Typha orientalis*	Bulrush
	**Vicia sativa*	Vetch

#Declared plant under the *Biosecurity and Agriculture Management Act 2007* (WA).

2.4 Viability estimate and Local Significance Criteria

The Assessment Summary and Viability Estimate template was completed after both the desktop and field assessments were completed. Each reserve was measured against the ecological criteria specified in the template to determine if the reserve met Local Significance Criteria, and therefore represented an LSNA. The same criteria were utilised to determine the priority level for protection and management based on their relative ecological values. LSNAs are assigned a primary Priority rating of 1 (A or B), 2 or 3 based on the ecological values described by the Local Significance Criteria, and are prioritised in that order (Molly et al. 2007). Priority 1A LSNAs are 'natural areas that are of high value in a regional (or greater) context for the ecological values, even if this has not been formally recognised in Government legislation and/or policy' (Molly et al. 2007). Priority 1A LSNAs are areas that:

- Meet any of the regional representation criteria (except for Criteria 1 a) iii);
- Meet any of the rarity criteria;
- Are part of a regional ecological linkage; or
- Meet any of the criteria for protection of wetland, streamline and estuarine fringing vegetation and coastal vegetation.

To determine the Local Significance Criteria, the PBP spatial and statistical analysis of 2013 remnant vegetation extent data by vegetation complexes and administrative categories across IBRA (Interim

Biogeographic Regionalisation for Australia) sub-regions and in Perth and Peel regions, was utilised (PBP 2013).

Each reserve was then graded from reserves having the highest viability estimate to those having the lowest.

2.5 Limitations

Table 7: Survey limitations

Sources of information	The Swan Coastal Plain has been relatively well surveyed, with extensive survey work occurring due to the ongoing urban development of the Perth metropolitan area.
Scope of work	The scope of work was adequate to undertake the NAIA and to identify conservation significant flora species.
Completeness of survey	The study area was surveyed in a targeted fashion in order to collect sufficient data to determine vegetation communities, condition and conservation significant flora present within the study area.
Intensity of survey	In order to describe the vegetation communities a minimum of one quadrat was installed per vegetation community within each reserve. This is a suitable intensity to complete the NAIA.
Timing, weather, season, cycle	The survey was conducted in November and December 2016. The total rainfall for the 12 months leading up to the survey was 818.0 mm, which is close to the average historical annual rainfall (823.5 mm). A total of 274.8 mm of rain fell in the three months leading up to the survey, which is slightly higher than the historical average of 259.2 mm. The amount of rainfall received prior to the field survey was sufficient for flowering for most species during the spring season.
Disturbances	The study area has been subject to a number of disturbances, including weed invasion, clearing, proliferation of track and rubbish dumping.
Resources	The botanists undertaking the surveys were suitably qualified to undertake the assessment. The field survey was undertaken using Android Nexus 7 tablet operating the ArcGIS Collector application. These units can have errors in accuracy of between 3-20 m (subject to availability of satellites on the day).
Accessibility / remoteness	All required sections of the study area were accessible.

3 Results and discussion

3.1 Vegetation community and condition

The completed NAIA Field Assessment templates A and B for each reserve are presented in **Appendix A** to **Appendix P**. These appendices also include the mapping of vegetation communities, vegetation condition and weeds for each reserve.

The vegetation communities surveyed across the 16 reserves represent both upland and wetland communities that are typically found on the Swan Coastal Plain. A total of 22 vegetation communities were recorded across the reserves. The upland communities were comprised of a mix of the dominant species *Banksia attenuata*, *Banksia menziesii*, *Eucalyptus marginata* subsp. *marginata*, *Nuytsia floribunda, Xanthorrhoea preissii* and *Allocasuarina humilis* forming open/low open woodlands on grey/white sand. The wetland or dampland vegetation communities were comprised of a mix of the dominant species *Melaleuca preissiana*, *Melaleuca rhaphiophylla*, *Eucalyptus rudis* and *Nuytsia floribunda* open forest to low open woodland. A full list of the vegetation communities recorded across each of the reserves is presented in **Table 8**. One TEC, *Banksia* Woodlands of the Swan Coastal Plain, was located at nine of the 16 reserves, as follows:

- Banksia Eucalypt Woodland Park;
- Beeliar Reserve;
- Brandwood Reserve;
- Classon Park;
- Cocos Park Reserve;
- Frankland Park;
- Heatherlea Park;
- Little Rush Lake Reserve; and
- Monticola Gardens.

Table 8: Vegetation communities recorded across reserves

Baler Reserve	ErMpOF	*Eucalyptus rudis* and *Melaleuca preissiana* open forest over *Viminaria juncea, Aotus gracillima* and *Astartea fascicularis* open shrubland.
	MpLW	*Melaleuca preissiana* low woodland over *Kunzea glabrescens* tall open scrub over *Dasypogon bromeliifolius* very open herbland over *Lepidosperma longitudinale* and *Schoenus efoliatus* open sedgeland.
Banksia Eucalypt Woodland Park	AsOS	*Astartea scoparia* open shrubland over *Hypocalymma angustifolium* closed low heath over *Dasypogon bromeliifolius* very open herbland over **Ehrharta calycina* very open grassland.
	BaNfW	*Banksia attenuata* and *Nuytsia floribunda* woodland over *Banksia ilicifolia* low open woodland over *Kunzea glabrescens* and *Adenanthos cygnorum* subsp. *cygnorum* tall shrubland over *Macrozamia reidlei* open shrubland over *Hibbertia subvaginata*,

		Bossiaea eriocarpa and *Gompholobium tomentosum* low open shrubland over *Desmocladus flexuosus* very open sedgeland.
	EmW	*Eucalyptus marginata* subsp. *marginata* woodland over *Banksia attenuata* and *Allocasuarina fraseriana* low woodland over *Hibbertia hypericoides* subsp. *hypericoides* and *Bossiaea eriocarpa* open low heath over *Patersonia occidentalis* var. *occidentalis, Dasypogon bromeliifolius* and *Burchardia congesta* very open herbland over *Desmocladus flexuosus* very open sedgeland.
	MpNfOW	*Melaleuca preissiana* and *Nuytsia floribunda* open woodland over *Kunzea glabrescens* and *Xanthorrhoea preissii* tall open scrub over *Pericalymma ellipticum* and *Astartea scoparia* open low heath over *Dasypogon bromeliifolius* open herbland.
	MpErOF	*Melaleuca preissiana* and *Eucalyptus rudis* open forest over *Kunzea glabrescens* tall open shrubland over *Astartea scoparia* closed heath over *Siloxerus humifusus* and *Cassytha glabella* very open herbland over *Schoenus efoliatus* very open sedgeland over **Aira caryophyllea* and **Briza maxima* very open grassland.
Beeliar Reserve	EmBaBmLW	*Eucalyptus marginata* subsp. *marginata*, *Banksia attenuata* and *Banksia menziesii* low woodland over *Xanthorrhoea preissii* and *Macrozamia riedlei* shrubland over *Hibbertia hypercoides* and *Stirlingia latifolia* low open shrubland over *Desmocladus asper* very open sedgeland over **Ehrharta calycina* very open grassland.
Brandwood Reserve	BaBmLOW	*Banksia attenuata* and *Banksia menziesii* low open woodland over *Allocasuarina humilis* open shrubland over *Eremaea pauciflora* and *Hibbertia hypericoides* low open shrubland over *Mesomelaena pseudostygia* very open sedgeland over **Ehrharta calycina* very open grassland.
Classon Park	BaBmLOW	*Banksia attenuata* and *Banksia menzeisii* low open woodland over *Allocasuarina humilis, Xanthorrhoea preissii, Jacksonia furcellata* and *Regelia inops* open shrubland over *Eremaea pauciflora* low open shrubland over *Lyginia barbata* very open sedgeland over **Ehrharta calycina* very open grassland.
Cocos Park Reserve	BaBmLW	*Banksia attenuata* and *Banksia menzeisii* low woodland over *Xanthorrhoea preissii* open shrubland over *Hibbertia hypericoides* open low heath over *Mesomelaena pseudostygia* very open sedgeland over **Ehrharta calycina* very open grassland.
Coojong Park	ErOF	*Eucalyptus rudis* open forest over *Acacia saligna* tall shrubland over *Hardenbergia comptoniana* very open herbland.
Doherty Reserve	CcOF	*Corymbia calophylla* open forest over *Xanthorrhoea preissii* tall shrubland.

Emma Treeby Reserve	MrLW	*Melaleuca rhaphiophylla* low woodland over *Pteridium esculentum* subsp. *esculentum* herbland over *Juncus pallidus* very open sedgeland.
	LsRaOH	*Lotus subbiflorus* and *Rumex acetosella* open herbland over *Juncus pallidus* sedgeland over **Avena barbata* very open grassland.
	MpLOW	*Melaleuca preissiana* low open woodland over *Kunzea glabrescens* tall open shrubland over *Astartea scoparia* and *Xanthorrhoea preissii* open shrubland over *Hypocalymma angustifolium* low open shrubland over *Baumea articulata* very open sedgeland over **Ehrharta calycina* very open grassland.
Frankland Park	BaBmOW	*Banksia attenuata* and *Banksia menziesii* open woodland over *Allocasuarina humilis* and *Xanthorrhoea preissii* open shrubland over *Hibbertia hypericoides* subsp. *hypericoides* and *Gompholobium tomentosum* low open shrubland.
Freshwater Reserve	ErMpMrLOF	*Eucalyptus rudis, Melaleuca preissiana* and *Melaleuca rhaphiophylla* low open forest over *Astartea fascicularis* open shrubland over *Lepidosperma effusum* closed sedgeland.
Heatherlea Park	BaBmLOW	*Banksia attenuata* and *Banksia menziesii* low open woodland over *Allocasuarina humilis* and *Regelia ciliata* open shrubland over *Eremaea pauciflora, Hibbertia hypericoides* and *Gompholobium tomentosum* low open shrubland over *Patersonia occidentalis* and *Stirlingia latifolia* very open herbland over **Ehrharta calycina* very open grassland.
Little Rush Lake Reserve	BaBmLOW	*Banksia attenuata* and *Banksia menziesii* low open woodland over *Adenanthos cygnorum, Kunzea glabrescens* and *Jacksonia Furcellata* tall shrubland over *Xanthorrhoea preissii* open shrubland over **Carpobrotus edulis* very open herbland over **Ehrharta calycina* and **Ehrharta longiflora* very open grassland.
	ErOW	*Eucalyptus rudis* open woodland over *Melaleuca rhaphiophylla* low open forest.
	MpOW	*Melaleuca preissiana* open woodland over *Lepidosperma leptostachyum* and *Baumea juncea* sedgeland.
Marshwood Reserve	EmLW	*Eucalyptus marginata* low woodland over *Xanthorrhoea preissii* shrubland over *Hibbertia hypericoides* and *Kunzea glabrescens* low shrubland over *Mesomelaena pseudostygia* very open sedgeland.
Mather Reserve	MrLOF	*Melaleuca rhaphiophylla* low open forest over **Cirsium vulgare, *Lactuca serriola forma serriola, *Centella asiatica* and **Fumaria capreolata* very open herbland over **Lolium perenne, *Cenchrus clandestinus* and **Cynodon dactylon* very open grassland.

Monticola Gardens	BaBmAfLOW	*Banksia attenuata, Banksia menziesii* and *Allocasuarina fraseriana* low open woodland over *Melaleuca thymoides* tall open shrubland over *Xanthorrhoea preissii* shrubland over *Dasypogon bromeliifolius* open herbland.

