Flora and Fauna Assessment

Gloucester Park, Margaret River

Litoria Ecoservices
Environmental Assessment, Planning & Management

Prepared November 2016
for the Shire of Augusta Margaret River

Version Control

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Draft 1	29/11/ 2016	Draft for client review	DMcK
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1.0 INTRODUCTION

1.1 Background

Litoria Ecoservices (LE) was engaged by the Shire of Augusta Margaret River (the Shire) to prepare a report to assist the land use planning process for Gloucester Park and the Shire's consideration of options for the expansion of community recreational facilities.

1.2 Site Description

The subject site forms part of Gloucester Park, Margaret River and the three target areas include patches of vegetation within Lot 999 and Lot 45. The location of Gloucester Park is identified on Figure 1. The location of the three target areas within Gloucester Park are identified on Figure 2

The property is characterised by relatively flat topography, however, the site has had significant earthworks and site disturbance throughout its land use history creating highly variable topography at a fine scale.

The site vegetation represents a mix of remnant native vegetation, grass open space playing surfaces, parkland cleared areas and weedy disturbed areas.

The property is bordered to the north, south, east and west by private residential and commercial properties.

The site lies within the Margaret River catchment and contains no well defined streams or tributaries. There is one small soak/ water storage facility in the north eastern corner of the site. A number of drains have been constructed throughout the site to assist in the drainage of the sporting fields.

1.4 Assessment Objectives and Scope

The assessment was undertaken throughout late October and November 2016 to facilitate the consideration landuse planning decisions regarding the future development of Gloucester Park in order to provide community recreational facilities.

In order to achieve the above purpose the assessment has been designed and focused around the following scope and objectives:

- To assess the condition, nature and conservation significance of native vegetation onsite; and
- To assess the condition, nature and conservation significance of habitat and fauna observed/ present onsite.

This assessment of the site's flora and fauna represents a Level 1 Survey as described by the EPA's Guidance for the Assessment of Environmental Factors, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (Guidance Statement 51) (EPA 2004) and a Level 1 Survey as described by EPA's Guidance for the Assessment of Environmental Factors, Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (Guidance Statement 56) (EPA 2004).

1.5 Personnel

The assessment was undertaken by Drew M^{c}Kenzie BAppSc (Env) Hons. of Litoria Ecoservices, Margaret River. Drew has over 17 years professional experience in environmental and natural resource management including over 12 years experience in native vegetation survey, assessment and management within south west WA.

1.6 Landform

The site lies within the Cowaramup land system and is comprised of a variety of soils within the Cowaramup Uplands (COu). It should be noted that the topography and soils of all three sites has been highly modified through a range of historical land uses and earthworks and is highly variable at a fine scale and not necessarily reflective of the original condition or nature.

1.8 Climate

Located in Western Australia's south-west, the area experiences a Mediterranean climate with hot dry summers and cool wet winters. Nearby Witchcliffe records an average annual rainfall of 1013 mm with 85% of this rain falling between May and October.

1.9 Vegetation

Augusta Margaret River Shire is situated within the South West Botanical Province of WA which is internationally recognised as a biodiversity hotspot. Within this, the site lies in the Boranup System of the Western Botanical subdistrict within the Darling Botanical District. The Western Botanical subdistrict spans from Cape Naturalist to Albany with Witchcliffe falling within the Boranup System. This system is described as Tall Forest of Karri (*Eucalyptus diversicolor*) on red earths and Forest of Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) on the red and yellow podzolic soils. Extensive paperbark (*Melaleuca* spp.) and sedge swamps occur in the valleys and flood plains. (Beard 1990)

Gloucester Park is dominated by cleared playing ovals, open space and parkland cleared areas. It also contains small areas of remnant trees and vegetation primarily located around the south western corner, western corner and north western corner.

The three areas that are the focus of this assessment are described as follows:
Lot 45: A parkland cleared area with remnant and regrowth Marri and WA Peppermint with very minimal understorey or groundcover

Nippers Oval Remnant: A remnant area of Jarrah/ Marri Open Forest with a mix of a diverse, healthy understorey/ midstorey and degraded weedy understorey

Lower Western Oval vegetation: A highly variable degraded area dominated by a range of weedy shrubs and groundcover species.

2. FLORA AND VEGETATION

2.1 Scope of Work

The assessment represents a Level 1 Assessment as described by the EPA's Guidance for the Assessment of Environmental Factors, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (Guidance Statement 51) (EPA 2004). As such it includes:

- Desktop study to collate historical knowledge; and
- a reconnaissance survey.

This level of survey is considered appropriate under the requirements of Guidance Statement 51.

Limitations in the survey are acknowledged in that it is limited in scope, duration, detail and seasonality. If a detailed survey was undertaken or the site assessed at different seasons throughout the year, the flora recorded for the property could be significantly expanded.

In accordance with EPA Guidance Statement No 51 the following variables which may influence the assessment are documented in table 1:

Table1. Statement of survey constraints

Variable	Constraints	Details
Experience levels and resources	No constraints	The scientist that undertook the assessment was regarded as suitably qualified for the level of assessment undertaken.
Proportion of flora identified	No constraints	Native and weed species observed during the reconnaissance survey were identified
Sources of Information	No constraints	The Capes region has been covered by a number of targeted biological surveys. Documented information regarding the site was limited however the assessment was able to utilise a number of relevant databases and local records.
Proportion of the task achieved and further work to be undertaken	No Constraints	There is no requirement for further work for a Level 1 Survey
Timing, weather, season, cycle	Minor Constraints	The survey was undertaken during late Spring 2016. While this period will pick up most annual species It is noted that some target species if present may have finished flowering before the survey commenced.
Intensity of Survey	No constraints	All areas mapped and searched at a high level of intensity for a Level 1 survey
Completeness	No constraints	All areas mapped and searched at a high level of intensity for a Level 1 survey
Resources	No constraints	Extensive local knowledge and relevant keys and guides utilised
Remoteness or access	No constraints	No limitations in access
Availability of contextual information for the survey area	No constraints	Several relevant references and reports available and utilised.

2.1.1 Vegetation Representation

The vegetation complex present on site as per the mapping of Mattiske and Havel (1998) were compared to the extent remaining using the data available from the Department of Agriculture and Food (2014). This analysis is presented below in Table 1.

Table 2: Percentage of remaining Vegetation Complexes as per Mattiske and Havel (1998)

Vegetation Complex	Pre European Extent (ha)	Current Extent (ha)	Percentage Remaining	Percentage Reservation
Cowaramup Uplands (C1)	18,982	6552	34.5%	14%

The State Government's commitment to the National Objectives Targets for Biodiversity Conservation includes a target to prevent the clearance of ecological communities with extents below 30% of their pre European coverage or less than 1500ha total extent remaining.

The C1 vegetation complex does not trigger the criteria of less than 30% remaining however it is noted that it is closely approaching the 30% trigger and given errors within some of this broad scale mapping it could be under the 30% threshold if more detailed, more broadly ground truthed mapping was undertaken

The C1 vegetation complex would benefit from additional protection and reservation.

2.1.2 Ecological Connectivity

Based on the South West Regional Ecological Linkages mapping the property is identified as having a 1a proximity value – ie with an edge touching or <100m from an edge.

2.1.3 Previous records on the property and vicinity

A November 2016 search of the Atlas of Living Australia (ALA) database identified 513 species as being recorded within a 1km radius of the site. This figure included:

- 266 plant species
- 7 Mammal species (some of which represent fossil records);
- 103 Bird species;
- 12 Reptile species;
- 5 Amphibian species; and
- 96 Arthropods species.

The plant species identified by this search are included as Appendix 4.

Additionally a search a Department of Energy and Environment Protected Matters Search and DPAW Threatened Flora database was conducted in November 2016. This search identified the following state and federally protected species as being recorded within a 5km buffer of the property.

Table 3: Threatened and Priority Flora recorded from surrounding areas

Taxon	Status	Rank	EPBC	FloweringPeriod
Banksia nivea	T	EN	EN	Sep-Oct
Banksia squarrosa subsp. argillacea	T	EN	VU	June to Nov
Caladenia excelsa	T	EN	EN	Sep-Oct
Caldenia hoffmanii	T	EN	EN	Sep-Oct
Caladenia huegelii	T	EN	EN	Sep-Oct
Caladenia lodgeana	T	CR	CR	Oct-Nov
Caladenia winfieldii	T	EN	EN	Sep- Oct
Drakaea micrantha	T	EN	VU	Sep-Oct
Gastrolobium papilio	T	EN	EN	
Lambertia echinate subsp. occidentalis	T	EN	EN	
Gahnia sclerioides	4			-
Gastrolobium formosum	3			Nov-Jan

2.2 Field Results

2.2.1 Surveys

The reconnaissance survey was conducted over three days in late October and November 2016. This involved walking transects approx 10m apart across the portions of the site containing stands of native vegetation. The aim of this was to map vegetation condition and units across these areas, search for rare, threatened or priority species and to generate a preliminary species list for the site.

Appendix 1 shows all flora species, native and introduced, that were identified during the course of the reconnaissance survey.

A total of 85 species were observed during the reconnaissance survey. Of these, 41 native species were recorded. All species observed are listed in Appendix 1.

2.2.2 Rare and Priority Flora

No Declared Rare Flora or Priority species were recorded during the course of the survey.

2.2.3 Introduced Flora

A total of 44 introduced species were recorded during the course of the survey within the remnant vegetation. These species are denoted by an asterisk in Appendix 1.

One species (Cape Tulip (*Moraea flaccida*)) is declared under Section 22 of the *Biosecurity and Agriculture Management Act 2007* were identified on site. Within the Shire of Augusta Margaret River this species are categorised as C3 (Management) declared pest. Under the Act C3 organisms should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism or prevent or contain the spread of the organism.

A number of other environmental weed species considered as high priorities for control were identified and mapped as part of the assessment. these are considered a priority either due to the level of invasiveness and impact of the species under local conditions or due to relatively restricted nature of the current infestation. Two of these are recognised as Weeds of National Significance (WONS). These include:

- Victorian tea tree (*Leptospermum laevigatum*);
- Watsonia (Watsonia *meriana var. bulbillifera*);
- Butterfly bush (*Polygala myrtifolia*);
- Flaxleaf Broom (*Genista linifolia*) (WONS species);
- Montpellier Broom (*Genista monspessulana*)(WONS species);
- Tambookie (*Hyparrhenia hirta*);
- Flinders range wattle (*Acacia iteaphylla*);
- Sydney Golden Wattle (*Acacia longifolia*);
- Blackwood (*Acacia melanoxylon*);
- Sweet Pittosporum (*Pittosporum undulatum*) and
- Wavy Gladioli (*Gladiolus undulatus*).

2.2.4 Threatened and Priority Ecological Communities

No Threatened of Priority Ecological Communities were recorded on site.

