



# Water Corporation

## Ellenbrook Tank and the Inlet and Outlet main Flora, vegetation and fauna assessment

April 2013

# Executive summary

The Water Corporation are currently planning to develop the Ellenbrook Tanksite, which will include clearing of native vegetation for the proposed DN900 inlet and DN1200 outlet mains and at the proposed Ellenbrook Tanksite (herein referred to as the Project Area). The inlet and outlet mains are both within a 3.8 km long section of the existing 20 m wide easement and the Ellenbrook Tanksite is approximately 14.5 hectares in size. The Water Corporation has commissioned GHD Pty Ltd (GHD) to undertake a spring survey of the inlet and outlet mains and Ellenbrook Tanksite, including a Level two flora and vegetation survey and Level one fauna and habitat assessment. The purpose of the flora, vegetation and fauna surveys is to define the environmental sensitivity of the site, including key values such as conservation significant flora, fauna and communities.

The following is a summary of the findings of the flora and fauna assessment:

## Existing Environment

- The Project Area is located within an Environmentally Sensitive Area (ESA) buffer extent, which is associated with several Conservation Category geomorphic wetlands and a Resource Enhancement Category wetland;
- There are no conservation areas managed by the Department of Environment and Conservation (DEC) within the Project Area, however the Project Area is surrounded by the DEC Gnangara-Moore River State Forest;
- The Project Area is located within Bush Forever Site No. 399 and adjacent to Bush Forever Site No. 300. Both Bush Forever Sites are noted for being corridors through otherwise highly cleared lands and provide linkages of regional significance; and
- No watercourses or wetlands were identified within the Project Area.

## Flora and Vegetation

- Two vegetation types were identified within the Project Area during the survey: *Banksia* Low Open Forest and *Kunzea*, *Banksia* and *Jacksonia* Shrubland;
- The vegetation types present in the Project Area correspond to Beard (1979) vegetation associations 1001 and 949. According to information provided in the Government of Western Australia (2010) these associations are classified as *Vulnerable* for vegetation association 1001 and of *Least Concern* for vegetation associations 949. A total of 0.68 ha of vegetation association 1001 is located within the Project Area in the *Completely Degraded* section along the road in the south of the Project Area;
- The vegetation condition of the Project Area was assessed using the Keighery (1994) scale. Native vegetation located in the northern section of the Project Area rated between *Pristine* (1) to *Excellent* (2). A small section of rehabilitated vegetation in the Project Area rated between *Good* (3) to *Degraded* (5). Areas south of the rehabilitated area traverse previously disturbed /cleared quarry and roads and these were *Completely Degraded* (6);
- A preliminary assessment for *Phytophthora* spp. (Dieback) as part of the vegetation condition assessment recorded some *Banksia* deaths suspected to be related to Dieback;
- A total of 116 plant taxa were recorded within the Project Area, comprising of 33 plant families and 80 plant genera;
- A total of 14 introduced (exotic) species were recorded during the survey. No Weeds of National Significance (WONS) listed by the Federal Government or Declared Plants



under the Section 37 of the *Agricultural and Related Resources Protection Act 1976* were recorded in the Project Area;

- No Federal and State Threatened Ecological Communities (TECs) were recorded during the survey;
- The Priority Ecological Community (PEC) Swan Coastal Plain *Banksia attenuata* - *Banksia menziesii* woodlands, SCP23b, listed as a Priority 3 PEC by the DEC is present within the northern section of the Project Area. This PEC is associated with the vegetation type *Banksia* Low Open Forest. Approximately 14.5 ha of this PEC is located within the Project Area;
- The buffer zone for the PEC *Banksia ilicifolia* woodlands, SCP22, listed as a Priority 3 PEC at the State level, was identified from desktop assessments as located over the Project Area. The buffer for this PEC is located within the rehabilitated vegetation of *Kunzea*, *Banksia* and *Jacksonia* Shrubland and other areas that have previously been cleared. *Banksia ilicifolia* was not recorded during the time of the survey. This PEC was not recorded during the field survey;
- No Threatened Flora (previously called Declared Rare Flora) listed under the *Wildlife Conservation Act 1950*, species of national conservation significance listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), Priority flora listed by the Department of Environment and Conservation (DEC) were recorded from the Project Area; and
- A likelihood of occurrence assessment for conservation significant species identified three species as likely to occur and seven species possibly occurring within the Project Area. This is based on the species known range and habitat requirements.

## Fauna

- The Project Area contains two broad fauna habitat types, based on the predominant landforms, soil and vegetation structure of the area. These habitat types are broadly based on the vegetation types identified within the Project Area;
- A total of 21 fauna species were recorded within the Project Area, consisting of 19 birds and two mammals. All of the species recorded during the survey are typical of the Perth Swan Coastal Plain;
- Habitat assessments were undertaken for Black Cockatoos and the Graceful Sun Moth (GSM). This identified 15.2 ha of Black Cockatoo foraging and 14.5 ha of GSM habitat present within the Project Area;
- A likelihood of occurrence assessment for conservation significant fauna species based on the known locations and distribution of species and habitat requirements identified eight conservation significant fauna species as likely to occur or possibly to occur within the Project Area;
- It is likely that the project will trigger referral to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPoC) due to the clearing of Black Cockatoo foraging habitat. A total of 15.2 ha of Black Cockatoo foraging habitat is located within the Project Area. The majority of this area is located within the Ellenbrook Tanksite, where there is 14.5 ha of quality foraging habitat. There is one Carnaby's Cockatoo known roosting site located approximately 2 km west of the Project Area, in *Melaleuca* trees and the Project Area has been identified as likely to provide a habitat linkage between other foraging and roosting sites;

- There is up to 14.5 ha of potential GSM habitat present within the Ellenbrook Tanksite. Confirmation of this species presence requires a targeted assessment. Should GSM be present, the Project is likely to trigger a referral to DSEWPac as there is a real chance or possibility that it will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; and
- Database searches indicate that seven bird species listed under the EPBC Act as Migratory and/or Marine occur or potentially occur within 5 km of the Project Area. While there is the potential for a number of migratory bird species to occur occasionally within the Project Area, the Project Area is not considered to be important habitat for any of the migratory species and it is unlikely that listed migratory species would be significantly impacted by the proposed works.