The vegetation condition across the combined area of the 16 reserves is presented in **Table 9**. The total area used in the calculation of vegetation condition as a proportion of the study area excludes parkland cleared areas, isolated trees in cleared settings, ovals, turfed areas, revegetated areas, firebreaks, drainage areas and tracks.

Threatening processes that have degraded the vegetation condition included weed invasion, clearing of vegetation, historical land use practices, rubbish dumping and proliferation of tracks.

Table 9: Total area and proportion of vegetation condition across all 16 reserves

Pristine	0.0	0.0
Excellent	47.04	33.7
Very Good	13.70	9.8
Good	22.09	15.8
Degraded	29.38	21.1
Completely degraded	11.72	8.4
Open water	5.38	3.9
Parkland	3.95	2.8
Revegetated	2.50	1.8
Firebreak	2.99	2.1
Other uses	0.67	0.5
Total	**139.41**	**100**

3.2 Assessment summary and ecological viability estimate

The results of the Assessment Summary and Viability Estimate, and reserve grading from highest viability estimate to the lowest, are presented in **Table 10**. All reserves meet the criteria for a Priority 1A protection level due to meeting criteria such as regional representation, rarity and regional ecological linkages. Frankland Park recorded the highest viability estimate with 18.9, while Beeliar Reserve and Doherty Reserve recorded the lowest with 10.1.

Table 10: Natural area assessment summary and ecological viability assessment

1	Frankland Park	18.9
2	Little Rush Lake Reserve	18.7
3	Banksia Eucalypt Woodland Park	18.35
4	Emma Treeby Reserve	14.5
5	Cocos Park Reserve	14.1
6	Freshwater Reserve	13.7
7	Baler Reserve	12.35
8	Mather Reserve	12.3
9	Coojong Park	11.9
10	Heatherlea Park	11.6
11	Marshwood Reserve	11.5
12	Brandwood Reserve	11.2
13	Monticola Gardens	11.2
14	Classon Park	11.1
15	Beeliar Reserve	10.1
16	Doherty Reserve	10.1

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Appendix B Banksia Eucalypt Woodland Park field assessment templates and weed mapping

Natural Area Initial Desktop Assessment

Date of assessment 10/11/2016 Native Vegetation Unique ID No.

Name of area Banksia Eucalypt Woodland Park

Other names used Woodland Park

Location (address/street name incl. suburb, nearest street corner, Local Government)

Cape Le Grand Ave, Yanchep Ln, Cape Range Crs and Gibbs Rd, Aubin Grove, City of Cockburn

Street Directory Page and Grid Ref. (Street Smart/ Gregorys/ UBD) UBD 2013 pg 388, ref N10

Prepare the following maps and label with the name of the area.

Area (ha) 40.92 ha Perimeter (m) 3852.24 m

Perimeter (m) to area (m^2) ratio 0.009 Priority for Further Investigation

Lot/Location/Reserve Number/s Lot 800 and Lot 1004

Ownership (Local Government Reserve / Other Govt (Agency?) / Private)

Local Government Reserve

Land Manager City of Cockburn

Vesting Purpose Conservation Reserve, Parks and Recreation

MRS Reservation or Zoning Parks and Recreation

TPS Reservation or Zoning Development Area, Contribution, Parks and Recreation, Water Catchment

Protection Status (circle) none / conservation covenant / conservation zone / conservation vesting purpose / Bush Forever & Parks and Recreation in the MRS / protected CALM land

Current Status/Use of land Conservation, Parks and Recreation

Long term plans? Conservation, Parks and Recreation

Initial Desktop Assessment

Name of area: Banksia Eucalypt Woodland Park

Recognised International/ National/ State/ ~~Regional~~ Conservation Value

Specify Bush Forever Site 492 and Conservation Area

Part of a Draft Regional Ecological Linkage

Specify (links which areas?): None

Mapped Vegetation Complex/es Bassendean complex – Central and South

Mapped Soil Type/s (if mapping available) 212Bs__B1, 212Bs__B2, 212Bs__B3 and 212Bs__B4

Mapped wetland/s: Yes Environmental Protection Policy (EPP) Lake: No

Wetland Management Category: Sumpland – Conservation

Is it a mapped floodplain area? No

Potential Reference Sites and Plots (e.g. Bush Forever Sites; CALM Reserves, see Map 2). For Bush Forever Sites note floristic community type/s (FCTs) and whether FCTs actual or inferred.

Bush Forever Site 492

Floristic Community Types (inferred):

Supergroup 2: Seasonal wetlands

4 – *Melaleuca preissiana* damplands

5 – Mixed shrub damplands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau

21a – Central *Banksia attenuata – Eucalyptus marginata* woodlands

21c – low-lying *Banksia attenuata* woodlands or shrublands

23a – Central *Banksia attenuata – B. menziesii* woodlands

Existing biological information for area or for potential Reference Sites (reports/ surveys/ species lists)

City of Cockburn Natural Area Management Strategy 2012 - 2022

Eco Logical Australia (ELA). 2013. Vegetation Community, Condition and Weed Mapping for Multiple Reserves in the City of Cockburn. Prepared for the City of Cockburn.

Conservation Management Plan None Current or Review needed?

Title/Author/Year

Part of a Local Ecological Linkage

(if these have not already been determined by Local Government mark potential linkages on Map 2)

Time since isolation from other natural areas <5 years/ 5 - 20 years/ >20 years

(consult local community, historical aerial photography)

Initial Desktop Assessment

Name of area: Banksia Eucalypt Woodland Park

Does it contain any mapped Threatened Ecological Communities (see Map 2)? Yes

Specify: Banksia woodlands of the Swan Coastal Plain TEC

Does it contain any mapped Declared Rare Flora (see Map 2) or is it a known location for any Specially Protected Fauna or significant habitat for these fauna? Yes

Specify: Habitat for Black Cockatoos

Does it contain any mapped Priority (see Map 2) or other significant **flora** (e.g. see Table 13, Bush Forever, Vol. 2, p. 51) or is it a known location for any Priority or other significant **fauna** (e.g. see Tables 14 and 15, Bush Forever, Vol. 2, pp. 59-63) or significant habitat for these fauna?

Yes

Specify Quenda habitat

Riparian streamline vegetation expected No

Estuarine fringing vegetation expected No

Coastal vegetation expected (foredunes or secondary dunes) No

Fire History (consult with FESA/Volunteer Fire Brigades, local community, historical aerial photography)

Over 20+ years ago

Known to be of particular value to the local community for conservation No

Active Friends/Environmental Group No

Name of group and contact details

Surrounding land uses with potential for community interest and possibly assistance with management

- educational facility No
- residential development Yes
- other (specify) Yes

Children's service

Indigenous or European Cultural or Historical Heritage Value No

Notes

Natural Area Initial Field Assessment A

Date of assessment 10-15/11/2016 Native Vegetation Unique ID No. _____

Name of area Banksia Eucalypt Woodland Park

Location (address/street name) Cape Le Grand Ave, Yanchep Ln, Cape Range Crs and Gibbs Rd, Aubin Grove, City of Cockburn

Assessor Joel Collins *Skill Level 6c

Recorder _____ Skill Level _____

Recorder _____ Skill Level _____

Recorder _____ Skill Level _____

**Important Note: Skill level 4 or above is required by the assessor to complete this template (see Appendix 1).*

Photographs

Indicate film roll no. and photograph no., location and direction of each photo on Map 4 during the field assessment. e.g. R1/P4 ⇗ (Roll 1/Photo 4 looking ⇗)

Photographer's Name _____

Latitude And Longitude (for various locations noted during assessment, optional)

GPS used: GPS datum: GDA 1994_____

Descriptor and Location No. (eg. BMX jump GPS 1)	Reading/calculation (mark location number on Map 4) Latitude (S) or Northing	Longitude (E) or Easting
ELA09	6441467	393029
ELA10	6441150	393096
ELA11	6441134	393260
ELA12	6440871	392937
ELA13	6441285	392699

Prepare the following map during the field assessment and label with the name of the area.

_____

Uplands, Wetlands And Structural Plant Communities – Description And Mapping

On Map 4 divide the site into upland versus wetland areas and then into broad sections based on structural plant communities. Allocate a number to each community and describe each community using a representative sample point. Note the vegetation condition of each sample point as well as drawing a vegetation condition map for the whole site.

Describe each community using page 5 and 6 of these templates

Each structural plant community is described by noting the dominant species in each growth form layer of the community (see Appendix 2). Collect specimens for identification if necessary provided you have a licence from CALM and land owner permission. Carefully label all specimens. DO NOT collect species suspected of being DECLARED RARE FLORA instead take a good photo and accurately note location. Do not collect whole plants unless they are very small species and do not collect at all if only a few are present, take a good photo as an alternative

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Photocopy this page and complete for each Structural Plant Community identified .

Structural Plant Community No. _1_ Indicate location of sample point described on Map 4.

Latitude and Longitude

GPS used: yes/no GPS datum: GDA 1994 Easting.: 393029 Northing: 6441467

Landform and Soils

SLOPE: (flat)/ gentle/ steep ASPECT: N/ NE/ E/ SE/ S/ SW/ W/ NW OR (n/a)

SURFACE SOIL: Colour: Grey Texture: Sand

EXPOSED ROCK (type and % of surface):

SUB-SURFACE SOIL: Colour: __Grey Texture: (sand)/ loamy sand/ sandy loam/ loam/ clay/ gravel

UNDERLYING ROCK (type and depth if known):

DRAINAGE: (well)/ moderate/ poor WET: all year/ winter and spring only OR (n/a)

CURRENT WATER DEPTH: _____ cm

LITTER (% cover & depth): _1 %, 1 cm_____ BARE GROUND (% cover) __2 %____

Topographic Position Circle position of point described on a transect diagram of site below.

Upland or (Wetland?) **(circle one)**

Trees over 30 m			
Trees 10–30 m			
Trees under 10 m			
Mallees over 8 m			
Mallees under 8 m			
Shrubs over 2 m			
Shrubs 1-2 m	*Astartea scoparia*	2-10%	0.25 m, 5 %
Shrubs under 1 m	*Hypocalymma angustifolium*	over 70%	1.5 m, 80 %
Herbs	*Dasypogon bromeliifolius*	2-10%	0.5 m, 5 %
Sedges/ Rushes			
Grasses	**Ehrharta calycina*	2-10%	0.5 m, 5 %
Other (e.g. climbers)			

Common Native Species Note species observed.

Astartea scoparia, Austrostipa flavescens, Crassula colorata, Dasypogon bromeliifolius, Euchilopsis linearis, Hypocalymma angustifolium, Jacksonia furcellata, Kunzea glabrescens, Leptocarpus decipiens, Phlebocarya ciliate, Phyllangium divergens, Siloxerus humifusus, Trachymene pilosa.

Icon Flora Species (Note if present)

Vegetation Condition (Give reasoning and note scale used) (see Appendix 4) Excellent – low weed cover, no disturbance, intact vegetation structure, high species diversity

Description Of Structural Plant Community No. AsOS – *Astartea scoparia* open shrubland over *Hypocalymma angustifolium* closed low heath over *Dasypogon bromeliifolius* very open herbland over **Ehrharta calycina* very open grassland.

Icon Community (tick if an icon community)

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Photocopy this page and complete for each Structural Plant Community identified.