2.2.5 Vegetation Condition

The vegetation of the site has been assessed using a condition assessment based on the Vegetation Condition Scale of Keighery (1994), which is attached as Appendix 2.

Based on this system, condition ratings for the remnant native vegetation found on site is shown on Figure 3 and summarised as follows:

- The Lot 45 area was described as *Completely Degraded;*
- The Eastern portion of the Nippers Oval remnant ranges from *Completely Degraded* to *Degraded;*
- The central and western portions of the Nippers Oval remnant is considered largely *Good Condition* to *Very Good Condition* with a small strip of *Completely Degraded;* and
- The Lower Western Oval vegetation is considered *Completely Degraded*

2.2.6 Vegetation Units

Vegetation units were identified for the focus areas of the site. In total, eight units were identified across the site as shown in Figure 3.

The vegetation units are described as follows:

Lot 45:
AfCcCD - Completely Degraded Parkland cleared area of *Agonis flexuosa* and *Corymbia callophylla* over an occasional shrublayer of *Genista monspessulana, Bossiaea linophylla* and *Pittosporum undulatum* over an occasional herb/grass layer of *Solanum nigrum, Avena spp., Plantago lanceolata, Briza maxima, Hypochaeris spp.*

Nippers Oval Remnant:
CcEmVG - Very Good Condition Forest of *Corymbia calophylla* and *Eucalyptus marginata* over open shrubland of *Banksia grandis, Bossiaea linophylla, Hovea elliptica, Acacia myrtifolia,* with a low shrub/herb layer of *Tremandra stelligera, Scaevola calliptera, Pattersonia umbrosa, Hibbertia hypericoides, Dampiera linearis*

CcEmG – Good condition Forest of *Corymbia calophylla* and *Eucalyptus marginata* over open shrubland of *Agonis flexuosa, Acacia longifolia, Persoonia longifolia, Bossiaea linophylla, Acacia myrtifolia,* with a low herb and ground cover layer of *Tremandra stelligera, Pattersonia umbrosa, Watsonia meriana* and *Pteridium esculentum*

CcEmD – Degraded forest of *Corymbia callophylla* and *Eucalyptus marginata* over a shrubland of *Logania vaginalis, Jacksonia horridus, Agonis flexuosa, Acacia myrtifolia* over a herb/ grass layer of *Watsonia meriana* and *Pteridium esculentum.*

AfCcAlCD – Completely Degraded Parkland cleared area of *Agonis flexuosa* and *Corymbia callophylla* over an occasional shrublayer of *Acacia longifolia, Bossiaea linophylla* and *Chaemaecytisus palmensis* over an occasional herb/grass layer of *Watsonia meriana, Hyparrhenia hirta, Oxalis glabra and Pteridium esculentum*

Lower Western Oval:
AfD –Degraded Low Forest of *Agonis flexuosa* with occacasional *Corymbia callophylla* over a cleared shrub and ground layer

WmHhCD – Completely Degraded dense ground layer of *Watsonia meriana, Hyparrhenia hirta* without a shrub or overstorey layer.

AfCcD –Degraded Low forest of *Agonis flexuosa* with occasional *Corymbia calophylla* over dense shrub layer of *Leptospermum laevigatum, Acacia longifolia, Genista linifolia, Bossiea linophylla*, over a ground layer dominated by *Watsonia meriana, Hyparrhenia hirta.*

3. FAUNA ASSESSMENT

3.1 Scope of Work

The assessment represents a Level 1 Assessment as described by the EPA's Guidance for the Assessment of Environmental Factors, Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (Guidance Statement 56) (EPA 2004). As such it includes:

- Desktop study to collate historical knowledge; and
- a reconnaissance survey.

This level of survey is considered appropriate under the requirements of Guidance Statement 56, given the likely impacts being considered.

Limitations in the survey are acknowledged in that it is limited in scope, duration, detail and seasonality. If a detailed survey was undertaken or the site assessed at different seasons throughout the year, utilised invasive trapping methodologies, the fauna recorded for the property could be significantly expanded.

In accordance with EPA Guidance Statement No 56 the following variables which may influence the assessment are documented in table 4.

Table 4. Variables Associated with the Assessment

Variable	Details
Experience levels and resources	The assessment was undertaken by a suitably qualified ecologist for the level of assessment undertaken:
Scope: sampling methods/ intensity	The methodology, scope and intensity of the assessment were suitable for a Level One assessment of this nature.
Sources of Information	The Capes region has been the focus of a number of targeted biological surveys. Documented information regarding the site was limited however the assessment was able to utilise a number of relevant databases and local records.
Timing, weather, season	The survey was undertaken during late Spring 2016 whilst this period had an approximately average weather conditions.
Disturbances	No recent disturbances such as fire or clearing had recently occurred on or adjacent to the site
Access	No limitations to access across the whole site were experienced.

3.2 Desktop Review

The purpose of the desktop review was to gather existing information for the site and information on fauna records in the locality. In this instance this involved the following the following:

- Atlas of Living Australia Database;
- DPAW Threatened and Priority Fauna Database (this utilised an approximate 5km grid surrounding the survey area);

- SEWPAC Protected Matters Search Tool (this utilised an approximate 10km buffer surrounding the survey area)
- A review of the site vegetation as classified under the South West Regional Ecological Linkages (SWREL)

These sources were used to compile a list of significant species previously recorded in the area surrounding the site.

3.3 Reconnaissance Survey

The reconnaissance survey was conducted over three days and three nights in October and November 2016 and consisted of four components, active searching, opportunistic observations, habitat assessments and an assessment of key habitat trees.

3.3.1 Active Searching

Active searching on site comprised of camera trapping and spotlighting/ nocturnal search.

The camera trapping utilised one one Ltl Acorn PIR (Passive Infra-Red) cameras) over a combined 12 trapnights/ days. The trap was set in the Nippers Oval remnant.

The spotlighting searches focused on spotlighting for nocturnally active mammals (with a particular focus on searching for Western Ringtail Possums) and recording animal calling (predominantly amphibians).

3.3.2 Opportunistic observations

Observations of scats, tracks, diggings and burrows and other traces of terrestrial vertebrate fauna were made over the three days spent on site during October and November.

3.3.3 Habitat assessment

Habitat was assessed in the Nippers Oval remnant and the Lower Western Oval vegetation. The assessment considered the structural and floristic diversity of the site both vertically and horizontally and considered such factors as the presence and quality of breeding and foraging resources within the site for a range of fauna species.

3.3.4 Habitat Tree assessment

An assessment of potential significant habitat trees located within the three target areas was undertaken to identify if any of the trees had significant habitat and breeding potential for threatened species such as the threatened Black Cockatoo species and Western Ringtail Possums.

3.4 Findings

The following details the results of the assessment.

3.4.1 Database Searches

A search of relevant databases provide a list of 23 animal species of conservation significance previously recorded from surrounding areas including 1 extinct species 11 threatened species, 6 priority listed species, 4 migratory species and 1 specially protected fauna species. Table 5 below identifies the significant fauna species identified from DPAW and SEWPAC database searches as being recorded in the nearby locality.

Table 5. Threatened species highlighted through database searches as recorded from within a 5km grid surrounding the survey site.

NAME	COMMON NAME	WA CONSERVATION CODE	COMMONWEALTH LISTING
Extinct Species			
Potorous platyops	Broad-faced Potoroo	X	Extinct
Threatened Species			
Botaurus poiciloptilus	Australasian Bittern	T	Endangered
Calidrus ferruginea	Curlew Sandpiper	T	Critically Endangered
Calyptorhynchus latirostris	Carnaby's Cockatoo	T	Endangered
Calyptorhynchus banksii subsp. Naso	Forest Red-tailed Black-Cockatoo	T	Vulnerable
Calyptorhynchus baudinii	Baudin's Black Cockatoo	T	Vulnerable
Nannatherina balstoni	Balston's Pygmy Perch	T	Vulnerable
Cherax tenuimanus	Hairy Marron	T	Critically Endangered
Dasyurus geoffroii	Chuditch	T	Vulnerable
Pseudocheirus occidentalis	Western Ringtail Possum	T	Vulnerable
Setonix brachyurus	Quokka	T	Vulnerable
Numenius madagascariensis	Eastern Curlew	T	Critically Endangered
Priority Species			
Geotria australis	Pouched Lamprey	P1	
Hydromys chrysogaster	Water-rat	P4	
Isoodon obesulus subsp. Fusciventer	Quenda, Southern Brown Bandicoot	P5	
Ixobrychus flavicollis australis	Black Bittern (southwest pop)	P1	
Macropus irma	Western Brush Wallaby	P4	
Tyto novaehollandiae subsp. Novaehollandiae	Masked Owl (southern subsp)	P3	
Migratory Species			
Apus pacificus	Fork-tailed swift		MMB
Calidrus ferruginea	Curlew Sandpiper		MWS
Numenius madagascariensis	Eastern Curlew		MWS
Pandion haliaetus	Osprey		MWS
Specially Protected Fauna			
Falco peregrines	Australian Peregrine Falcon	S	

**It should be noted that some of these records are historical in nature.*

3.4.2 Connectivity

The sites links with existing remnant vegetation to the south via the Montessori school bushland and links with the large Bramley National Park and Margaret River remnant and linkage via vegetation along the Rails to Trails and the "Margaret River A Class Reserve" .

The South West Regional Ecological Linkages project classified the connectivity value of vegetation throughout the south west. Under the mapping produced through this project, an axis line was identified as running east – west through the central portion of the site. Subsequently, the remnant vegetation through the site has also been identified as 1a – with an edge touching or <100m from a linkage (the highest level of proximity to an axis line).

3.4.3 Results of the Reconnaissance Survey

A total of 24 vertebrate fauna were recorded during the reconnaissance survey. This included three amphibian, seventeen bird species and four mammal species.

The spotlighting undertaken over three nights (4/11/16, 6/11/16 and 9/11/16) provided the following observations or confirmations of value:

- Three amphibian species calling damp areas within the Lower Western Oval vegetation;
- Western Ringtail Possums observed on each night within or immediately adjacent to each of the three target areas and the surrounding broader Gloucester park vegetation;
- Brushtail possums confirmed to be utilising the broader vegetation in and around Gloucester Park; and
- Confirmed Western Grey Kangaroo presence adjacent to the Nippers Oval remnant.

The locations of relevant sightings are detailed in Figure 3.

Camera trapping provided the following results:

- Recorded Red-winged Fairy-wren not observed during the site visits; and
- Confirmed records of Western Grey Kangaroo within the Nippers Oval Remnant;

Table 6 below summarises the fauna observations made during the course of the reconnaissance survey.

Table 6: Opportunistic vertebrate fauna records.