### Assessment against the 10 Clearing Principles

An assessment against the “10 Clearing Principles” identified that the Project is at variance to Principles (a) and (b) and may be at variance with Principle (h).

### Recommendations

#### Recommendation 1

The proposed clearing of native vegetation for the proposed Ellenbrook Tanksite is to be limited or avoided, as this area of bushland is the PEC Swan Coastal Plain *Banksia attenuata* - *Banksia menziesii* woodlands, SCP23b, listed as a Priority 3 PEC by the DEC. If clearing for the proposed Ellenbrook Tanksite cannot be avoided, it is recommended the project is discussed with the DEC, in regards to potential environmental offsets as a means to offset the clearing of the *Banksia attenuata* - *Banksia menziesii* woodlands, SCP23b.

Rehabilitation of cleared areas is recommended, to reinstate the *Banksia attenuata* - *Banksia menziesii* woodlands, SCP23b.

#### Recommendation 2

Clearing of the Ellenbrook Tanksite is likely to trigger referral to the DSEWPac due to the clearing of more than 1 ha of quality Black Cockatoo foraging habitat. A total of 14.5 ha of Black Cockatoo foraging habitat is located within this section of the Project Area. It is recommended the project be discussed with DSEWPac before a final decision to refer is made.

#### Recommendation 3

GHD recommends a targeted Graceful Sun Moth survey in the native vegetation proposed to be cleared for the Ellenbrook Tanksite. This survey will determine their presence or absence within the Project Area.

#### Recommendation 4

As there is an ESA and Bush Forever Site located over the Project Area, the exemptions to clearing regulations do not apply and an application to the DEC for a clearing permit will need to be submitted to clear native vegetation within the Project Area.

#### Recommendation 5

A formal dieback assessment consistent with DEC requirements should be conducted prior to works to determine if *Phytophthora* spp. are present within native bushland proposed to be cleared in the Project Area. A Dieback Management plan to address issues and the management of the disease should be employed.

#### Recommendation 6

A Construction Environmental Management Plan (CEMP) should be developed to address the potential impacts expected to be experienced during the clearing of native vegetation for the proposed Ellenbrook Tanksite and inlet and outlet mains.

This report is subject to, and must be read in conjunction with, the limitations set out in section 2.4 and the assumptions and qualifications contained throughout the Report.

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# 1. Introduction

## 1.1 Background

The Water Corporation require a flora, vegetation and fauna survey of Ellenbrook Tanksite and inlet and outlet mains located in Ellenbrook, 20 kilometres (kms) north east of Perth. The Water Corporation is planning to develop the Ellenbrook Tanksite and two inlet and outlet mains.

GHD Pty Ltd (GHD) was commissioned to undertake a spring flora and fauna investigation for the proposed work. The purpose of the flora, vegetation and fauna surveys is to define the environmental sensitivity of the site, including key values such as conservation significant flora, fauna and communities.

## 1.2 Project Area

The Project Area (Figure 1) is 23.3 hectares (ha) in size and consists of:

- Ellenbrook Tanksite (approximately 14.5 ha); and
- The inlet and outlet mains, which are both within a 3.8 km long section of the existing 20 metre (m) wide easement.

## 1.3 Scope of Works

This flora and fauna assessment included both a desktop review and field survey. The scope of works, as per the Water Corporation Brief and GHD proposal was to:

- Review existing literature and databases to gather background information, including:
  - Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Protected Matters Search;
  - Department of Environment and Conservation (DEC) NatureMap Flora and Fauna Search; and
  - DEC Threatened and Priority Ecological Communities and Threatened Flora database search.
- Complete a Level 2 flora survey including grid-based searches and quadrat based sampling. The survey was to provide details on the:
  - vegetation types present;
  - vegetation condition;
  - locations of declared weeds;
  - locations of *Lomandra maritima*, *Lomandra hermaphrodita*, Threatened or Priority flora and any other flora of local or taxonomic significance;
  - visual evidence of disease status or other existing impacts on vegetation. The dieback assessment considered the presence of key indicator species, but was not a formal dieback assessment consistent with DEC requirements.
- Complete a Level 1 fauna assessment including:

- a habitat survey;
- assessment of the likelihood of occurrence of conservation significant species;
- opportunistic sightings of non-cryptic species;
- an assessment for the potential for Graceful Sun Moth (*Synemon gratiosa*) to occur; however, identification of species presence requires targeted surveys during the month of March; and
- An assessment of Black Cockatoo foraging habitat and significant trees.

## 1.4 Report Limitations and Assumptions

This Report has been prepared by GHD for the Water Corporation and may only be used and relied on by the Water Corporation for the purpose agreed between GHD and the Water Corporation as set out in section 1.3 of this Report.