Trees / Mallees	**Herbs**
	**Hypochaeris glabra*
	**Sonchus oleraceus*
	Crassula colorata
	Dasypogon bromeliifolius
	Phlebocarya ciliata
	Phyllangium divergens
	Siloxerus humifusus
	Trachymene pilosa
Shrubs	
Astartea scoparia	
Euchilopsis linearis	
Hypocalymma angustifolium	
Jacksonia furcellata	
Kunzea glabrescens	
Sedges / Rushes	
Leptocarpus decipiens	
Grasses	
**Aira caryophyllea*	
Austrostipa flavescens	
**Briza maxima*	
**Ehrharta calycina*	
**Ehrharta longiflora*	

Plant community No. 1 photo taken from NW corner looking to the SE

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Photocopy this page and complete for each Structural Plant Community identified.

Structural Plant Community No. 2 Indicate location of sample point described on Map 4.

Latitude and Longitude

GPS used: yes/no GPS datum: GDA 1994 Easting.: 393096 Northing: 6441150

Landform and Soils

SLOPE: flat/ gentle/ steep ASPECT: N/ NE/ E/ SE/ S/ SW/ W/ NW OR n/a

SURFACE SOIL: Colour: Light Grey Texture: Sand

EXPOSED ROCK (type and % of surface):

SUB-SURFACE SOIL: Colour: Grey Texture: sand/ loamy sand/ sandy loam/ loam/ clay/ gravel

UNDERLYING ROCK (type and depth if known):

DRAINAGE: well/ moderate/ poor WET: all year/ winter and spring only OR n/a

CURRENT WATER DEPTH: _____ cm

LITTER (% cover & depth): 60 %, 5 cm BARE GROUND (% cover) 2 %

Topographic Position Circle position of point described on a transect diagram of site below.

Upland or Wetland? **(circle one)**

Trees over 30 m			
Trees 10–30 m	*Banksia attenuata, Nuytsia floribunda*	30-70%	12 m, 50 %
Trees under 10 m	*Banksia ilicifolia*	2-10%	8 m, 5 %
Mallees over 8 m			
Mallees under 8 m			
Shrubs over 2 m	*Kunzea glabrescens, Adenanthos cygnorum* subsp. *cygnorum*	30-70%	3 m, 60 %
Shrubs 1-2 m	*Macrozamia reidlei*	2-10%	1.25 m, 5 %
Shrubs under 1 m	*Hibbertia subvaginata, Bossiaea eriocarpa, Gompholobium tomentosum*	2-10%	0.8 m, 5 %
Herbs			
Sedges/ Rushes	*Desmocladus flexuosus*	2-10%	0.75 m, 3 %
Grasses			
Other (e.g. climbers)			

Common Native Species Note species observed. *Adenanthos cygnorum* subsp. *cygnorum, Austrostipa flavescens, Banksia attenuata, Banksia ilicifolia, Bossiaea eriocarpa, Burchardia congesta, Calytrix flavescens, Dasypogon bromeliifolius, Desmocladus asper, Desmocladus flexuosus, Drosera erythrorhiza* subsp. *erythrorhiza, Eucalyptus todtiana, Gompholobium tomentosum, Hibbertia subvaginata, Kunzea glabrescens, Leucopogon propinquus, Levenhookia stipitata, Lomandra hermaphrodita, Lyginia imberbis, Macrozamia riedle, Melaleuca thymoides, Nuytsia floribunda, Patersonia occidentalis* var. *occidentalis, Phlebocarya ciliata, Pterostylis* sp., *Stylidium brunonianum, Stylidium repens, Trachymene pilosa*

Icon Flora Species (Note if present)

Vegetation Condition (Give reasoning and note scale used) (see Appendix 4) Excellent – low weed cover, no disturbance, intact vegetation structure, high species diversity

Description of Structural Plant Community No. BaNfW – *Banksia attenuata* and *Nuytsia floribunda* woodland over *Banksia ilicifolia* low open woodland over *Kunzea glabrescens* and *Adenanthos cygnorum* subsp. *cygnorum* tall shrubland over *Macrozamia reidlei* open shrubland over *Hibbertia subvaginata, Bossiaea* eriocarpa and *Gompholobium tomentosum* low open shrubland over *Desmocladus flexuosus* very open sedgeland.

Icon Community (tick if an icon community)

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Photocopy this page and complete for each Structural Plant Community identified.

Trees / Mallees	**Herbs**
Banksia attenuata	*Burchardia congesta*
Banksia ilicifolia	*Dasypogon bromeliifolius*
Eucalyptus todtiana	*Drosera erythrorhiza* subsp. *erythrorhiza*
Nuytsia floribunda	**Hypochaeris glabra*
	Levenhookia stipitata
	Lomandra hermaphrodita
	Patersonia occidentalis var. *occidentalis*
	Phlebocarya ciliata
Shrubs	*Pterostylis* sp.
Adenanthos cygnorum subsp. *cygnorum*	*Stylidium brunonianum*
Bossiaea eriocarpa	*Stylidium repens*
Calytrix flavescens	*Trachymene pilosa*
Gompholobium tomentosum	
Hibbertia subvaginata	
Kunzea glabrescens	
Leucopogon propinquus	
Macrozamia riedlei	
Melaleuca thymoides	
Sedges / Rushes	
Desmocladus asper	
Desmocladus flexuosus	
Lyginia imberbis	
Grasses	
**Aira caryophyllea*	
Austrostipa flavescens	
**Briza maxima*	

Plant community No. 2 photo taken from NW corner looking to the SE

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Photocopy this page and complete for each Structural Plant Community identified .

Structural Plant Community No. _3___ Indicate location of sample point described on Map 4.

Latitude and Longitude

GPS used: yes/no GPS datum: GDA 1994 Easting.: 393260 Northing: 6441134

Landform and Soils

SLOPE: flat/ (gentle)/ steep ASPECT: N/ NE/ E/ (SE)/ S/ SW/ W/ NW OR n/a

SURFACE SOIL: Colour: Light Grey Texture: Sand

EXPOSED ROCK (type and % of surface):

SUB-SURFACE SOIL: Colour: __White__ Texture: (sand)/ loamy sand/ sandy loam/ loam/ clay/ gravel

UNDERLYING ROCK (type and depth if known):

DRAINAGE: (well)/ moderate/ poor WET: all year/ winter and spring only OR (n/a)

CURRENT WATER DEPTH: _____ cm

LITTER (% cover & depth): __5 %, 2 cm__ BARE GROUND (% cover) __2 %__

Topographic Position Circle position of point described on a transect diagram of site below.

(Upland) or Wetland? **(circle one)**

Trees over 30 m			
Trees 10–30 m	*Eucalyptus marginata subsp. marginata*	10-30%	12 m, 15 %
Trees under 10 m	*Banksia attenuata, Allocasuarina fraseriana*	10-30%	8 m, 25 %
Mallees over 8 m			
Mallees under 8 m			
Shrubs over 2 m			
Shrubs 1-2 m			
Shrubs under 1 m	*Hibbertia hypericoides* subsp. *hypericoides, Bossiaea eriocarpa*	30-70%	0.5 m, 30 %
Herbs	*Patersonia occidentalis* var. *occidentalis, Dasypogon bromeliifolius, Burchardia congesta*	2-10%	0.3 m, 5 %
Sedges/ Rushes	*Desmocladus flexuosus*	2-10%	0.25 m, 5 %
Grasses			
Other (e.g. climbers)			

Common Native Species Note species observed. *Allocasuarina fraseriana, Amphipogon turbinatus, Banksia attenuata, Banksia menziesii, Bossiaea eriocarpa, Burchardia congesta, Conostephium pendulum, Conostylis aculeata* subsp. *cygnorum, Dampiera linearis, Dasypogon bromeliifolius, Desmocladus flexuosus, Eucalyptus marginata* subsp. *marginata, Gompholobium tomentosum, Hardenbergia comptoniana, Hibbertia huegelii, Hibbertia hypericoides* subsp. *hypericoides, Hypocalymma angustifolium, Jacksonia furcellata, Lepidosperma leptostachyum, Leucopogon conostephioides, Levenhookia stipitata, Lobelia tenuior, Lomandra hermaphrodita, Macrozamia riedle, Patersonia occidentalis* var. *occidentali, Petrophile linearis, Phlebocarya ciliata, Stirlingia latifolia, Stylidium brunonianum, Stylidium repens, Trachymene pilosa, Xanthorrhoea preissii*

Icon Flora Species (Note if present)

Vegetation Condition (Give reasoning and note scale used) (see Appendix 4) Excellent – low weed cover, no disturbance, intact vegetation structure, high species diversity

Description Of Structural Plant Community No. EmW – *Eucalyptus marginata* subsp. *marginata* woodland over *Banksia attenuata* and *Allocasuarina fraseriana* low woodland over *Hibbertia hypericoides* subsp. *hypericoides* and *Bossiaea eriocarpa* open low heath over *Patersonia occidentalis* var. *occidentalis, Dasypogon bromeliifolius* and *Burchardia congesta* very open herbland over *Desmocladus flexuosus* very open sedgeland.

Icon Community (tick if an icon community)

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Photocopy this page and complete for each Structural Plant Community identified.

Trees / Mallees	**Herbs**
Allocasuarina fraseriana	**Disa bracteata*
Banksia attenuata	**Gladiolus caryophyllaceus*
Banksia menziesii	**Hypochaeris glabra*
Eucalyptus marginata subsp. *marginata*	**Ursinia anthemoides* subsp. *anthemoides*
	Burchardia congesta
	Conostylis aculeata subsp. *cygnorum*
	Dampiera linearis
	Dasypogon bromeliifolius
Shrubs	*Hardenbergia comptoniana*
Bossiaea eriocarpa	*Levenhookia stipitata*
Conostephium pendulum	*Lobelia tenuior*
Gompholobium tomentosum	*Lomandra hermaphrodita*
Hibbertia huegelii	*Patersonia occidentalis* var. *occidentalis*
Hibbertia hypericoides subsp. *hypericoides*	*Phlebocarya ciliata*
Hypocalymma angustifolium	*Stylidium brunonianum*
Jacksonia furcellata	*Stylidium repens*
Leucopogon conostephioides	*Trachymene pilosa*
Macrozamia riedlei	
Petrophile linearis	
Stirlingia latifolia	
Xanthorrhoea preissii	
Sedges / Rushes	
Desmocladus flexuosus	
Lepidosperma leptostachyum	
Grasses	
**Briza maxima*	
Amphipogon turbinatus	

Plant community No. 3 photo taken from NW corner looking to the SE

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Photocopy this page and complete for each Structural Plant Community identified .

Structural Plant Community No. 4 Indicate location of sample point described on Map 4.

Latitude and Longitude

GPS used: yes/no GPS datum: GDA 1994 Easting.: 392937 Northing: 6440871

Landform and Soils

SLOPE: flat/ gentle/ steep ASPECT: N/ NE/ E/ SE/ S/ SW/ W/ NW OR n/a

SURFACE SOIL: Colour: Dark Grey Texture: Sand

EXPOSED ROCK (type and % of surface):

SUB-SURFACE SOIL: Colour: Black Texture: sand/ loamy sand/ sandy loam/ loam/ clay/ gravel

UNDERLYING ROCK (type and depth if known):

DRAINAGE: well/ moderate/ poor WET: all year/ winter and spring only OR n/a

CURRENT WATER DEPTH: _____ cm

LITTER (% cover & depth): 5 %,6 cm BARE GROUND (% cover) 2 %

Topographic Position Circle position of point described on a transect diagram of site below.