Common Name	Scientific Name	Status	Nature of the record
Amphibia			
Squelching Froglet	*Crinea insignifera*		C
Motorbike Frog	*Litoria adelaidensis*		C
Slender Tree Frog	*Litoria moorei*		C
Aves			
Common Bronzewing	*Phaps chalcoptera*		O
Carnabys Black Cockatoo	*Calyptorhynchus latirostris*	T, V	F
Baudins Black Cockatoo	*Calyptorhynchus baudinii*	T, V	O, C, F
Western Rosella	*Platycercus icterotis*		O
Australian Ringneck	*Barnadius zonarius*		O, C
Laughing Kookaburra	*Dacelo novaeguineae*	Int.	O, C
Splendid Fairy Wren	*Malurus splendens*		O
Red-winged Fairy-wren	*Malurus elegans*		O
White –browed Scrubwren	*Sericornis frontalis*		O
Western Gerygone	*Gerygone fusca*		C
Red Wattlebird	*Anthochaera carunculata*		O, C
New Holland Honeyeater	*Phylidonyris novaehollandiae*		O, C
Golden Whistler	*Pachycephala pectoralis*		O, C
Grey Fantail	*Rhipidura fuliginosa*		O,C
Australian Magpie	*Gymnorhina tibicen*		O, C
Australian Raven	*Corvus coronoides*		O, C
Silvereye	*Zosterops lateralis*		O, C
Mammals			
Western Grey Kangaroo	*Macropus fuliginosus*		O, S
Western Ringtail Possum	*Pseudocheirus occidentalis*	T, V	O, S
Common Brushtail Possum	*Trichosurus vulpecula*		O
Quenda/ Southern Brown Bandicoot	*Isoodon obesulus*	P5	O, T

Key to Record: O: Observed S:Scat T: Tracks/scratching/diggings C:Call F:Feeding Signs
Status key: Int: Introduced, P5: Priority 5 WA WC Act, T: Threatened WA WC Act, V: Vulnerable EPBC Act

Opportunistic observations on site yielded the following records of significance:

- Quenda diggings present within the Nippers Oval remnant and the Lower Western Oval vegetation;
- Observation of Baudin's Black Cockatoo crossing the site. These sightings range in flock size from 4 through to approximately 12 individuals;

3. 5 Habitat Assessment

The details of the habitat assessment are provided in Appendix 7. The assessments identified the habitat potential within parts of the Nippers Oval remnant as good and within a portion of the Lower Western Oval as relatively poor but with a good potential to support Western Ringtail Possum .

3.6 Habitat Tree Assessment

The vast majority of trees within the site are relatively young regrowth trees with a diameter at breast height (dbh <500mm). No large hollow bearing trees were observed during the course of field work within the three target areas.

The key findings of this assessment are as follows:

- Western Ringtail Possum dreys were found within each of the three target areas (the location of these are identified on Figure 5);
- No large hollow bearing trees were observed within the Lot 45 target area;
- No large hollow bearing trees were observed within the Nippers Oval remnant target area;
- No large hollow bearing trees were observed within the Lower Western Oval target area;
- It is noted that a significant tree assessment for potential black cockatoo habitat as defined under the SEWPAC guidelines was beyond the scope of this report.

3.7 Significant Species

Of the threatened or priority species identified through the database search, the following were either directly observed on site, evidence of the species were observed on site or are predicted as having potential to regularly utilise the site:

- *Pseudocheirus occidentalis* (Western Ringtail Possum);
- *Isoodon obesulus subsp. Fusciventer* (Quenda)
- *Calyptorhynchus baudinii* (Baudin's Cockatoo);
- *Calyptorhynchus banksii subsp. Naso* (Forest Red-tailed Black-Cockatoo);
- *Calyptorhynchus latirostris* (Carnaby's Cockatoo);
- *Phascogale tapoatafa ssp. (WAM M434) (*Brush-tailed Phascogale);
- *Macropus irma* (Western brush wallaby);
- *Tyto novaehollandiae subsp. Novaehollandiae* (Masked Owl)

Western Ringtail Possum

The assessment highlighted the presence of Western Ringtail Possums(WRP) throughout the vegetation within the western portions of Gloucester Park. This was evidenced by the presence of dreys, scat and spotlighting records. WRP were recorded within or immediately adjacent to each of the target areas on all of the three spotlighting surveys.

The assessment recorded an average 4.3 WRP per night within or immediately adjacent to the Lower Western Oval vegetation. The assessment recorded an average 1.67 WRP per night within or immediately adjacent to both the Nippers Oval remnant vegetation and the Lot 45 area. Whilst the assessment was not intended to provide a quantitative analysis of the population it does indicate that the three areas are consistently utilised by the species. Further more detailed assessment may show these areas and particularly the Lower Western Oval has having relatively high densities for Margaret River. The presence of at least two juvenile individuals within the Lower Western Oval vegetation confirms this as breeding habitat.

Quenda

Evidence (diggings and tracks) of this species was observed in the Nippers Oval Remnant and the Lower Western Oval vegetation. An individual was sited in the Nippers Oval remnant. It is possible that it is more widespread particularly utilising the areas of dense understorey and likely to be present throughout parts of the broader Gloucester Park. There exists potential for expanding the local population of this species through Gloucester Park with high quality revegetation plantings and bush regeneration within the retained portions vegetation and appropriate management of domestic dogs, cats and feral animals within the development.

Brushtailed Phascogale

No sightings or evidence of Brushtailed Phascogale were recorded during the site work. There remains a possibility that they may utilise the site occasionally but it is considered that the site is unlikely to represent important habitat for the species.

Black Cockatoos

Flocks of Baudins Black Cockatoos were heard and observed passing through the site. Feeding signs of Baudins black cockatoo were observed within the Lot 45 and Nippers Oval Remnant areas. Feeding signs of Carnabys black cockatoo. The site is also very likely to be utilised from time to time by Forest Red Tailed Black Cockatoo. No nesting sites were observed during the course of the site work. No roosting sites were observed during the course of the field work. However, the limited duration and seasonality of assessment cannot confirm the utilisation of the site during other parts of the year. Under the EPBC Act referral guidelines the site contains potential breeding habitat as defined as it contains Marri greater than 500mm dbh. The site also represents foraging habitat under the guidelines.

Given that no nesting sites or large hollow bearing trees where identified on site and there are minimal number of Marris greater than 500mm dbh within the target area, any action within the target areas are not likely to be considered to be significant under the guidelines. A significant tree assessment of all trees greater than 500mm was not part of the scope of this assessment

The guidelines recommend different referral responses depending on the level of risk as detailed in Table 7 below. Table 7 details how the site matches with each trigger.

Table 7. Consideration of the SEWPAC risk ratings referral recommendations

Trigger	Occurrence on the site
High risk of significant impact: referral recommended	
Clearing of any known nesting tree	None observed or recorded on site – **no referral**
Clearing of any part of a vegetation community known to contain breeding habitat	Potential breeding habitat present across the site – the extent of impact depends on the final layout of the structure plan. No clearing will occur to any known breeding habitat - **no referral**

Clearing of more than 1 ha of 'quality foraging habitat'	Greater than 1ha of 'quality foraging habitat' present on the broader Gloucester Park site but but the proposal will not result in the clearing of 1ha of 'quality foraging habitat'.- **no referral**
Clearing or degradation (including pruning the top canopy) of a known night roosting site.	No roosting sites have been recorded or observed on site - **no referral**
Creating a gap of greater than 4km between patched of black cockatoo habitat (breeding, foraging or roosting)	Any action on the site will not create a 4km gap – **no referral**.
Uncertainty: referral recommended or contact the department	
Degradation (such as altered hydrology or fire regimes) of more than 1ha of foraging habitat. Significance will depend on the level and extent of degradation and the quality of the habitat	>1ha of foraging habitat present on site. Degradation will not occur to 1ha of this habitat – **no referral**
Clearing or disturbance in areas surrounding black cockatoo breeding, foraging or night roosting habitat that has the potential to degrade habitat through introduction of invasive species, edge effects, hydrological changes, increased human visitation or fire	Clearing is proposed as part of the project. Depending on the final details of the proposal and footprint of clearing – **contact with the department recommended**
Actions that do not directly affect the listed species but that have the potential for indirect impacts such as increasing competitors for nest hollows.	It is considered that the proposal is unlikely to place significant pressure directly or indirectly on the species - **no referral**
Actions with the potential to introduce known plant diseases such as Phytophthora spp. to an area where the pathogen was not previously known	It is suspected that *Phytophthora cinamonii* is already present within large parts of the site. Site work should be undertaken under strict hygiene management protocols to ensure Phytophthora dieback and other diseases are managed appropriately – **no referral**.
Low risk of significant impacts: referral may not be required	
Actions that do not affect black cockatoo habitat or individuals	The action will not directly affect individuals but will impact potential breeding and foraging habitat as defined by the guidelines – **contact with the department recommended.**
Actions whose impacts occur outside the modelled distribution of the three black cockatoos	The action is within the modelled distribution of *Calyptorhynchus banksii naso* and within the modelled breeding range and known breeding areas for *Calyptorhynchus litorostris* and *Calyptorhynchus baudinii* respectively – **contact with the department recommended.**

Western Brush Wallaby

Western Brush Wallaby are frequently sighted in or around large unfragmented blocks of remnant vegetation in the Capes region. However, given the largely fragmented landscape around the site, and smaller habitat patches it is considered very unlikely that the site is significant for this species.

Masked Owl

Whilst not recorded during the site work, this species has the potential to occasionally utilise parts of the site from time. The limited area to be impacted by the proposal is not considered to be significant for this species. Improved habitat quality and extent through revegetation and bush regeneration efforts through Gloucester Park, in time, could help improve the habitat value for this species.

4. SUMMARY AND RECOMMENDATIONS

4.1 Summary and conclusions

The following provides a summary of the key findings of the assessment:

- No Declared Rare Flora or Priority flora species were recorded on site during the reconnaissance survey.
- Four declared or priority fauna species were recorded on site during the survey including Baudins Black Cockatoo, Carnaby's Black Cockatoo, Western Ringtail Possum and indications of Quenda activity it is likely that Forest Red Tail Black Cockatoos also utilise the site.
- All three focus areas support Western Ringtail Possums including active and or historically active dreys;
- The Lot 45 and Lower Western Oval Areas appear to represent habitat for several individuals and with multiple dreys including confirmed active dreys and juveniles
- Whilst it was beyond the scope of the assessment to provide a quantative assessment of the Western Ringtail Possum population through the site, it is noted that the densities recorded were high (particularly within the Lower Western Oval vegetation) for Margaret River populations of WRP;
- The vegetation condition of the Lot 45 and Lower Western Oval areas were poor but it is worth noting that this is not necessarily a good indication of habitat quality or potential for Western Ringtail Possums;
- All three target areas contain a number of high priority environmental weed species;
- Whilst portions of the Nippers Oval Remnant remain in good and very good condition, the remainder of the focus areas are degraded and a relatively low priority from a vegetation condition perspective.