GHD otherwise disclaims responsibility to any person other than the Water Corporation arising in connection with this Report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this Report were limited to those specifically detailed in the Report and are subject to the scope limitations set out in the Report.

The opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the date of preparation of the Report. GHD has no responsibility or obligation to update this Report to account for events or changes occurring subsequent to the date that the Report was prepared.

GHD has prepared this Report on the basis of information provided by the Water Corporation and Government authorities, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the Report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this Report are based, in part, on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points. Investigations undertaken in respect of this Report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this Report.

Site conditions (species and communities of conservation significance) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this Report if the site conditions change.

## 2. Methodology

### 2.1 Desktop Assessment

Prior to the commencement of field surveys, a desktop review was undertaken. The desktop review included:

- A review of the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) Protected Matters database (DSEWPaC, 2012b) – to identify species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) potentially occurring within the Project Area;
- A review of the DEC NatureMap database (DEC, 2012b), for flora and species previously recorded within a 5 km buffer of the Project Area;
- A review of the DEC Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) databases to determine the potential for TECs or PECs to be present within the Project Area;
- A review of the DEC Flora and Communities Database for records of conservation significant species and communities recorded within the Project Area and surrounds;
- A review of previous vegetation mapping of the Project Area;
- A review of the DEC Environmentally Sensitive Area (ESA) database to determine whether any ESA's are located within the Project Area;
- Beard (1979) and Heddle *et al.* (1980) vegetation mapping for the Project Area; and
- Aerial photography, geology, soils, hydrology and topography data.

### 2.2 Field Survey

#### 2.2.1 Flora and Vegetation

Field surveys were undertaken with regards to the Environmental Protection Authority (EPA) Guidance Statement No. 51, *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004a) and *Terrestrial Biological Surveys as an Element of Biodiversity Protection*, Position Statement No. 3 (EPA, 2002). Two GHD ecologists visited the site on 30 October, 2012.

Field assessment methodology involved sampling using quadrats located in representative vegetation types and recording of plant species present (visible) at the time of the survey in the Project Area. Grid-based searches, 30 metres apart, allowed for specific mapping of *Lomandra maritima*, *Lomandra hermaphrodita*, Threatened and Priority flora and other flora of local or taxonomic significance.

Vegetation types were identified by means of a combination of aerial photography interpretation, topographical features, previous mapping (Beard, 1979 and Heddle *et al.* 1980) and field observations.

Quadrat sampling sites were an area of 10 m × 10 m and the position of each site was recorded using a GPS unit. The information presented in Table 1 was recorded for each quadrat. During the field assessment six quadrats were assessed.



The locations of quadrats are provided in Figure 3, Appendix A.

**Table 1** Field data recorded during the field survey

Aspect	Measurement
Physical Features	Aspect, soil attributes. Percentage surface cover by: rocks, logs and branches, leaf litter, bare ground.
Location	Coordinates recorded in GDA94 datum using a hand-held Global Positioning System (GPS) tool and PDA (Trimble Nomad), to accuracy approximately $\pm 5$ m and $\pm 2$ m respectively.
Vegetation Condition	Vegetation condition was assessed using the condition rating scale devised by Keighery (1994).
Disturbance	Level and nature of disturbances (e.g. weed presence, fire – and time since last fire, impacts from grazing, exploration activities).
Flora	List of dominant flora from each structural layer. Cover class for each structural layer.

### Flora species Identification

Species that were well known to the survey botanists were identified in the field, while species that were unknown were collected and assigned a unique number to facilitate tracking. Plant species were identified by the use of local and regional flora keys and by comparison with the named species held at the Western Australian Herbarium. Plant taxonomists who are considered to be an authority on a particular plant group were consulted when necessary.

The conservation status of all recorded flora was compared against the current lists available on FloraBase (DEC, 2012a) and the EPBC Threatened species database provided by DSEWPaC (2012a).

### 2.2.2 Vegetation Condition

The vegetation condition of the Project Area was assessed using the vegetation condition rating scale developed by Keighery (1994) that recognises the intactness of vegetation, which is defined by the following:

- Completeness of structural levels;
- Extent of weed invasion;
- Historical disturbance from tracks and other clearing or dumping; and
- The potential for natural or assisted regeneration.

The scale consists of six rating levels as outlined in Table 2.

**Table 2** Vegetation condition rating scale

Vegetation condition rating	Vegetation condition	Description
1	Pristine or Nearly So	No obvious signs of disturbance.
2	Excellent	Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species.
3	Very Good	Vegetation structure altered, obvious signs of disturbance.
4	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances, retains basic vegetation structure or ability to regenerate it.
5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not in a state approaching good

Vegetation condition rating	Vegetation condition	Description
		condition without intensive management.
6	Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost without native species.

A preliminary assessment for *Phytophthora cinnamomi* (Dieback) based on the presence/absence of typical indicator species was undertaken. This is not a formal dieback assessment consistent with DEC requirements.

## 2.3 Fauna

The fauna assessment was consistent with a Level 1 assessment (reconnaissance survey) in accordance with Guidance Statement No. 56, *Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004b). Nomenclature used in the report follows that used by the Western Australian Museum and DEC's NatureMap program, as it is deemed to contain the most up-to-date species information for Western Australia.