Upland or Wetland? **(circle one)**

Trees over 30 m			
Trees 10–30 m	*Melaleuca preissiana, Nuytsia floribunda*	2-10%	8 m, 10 %
Trees under 10 m			
Mallees over 8 m			
Mallees under 8 m			
Shrubs over 2 m	*Kunzea glabrescens, Xanthorrhoea preissii*	30-70%	50 %, 0.25 %
Shrubs 1-2 m			
Shrubs under 1 m	*Pericalymma ellipticum, Astartea scoparia*	30-70%	60 %, 0.75 m
Herbs	*Dasypogon bromeliifolius*	10-30%	0.5 m, 20 %
Sedges/ Rushes			
Grasses			
Other (e.g. climbers)			

Common Native Species Note species observed.

Acacia pulchella, Adenanthos obovatus, Allocasuarina fraseriana, Astartea scoparia, Austrostipa flavescens, Boronia dichotoma, Cassytha glabella, Conostylis aculeata subsp. *cygnorum, Dasypogon bromeliifolius, Euchilopsis linearis, Homalosciadium homalocarpum, Hypocalymma angustifolium, Kunzea glabrescens, Levenhookia stipitata, Melaleuca preissiana, Nuytsia floribunda, Opercularia vaginata, Pericalymma ellipticum, Phyllangium diverges, Platytheca galioides, Pterostylis* sp., *Schoenus efoliatus, Siloxerus humifusus, Stylidium brunonianum, Stylidium repens, Stylidium scariosum, Thysanotus sparteus, Trachymene pilosa, Waitzia nitida, Xanthorrhoea preissii*.

Icon Flora Species (Note if present)

Vegetation Condition (Give reasoning and note scale used) (see Appendix 4) Excellent – low weed cover, no disturbance, intact vegetation structure, high species diversity

Description Of Structural Plant Community No. MpNfOW – *Melaleuca preissiana* and *Nuytsia floribunda* open woodland over *Kunzea glabrescens* and *Xanthorrhoea preissii* tall open scrub over *Pericalymma ellipticum* and *Astartea scoparia* open low heath over *Dasypogon bromeliifolius* open herbland.

Icon Community (tick if an icon community)

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Photocopy this page and complete for each Structural Plant Community identified.

Trees / Mallees	**Herbs**
Allocasuarina fraseriana	**Hypochaeris glabra*
Melaleuca preissiana	**Ursinia anthemoides* subsp. *anthemoides*
Nuytsia floribunda	*Cassytha glabella*
	Conostylis aculeata subsp. *cygnorum*
	Dasypogon bromeliifolius
	Homalosciadium homalocarpum
	Levenhookia stipitata
	Opercularia vaginata
Shrubs	*Phyllangium divergens*
Acacia pulchella	*Platytheca galioides*
Adenanthos obovatus	*Pterostylis* sp.
Astartea scoparia	*Schoenus efoliatus*
Boronia dichotoma	*Siloxerus humifusus*
Euchilopsis linearis	*Stylidium brunonianum*
Hypocalymma angustifolium	*Stylidium repens*
Kunzea glabrescens	*Stylidium scariosum*
Pericalymma ellipticum	*Thysanotus sparteus*
Xanthorrhoea preissii	*Trachymene pilosa*
	Waitzia nitida
Sedges / Rushes	
Grasses	
**Aira caryophyllea*	
Austrostipa flavescens	
**Briza maxima*	

Plant community No. 4 photo taken from NW corner looking to the SE

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Photocopy this page and complete for each Structural Plant Community identified .

Structural Plant Community No. 5 Indicate location of sample point described on Map 4.

Latitude and Longitude

GPS used: yes/no GPS datum: GDA 1994 Easting.: 392699 Northing: 6441285

Landform and Soils

SLOPE: flat/ gentle/ steep ASPECT: N/ NE/ E/ SE/ S/ SW/ W/ NW OR n/a

SURFACE SOIL: Colour: Dark grey Texture: Sandy Loam

EXPOSED ROCK (type and % of surface):

SUB-SURFACE SOIL: Colour: Dark Grey Texture: sand/ loamy sand/ sandy loam/ loam/ clay/ gravel

UNDERLYING ROCK (type and depth if known):

DRAINAGE: well/ moderate/ poor WET: all year/ winter and spring only OR n/a

CURRENT WATER DEPTH: _____ cm

LITTER (% cover & depth): 10 %, 4 cm BARE GROUND (% cover) 2 %

Topographic Position Circle position of point described on a transect diagram of site below.

Upland or Wetland? **(circle one)**

Trees over 30 m			
Trees 10–30 m	*Melaleuca preissiana, Eucalyptus rudis*	30-70%	15 m, 70 %
Trees under 10 m			
Mallees over 8 m			
Mallees under 8 m			
Shrubs over 2 m	*Kunzea glabrescens*	2-10%	2 m, 5 %
Shrubs 1-2 m	*Astartea scoparia*	over 70%	1.75 m, 90 %
Shrubs under 1 m			
Herbs	*Siloxerus humifusus, Cassytha glabella*	2-10%	1 m, 5 %
Sedges/ Rushes	*Schoenus efoliatus*	2-10%	1.25 m, 5 %
Grasses	**Aira caryophyllea, *Briza maxima*	2-10%	0.5 m, 5 %
Other (e.g. climbers)			

Common Native Species Note species observed. *Acacia pulchella, Aotus gracillima, Astartea scoparia, Calothamnus lateralis, Cassytha glabella, Dampiera linearis, Eucalyptus rudis, Hypocalymma angustifolium, Isolepis marginata, Kunzea glabrescens, Melaleuca preissiana, Patersonia occidentalis, Siloxerus humifusus, Thysanotus multiflorus, Trachymene pilosa*

Icon Flora Species (Note if present)

Vegetation Condition (Give reasoning and note scale used) (see Appendix 4) Excellent – low weed cover, no disturbance, intact vegetation structure

Description Of Structural Plant Community No. MpErOF – *Melaleuca preissiana* and *Eucalyptus rudis* open forest over *Kunzea glabrescens* tall open shrubland over *Astartea scoparia* closed heath over *Siloxerus humifusus* and *Cassytha glabella* very open herbland over *Schoenus efoliatus* very open sedgeland over **Aira caryophyllea* and **Briza maxima* very open grassland.

Icon Community (tick if an icon community)

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Photocopy this page and complete for each Structural Plant Community identified.

Trees / Mallees	**Herbs**
Eucalyptus rudis	**Hypochaeris glabra*
Melaleuca preissiana	**Sonchus oleraceus*
	Cassytha glabella
	Dampiera linearis
	Patersonia occidentalis
	Siloxerus humifusus
	Thysanotus multiflorus
	Trachymene pilosa
Shrubs	
Astartea scoparia	
Acacia pulchella	
Aotus gracillima	
Calothamnus lateralis	
Hypocalymma angustifolium	
Kunzea glabrescens	
Sedges / Rushes	
Isolepis marginata	
Schoenus efoliatus	
Grasses	
**Aira caryophyllea*	
**Briza maxima*	
**Ehrharta longiflora*	

Plant community No. 5 photo taken from NW corner looking to the SE

Weed Species Note species observed, especially the occurrence of species in better condition areas, even if they only occur in small numbers or in small patches at present. Note the distribution of each species across the site, e.g. throughout the site, spot occurrences or disturbed areas only (edges/tracks/cleared areas). Mark spot occurrences and easily mapped distributions on Map 4. If a species is widespread, note whether it is restricted to specific plant communities or wetland areas.

Acacia longifolia	Throughout the site
**Aira caryophyllea*	Disturbed areas only
**Asparagus asparagoides (Bridal Creeper)*	Spot occurrences
**Asphodelus fistulosus (Onion Weed)*	Spot occurrences
**Briza maxima* (Blowfly Grass)	Throughout the site
**Carpobrotus edulis (Pigface)*	Spot occurrences
**Cenchrus sp.*	Spot occurrences
**Cenchrus setaceus*	Spot occurrences
**Cyperus tenellus*	
***Cynodon dactylon (Couch)*	Spot occurrences
**Disa bracteata* (South Africa Weed Orchid)	Spot occurrences
**Ehrharta calycina* (Perennial Veldt Grass)	Throughout the site
**Ehrharta longiflora* (Annual Veldt Grass)	Spot occurrences
**Eragrostis curvula (African Lovegrass)*	Spot occurrences
**Euphorbia terracina* (Geraldton Carnation Weed)	Spot occurrences
**Gladiolus caryophyllaceus* (Wild Gladiolus)	Throughout the site
**Gomphocarpus fruticosus* (Narrow-leaved Cotton Bush)	Spot occurrences
**Hypochaeris glabra* (Smooth Catsear)	Throughout the site
Pelargonium capitatum (Rose Pelargonium)	Spot occurrences
**Polypogon monspeliensis*	Spot occurrences
**Sonchus oleraceus* (Common Sowthistle)	Disturbed areas only
**Urospermum picroides* (False Hawkbit)	Spot occurrences
**Ursinia anthemoides* (Ursinia)	Disturbed areas only
**Wahlenbergia capensis* (Cape Bluebell)	Disturbed areas only
*Zantedeschia aethiopica (Arum Lily)	Spot occurrences

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Feral Fauna Note species observed or evidence for presence of species (scats, tracks or traces).

Evidence of Foxes (burrows, wildlife kills)		
Evidence of Rabbits (burrows, dung piles, grazing)	✓	
Evidence of Dogs (droppings, scratchings)	✓	
Evidence of Cats (wildlife kills)	✓	Pet cat seen
European Honey Bees (hives in tree hollows)		
Evidence of Horses/ Cattle/ Sheep (foot prints, droppings)		
Evidence of Pigs (soil disturbance)		
Rainbow Lorikeets	✓	Calling
Other		

Native Fauna and Fungi. Note species observed or evidence of presence for fauna species. Indicate icon species.

Isoodon obesulus (Quenda)	Habitat present and diggings
Lichenostomus virescens (Singing Honeyeater)	Observed directly
Lichmera indistincta (Brown Honeyeater)	Observed directly
Merops ornatus (Rainbow Bee-eater)	Calls heard
Phaps chalcoptera (Common Bronzewing Pigeon)	Observed directly
Phylidonyris niger (White-cheeked Honeyeater)	Observed directly
Spilopelia chinensis (Spotted Dove)	Observed directly
Black Cockatoo	Habitat

Native Fauna and Fungi Habitat

Areas of trees (with or without understorey)	✓	
Areas of dense understorey vegetation	✓	
Tree hollows in old mature trees	✓	
Dead branches as perches for hunting/ look outs	✓	
Dead vegetation for fungi/invertebrate habitat (leaf litter, branches/logs)	✓	
Large fallen logs on the ground	✓	
Granite or other natural rocky outcrops		

Moss beds for fungi habitat	✓	
Wetlands or waterways	✓	

Vegetation Health

Note dead or dying trees, shrubs, herbs and so on. Note the species concerned and the pattern of deaths/changes in the vegetation. *Phytophthora* Root Rot moves in fronts and along drainage lines therefore noting patterns helps to determine whether *Phytophthora* spp. are present. Appendix 5 defines and provides the website address for a list of common indicator species that are affected by *Phytophthora* spp. Do not automatically assume dead or dying plants means that *Phytophthora* is present.