4.2 Recommendations

The following recommendations are provided based upon the findings of the Level 1 assessment and the understanding that at this stage the exact nature and footprint of any proposed development within the three target areas of this assessment is not yet fully defined:

1. Where possible minimise clearing and disturbance of native vegetation (especially the areas identified as Very Good or Good Condition);
2. Where possible reduce the impact on and disturbance of threatened Western Ringtail Possum populations and habitat (including isolated mature *Agonis flexuosa* in se);
3. Where disturbance of existing populations including active dreys and known breeding populations are proposed it is likely that both State and Federal government approval will be required and the Shire should refer the proposal to the Federal Government under the EPBC Act as an action that may be considered to have a 'significant impact' under the definitions of the Act.
4. A WRP (and Quenda) Management Plan should be prepared detailing the management of clearing operations on site, any translocation of WRP and Quenda impacted by the proposal, any further surveys required and details recommendations for the improvement of existing habitat within Gloucester Park and the creation of additional habitat through revegetation of secure areas.

5. Inclusion of specific feed species and habitat features for Western Ringtail Possums and Black Cockatoos into revegetation and landscape plantings around Gloucester Park.
6. Whilst it is considered unlikely that any likely proposal within the target areas would require referral to the Department of Environment and Energy with respect to the impact on Black Cockatoo species, it is recommended that the Department is contacted and the proposal discussed in accordance with the SEWPAC guidelines and triggers detailed within the report.
7. Undertake bush regeneration works and control of priority environmental weed species within the Remnant Vegetation portions of Gloucester Park.
8. Consider additional long term fauna surveys and monitoring throughout alternative times of the year within Gloucester Park in order to continue to develop a better understanding of the site's fauna.

5. REFERENCES

Atlas of Living Australia (2016) Biodiversity Database Search Undertaken November 2016

Beard, J.S (1990) *Plant Life of Western Australia*. Kangaroo Press, Kenthurst.

Conservation and Land Management (1999) *Environmental Weeds Strategy for Western Australia (ENSWA)*, Department of Conservation and Land Management, Como.

Department of Agriculture (2003) Land Profiler, Shires of Capel, Busselton and Augusta-Margaret River, Perth, Western Australia.

Department of Conservation and Land Management (2003) Declared Rare and Priority Flora List. Publicly available list prepared by the then Department of Conservation of Land Management, Western Australia.

Department of Environment and Conservation (DEC) (2007) Definitions, categories and criteria for threatened and priority ecological communities.

Department of Environment and Conservation (DEC) (2010) List of Threatened Ecological Communities on the TEC Database endorsed by the Minister for the Environment

Department of Environment and Conservation (DEC) (2010) Priority ecological communities list.

Department of Environment and Energy (DEE) (2016) Protected Matters Search Tool: Accessed November 2016.

Department of Environment, Water, Heritage and Arts (DEWHA 2009) Significant impact guidelines for the vulnerable western ringtail possum (*Pseudocheirus occidentalis*) in the southern Swan Coastal Plain, Western Australia

Department of Parks and Wildlife (2014) Conservation Codes for Western Australian Flora and Fauna, Department of Parks and Wildlife, Western Australia.

Department of Sustainability, Environment, Water, Population and Communities (SEWPAC) (2012) EPBC Act 1999 referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered), *Calyptorhyncus latirostris*, Baudins cockatoo (vulnerable) *Calyptorhyncus baundinii*, Forest redtailed black cockatoo (vulnerable) *Calyptorhynchus banksii naso*

Environmental Protection Agency (2004) *Guidance for the Assessment of Environmental Factors. Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* Guidance Statement 51, Environmental Protection Authority, Perth, Western Australia.

Environmental Protection Agency (2004*) Guidance for the Assessment of Environmental Factors. Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia*. Guidance Statement 56, Environmental Protection Authority, Perth, Western Australia.

Florabase (2016) Department of Environment and Conservation, Western Australian Herbarium. Accessed online, November 2016.

Hoskin, C, Grigg, G, Stewart, D and MacDonald, S (2015) Frogs of Australia: An electronic field guide to the frogs of Australia.

Keighery, B.J. (1994) *Bushland Plant Survey. A Guide to Plant Community Survey for the Community.* Wildflower Society of WA (Inc.), Western Australia.

Mattiske, E. M and Havel J.J. (1998) *Vegetation Complexes of the South-West Forest Region of Western Australia.* Maps and report prepared as part of the Regional Forest Agreement, Western Australia for the Department of Conservation and Land Management and Environment Australia.

Mattiske Consulting Pty Ltd (2002) *Review of Management Options for Poorly Represented Vegetation Complexes*, Prepared for Conservation Commission

Molloy, S., O'Connor, T., Wood, J. and Wallrodt, S. (2007), *Local Government Biodiversity Planning Guidelines: Addendum to the South West Biodiversity Project Area*, Western Australian Local Government Association, West Perth.

Molloy, S., Wood, J., Hall, S., Wallrodt, S and Whisson, G. (2009). *South West Regional Ecological Linkages Technical Report*. Western Australian Local Government Association (WALGA) and the Department of Environment and Conservation (DEC), West Perth.

Morcombe, M and Stewart, D (2015) eGuide to Australian Birds

Simpson, K and Day, N (2010) Field Guide to the Birds of Australia (8th Edition) Viking Press.

Strahan, R (1995) The Mammals of Australia, Strahan ed, Australian Museum/ Reed Books

Wheeler, J., Marchant, N and Lewington, M (2002) Flora of the South West. ABRS Canberra.

APPENDIX 1: FLORA SPECIES RECORDED ON-SITE

Family	Species	Lot 45	Lower Western Oval	Nippers Oval
Alliaceae	*Agapanthus praecox**			X
Asteraceae	*Arctotheca calendula**	X	X	
Asteraceae	*Conyza sumatrensis**	X	X	
Asteraceae	*Dimorphotheca ecklonis**			X
Asteraceae	*Hypochaeris radicata**	X	X	X
Brassicaceae	*Raphanus raphanistrum**	X	X	
Celastraceae	*Stackhousia monogyna*			X
Cyperaceae	*Isolepis prolifera**			X
Dennstaedtiaceae	*Pteridium esculentum*		X	X
Dilleniaceae	*Hibbertia cuneiformis*		X	
Dilleniaceae	*Hibbertia cunninghamii*			X
Dilleniaceae	*Hibbertia hypericoides*		X	X
Droseraceae	*Drosera pallida*			X
Elaeocarpaceae	*Tremandra stelligera*			X
Ericaceae	*Astroloma ciliatum*		X	X
Ericaceae	*Leucopogon spp.*			X
Ericaceae	*Leucopogon verticillatus*			X
Euphorbiaceae	*Euphorbia peplus**	X	X	
Fabaceae	*Bossiaea linophylla*	X	X	X
Fabaceae	*Chamaecytisus palmensis**			X
Fabaceae	*Genista linifolia**		X	X
Fabaceae	*Genista monspessulana**	X		
Fabaceae	*Hardenbergia comptoniana*			X
Fabaceae	*Hovea elliptica*			X
Fabaceae	*Jacksonia horrida*			X
Fabaceae	*Medicago polymorpha**	X	X	X
Fabaceae	*Melitotus indicus**			X
Fabaceae	*Mirbellia alata*			
Fabaceae	*Sphaerolobium medium*			
Fabaceae	*Trifolium repens**	X	X	X
Fabaceae	*Trifolium spp**			X
Fumariaceae	*Fumaria capreolata**	X	X	
Goodeniaceae	*Dampiera linearis*			X
Haemerocallidaceae	*Agrostocrinum hirsutum*			X
Haemodoraceae	*Anigozanthos flavidus*			X
Haemodoraceae	*Conostylis spp.*			X
Iridaceae	*Gladiolus undulatus **	X	X	X
Iridaceae	*Moraea flaccida** **DP**			X
Iridaceae	*Patersonia umbrosa var xanthina*			X
Iridaceae	*Patersonia occidentalis*		X	
Iridaceae	*Romulea rosea **			X
Iridaceae	*Chasmanthe floribunda**		X	
Iridaceae	*Watsonia meriana var. bulbillifera**		X	X
Juncaceae	*Juncus microcephalis**			X
Juncaceae	*Juncus pallidus*			X
Mimosaceae	*Acacia decurrens**		X	
Mimosaceae	*Acacia iteaphylla**			X

Family	Species	Lot 45	Lower Western Oval	Nippers Oval
Mimosaceae	*Acacia longifolia**		*X*	*X*
Mimosaceae	*Acacia melanoxylon**		*X*	
Mimosaceae	*Acacia myrtifolia*			*X*
Mimosaceae	*Acacia pulchella*			*X*
Mimosaceae	*Acacia podalyrfolia**		*X*	
Myrtaceae	*Agonis flexuosa*	*X*	*X*	*X*
Myrtaceae	*Corymbia calophylla*	*X*	*X*	*X*
Myrtaceae	*Eucalyptus marginata*			*X*
Myrtaceae	*Leptospermum laevigatum **		*X*	
Oxalidaceae	*Oxalis glabra**	*X*	*X*	*X*
Oxalidaceae	*Oxalis incarnata**		*X*	*X*
Oxalidaceae	*Oxalis pes-caprae**	*X*	*X*	*X*
Pinaceae	*Pinus spp.**			*X*
Pittosporaceae	*Pittosporum undulatum**	*X*	*X*	
Plantaginaceae	*Plantago lanceolata**	*X*	*X*	*X*
Poaceae	*Avena barbata**	*X*	*X*	*X*
Poaceae	*Briza maxima**	*X*	*X*	*X*
Poaceae	*Briza minor**	*X*	*X*	*X*
Poaceae	*Eragrostris curvula**	*X*		
Poaceae	*Hyparrhenia hirta**	*X*	*X*	*X*
Poaceae	*Lolium spp**			*X*
Poaceae	*Microleana stipoides*			*X*
Poaceae	*Tetrarrhena laevis*			*X*
Poaceae	*Pennisetum clandestinum**	*X*	*X*	*X*
Polygalaceae	*Comesperma confertum*			*X*
Polygalaceae	*Polygala myrtifolia**		*X*	*X*
Proteaceae	*Banksia grandis*			*X*
Proteaceae	*Hakea lissocarpha*			*X*
Proteaceae	*Hakea amplexicaulis*			*X*
Proteaceae	*Persoonia longifolia*			*X*
Proteaceae	*Petrophile diversifolia*		*X*	*X*
Rubiaceae	*Opercularia hisidula*			*X*
Rubiaceae	*Coprosoma repens**		*X*	
Stylidiaceae	*Stylidium schoenoides*			*X*
Solanaceae	*Solanum nigrum**	*X*		
Thymelaeaceae	*Pimelea rosea*			*X*
Xanthorrhoeaceae	*Xanthorrhoea preissii*			*X*
Zamiaceae	*Macrozamia riedlei*		*X*	*X*

APPENDIX 2: VEGETATION CONDITION SCALE (ADAPTED FROM KEIGHERY 1994)

CONDITION	DESCRIPTION
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
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 composing weed or crop species with isolated native trees or shrubs.