The methodology used to undertake the fauna assessment included:

- Opportunistic searches across all habitat types within the Project Area. This ensured the maximum suite of species potentially occurring at the Project Area was observed. This involved searching through microhabitats including turning over logs or rocks, turning over leaf litter and examining hollow logs;
- Opportunistic visual and aural surveys. This accounted for many bird species potentially utilising the Project Area;
- The site was also be searched for tracks, scats, bones, diggings and feeding areas for both native and feral fauna;
- A Black Cockatoo and Graceful Sun Moth habitat assessment including grid-based searches for *Lomandra maritima* and *Lomandra hermaphrodita*, as well as an assessment of Black Cockatoo foraging habitat and significant trees with a DBH greater than 500 mm; and
- Domestic animals that were present at the Project Area through recreational activities were discounted in the species diversity results for this report.

## 2.4 Limitations to Assessment

### 2.4.1 Fauna Survey Limitations

The fauna assessment undertaken was a reconnaissance survey only (Level 1) and thus only sampled those species that can be easily seen, heard or have distinctive signs, such as tracks, scats, diggings etc. Many cryptic and nocturnal species would not have been identified during a reconnaissance survey.

The fauna assessment was aimed at identifying habitat types within the Project Area. In addition, terrestrial vertebrate fauna using the Project Area were identified. No sampling for invertebrates or aquatic species occurred. The information available on the identification, distribution and conservation status of invertebrates is generally less extensive than that of vertebrate species.

This survey was carried out during only one season and in one year. Complete faunal surveys often require multiple surveys, at different times of year, and over a period of a number of years, to enable full survey of all species present.

#### 2.4.2 Flora Survey Limitations

Complete flora and vegetation surveys can require multiple surveys, at different times of year, and over a period of a number of years, to enable observation of all species present. Some flora species, such as annuals, are only available for collection at certain times of the year and others are only identifiable at certain times (such as when they are flowering). Additionally, climatic and stochastic events (such as fire) may affect the presence of plant species. Species that have a very low abundance in the area are more difficult to locate, due to above factors.

Flora composition changes over time, with flora species having specific growing periods, especially annuals and ephemerals (some plants lasting for a markedly brief time, some only a day or two). Therefore, the results of future botanical surveys in this location may differ from the results of this survey.

The timing of the flora survey and the rainfall during the preceding months was considered satisfactory for the identification of all annual and ephemeral species, including any Threatened or Priority listed species that may have been present. The Project area received a total of 235.4 mm of rainfall during the months of August to 30<sup>th</sup> October, which is 1.6 mm below the historical average annual rainfall (1944-2010).

#### 2.4.3 Desktop Survey Limitations

Desktop investigations use a variety of online resources (as detailed in section 2.1), the responsibility for the accuracy of such data remains with the issuing authority, not with GHD. The DSEWPac Protected Matters database is used to identify species listed under the EPBC Act. This data base draws on various sources to report on the potential of the species occurrence within the area. The DSEWPac search tool is broad-scale in its' reporting and often the specific habitat requirements of the species do not occur within Project Areas and are unlikely to occur within the area. For this reason not all species reported by the search tool need to be considered in impact assessments. The DEC NatureMap database reports on records of the species within the designated area and can provide more accurate information of the likelihood of species presence.

The EPBC Act Protected Matters Search Tool is based on bioclimatic modelling for the potential presence of species. As such, this does not represent actual records of the species within the area. The records from DEC searches of threatened flora and fauna provide more accurate information for the general area; however, some records of collections, sightings or trappings can be dated and often misrepresent the current range of threatened species.

## 3. Existing Environment

### 3.1 Bioregion

The Project Area is located within the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) Region, Swan Coastal Plain Sub-Region. This sub-region is dominated by woodlands of *Banksia* and Tuart on sandy soils, sheoak on outwash plains, and paperbark in swampy areas. The colluvial and aeolian sand areas represent three phases of Quaternary marine sand dune development (which provide relief), and include a complex series of seasonal fresh water wetlands, alluvial river flats, coastal limestones and several off-shore islands. Younger sandy areas and limestones are dominated by heath and/or Tuart woodlands, while *Banksia* and Jarrah-*Banksia* woodlands are found on the older dune systems (Mitchell *et al.* 2002).