Numerous tree stumps (not from logging)		
Dead or dying species	✓	Poor canopy health *Eucalyptus rudis*.
Obvious reduction of tree canopies (e.g. staghorns)		
Heavy leaf/stem damage by insects (e.g. lerps, stem borers)		
Diseases/pests suspected	✓	Insect attack on *E. rudis*
Drought/lowering of groundwater table suspected	✓	
Flooding/rise in groundwater table suspected		

Miscellaneous Disturbance Factors and Threatening Processes

Determine the range and extent of disturbance factors and threatening processes occurring at the site. If appropriate, mark on Map 4 and photograph as required. If site is large it may be beneficial to divide into sections and evaluate each separately.

Evidence of salinisation (e.g. scalding, seeps)		
Erosion (e.g. gullies, bank collapse)		
Wetland eutrophication (e.g. algal blooms)		
Stormwater drains/sumps		
Service corridors (e.g. Water Corp, Telstra, Western Power, Alinta Gas)		
Mining/extraction		
Evidence of past logging (e.g. selective removal of large trees)		
Previous clearing (may be partially cleared areas or evidence of previous clearing and regrowth over much of site)		
Overgrazing (e.g. rabbits, stock, goats; over-population by kangaroos)	✓	Potentially from rabbits
Firewood collection (e.g. recent chainsaw/axe cuts, sawdust piles)		
Dope plants/ production equipment		
Soil movement (dumping or removal)		
Rubbish dumping (note type, e.g. construction, garden waste, weed source?)	✓	Minor
Proliferation of tracks (fire breaks, walk trails)	✓	New tracks to two cubbies that have been constructed in the north – west area
Off road vehicle use (4WD / trail bikes/ BMX/ mountain bikes)		
Cubby construction	✓	

Vandalism (damage to plants)	✓	Branches broken off to make cubbies
"Enrichment Planting" (revegetation with species not found in that local plant community, are these becoming weeds?)		
Impacts of High Fire Frequency and/or Intensity		
• Reduced range of tree ages		
• Fire scars high up (due to a hot burn)		
• Major trunk damage		
• Trees suckering from trunk and branches		
• Amount of leaf litter reduced		
• Large fallen logs nearly burnt away		
• Evidence of arson (burnt grass tree skirts, matches, cigarette lighters, exploded spray cans)		
Time since last fire (estimate)	✓	>10 years

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Vegetation Condition Map

For initial assessment, the overall vegetation condition of the site can be determined after familiarising yourself with the site. On Map 4, divide the site into broad sections based on condition, draw the boundaries of each section and record their condition. Using the map, estimate the % area each section occupies of the total site and note in the relevant boxes below using the Keighery (1994) condition scale(see Appendix 4). For example, 'Very Good: Section 1, 75% of site.' 'Degraded: Section 2, 25% of site.' For most sites there will be very degraded areas along tracks, for example, where rubbish has been dumped. If not extensive, these can be referred to by adding a statement such as 'areas of severe localised disturbance' in the comments.

Vegetation Condition Scales Indicate % area each section occupies of the total site (ensure adds up to 100%).

% area	0	73.9	6.5	14.6	3.6	1.5

Comments

Vegetation condition scale percentages, above, are equal to 100 % of the mapped vegetation and 97.2 % of the total reserve

Covers of additional condition categories of the entire reserve:

Revegetated: 0%
Fire breaks/tracks: 2.7%
Open Water: 0.1%
Other uses: 0%
Parkland: 0%

Existing Management Infrastructure

Describe type in box below and mark location on Map 4, photograph if required.

Fencing	✓	
Fence condition	✓	Excellent
Gates	✓	
Paths	✓	Cement
Path condition	✓	Excellent
Path fencing		
Path fence condition		
Fire access tracks	✓	
Signs	✓	
Previous works		

Social Significance Values

Evidence of Community/ Passive recreation/ Education interest	✓	
Landscape amenity (e.g. area screens/ buffers conflicting land uses)	✓	
Scenic features (e.g. high point in landscape)		
Indigenous/ European Heritage (Cultural or Historical)	✓	
Other		

Surrounding Land Uses (mark on Map 4)

Surrounding Land Uses (note type/s and indicate likely impacts/benefits e.g. source of rubbish; weed seeds blowing into site; potential for community interest and perhaps volunteers to assist management)	Housing and remnant vegetation

Recommendations for Management List potential management actions (for example, assessment for the presence of *Phytophthora* species by an accredited assessor; fencing; signage to identify as a conservation area; rubbish removal; detailed weed survey and mapping; fire response and management planning; detailed flora/fauna/fungi surveys).
Lock missing on gate on Lyon Road
Continue weed control on tracks and other degraded areas
Spot-spray Veldt grass and Arum Lily
Control priority weed species
Control rabbits and ferals

Initial Field Assessment A

Name of area: Banksia Eucalypt Woodland Park

Confirmation of GIS Mapped Boundaries

Prepare the following map if recommending changes to native vegetation (A) or wetland (B) mapping and label with the name of the area.

When recommending changes, forward a completed copy of all 4 Initial Natural Area Assessment templates to the Perth Biodiversity Project, WALGA, 15 Altona St, West Perth 6005 for distribution to relevant custodian of database.

A	**Mapped Native Vegetation** (DPI/Dept of Agriculture 2001)	**Yes / No**
	Rationale: _____	
B	**Mapped Wetland/s and Management Category** CC, RE or MU (DoE current update)	**Yes / No/ Na** For changes to the mapping of wetlands on the Swan Coastal Plain complete and attach the current Department of the Environment guidelines for evaluating wetlands in this bioregion
	Rationale: _____	
C	**Mapped Vegetation Complex/es** (Heddle, Loneragan and Havel 1980 or Mattiske & Havel 1998)	Yes/No More likely to be _____
	Rationale: (do not map)_____	

Natural Area Initial Field Assessment B –

Significant Species and Communities

General Information

Date of assessment 10/11/2016 Native Vegetation Unique ID No. _____

Name of area Banksia Eucalypt Woodland Park

Location (address/street name) Cape Le Grand Ave, Yanchep Ln, Cape Range Crs and Gibbs Rd, Aubin Grove, City of Cockburn

Assessor Joel Collins *Skill Level 6c

Recorder _____ Skill Level _____

Recorder _____ Skill Level _____

Recorder _____ Skill Level _____

**Important Note: Skill level 5 or above is required by the assessor to survey natural areas for significant species. Skill Level 6 is required to survey for threatened ecological communities (see Appendix 1).*

No significant species or communities recorded through Field Assessment B If searches for significant flora, significant fauna and Threatened Ecological Communities by an appropriately skilled assessor have **NOT** recorded any significant species or communities on this site during this assessment, tick the box and continue no further.	✓

Partial Assessment ONLY □ In situations where significant species or communities have been recorded during Field Assessment A but a comprehensive Field Assessment B has **NOT** yet taken place, transfer the relevant information to these forms for databasing purposes and tick this box.	✓

Photographs

Indicate film roll no. and photograph no., location and direction of each photo on Map 4 during the field assessment. e.g. R1/P4 ⇗ (Roll 1/Photo 4 looking⇗)

Photographer's Name _____

Latitude And Longitude (for various locations noted during assessment, compulsory)

GPS used: yes GPS datum: _____

Descriptor and Location No. (eg. Species A GPS 1)	Reading/calculation (mark location number on Map 6) Latitude (S) or Northing	Longitude (E) or Easting
ELA10	6441150	393096
ELA11	6441134	393260

Prepare the following map during the field assessment and label with the name of the area. Consult Map 4 prepared for Natural Area Initial Field Assessment A for the structural plant communities and vegetation condition mapping, update on Map 6 if necessary.

Threatened Ecological Communities (TECs) (see Appendix 6) List the Threatened Ecological Communities present or believed to be present on the site and the reasons why. For those TECs based on floristic community types, map the boundary of each TEC by cross referencing with the structural plant communities mapped during the Natural Area Initial Field Assessment A (Map 4). **During spring**, describe a standard 10 x 10 m quadrat and compile a species list for each structural plant community representing a TEC (see **page 15**, Threatened Ecological Communities – Description and Mapping).
TEC Banksia Woodlands of the Swan Coastal Plain (Endangered) Environment Protection and Biodiversity
Conservation Act 1999 (EPBC Act)

Significant Native Flora (see Appendix 6)

Note presence of Declared Rare, Priority or other significant flora. Note location of species on Map 6. Indicate which structural plant communities they occur in (refer to Map 4 of the Natural Area Initial Field Assessment A).

Significant Native Fauna (see Appendix 6)

Note presence or evidence for presence of Specially Protected, Priority or other significant fauna. Note location of species/evidence on Map 6. Indicate which structural plant communities they occur in or utilise.

Isoodon obesulus (Quenda)	Likely habitat
Black cockatoo species	Likely habitat
Merops ornatus (Rainbow Bee-eater)	Likely habitat

Photocopy this page and complete for **each** Structural Plant Community identified as a TEC OR if preferred use Recording Sheets 1 & 2 of Keighery (1994) (see Appendix 3) to describe each community. Note that Appendix 3 contains minor modifications to the Keighery (1994) templates to include the additional information required below.

Threatened Ecological Communities – Description and Mapping

For TECs based on floristic community types, description and mapping needs to be undertaken during spring to provide the definitive floristic information needed to confirm the presence of a TEC. On Map 6, draw the boundary of each Threatened Ecological Community present and label with the TEC to which it belongs. These boundaries should be based on the structural plant communities identified on Map 4 of the Natural Area Initial Field Assessment A template. Allocate a number to each structural plant community representing a TEC and describe each below using a permanently located and representative 10 x 10 m quadrat. Note the vegetation condition of each quadrat. Compile a list of the plant species present within each quadrat.

Structural Plant Community No. 2 Indicate location of sample point described on Map 4.

Latitude and Longitude

GPS used: yes/no GPS datum: GDA 1994 Easting.: 393096 Northing: 6441150

Landform and Soils

SLOPE: (flat)/ gentle/ steep ASPECT: N/ NE/ E/ SE/ S/ SW/ W/ NW OR (n/a)

SURFACE SOIL: Colour: Light Grey Texture: Sand

EXPOSED ROCK (type and % of surface):

SUB-SURFACE SOIL: Colour: Grey Texture: (sand)/ loamy sand/ sandy loam/ loam/ clay/ gravel

UNDERLYING ROCK (type and depth if known):

DRAINAGE: (well)/ moderate/ poor WET: all year/ winter and spring only OR (n/a)

CURRENT WATER DEPTH: _____ cm

LITTER (% cover & depth): 60 %, 5 cm BARE GROUND (% cover) 2 %

Topographic Position Circle position of point described on a transect diagram of site below.