APPENDIX 3: REPRESENTATIVE PHOTOS OF THE SITE VEGETATION

Nippers Oval Remnant: AfCcAlCD

Nippers Oval Remnant: CcEdD

Nippers Oval Remnant: CcEmVG

Lower Western Oval vegetation: AfD

Lower Western Oval vegetation: WmHhCD

APPENDIX 4: RESULTS OF THE ALA DATABASE SEARCH

Family	Species Name
Amaranthaceae	*Ptilotus manglesii (Lindl.) F.Muell.*
Amaryllidaceae	*Amaryllis belladonna L.*
Aneuraceae	*Riccardia bipinnatifida (Colenso) Hewson*
Apiaceae	*Apium prostratum Labill. ex Vent.*
Apiaceae	*Foeniculum vulgare Mill.*
Apiaceae	*Platysace compressa (Labill.) C.Norman*
Apiaceae	*Platysace tenuissima (Benth.) C.Norman*
Apiaceae	*Xanthosia atkinsoniana F.Muell.*
Apiaceae	*Xanthosia candida (Benth.) Steud.*
Apocynaceae	*Vinca major L.*
Araliaceae	*Hedera helix L.*
Asparagaceae	*Asparagus asparagoides (L.) W.Wight*
Asparagaceae	*Lomandra pauciflora (R.Br.) Ewart*
Asparagaceae	*Thysanotus arenarius Brittan*
Aspleniaceae	*Asplenium trichomanes L.*
Asteraceae	*Asteridea pulverulenta Lindl.*
Asteraceae	*Conyza sumatrensis (Retz.) E.Walker*
Asteraceae	*Crepis capillaris (L.) Wallr.*
Asteraceae	*Erigeron karvinskianus DC.*
Asteraceae	*Hypochaeris glabra L.*
Asteraceae	*Hypochaeris radicata L.*
Asteraceae	*Logfia gallica (L.) Coss. & Germ.*
Asteraceae	*Olearia paucidentata (Steetz) F.Muell. ex Benth.*
Asteraceae	*Olearia rudis (Benth.) F.Muell. ex Benth.*
Asteraceae	*Rhodanthe citrina (Benth.) Paul G.Wilson*
Asteraceae	*Sonchus oleraceus L.*
Aytoniaceae	*Asterella drummondii (Hook.f. & Taylor) R.M.Schust. ex D.G.Long*
Boraginaceae	*Echium plantagineum L.*
Brassicaceae	*Diplotaxis muralis (L.) DC.*
Bryaceae	*Rosulabryum billarderii (SchwÃ¤gr.) J.R.Spence*
Campanulaceae	*Lobelia anceps L.f.*
Caprifoliaceae	*Lonicera japonica Thunb.*
Caprifoliaceae	*Lonicera x italica Schmidt ex Tausch*
Caryophyllaceae	*Silene gallica L.*
Caryophyllaceae	*Silene vulgaris (Moench) Garcke*
Colchicaceae	*Burchardia multiflora Lindl.*
Cyperaceae	*Cyperus congestus Vahl*
Cyperaceae	*Cyperus eragrostis Lam.*
Cyperaceae	*Lepidosperma longitudinale Labill.*
Cyperaceae	*Mesomelaena tetragona (R.Br.) Benth.*
Dasypogonaceae	*Dasypogon hookeri J.Drumm.*

Family	Species Name
Dicranaceae	*Dicranoloma diaphanoneuron (Hampe) Paris*
Dilleniaceae	*Hibbertia amplexicaulis Steud.*
Dilleniaceae	*Hibbertia commutata Steud.*
Dilleniaceae	*Hibbertia cuneiformis (Labill.) Sm.*
Dilleniaceae	*Hibbertia diamesogenos (Steud.) J.R.Wheeler*
Dilleniaceae	*Hibbertia furfuracea (R.Br. ex DC.) Benth.*
Dilleniaceae	*Hibbertia grossulariifolia (Salisb.) Salisb.*
Dilleniaceae	*Hibbertia hypericoides (DC.) Benth.*
Ditrichaceae	*Ditrichum difficile (Duby) M.Fleisch.*
Ditrichaceae	*Pleuridium nervosum (Hook.) Mitt.*
Droseraceae	*Drosera menziesii R.Br. ex DC.*
Elaeocarpaceae	*Tremandra stelligera R.Br. ex DC.*
Ericaceae	*Leucopogon australis R.Br.*
Ericaceae	*Leucopogon capitellatus DC.*
Ericaceae	*Leucopogon cordatus Sond.*
Ericaceae	*Leucopogon glabellus R.Br.*
Ericaceae	*Lysinema ciliatum R.Br.*
Ericaceae	*Lysinema conspicuum R.Br.*
Fabaceae	*Acacia divergens Benth.*
Fabaceae	*Acacia gilbertii Meisn.*
Fabaceae	*Acacia littorea Maslin*
Fabaceae	*Acacia myrtifolia (Sm.) Willd.*
Fabaceae	*Acacia pulchella R.Br.*
Fabaceae	*Acacia urophylla Benth.*
Fabaceae	*Acacia varia Maslin*
Fabaceae	*Bossiaea eriocarpa Benth.*
Fabaceae	*Bossiaea linophylla R.Br.*
Fabaceae	*Callistachys lanceolata Vent.*
Fabaceae	*Chamaecytisus palmensis (Christ) F.A.Bisby & K.W.Nicholls*
Fabaceae	*Chorizema cordatum Lindl.*
Fabaceae	*Chorizema diversifolium A.DC.*
Fabaceae	*Chorizema nanum (Andrews) Sims*
Fabaceae	*Chorizema reticulatum Meisn.*
Fabaceae	*Chorizema rhombeum R.Br.*
Fabaceae	*Daviesia horrida Preiss ex Meisn.*
Fabaceae	*Daviesia inflata Crisp*
Fabaceae	*Dipogon lignosus (L.) Verdc.*
Fabaceae	*Gastrolobium cuneatum Henfr.*
Fabaceae	*Genista linifolia L.*
Fabaceae	*Genista monspessulana (L.) L.A.S.Johnson*
Fabaceae	*Gompholobium confertum (DC.) Crisp*
Fabaceae	*Gompholobium ovatum Meisn.*
Fabaceae	*Gompholobium scabrum Sm.*
Fabaceae	*Gompholobium villosum (Meisn.) Crisp*

Family	Species Name
Fabaceae	*Hovea elliptica (Sm.) DC.*
Fabaceae	*Kennedia carinata (Benth.) Van Houtte*
Fabaceae	*Lathyrus tingitanus L.*
Fabaceae	*Paraserianthes lophantha (Willd.) I.C.Nielsen*
Fabaceae	*Trifolium ligusticum Loisel.*
Fabaceae	*Vachellia farnesiana (L.) Wight & Arn.*
Fabaceae	*Vicia sativa L.*
Funariaceae	*Entosthodon subnudus (Taylor) Fife*
Funariaceae	*Funaria hygrometrica Hedw.*
Goodeniaceae	*Dampiera alata Lindl.*
Goodeniaceae	*Dampiera hederacea R.Br.*
Goodeniaceae	*Dampiera linearis R.Br.*
Goodeniaceae	*Diaspasis filifolia R.Br.*
Goodeniaceae	*Scaevola calliptera Benth.*
Goodeniaceae	*Scaevola microphylla (de Vriese) Benth.*
Haemodoraceae	*Anigozanthos flavidus DC.*
Haemodoraceae	*Anigozanthos humilis Lindl.*
Haemodoraceae	*Conostylis aculeata R.Br.*
Haemodoraceae	*Phlebocarya ciliata R.Br.*
Haloragaceae	*Gonocarpus benthamii Orchard*
Hemerocallidaceae	*Caesia micrantha Lindl.*
Hemerocallidaceae	*Caesia occidentalis R.Br.*
Hydrocharitaceae	*Vallisneria australis S.W.L.Jacobs & Les*
Hypericaceae	*Hypericum perforatum L.*
Iridaceae	*Babiana angustifolia Sweet*
Iridaceae	*Chasmanthe floribunda (Salisb.) N.E.Br.*
Iridaceae	*Freesia leichtlinii Klatt*
Iridaceae	*Gladiolus angustus L.*
Iridaceae	*Ixia maculata L.*
Iridaceae	*Orthrosanthus polystachyus Benth.*
Iridaceae	*Patersonia umbrosa Endl.*
Iridaceae	*Tritonia crocata (L.) Ker Gawl.*
Iridaceae	*Tritonia gladiolaris (Lam.) Goldblatt & J.C.Manning*
Iridaceae	*Watsonia borbonica (Pourr.) Goldblatt*
Iridaceae	*Watsonia meriana (L.) Mill.*
Iridaceae	*Watsonia versfeldii J.W.Mathews & L.Bolus*
Juncaceae	*Juncus kraussii Hochst.*
Juncaceae	*Juncus microcephalus Kunth*
Juncaceae	*Juncus pallidus R.Br.*
Lamiaceae	*Hemigenia sericea Benth.*
Lamiaceae	*Mentha pulegium L.*
Lauraceae	*Cassytha racemosa Nees*
Leucobryaceae	*Campylopus pyriformis (Schultz) Brid.*
Linderniaceae	*Parentucellia latifolia (L.) Caruel*

Family	Species Name
Lophocoleaceae	*Chiloscyphus semiteres (Lehm. & Lindenb.) Lehm. & Lindenb.*
Malvaceae	*Modiola caroliniana (L.) G.Don*
Menyanthaceae	*Liparophyllum latifolium (Benth.) Tippery & Les*
Myrtaceae	*Agonis flexuosa (Willd.) Sweet*
Myrtaceae	*Astartea leptophylla Schauer*
Myrtaceae	*Eucalyptus microcorys F.Muell.*
Myrtaceae	*Kunzea ciliata Toelken*
Myrtaceae	*Melaleuca systena Craven*
Myrtaceae	*Taxandria parviceps (Schauer) J.R.Wheeler & N.G.Marchant*
Nymphaeaceae	*Nymphaea odorata Aiton*
Oxalidaceae	*Oxalis corniculata L.*
Oxalidaceae	*Oxalis debilis Kunth*
Oxalidaceae	*Oxalis incarnata L.*
Oxalidaceae	*Oxalis pes-caprae L.*
Papaveraceae	*Eschscholzia californica Cham.*
Papaveraceae	*Fumaria muralis Sond. ex W.D.J.Koch*
Pittosporaceae	*Billardiera floribunda (Putt.) F.Muell.*
Pittosporaceae	*Billardiera fusiformis Labill.*
Pittosporaceae	*Billardiera variifolia DC.*
Pittosporaceae	*Marianthus candidus Hugel ex Endl.*
Pittosporaceae	*Pittosporum undulatum Vent.*
Plantaginaceae	*Gratiola peruviana L.*
Plantaginaceae	*Plantago lanceolata L.*
Plantaginaceae	*Veronica arvensis L.*
Poaceae	*Aira caryophyllea L.*
Poaceae	*Anthoxanthum odoratum L.*
Poaceae	*Briza maxima L.*
Poaceae	*Briza minor L.*
Poaceae	*Bromus diandrus Roth*
Poaceae	*Cenchrus clandestinus (Hochst. ex Chiov.) Morrone*
Poaceae	*Cortaderia selloana (Schult. & Schult.f.) Asch. & Graebn.*
Poaceae	*Dactylis glomerata L.*
Poaceae	*Echinochloa crus-galli (L.) P.Beauv.*
Poaceae	*Ehrharta villosa Schult.f.*
Poaceae	*Festuca arundinacea Schreb.*
Poaceae	*Holcus lanatus L.*
Poaceae	*Hyparrhenia hirta (L.) Stapf*
Poaceae	*Lolium rigidum Gaudin*
Poaceae	*Lolium x hybridum Hausskn.*
Poaceae	*Neurachne alopecuroidea R.Br.*
Poaceae	*Poa drummondiana Nees*
Podocarpaceae	*Podocarpus drouynianus F.Muell.*
Polygalaceae	*Comesperma confertum Labill.*
Polygalaceae	*Comesperma virgatum Labill.*