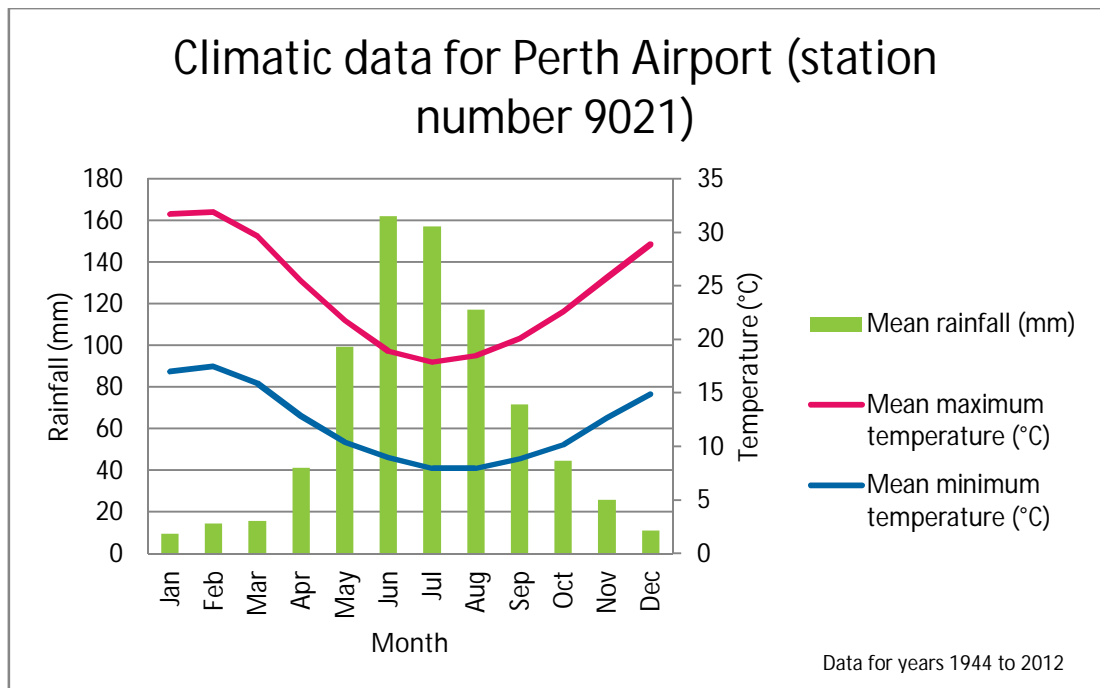
### 3.2 Climate

The Project Area experiences a Mediterranean climate, with mild wet winters and hot dry summers. The closest Bureau of Meteorology (BOM) weather station to the Project Area is located 15 km away at Perth Airport (station number 9021). A summary of the climatic data (Bureau of Meteorology, 2012) for this weather station is provided in Table 3 and is graphed in Plate 1.

Table 3 Climatic data for Perth Airport (station 9021)

Mean annual maximum temperature:	17.9 °C to 31.9 °C
Mean annual minimum temperature:	8.0 °C to 17.5 °C
Annual Rainfall:	774.4 mm
Mean number of days of rain $\geq 1$ mm per year:	86.3





**Plate 1** Climatic data for Perth Airport (station 9021)

### 3.3 Landform and Soils

The Swan Coastal Plain is generally of low relief, 20 to 30 km wide, and composed of Quaternary continental sediments. Its boundary is marked by scarps and associated features. The alluvial terrain, along the eastern fringe of the Plain, comprises materials of different ages and this is the basis for subdivision into mapping units. In the Darling Plateau, the lateritic uplands, which are dominated by duricrust, gravels and sands, forms a gently undulating surface (Department of Conservation and Environment, 1980).

Based on the mapping by Churchwood and McArthur (1978), the Project Area occurs on the Swan Coastal Plain, Bassendean dunes. The Bassendean dunes are defined by sand plains with low dunes and occasional swamps; iron or humus podzols; and areas of complex steep dunes.

### 3.4 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are declared by notice under Section 51B of the *Environmental Protection Act 1986* (EP Act).

A search of DEC's online Native Vegetation Viewer (DEC, 2012c) was undertaken to determine the location of any ESAs within the Project Area.

The Project Area is located within an ESA (Figure 2). The ESA extends beyond the bounds of the Project area and is associated with several geomorphic wetlands and Bush Forever Sites in the Project surrounds.

### 3.5 Conservation Areas and Reserves

There are no conservation areas managed by the DEC within the Project Area. An unnamed Nature reserve is located approximately 400 metres to the west of the Project Area (Figure 2). The Project Area is surrounded by the DEC Gnangara-Moore River State Forest.

### 3.6 Bush Forever Sites

The Bush Forever Strategy is a 10 year strategic plan which formally commenced in 2000 to protect approximately 51, 200 ha of regionally significant bushland within approximately 290 Bush Forever Sites. This strategy represents, where achievable, a target of at least 10% of each of the original 26 vegetation complexes of the Swan Coastal Plain portion of the Perth Metropolitan Region (The Government of Western Australia, 2000).

The Project Area is located within one Bush Forever Site (Site 399). Bush Forever Site 399 is adjacent to Bush Forever Site 300 (Figure 2). Details of these Sites are provided in Table 4.

Both Sites are listed as being 'part of a regionally significant contiguous bushland/wetland linkage which is a contiguous or largely contiguous corridor of bushland/wetland areas, being regionally significant links that are continuous or largely continuous bushland or wetland areas' (The Government of Western Australia, 2000). These areas are of particular significance as they provide corridors through otherwise highly cleared lands and provide linkages of regional significance (The Government of Western Australia, 2000).

Table 4 Bush Forever Sites and details in the vicinity of the Project Area

Site number	Site name	Size (ha)	Landscape features	Selection criteria met	Bush Forever recommendation	Linkages
300	Maralla Road Bushland, Ellenbrook/Upper Swan	641.5	Tall dune, open water, vegetated wetland, creek, vegetated uplands.	Providing a representation of ecological communities; diversity; rarity; maintaining ecological processes or natural systems; scientific or evolutionary importance; general criteria for the protection of wetland, streamline and estuarine fringing vegetation and coastal vegetation.	Site with Some Existing Protection; the Site is already reserved for Parks and Recreation in the Metropolitan Region Scheme and should be purchased for National Park, Conservation Park, Nature Reserve or Regional Park.	Adjacent native vegetation to the north and south outside the Site, east (Site 301), and west (Site 399); adjacent bushland north available; part of Greenways 36, 40, 59; part of a regionally significant contiguous <sup>1</sup> bushland/wetland linkage
399 <sup>2</sup>	Melaleuca Park and Adjacent Bushland, Bullsbrook/Lexia	4150.9	Tall dune, open water, vegetated wetland, creek, vegetated uplands.	Providing a representation of ecological communities; diversity; rarity; maintaining ecological processes or natural systems; scientific or evolutionary importance; general criteria for the protection of wetland, streamline and estuarine fringing vegetation and coastal vegetation.	Site with Some Existing Protection; the existing care, control and management of this Site is endorsed (Proposed 'Gnangara Park' – Cabinet 1996).	Adjacent native vegetation to the north (Site 462); east (Sites 6, 298 and 300) and west (Site 398); part of Greenways 40, 41, 36; part of a regionally significant contiguous and fragmented bushland/wetland linkage <sup>3</sup> .