Upland or Wetland? **(circle one)**

Trees over 30 m			
Trees 10–30 m	*Banksia attenuata, Nuytsia floribunda*	30-70%	12 m, 50 %
Trees under 10 m	*Banksia ilicifolia*	2-10%	8 m, 5 %
Mallees over 8 m			
Mallees under 8 m			
Shrubs over 2 m	*Kunzea glabrescens, Adenanthos cygnorum* subsp. *cygnorum*	30-70%	3 m, 60 %
Shrubs 1-2 m	*Macrozamia reidlei*	2-10%	1.25 m, 5 %
Shrubs under 1 m	*Hibbertia subvaginata, Bossiaea eriocarpa, Gompholobium tomentosum*	2-10%	0.8 m, 5 %
Herbs			
Sedges/ Rushes	*Desmocladus flexuosus*	2-10%	0.75 m, 3 %
Grasses			
Other (e.g. climbers)			

Common Native Species Note species observed. *Adenanthos cygnorum* subsp. *cygnorum, Austrostipa flavescens, Banksia attenuata, Banksia ilicifolia, Bossiaea eriocarpa, Burchardia congesta, Calytrix flavescens, Dasypogon bromeliifolius, Desmocladus asper, Desmocladus flexuosus, Drosera*

erythrorhiza subsp. *erythrorhiza, Eucalyptus todtiana, Gompholobium tomentosum, Hibbertia subvaginata, Kunzea glabrescens, Levenhookia stipitata, Lomandra hermaphrodita, Lyginia imberbis, Macrozamia riedle, Nuytsia floribunda, Patersonia occidentalis* var. *occidentalis, Phlebocarya ciliata, Pterostylis* sp., *Stylidium brunonianum, Stylidium repens, Trachymene pilosa*
Icon Flora Species (Note if present)
Vegetation Condition (Give reasoning and note scale used) (see Appendix 4) Excellent – low weed cover, no disturbance, intact vegetation structure
Description of Structural Plant Community No. BaNfW – *Banksia attenuata* and *Nuytsia floribunda* woodland over *Banksia ilicifolia* low open woodland over *Kunzea glabrescens* and *Adenanthos cygnorum* subsp. *cygnorum* tall shrubland over *Macrozamia reidlei* open shrubland over *Hibbertia subvaginata, Bossiaea* eriocarpa and *Gompholobium tomentosum* low open shrubland over *Desmocladus flexuosus* very open sedgeland.
Icon Community (tick if an icon community)

Photocopy this page and complete for each Structural Plant Community identified.

Trees / Mallees	**Herbs**
Banksia attenuata	*Burchardia congesta*
Banksia ilicifolia	*Dasypogon bromeliifolius*
Eucalyptus todtiana	*Drosera erythrorhiza* subsp. *erythrorhiza*
Nuytsia floribunda	**Hypochaeris glabra*
	Levenhookia stipitata
	Lomandra hermaphrodita
	Patersonia occidentalis var. *occidentalis*
	Phlebocarya ciliata
Shrubs	*Pterostylis* sp.
Adenanthos cygnorum subsp. *cygnorum*	*Stylidium brunonianum*
Bossiaea eriocarpa	*Stylidium repens*
Calytrix flavescens	*Trachymene pilosa*
Gompholobium tomentosum	
Hibbertia subvaginata	
Kunzea glabrescens	
Macrozamia riedlei	
Sedges / Rushes	
Desmocladus asper	
Desmocladus flexuosus	
Lyginia imberbis	
Grasses	
**Aira caryophyllea*	
Austrostipa flavescens	
**Briza maxima*	

Plant community No. 2 photo taken from NW corner looking to the SE

Initial Field Assessment B

Name of area: Banksia Eucalypt Woodland Park

Structural Plant Community No. 3 Indicate location of sample point described on Map 4.

Latitude and Longitude

GPS used: yes/no GPS datum: GDA 1994 Easting.: 393260 Northing: 6441134

Landform and Soils

SLOPE: flat/ gentle/ steep ASPECT: N/ NE/ E/ SE/ S/ SW/ W/ NW OR n/a

SURFACE SOIL: Colour: Light Grey Texture: Sand

EXPOSED ROCK (type and % of surface):

SUB-SURFACE SOIL: Colour: White Texture: sand/ loamy sand/ sandy loam/ loam/ clay/ gravel

UNDERLYING ROCK (type and depth if known):

DRAINAGE: well/ moderate/ poor WET: all year/ winter and spring only OR n/a

CURRENT WATER DEPTH: _____ cm

LITTER (% cover & depth): 5 %, 2 cm BARE GROUND (% cover) 2 %

Topographic Position Circle position of point described on a transect diagram of site below.

Upland or Wetland? **(circle one)**

Trees over 30 m			
Trees 10–30 m	*Eucalyptus marginata subsp. marginata*	10-30%	12 m, 15 %
Trees under 10 m	*Banksia attenuata, Allocasuarina fraseriana*	10-30%	8 m, 25 %
Mallees over 8 m			
Mallees under 8 m			
Shrubs over 2 m			
Shrubs 1-2 m			
Shrubs under 1 m	*Hibbertia hypericoides* subsp. *hypericoides, Bossiaea eriocarpa*	30-70%	0.5 m, 30 %
Herbs	*Patersonia occidentalis* var. *occidentalis, Dasypogon bromeliifolius, Burchardia congesta*	2-10%	0.3 m, 5 %
Sedges/ Rushes	*Desmocladus flexuosus*	2-10%	0.25 m, 5 %
Grasses			
Other (e.g. climbers)			

Common Native Species Note species observed. *Allocasuarina fraseriana, Amphipogon turbinatus, Banksia attenuata, Banksia menziesii, Bossiaea eriocarpa, Burchardia congesta, Conostephium pendulum, Conostylis aculeata* subsp. *cygnorum, Dampiera linearis, Dasypogon bromeliifolius, Desmocladus flexuosus, Eucalyptus marginata* subsp. *marginata, Gompholobium tomentosum, Hardenbergia comptoniana, Hibbertia huegelii, Hibbertia hypericoides* subsp. *hypericoides, Hypocalymma angustifolium, Jacksonia furcellata, Leucopogon conostephioides, Levenhookia stipitata, Lobelia tenuior, Lomandra hermaphrodita, Macrozamia riedle, Patersonia occidentalis* var. *occidentali, Petrophile linearis, Phlebocarya ciliata, Stirlingia latifolia, Stylidium brunonianum, Stylidium repens, Trachymene pilosa, Xanthorrhoea preissii*

Icon Flora Species (Note if present)

Vegetation Condition (Give reasoning and note scale used) (see Appendix 4) Excellent – low weed cover, no disturbance, intact vegetation structure

Description Of Structural Plant Community No. EmW – *Eucalyptus marginata* subsp. *marginata* woodland over *Banksia attenuata* and *Allocasuarina fraseriana* low woodland over *Hibbertia hypericoides* subsp. *hypericoides* and *Bossiaea eriocarpa* open low heath over *Patersonia occidentalis* var. *occidentalis, Dasypogon bromeliifolius* and *Burchardia congesta* very open herbland over *Desmocladus flexuosus* very open sedgeland.

Icon Community (tick if an icon community)

Initial Field Assessment B Name of area: Banksia Eucalypt Woodland Park

Photocopy this page and complete for each Structural Plant Community identified.

Trees / Mallees	**Herbs**
Allocasuarina fraseriana	**Disa bracteata*
Banksia attenuata	**Gladiolus caryophyllaceus*
Banksia menziesii	**Hypochaeris glabra*
Eucalyptus marginata subsp. marginata	**Ursinia anthemoides* subsp. *anthemoides*
	Burchardia congesta
	Conostylis aculeata subsp. *cygnorum*
	Dampiera linearis
	Dasypogon bromeliifolius
Shrubs	*Hardenbergia comptoniana*
Bossiaea eriocarpa	*Levenhookia stipitata*
Conostephium pendulum	*Lobelia tenuior*
Gompholobium tomentosum	*Lomandra hermaphrodita*
Hibbertia huegelii	*Patersonia occidentalis* var. *occidentalis*
Hibbertia hypericoides subsp. *hypericoides*	*Phlebocarya ciliata*
Hypocalymma angustifolium	*Stylidium brunonianum*
Jacksonia furcellata	*Stylidium repens*
Leucopogon conostephioides	*Trachymene pilosa*
Macrozamia riedlei	
Petrophile linearis	
Stirlingia latifolia	
Xanthorrhoea preissii	
Sedges / Rushes	
Desmocladus flexuosus	
Grasses	
**Briza maxima*	
Amphipogon turbinatus	

Plant community No. 3 photo taken from NW corner looking to the SE

Natural Area Initial Assessment Summary

i) recognised International, National, State or Regional conservation value but not already protected Specify: Bush Forever Site 492 and Conservation Area	yes/no
ii) of an ecological community with only 1500 ha or 30% or less (whichever is the greater) remaining in IBRA subregion Specify: Bassendean Complex – Central and South 26.1% remaining	yes/no
iii) large (greater than 20 ha), viable natural areas in good or better condition of an ecological community with more than 30% remaining within the IBRA subregion	yes/no
iv) of an ecological community with only 1500 ha or 15% or less (whichever is the greater) protected for conservation in the Jarrah Forest IBRA subregion Specify: Not within Jarrah Forest IBRA subregion	yes/no
v) of an ecological community with only 400 ha or 10% or less (whichever is the greater) protected for conservation in the Bush Forever Study Area Specify: 17.00% protected in BF study area	yes/no
i) of an ecological community with 10% or less remaining of its pre-European extent within the Local Government Area Specify:	yes/no
ii) of an ecological community with 30% or less remaining of its pre-European extent within the Local Government Area Specify:	yes/no
iii) large (greater than 10 ha), viable natural areas in good or better condition of an ecological community with more than 30% remaining within the Local Government Area	yes/no
i) natural area in good or better condition that contains both upland and wetland structural plant communities	yes/no
i) of an ecological community with only 1500 ha or 10% or less (whichever is the greater) remaining in the IBRA subregion Specify: Bassendean Complex – Central and South 26.1% remaining	yes/no
ii) of an ecological community with only 400 ha or 10% or less (whichever is the greater) remaining in the Bush Forever Study Area Specify: 17.00% protected in BF study area	yes/no
iii) contains a Threatened Ecological Community Specify: TEC Banksia Woodlands of the Swan Coastal Plain (Endangered) Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	yes/no
iv) contains Declared Rare Flora, Specially Protected Fauna or significant habitat for these fauna Specify: Potential Black Cockatoo feeding habitat	yes/no
v) contains Priority or other significant flora or fauna or significant habitat for these fauna Specify: Isoodon obesulus (Quenda) habitat, *Merops ornatus* (Rainbow Bee-eater) observed	yes/no
i) natural areas acting as stepping stones in a Regionally Significant Ecological Linkage	yes/no
ii) natural areas acting as stepping stones in a locally significant ecological linkage	yes/no
i) Conservation or Resource Enhancement category wetland plus buffer	yes/no
ii) EPP Wetland plus buffer	yes/no
iii) riparian vegetation plus buffer	yes/no
iv) floodplain area plus buffer	yes/no
v) estuarine fringing vegetation plus buffer	yes/no
vi) coastal vegetation on foredunes and secondary dunes	yes/no