Family	Species Name
Polygalaceae	*Polygala myrtifolia L.*
Polygonaceae	*Acetosella vulgaris Fourr.*
Pottiaceae	*Barbula calycina SchwÃ¤gr.*
Pottiaceae	*Weissia controversa Hedw.*
Primulaceae	*Lysimachia arvensis (L.) U.Manns & Anderb.*
Proteaceae	*Banksia ilicifolia R.Br.*
Proteaceae	*Banksia occidentalis R.Br.*
Proteaceae	*Conospermum caeruleum R.Br.*
Proteaceae	*Conospermum flexuosum R.Br.*
Proteaceae	*Grevillea manglesioides Meisn.*
Proteaceae	*Grevillea quercifolia R.Br.*
Proteaceae	*Grevillea trifida (R.Br.) Meisn.*
Proteaceae	*Hakea amplexicaulis R.Br.*
Proteaceae	*Hakea ceratophylla (Sm.) R.Br.*
Proteaceae	*Hakea lasiantha R.Br.*
Proteaceae	*Hakea lasianthoides Rye*
Proteaceae	*Hakea linearis R.Br.*
Proteaceae	*Hakea trifurcata (Sm.) R.Br.*
Proteaceae	*Persoonia longifolia R.Br.*
Proteaceae	*Persoonia saccata R.Br.*
Pteridaceae	*Adiantum aethiopicum L.*
Racopilaceae	*Racopilum cuspidigerum (SchwÃ¤gr.) Ã…ngstr.*
Ranunculaceae	*Clematis pubescens Hugel ex Endl.*
Restionaceae	*Meeboldina scariosa (R.Br.) B.G.Briggs & L.A.S.Johnson*
Restionaceae	*Tyrbastes glaucescens B.G.Briggs & L.A.S.Johnson*
Rhamnaceae	*Spyridium globulosum (Labill.) Benth.*
Rhamnaceae	*Trymalium odoratissimum Lindl.*
Rosaceae	*Cotoneaster glaucophyllus Franch.*
Rosaceae	*Rubus anglocandicans A.Newton*
Rosaceae	*Rubus laudatus A.Berger*
Rutaceae	*Boronia alata Sm.*
Rutaceae	*Boronia crenulata Sm.*
Rutaceae	*Boronia defoliata F.Muell.*
Rutaceae	*Boronia dichotoma Lindl.*
Rutaceae	*Boronia gracilipes F.Muell.*
Rutaceae	*Boronia megastigma Bartl.*
Rutaceae	*Boronia molloyae J.Drumm.*
Rutaceae	*Boronia tenuior Domin*
Rutaceae	*Chorilaena quercifolia Endl.*
Santalaceae	*Leptomeria squarrulosa R.Br.*
Sapindaceae	*Dodonaea ceratocarpa Endl.*
Sematophyllaceae	*Sematophyllum homomallum (Hampe) Broth.*
Solanaceae	*Datura stramonium L.*
Solanaceae	*Nicandra physalodes (L.) Gaertn.*

Family	Species Name
Solanaceae	*Solanum lucani F.Muell.*
Solanaceae	*Solanum nigrum L.*
Stylidiaceae	*Stylidium calcaratum R.Br.*
Stylidiaceae	*Stylidium eriopodum DC.*
Stylidiaceae	*Stylidium rhynchocarpum Sond.*
Stylidiaceae	*Stylidium spathulatum R.Br.*
Thymelaeaceae	*Pimelea clavata Labill.*
Thymelaeaceae	*Pimelea ferruginea Labill.*
Thymelaeaceae	*Pimelea spectabilis Lindl.*
Thymelaeaceae	*Pimelea suaveolens Meisn.*
Thymelaeaceae	*Pimelea sylvestris R.Br.*
Tropaeolaceae	*Tropaeolum majus L.*
Violaceae	*Hybanthus debilissimus F.Muell.*
Violaceae	*Viola odorata L.*
Xyridaceae	*Xyris lacera R.Br.*

APPENDIX 5: SPOTLIGHT DATA RECORD

SPOTLIGHTING OBSERVATION RECORD 1:

Date:4/11/2016 **Site:** Gloucester Park **Observer**: Drew McKenzie

Temp:18 degress **Wind**:CALM **Moon Phase**: New **Cloud** ($^1/_8$): Clear **Rain**: No

Start: 9:15PM **Finish**:11:15 PM **Total Dist**: 3 km **Speed:** ~1.5km/hr

Record No.	Time	Species	# Ads	Sex	Juv/PY	Dist m	Plant sp occupied	Ht m	Comments
1	9:26	WRP	1			6m	Peppy	6m	
2	9:45	WRP	1			12m	Marri	12m	
3	10:15	WRP	2		2	4m	Victorian Tea Tree	4m	
4	10:26	WRP	1			10m	Marri	10m	
5	10:32	WRP	2			8m	Marri	8m	

Note: Record sheet adopted from DPAW Spotlighting Record Sheet.

SPOTLIGHTING OBSERVATION RECORD 2:

Date: 6/11/2016 **Site:** Gloucester Park **Observer**: Drew McKenzie

Temp:12 degress **Wind**:10kn WSW **Moon Phase**: 1/4 **Cloud** ($^1/_8$): Partial Cloud **Rain**: No

Start: 7:30PM **Finish**:9:45 PM **Total Dist**: 3 km **Speed:** ~1.5 km/hr

Record No.	Time	Species	# Ads	Sex	Juv/PY	Dist m	Plant sp occupied	Ht m	Comments
1	7:45	WRP	2			10m	Marri	10m	
2	8:00	WRP	2			12m	Marri	10m	
3	8:10	WRP	1			14m	Pinus spp	14m	
4	8:37	WRP	1			10m	Peppy	10m	
5	8:54	WRP	2			10m	Peppy	8m	
6	8:57	WRP	1			12m	Marri	12m	Vocalising
7	9:21	BTP	1			15m	Marri	20m	

Note: Record sheet adopted from DPAW Spotlighting Record Sheet.

SPOTLIGHTING OBSERVATION RECORD 3:

Date:9/11/2016 **Site:** Gloucester Park **Observer**: Drew McKenzie

Temp:9 degress **Wind**:CALM **Moon Phase**: 1/2 **Cloud** ($^1/_8$): Partial Cloud **Rain**: No

Start: 9:15PM **Finish**:11:15 PM **Total Dist**: 3 km **Speed:** ~1.5km/hr

Record No.	Time	Species	# Ads	Sex	Juv/PY	Dist m	Plant sp occupied	Ht m	Comments
1	9:30	WRP	2			18m	Marri	15m	
2	9:40	WRP	1			4m	Peppy	4m	
3	9:55	WRP	1			6m	Marri	6m	
4	10:00	WRP	1		2	15m	Peppy	15m	
5	10:20	WRP	2			8m	Peppy	8m	
6	10:45	WRP	1			15m	Marri	40m	
7	10:55	BTP	1		2	15m	E'n. States Euc.	20m	
8	11:05	WRP	2			4m	Peppy	4m	

Note: Record sheet adopted from DPAW Spotlighting Record Sheet.

APPENDIX 6: FAUNA PHOTOS

Red Winged Fairy Wren, Nippers Oval Remnant,

Western Grey Kangaroo, Nippers Oval Remnant

Western Ringtail Possums, Lot 45

Western Ringtail Possums, Lower Western Oval

Quenda, Nippers Oval Remnant

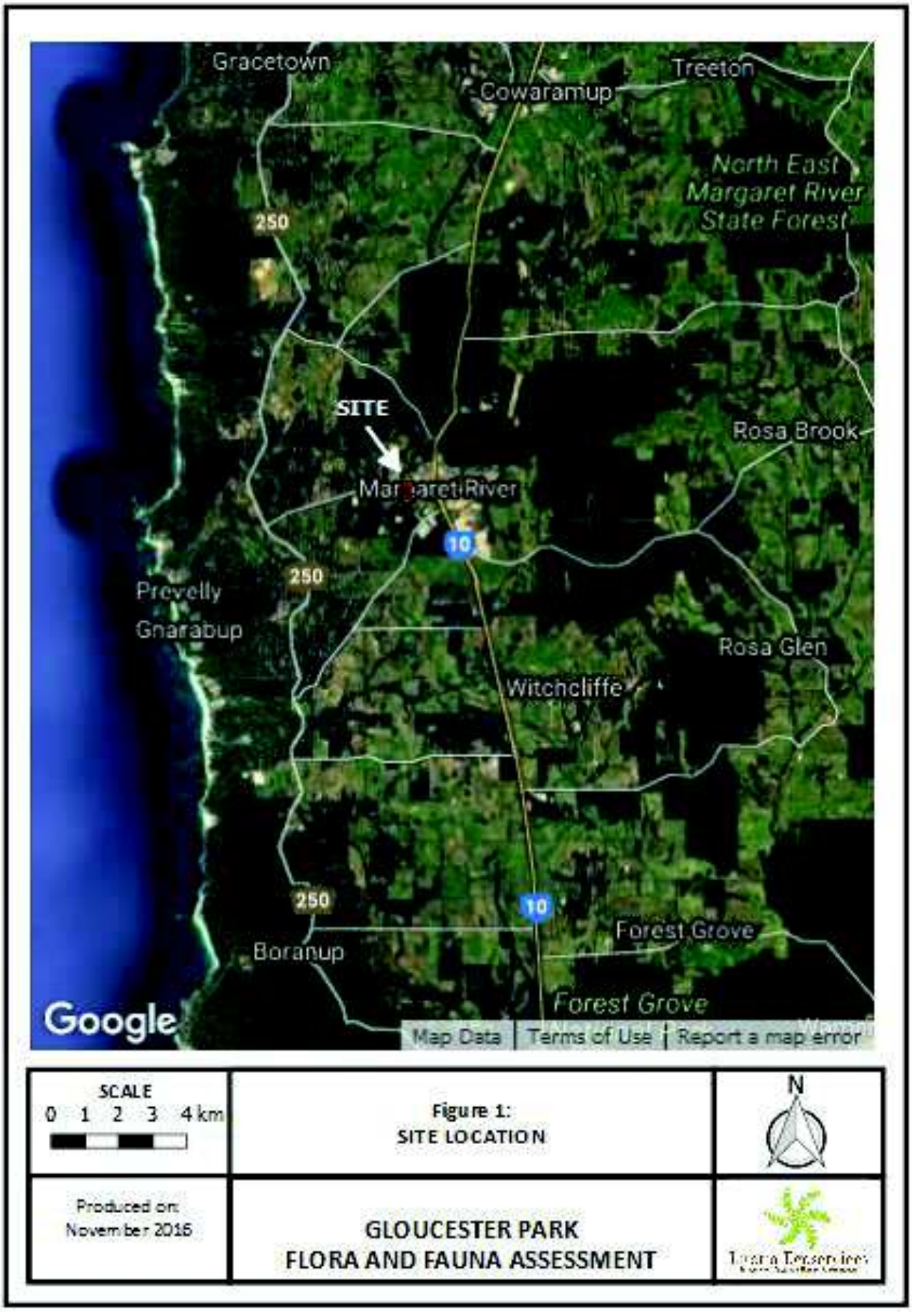
Western Ringtail Possum, Nippers Oval Remnant