<sup>1</sup> Contiguous or largely contiguous corridors of bushland/wetland areas, being regionally significant links that are continuous or largely continuous bushland or wetland areas (The Government of Western Australia, 2000).

<sup>2</sup> Located adjacent to the Project Area

<sup>3</sup> Linkages are areas of particular significance as they provide corridors through otherwise highly cleared lands and provide linkages of regional significance (The Government of Western Australia, 2000).

## 3.7 Wetlands and Watercourses

### 3.7.1 Watercourses

No watercourses were identified within the Project Area (Figure 2).

### 3.1 Geomorphic Wetlands

Wetlands include not only lakes with open water, but areas of seasonally, intermittently or permanently waterlogged soil. Approximately 25% of the Swan Coastal Plain between Moore River and Mandurah is classified as wetland (Hill *et al.* 1996).

Though extensive on the Swan Coastal Plain, not all wetlands retain significant ecological values due to the concentration of urban and agricultural development in the region. Most wetlands have been cleared, filled or developed over, leaving only 20% of all the wetlands that were present on the Swan Coastal Plain prior to European settlement. Of these, an estimated 15% of the wetland area has retained high ecological values (Hill *et al.* 1996).

Categorisation of wetlands has been undertaken by Hill *et al.* (1996), delineating the Swan Coastal Plain into levels of protection and management categories.

Conservation Category Wetlands are wetlands that support high levels of attributes and functions. Resource Enhancement Wetlands are those that have been partly modified but still support substantial functions and attributes. Multiple Use Wetlands are classified as those wetlands that have few important ecological attributes and functions remaining.

The Geomorphic Wetlands Swan Coastal Plain dataset displays the location, boundary, geomorphic classification (wetland type) and management category of wetlands on the Swan Coastal Plain.

No Geomorphic Wetlands are present within the Project Area (Figure 2). Two Geomorphic wetlands are located within 500 metres to the west of the Project Area: a dampland Resource Enhancement Category wetland (UFI 8541) and a sumpland Conservation Category wetland (UFI 8553).

## 3.2 Broad Vegetation Types

Broad-scale vegetation mapping of the area undertaken by Beard (1975) indicates the following vegetation associations are present within the Project Area:

- Low woodland; *Banksia* (association 949); and
- Medium very sparse woodland; Jarrah, with low woodland; *Banksia* & *Casuarina* (association 1001).

Hedde *et al.* (1980) mapped the Perth area at a finer scale than Beard. The Hedde *et al.* (1980) mapping identified the following vegetation complexes within the Project Area:

- Bassendean complex – north – transition vegetation complex (complex 45): a transition complex of low open forest and low woodland of *Banksia* species – *E. tottiana* on a series of high sand dunes. The understory species reflect similarities with both the Bassendean – north and Karrakatta – north vegetation complexes; and



- Bassendean complex – north (43): vegetation ranges from a low open forest and low open woodland of *Banksia* species *E. todtiana* to low woodland of *Melaleuca* species and sedgelands which occupy moister sites.

### 3.3 Broad Vegetation Type Extent and Status

A vegetation type is considered under-represented if there is less than 30% of its original distribution remaining. From a purely biodiversity perspective, and not taking into account any other land degradation issues, there are several key criteria now being applied to vegetation (Environmental Protection Authority, 2000). These are detailed below:

- The “threshold level” below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at 30% of the pre-European/pre-1750 extent for the vegetation type;
- 10% of the pre-European/pre-1750 extent for the vegetation type is regarded as being a level representing *Endangered*; and
- Clearing which would put the threat level into the class below should be avoided.

Such status can be delineated into five classes:

- *Presumed Extinct*: Probably no longer present in the bioregion
- *Endangered\**: <10% of pre-European extent remains
- *Vulnerable\**: 10-30% of pre-European extent exists
- *Depleted\**: 30–50% of pre-European extent exists
- *Least Concern*: >50% pre-European extent exists and subject to little or no degradation over a majority of this area.

\* Or a combination of depletion, loss of quality, current threats and rarity gives a comparable status

The EPA Guidance Statement No. 10 (Environmental Protection Authority, 2006) assesses the extent of Hedde *et al.* (1980) vegetation complexes currently present against predicted pre-European extents. As shown in Table 5, the Bassendean complexes mapped within the Project Area are present at more than 72 % of the pre-1750 extent and are regarded as *Least Concern*.

**Table 5** Vegetation complex, extent and status within the Project Area based on Heddle *et al.* (1980) and the Environmental Protection Authority (2006)

Vegetation complex	Total pre-1750 extent (ha)	Present extent (1997/98)	% of each remaining (1997/98)	% of each remaining of pre-1750 extent in secure tenure (2002)
		in the System 6/part System 1 area <sup>1</sup> (hectares)		
45: Bassendean complex – north – transition vegetation complex	17 675	16 308	92.3 (Least Concern)	57.8
43: Bassendean complex – north vegetation complex	74 147	53 384	72.0 (Least Concern)	27.5

(Environmental Protection Authority, 2006 and Heddle *et al.* 1980)

The extent of remnant vegetation associations has been assessed by the Government of Western Australia (2010), based on vegetation association mapping undertaken by Beard (1979). The remaining extents of the vegetation associations present within the Project Area as shown in Table 6, are considered *Vulnerable* for vegetation association 1001 and of *Least Concern* for vegetation associations 949. A total of 0.68 ha of vegetation association 1001 is located within the Project Area along the road in the south of the Project Area (Figure 2).