Initial Assessment Summary Name of area: Banksia Eucalypt Woodland Park

Size	Greater than 20 ha	(5)
	Greater than 10 ha less than 20 ha	4
	Greater than 4 ha less than 10 ha	3
	Greater than 1 ha less than 4 ha	2
	Less than 1 ha	1
Shape	Circle, square or squat rectangle	3.5
	Oval, rectangle or symmetrical triangle	3
	Irregular shape with few indentations	2.5
	Irregular shape with many indentations	(2)
	Long thin shape with large proportion of area greater than 50 m wide	1.5
	Long thin shape with large proportion of area less than 50 m wide	1
Perimeter to area ratio	Less than 0.01	(4)
	Greater than 0.01 less than 0.02	3
	Greater than 0.02 less than 0.04	2
	Greater than 0.04	1
Vegetation condition NB: based on Keighery (1994) condition scale	Pristine 10 x % =	
	Excellent 8 x 73.9 % = 6.0	
	Very Good 6 x 6.5 % = 0.4	
	Good 4 x 14.6 % = 0.6	
	Degraded 2 x 3.6 % =0.1	
	Completely Degraded 0 x 1.5 % = 0	
	Total calculated score =	7.1
Connectivity No connectivity = 0	Forms part of a Regional Ecological Linkage and is contiguous with a protected natural area greater than 4ha	5
	Not part of a Regional Ecological Linkage but contiguous with a protected natural area greater than 4ha	4.5
	Forms part of a Regional Ecological Linkage and is within 500 m of more than 4 protected natural areas having an area greater than 4 ha	4
	Not part of a Regional Ecological Linkage but within 500 m of more than 4 protected natural areas having an area greater than 4 ha	3.5
	Forms part of a Regional Ecological Linkage and is within 500 m of 3 or 4 protected natural areas having an area greater than 4 ha	3
	Not part of a Regional Ecological Linkage but within 500 m of 3 or 4 protected natural areas having an area greater than 4 ha	2.5
	Forms part of a Regional Ecological Linkage and is within 500 m of 2 protected natural areas having an area greater than 4 ha	2
	Not part of a Regional Ecological Linkage but within 500 m of 2 protected natural areas having an area greater than 4 ha	1.5
	Forms part of a Regional Ecological Linkage and is within 500 m of less than 2 protected natural areas having an area greater than 4 ha	1
	Not part of a Regional Ecological Linkage but within 500 m of less than 2 protected natural areas having an area greater than 4 ha	0.5
	Forms part of a Regional Ecological Linkage but is not within 500 m of any protected natural areas having an area greater than 4 ha	(0.25)

Combined Weed Coverage - Banksia Eucalypt Woodland Park

Legend

Reserve Footprint

Combined Weed Cover

- <5%
- 6-30%
- 31-60%
- >61%

0 40 80 160

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

N

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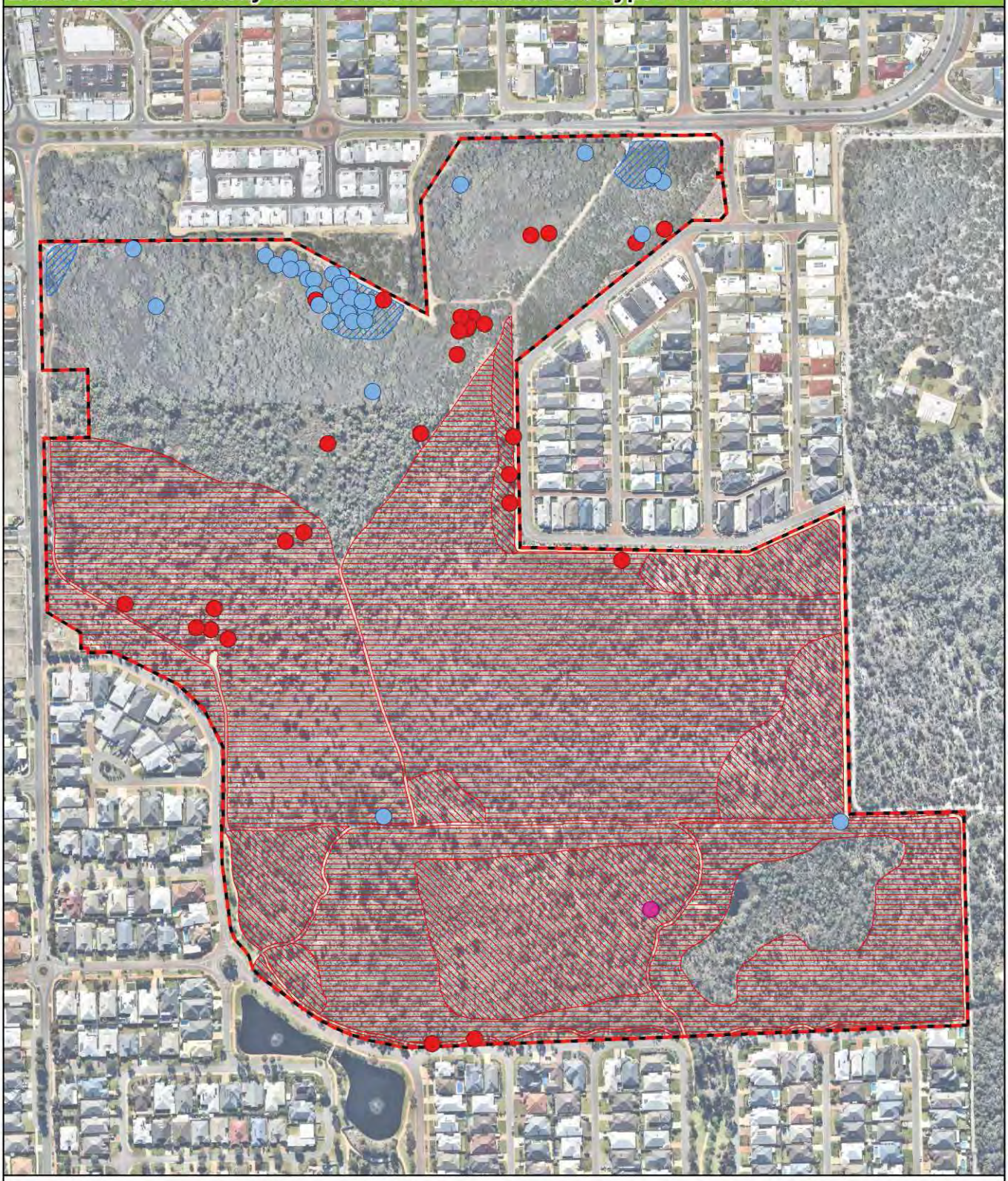
[redacted]

Bulbous Weed Density and Locations - Banksia Eucalypt Woodland Park



Legend

Reserve Footprint

Bulbous Weed Locations

- *Asphodelus fistulosus*
- *Gladiolus caryophyllaceus*
- *Zantedeschia aethiopica*

Bulbous Weed Density

Gladiolus caryophyllaceus

- <5%
- 6-30%

Zantedeschia aethiopica

- <5%

0 40 80 160

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

N

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[redacted]

Grass Weed Density and Locations - Banksia Eucalypt Woodland Park

Legend

Reserve Footprint

Grass Weed Locations

Cenchrus sp

Grass Weed Density

Cenchrus setaceus

<5%

Cynodon dactylon

<5%

Ehrharta calycina

<5%

6-30%

31-60%

Eragrostis curvula

<5%

6-30%

0 40 80 160

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

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Other Weed Density and Locations - Banksia Eucalypt Woodland Park

Legend

- Reserve Footprint

Other Weed Locations

- *Asparagus asparagoides*
- *Carpobrotus edulis*
- *Euphorbia terracina*
- *Gomphocarpus fruticosus*
- *Pelargonium capitatum*

Other Weed Density

Asparagus asparagoides

- <5%

Euphorbia terracina

- <5%

Pelargonium capitatum

- <5%
- 6-30%

0 40 80 160

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

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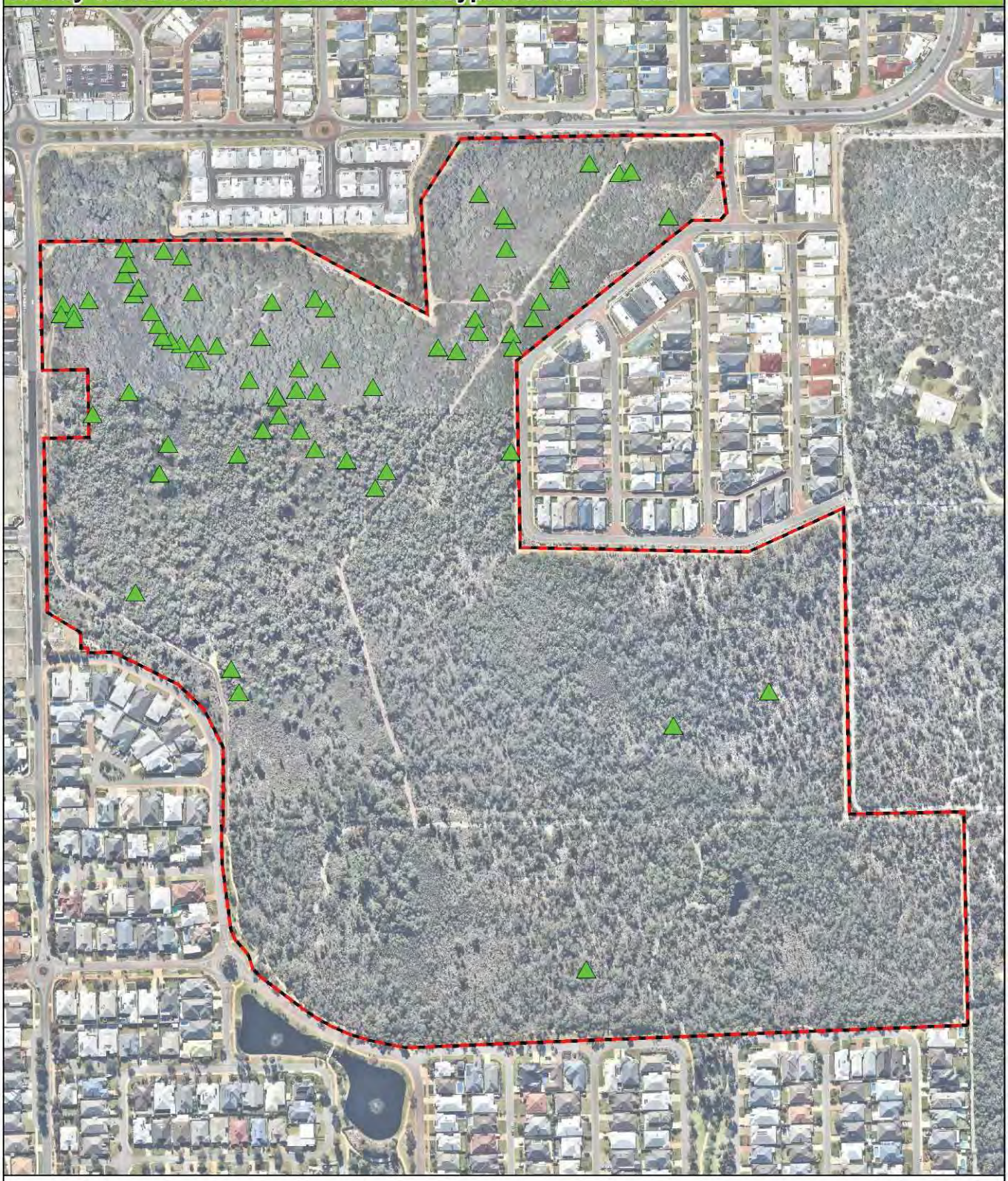
Woody Weed Locations - Banksia Eucalypt Woodland Park