APPENDIX 7: HABITAT ASSESSMENT RESULTS

Habitat Assessment Table : Location 1	
Location	North western portion of Nippers Oval Remnant
Vegetation Description	**CcEmVG** - Very Good Condition Forest of *Corymbia calophylla* and *Eucalyptus marginata* over open shrubland of *Banksia grandis, Bossiaea linophylla, Hovea elliptica, Acacia myrtifolia,* with a low shrub/herb layer of *Tremandra stelligera, Scaevola calliptera, Pattersonia umbrosa, Hibbertia hypericoides, Dampiera linearis*
Vegetation condition	Very Good Condition
Ground Layer	Good leaf litter layer and range of woody debris, fallen branches etc Good covering of ground covers species including *Pattersonia umbrosa, Hibertia hypericoides, Scaevola calliptera, Tremandra stelligera* and *Watsonia spp.*
Mid Storey	Diverse mid storey consisting predominantly of *Banksia grandis, Bossiaea linophylla, Hovea elliptica, Acacia myrtifolia and Xanthorrea preisii*
Overstorey	Mixed coverage of *Corymbia calophylla, Eucalyptus marginata and Agonis flexuosa*.
Connectivity to surrounding remnants and similar vegetation	SWREL rating as 1a vegetation linkage based on proximity Directly connected to adjoin degraded Rails to Trails vegetation and through the Montessori bushland to Elizabeth St bushland.
Feeding and breeding resources	Good vegetation cover, floristic and structural diversity, creating great foraging opportunities. Moderate coverage of fallen branches and ground debris, No standing hollows. Active bird population. Confirmed Western Ringtail Possum presence
Overall Habitat Rating	Good
	

Habitat Assessment Table : Location 2	
Location	Northern portion of Lower Western Oval vegetation
Vegetation Description	**AfCD –** Completely Degraded Low Forest of *Agonis flexuosa* over a cleared shrub and ground layer
Vegetation condition	Completely Degraded Vegetation Condition
Ground Layer	Minimal Leaf Litter, virtually no fallen timber, branches or logs. Virtually devoid of vegetation with occaccional
Mid Storey	No mid storey
Overstorey	Overstorey of mature *Agonis flexuosa* – good canopy and branch connectivity
Connectivity to surrounding remnants and similar vegetation	SWREL rating as 1a vegetation linkage based on proximity Directly connected to the adjoining BMX track vegetation and degraded Rails to Trails linkage.
Feeding and breeding resources	No hollow bearing trees observed, uniform age class of regrowth *Agonis flexuosa* resulting in very limited floristic and structural diversity – habitat potential is enhanced due to the proximity of additional thick ground cover immediately adjoining as part of the same vegetation patch. Quenda tracks observed, multiple Western Ringtail possums sighted including a drey within this vegetation
Habitat Rating	Poor overall but with significant potential to support Western Ringtail Possums

FIGURES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Treeton
North East Margaret River State Forest
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SITE
Rosa Brook
Margaret River
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Prevelly
Gnarabup
Rosa Glen
Witchcliffe
250
10
Forest Grove
Boranup
Forest Grove
Google
Map Data
Terms of Use
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SCALE
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Figure 1:
SITE LOCATION
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Produced on:
November 2016
GLOUCESTER PARK
FLORA AND FAUNA ASSESSMENT
Litoria Ecoservices

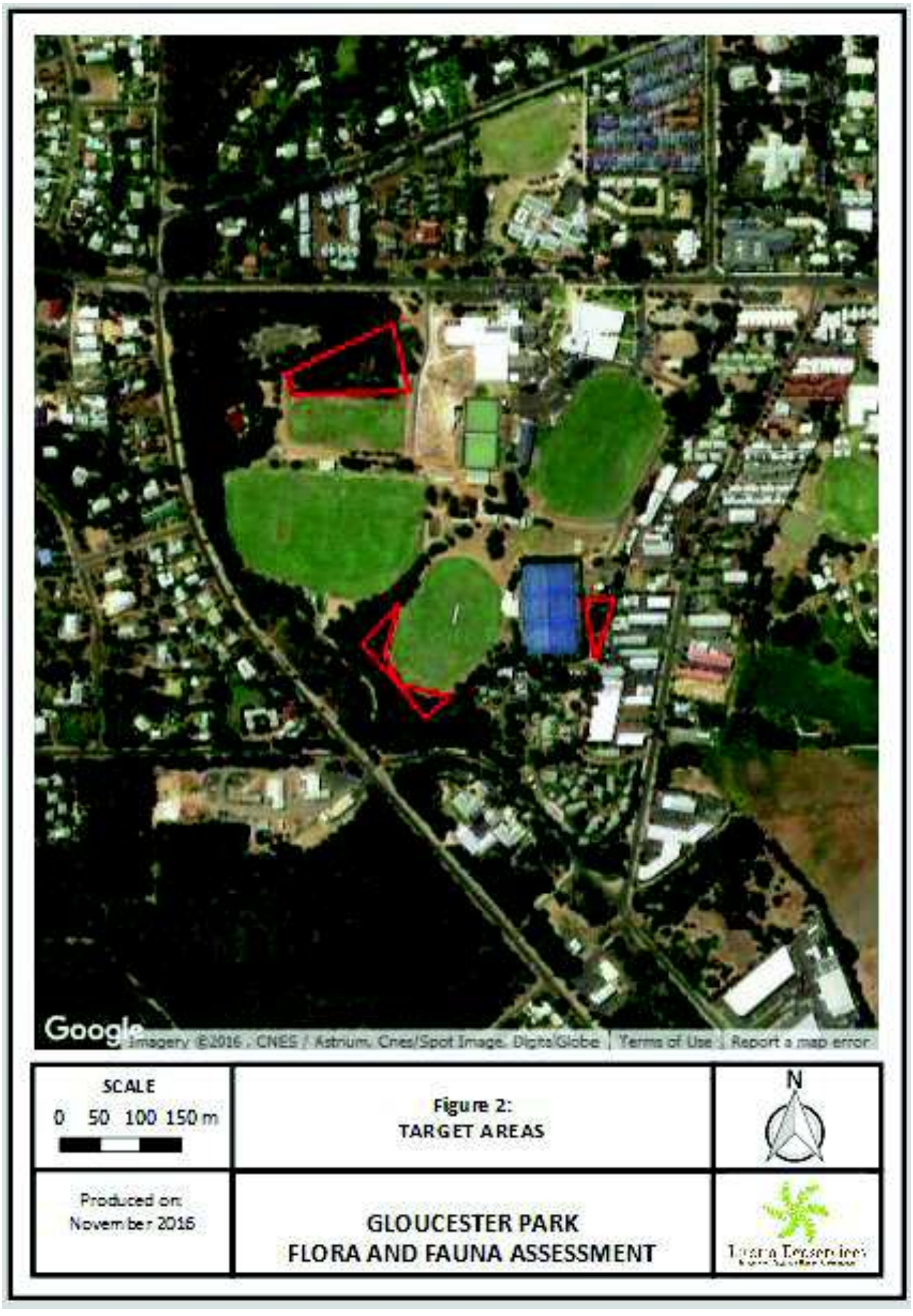
Google
Imagery ©2016 , CNES / Astrium, Cnes/Spot Image, DigitalGlobe | Terms of Use | Report a map error
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Figure 2:
TARGET AREAS
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Produced on:
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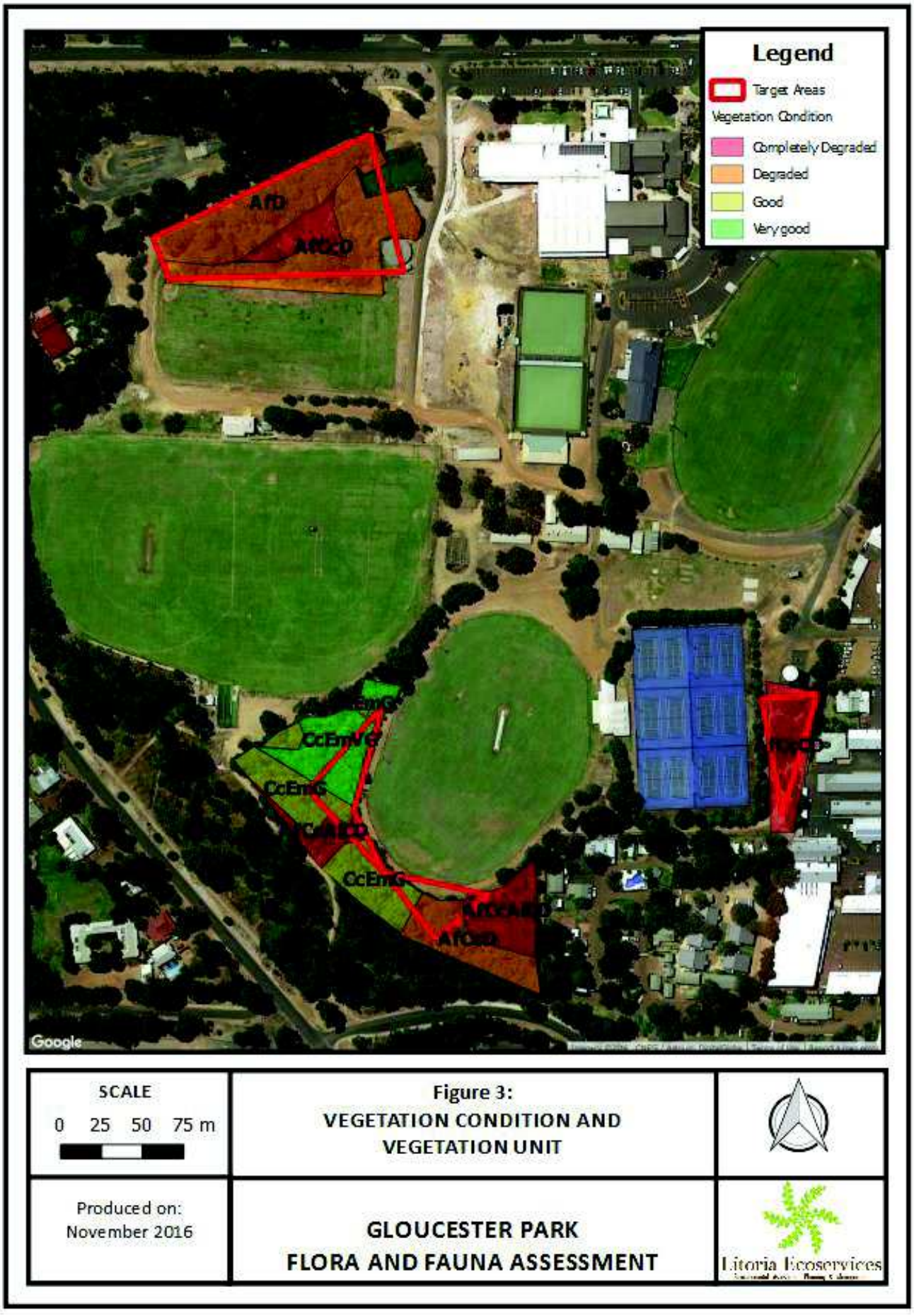
GLOUCESTER PARK
FLORA AND FAUNA ASSESSMENT
Litoria Ecoservices