**Table 6** Vegetation type, extent and status of pre-European vegetation within the Project Area for the whole of the State, Bioregion and City of Swan Local Government Area (LGA) (Government of Western Australia, 2010).

Vegetation Association	Region	Pre-European extent (ha)	Current extent (ha)	% remaining	% current extent in DEC Managed lands
949: Low woodland; <i>Banksia</i>	State	218193.94	124119.8	56.9%	51.1%
	SCP Bioregion	209,983.3	121,248.3	57.74%	51.63%
	LGA	16,235.17	8,266.44	50.92%	55.41%
1001: Medium very sparse woodland; Jarrah, with low woodland; <i>Banksia</i> & <i>Casuarina</i>	State	57410.23	14151.90	24.65	5.66
	SCP Bioregion	57,410.23	14,151.90	24.65	5.66
	LGA	8,868.67	2,393.76	26.99	2.70

According to the EPA Guidance Statement No. 10, it is important to note that the “remnant native vegetation mapping used in the Region is derived from dated aerial photography (in this case 1998) with limited ground-truthing. As a consequence the percentages of ecological

communities remaining are generally an overestimate of the native vegetation remaining at present and at the date of this Guidance [2006]. The principal factors contributing to this overestimation are:

- The preferential mapping of treed landscapes, leading to some mapping of areas that are parkland cleared or completely degraded;
- The inclusion of areas that are approved for clearing through development approvals and/or clearing permits; and
- Some areas that have been cleared since the time of the aerial photography.

It is therefore important to bear these issues in mind when the percentage of the vegetation complexes remaining is approaching 30%.” (Environmental Protection Authority, 2006); furthermore, additional clearing of the Swan Coastal Plain (since 1998) is likely to further reduce the actual percentage remaining of each vegetation type.

## 4. Results



### 4.1 Vegetation type and condition


#### 4.1.1 Vegetation types

A total of two vegetation types (not including highly disturbed areas) were identified within the Project Area. Native vegetation remaining within the Project Area consists predominantly of *Banksia* Low Open Forest which is consistent with Beard (1975) and Heddle *et al.* (1980) vegetation mapping for the area.

The vegetation types are described in Table 7 and mapped in Figure 3, Appendix A.

Table 7 Vegetation types present in the Project Area

Broad Vegetation Association/Formation	Vegetation Association	GHD Quadrat	Site Photo
<i>Banksia</i> Low Open Forest	<p>BaPIAxAcLb</p> <p>Low Open Forest of <i>Banksia attenuata</i> and <i>Banksia menziesii</i> over Shrubland of <i>Petrophile linearis</i>, <i>Regelia ciliata</i> and <i>Stirlingia latifolia</i> over Open Low Heath of <i>Astroloma xerophyllum</i>, <i>Croninia kingiana</i> and <i>Hibbertia subvaginata</i> over Very Open Grassland of <i>Austrostipa compressa</i> over Very Open Herbland of <i>Lechenaultia biloba</i>, <i>Stylidium</i> species and <i>*Ursinia anthemoides</i></p>	Q1, Q2, Q3, Q4	
<i>Kunzea</i> , <i>Banksia</i> and <i>Jacksonia</i> Shrubland	<p>KgRcCa</p> <p>Shrubland of <i>Kunzea glabrescens</i>, <i>Banksia attenuata</i> and <i>Jacksonia furcellata</i> over Low Shrubland of <i>Regelia ciliata</i>, <i>Gompholobium tomentosum</i> and <i>Hibbertia</i> species over Very Open Herbland of <i>Conostylis aculeata</i> subsp. <i>aculeata</i>, <i>*Gladiolus caryophyllaceus</i> and <i>Laxmannia squarrosa</i></p>	Q5, Q6	

Broad Vegetation Association/Formation	Vegetation Association	GHD Quadrat	Site Photo
Highly Disturbed	<p>HD</p> <p>Areas where clearing or other activities have fundamentally altered the composition of native vegetation and are not self-sustaining. These areas are completely or almost completely without native species. Some scattered native trees (<i>Eucalyptus</i> spp. and <i>Melaleuca</i> spp.) and shrub species may remain with an understorey dominated by introduced grasses (or crop species) and herbs.</p>		

#### 4.1.2 Vegetation Condition

Based on the Keighery (1994) condition rating scale (Table 2) the vegetation condition of the Project Area ranged from *Pristine* (1) to *Completely Degraded* (6). The native vegetation located in the northern section of the Project Area rated between *Pristine* (1) to *Excellent* (2). Common pasture weeds such as *\*Ursinia anthemoides*, *\*Hypochaeris* sp. and *\*Conyza* sp. were scattered in low abundance throughout the native vegetation in the northern section of the Project Area.

A small section of rehabilitated vegetation was located south west of the native vegetation in the north of the Project Area. The vegetation condition of the rehabilitated area rated between *Good* (3) to *Degraded* (5) as the vegetation structure within the rehabilitated vegetation was basic and signs of clearing in the past were evident. Areas south of the rehabilitated area have previously been disturbed /cleared for mining and infrastructure of these areas were assigned a rating of *Completely Degraded* (6).

Vegetation condition mapping is shown at Figure 4, Appendix A.