Legend

Reserve Footprint

Woody Weed Locations

Acacia longifolia

0 40 80 160

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

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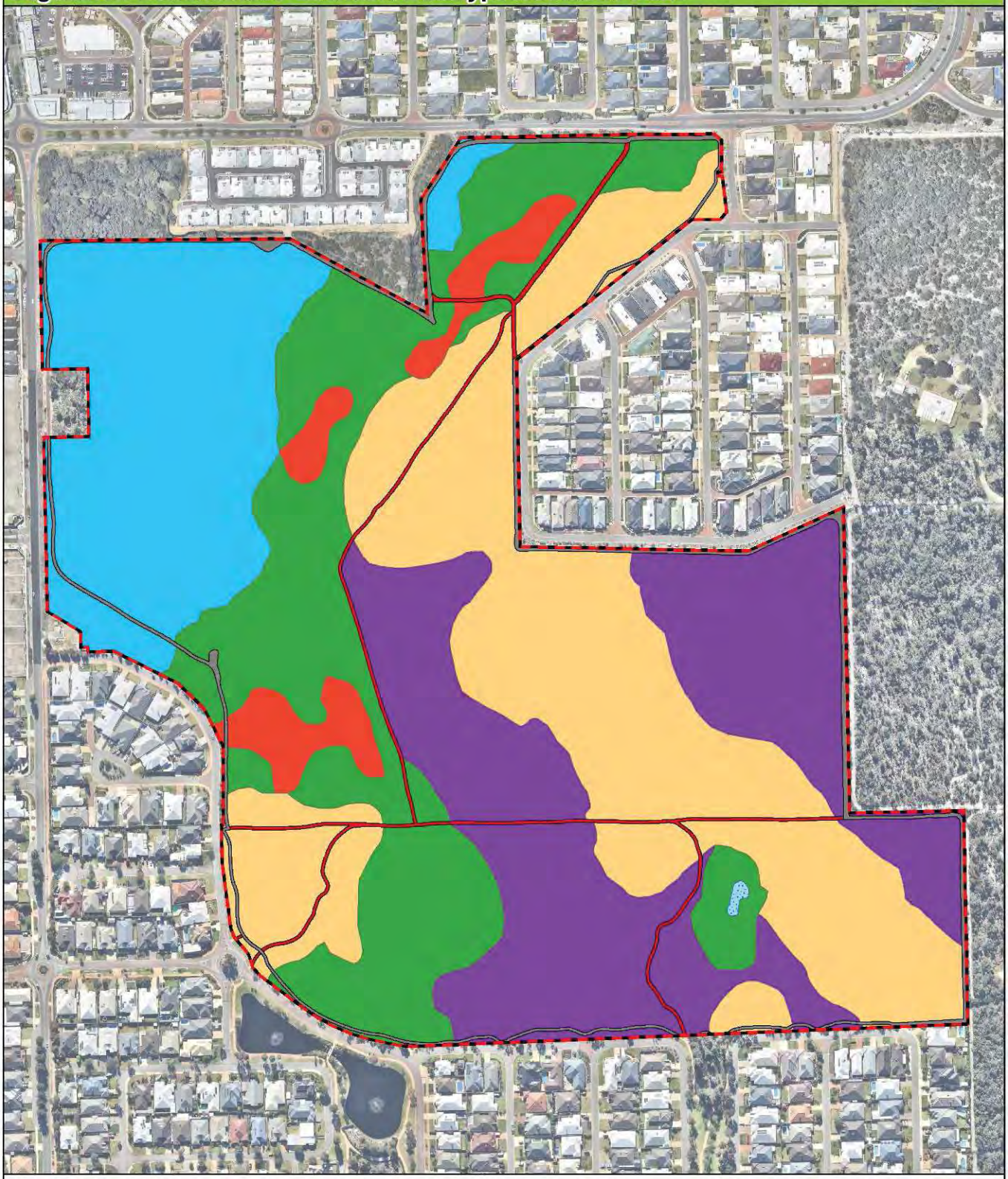
Vegetation Communities - Banksia Eucalypt Woodland Park



Legend

Reserve Footprint

Vegetation Communities

- 1 - AsOS
- 2 - BaNfW
- 3 - EmW
- 4 - MpNfOW
- 5 - MpErOF

Other

- Revegetated
- Fire Breaks / Tracks
- Internal Track Footprint
- Open Water
- Other Uses
- Parkland

0 40 80 160

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

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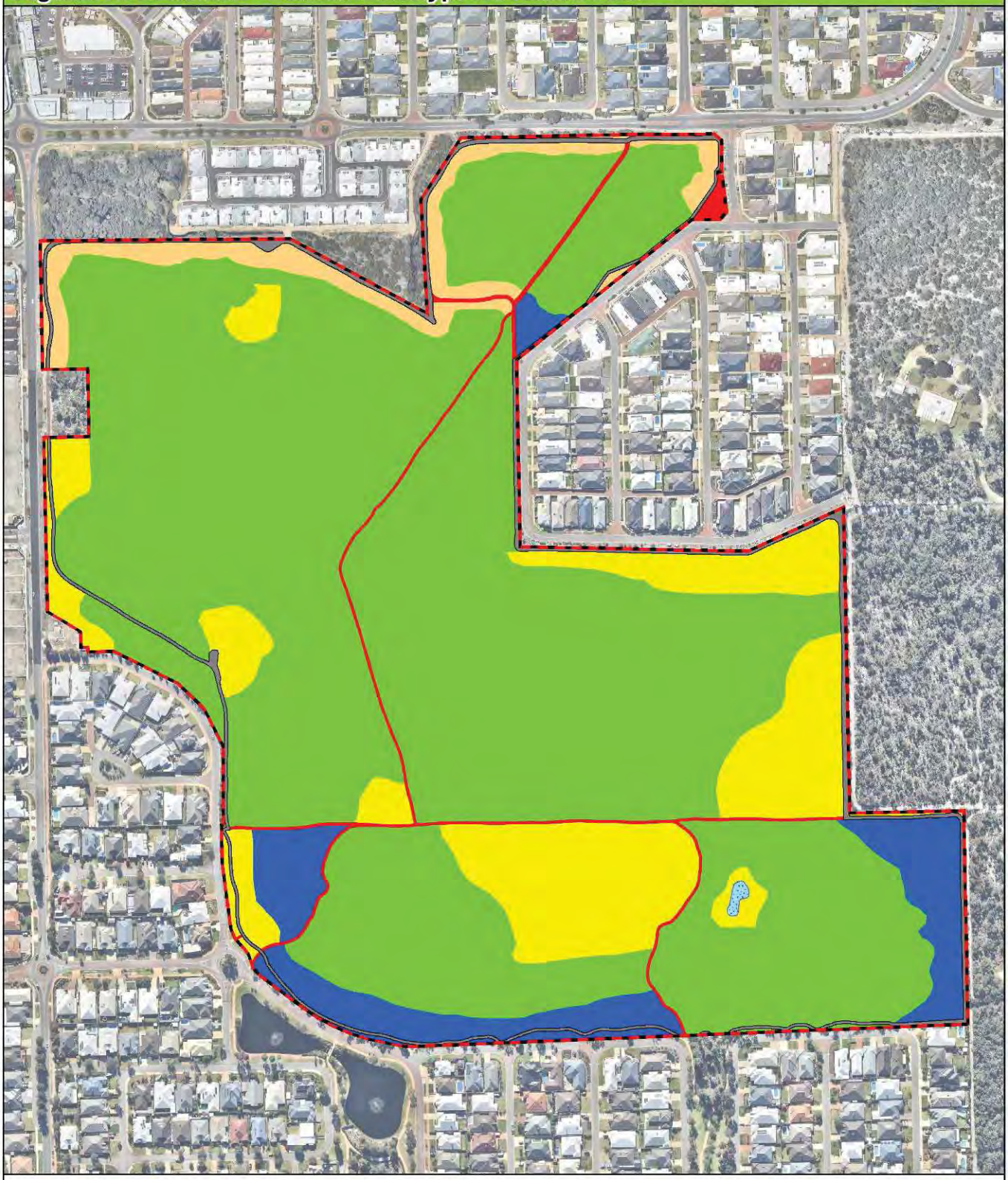
Vegetation Condition - Banksia Eucalypt Woodland Park



Legend

Reserve Footprint

Vegetation Condition

- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded

Other

- Revegetated
- Fire Breaks / Tracks
- Open Water
- Other Uses
- Parkland

0 40 80 160

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

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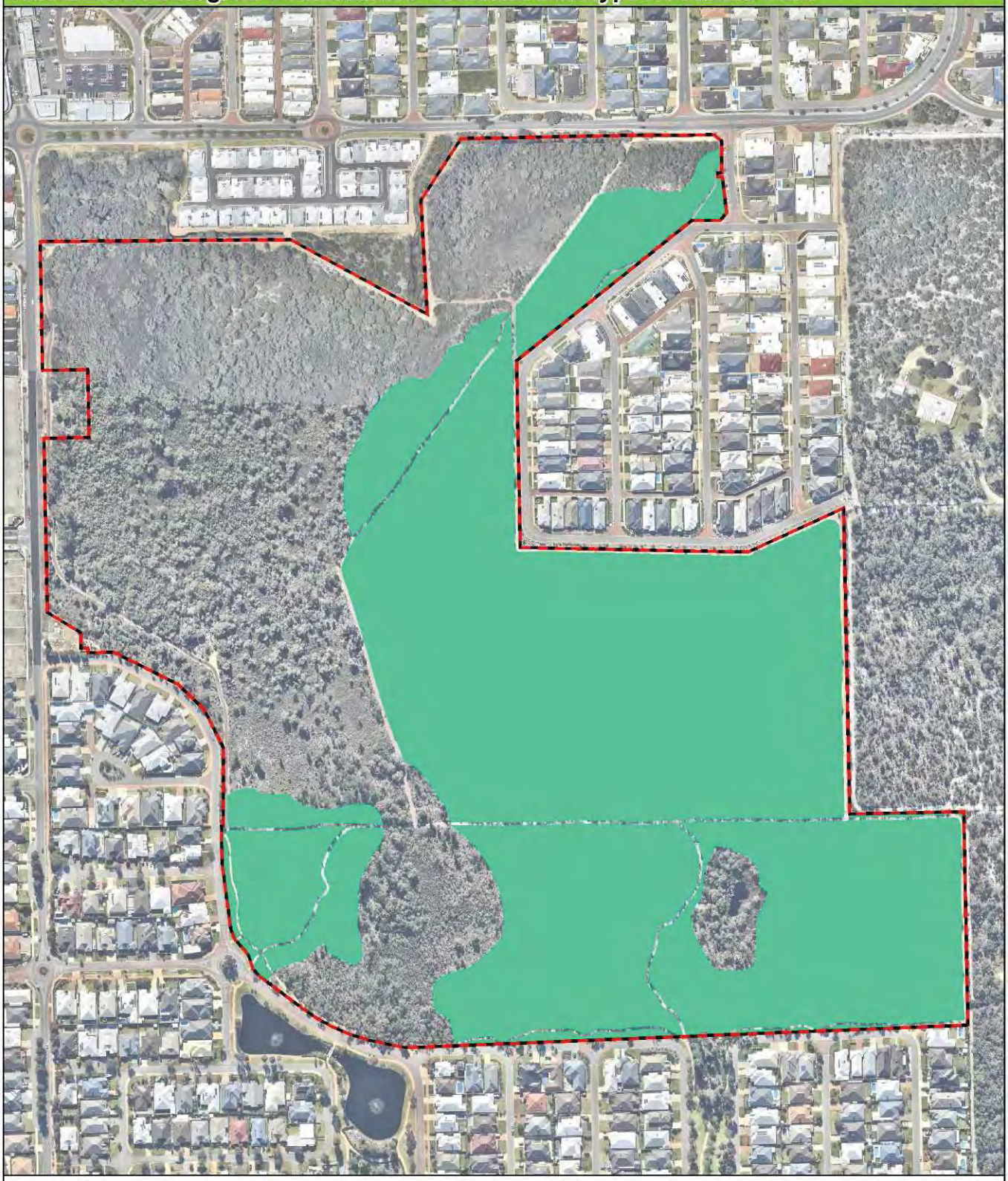
Threatened Ecological Communities - Banksia Eucalypt Woodland Park



Legend

- Reserve Footprint
- Threatened Ecological Communities

0 40 80 160

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

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