Legend
Target Areas
Vegetation Condition
Completely Degraded
Degraded
Good
Very good
AfD
AfCcD
CcEmG
CcEmG
CcEmG
CcEmG
AfCcD
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SCALE
0 25 50 75 m
Figure 3:
VEGETATION CONDITION AND
VEGETATION UNIT
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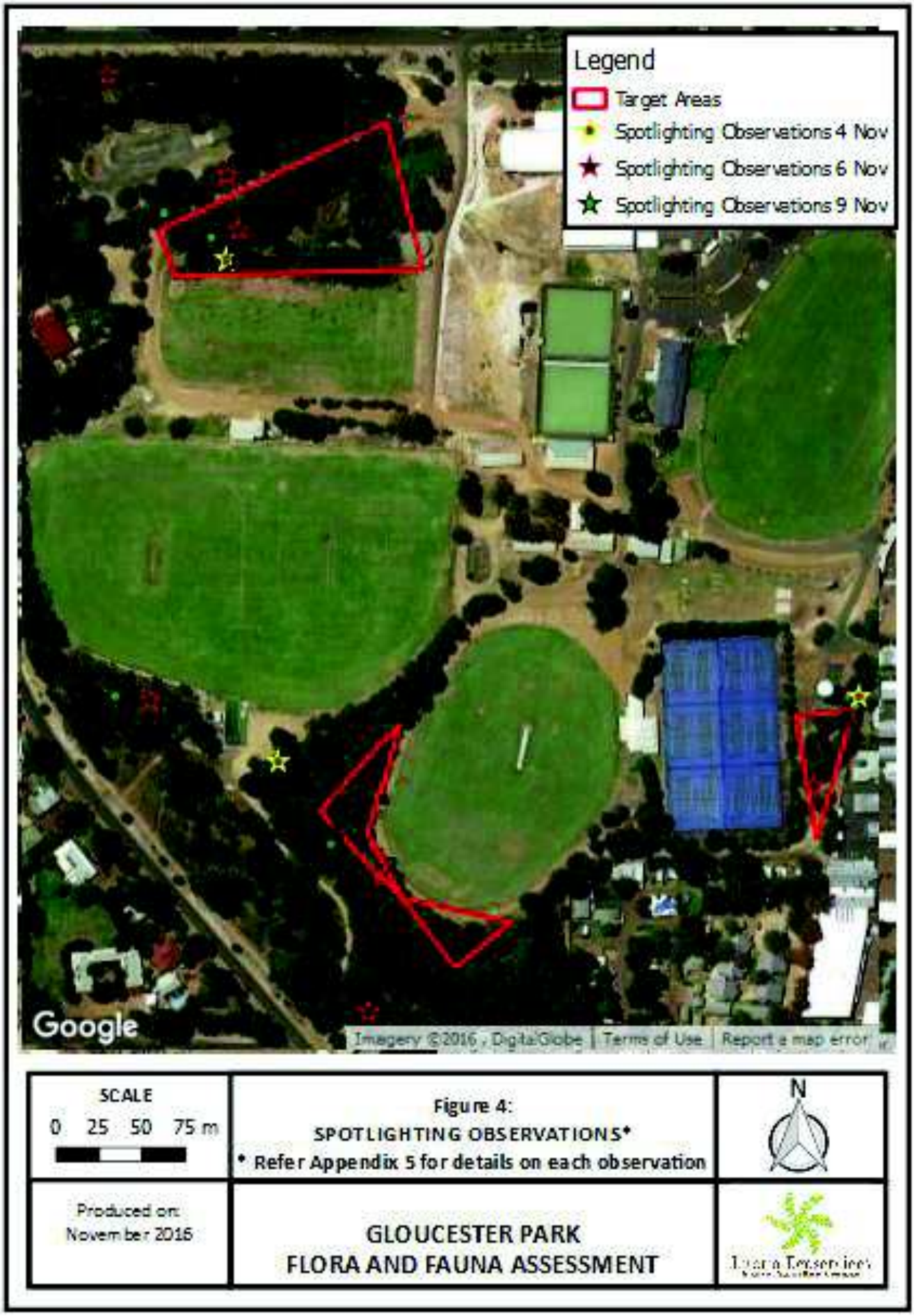
FLORA AND FAUNA ASSESSMENT
Litoria Ecoservices


Legend
Target Areas
Spotlighting Observations 4 Nov
Spotlighting Observations 6 Nov
Spotlighting Observations 9 Nov
Google
Imagery ©2016 , DigitalGlobe | Terms of Use | Report a map error
SCALE
0 25 50 75 m
Figure 4:
SPOTLIGHTING OBSERVATIONS*
* Refer Appendix 5 for details on each observation
N
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November 2016
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FLORA AND FAUNA ASSESSMENT
Litoria Ecoservices

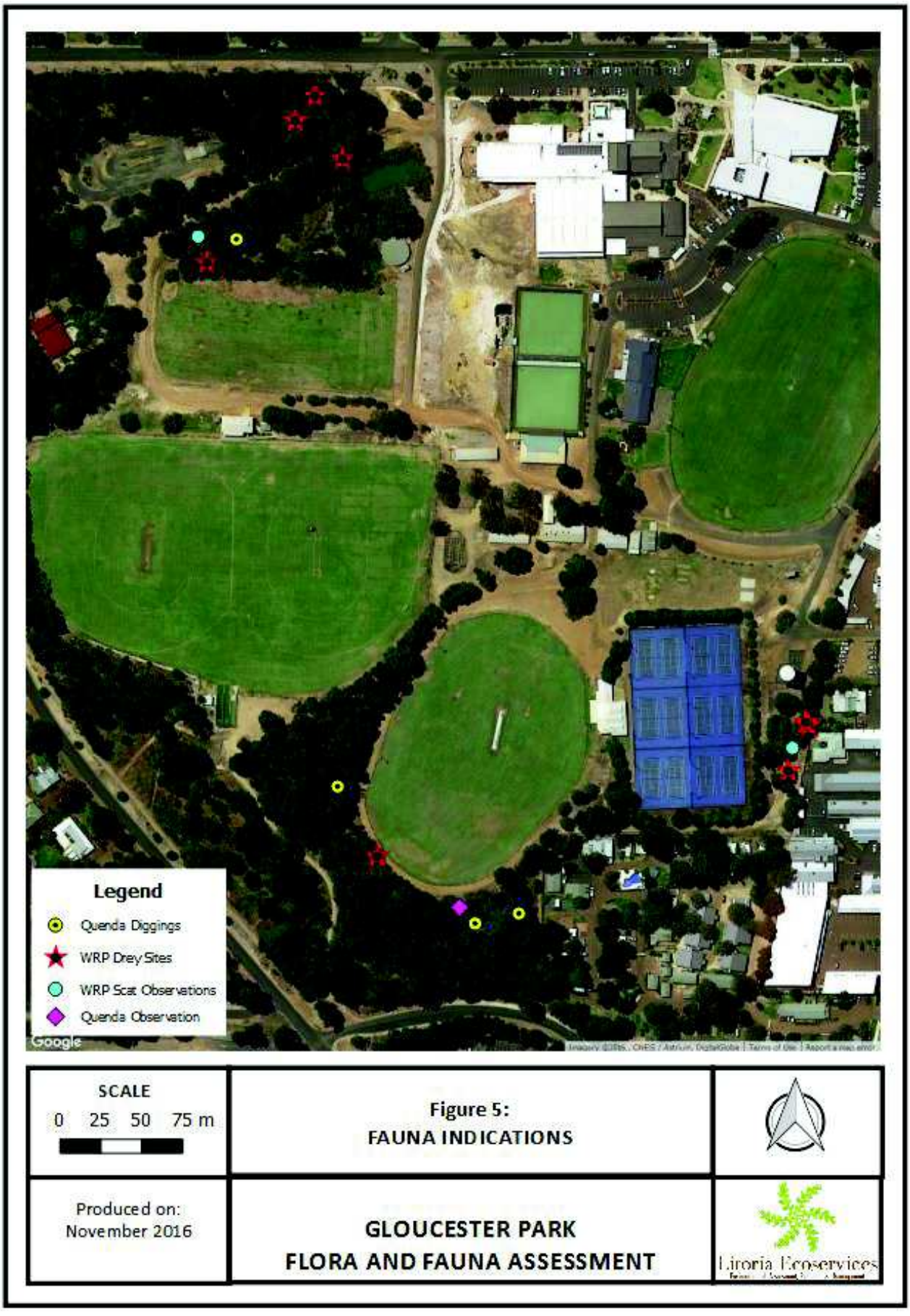
Legend
Quenda Diggings
WRP Drey Sites
WRP Scat Observations
Quenda Observation
Google
SCALE
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Figure 5:
FAUNA INDICATIONS
Produced on:
November 2016
GLOUCESTER PARK
FLORA AND FAUNA ASSESSMENT
Litoria Ecoservices