#### 4.1.3 Dieback Assessment

GHD undertook a preliminary assessment for *Phytophthora* spp. (Dieback) as part of the vegetation condition assessment. This was based on the presence/absence of typical indicator species, such as *Banksia* species. *Banksia* deaths suspected to be related to Dieback were recorded during the field survey and have been mapped at Figure 4.

#### 4.1.4 Flora Diversity

A NatureMap search identified 417 flora species collected within 5 km of the Project Area; of which 50 are naturalised (introduced) species. A copy of the desktop searches is provided in Appendix B.

The GHD spring survey identified a total 116 plant taxa (including subspecies and varieties) representing 33 families and 80 plant genera were recorded in the Project Area. This total is comprised of 102 native species and 14 introduced (exotic) species.

Dominant families recorded from the Project Area included:

- Myrtaceae            20 taxa;
- Stylidiaceae        10 taxa;
- Fabaceae            9 taxa; and
- Poaceae             8 taxa.

Eight of the collections could not be positively identified to species level and 14 of the collections could not be positively identified to genera level due to the absence of adequate flowering parts and/or fruiting bodies.

A full inventory of flora species present in the Project Area in Appendix D.

#### 4.1.5 Threatened and Priority Ecological Communities

Ecological communities are defined as naturally occurring biological assemblages that occur in a particular type of habitat (English & Blythe, 1997). Threatened Ecological Communities (TECs) are ecological communities that have been assessed and assigned to one of four categories related to the status of the threat to the community i.e. Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable.



TECs are listed under both State and Federal legislation; Federally-listed TECs are protected under the EPBC Act administered by the DSEWPaC. DEC maintains a list of TECs for Western Australia; some of these TECs are also protected under the EPBC Act.

DEC also maintains a Priority Ecological Community (PEC) List. PECs are not listed under any formal Federal or State legislation but are considered by DEC as important as whole ecosystems (including their processes and communities). Priorities 1, 2 and 3 PECs are ecological communities that are adequately known; are rare but not threatened, or meet criteria for Near Threatened. PECs that have been recently removed from the threatened list are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5. Further information on the conservation codes is provided in Appendix C.

A search of the EPBC Act Protected Matters Search Tool database identified the Organic Mound Springs TEC listed as Critically Endangered and the Shrublands and Woodlands on Muchea Limestone of the Swan Coastal Plain TEC listed as Endangered within 5 km of the Project Area.

A search of the DEC TEC/PEC database identified one TEC within 5 km of the Project Area, three PECs within 5 km of the Project Area and two PECs within the Project Area (Figure 2).

It should be noted that DEC provides locations for TECs and PECs that have a buffer placed typically between 500 m and 1 500 m radius around the community. As such, the TEC/PEC may not be present within the entire extent of the buffer area.

### Organic Mound Springs

The Organic Mound Springs is listed as a Critically Endangered TEC at the State level and Endangered under the EPBC Act.

The habitat of this community is characterised by a continuous discharge of groundwater in raised areas of peat. The peat and surrounds provide a stable, permanently moist series of microhabitats. Intact vegetated tumulus springs are only found at three locations. Typical and common native plant taxa associated with the tumulus springs are the trees *Banksia littoralis*, *Melaleuca preissiana* and *Eucalyptus rudis*, and the shrubs *Taxandria linearifolia*, *Pteridium esculentum*, *Astartea fascicularis* and *Cyclosorus interruptus*. The maintenance of hydrological processes in terms of both quality and quantity of water to the mounds is essential to sustain the tumulus spring communities (DEWSPaC, 2012g).

Field Assessment: No areas of continuous discharge of groundwater or peat were located within the Project Area during the time of the survey.

### Shrublands and Woodlands on Muchea Limestone of the Swan Coastal Plain

The Shrublands and Woodlands on Muchea Limestone of the Swan Coastal Plain are listed as an Endangered TEC at the State level and Endangered under the EPBC Act.

This vegetation community occurs on heavy soils composed of black clay or sandy clay on limestone. Typical plant species within this TEC are *Casuarina obesa*, *Eucalyptus decipiens* and *Eucalyptus foecunda*, *Melaleuca huegelii*, *Alyogyne huegelii* var. *huegelii*, *Grevillea curviloba* ssp. *incurva*, *Grevillea curviloba* ssp. *curviloba*, *Grevillea evanescens*, *Melaleuca acerosa*, *Melaleuca huegelii* and *Thysanotus arenarius*. The following exotic species are also currently common; *Hypochaeris glabra*, *Sonchus asper*, *Briza maxima*, *Briza minor*, *Anagallis arvensis* and *Centaureum erythraea* (DEWSPaC, 2012f).

Field Assessment: No plant species compositions comparable to this TEC were identified during the field survey.

#### **Low lying *Banksia attenuata* woodlands or shrublands, SCP 21c**

The Low lying *Banksia attenuata* woodlands or shrublands, SCP 21c is listed as a Priority 3 PEC by the DEC. The desktop assessment identified this PEC as occurring within 5 km of the Project Area.

This vegetation community is restricted to the Bassendean system on lower lying wetter areas and is dominated by *Melaleuca preissiana*, *Banksia attenuata*, *B. menziesii*, *Regelia ciliata*, *Eucalyptus marginata* or *Corymbia calophylla*. The Low lying *Banksia attenuata* woodlands or shrublands may be either a woodland or shrubland (DEC, 2010c).

Field Assessment: The vegetation type *Banksia* Low Open Forest recorded in the northern section of the Project Area shares some similarities in plant species composition with this PEC, however the PEC Swan Coastal Plain *Banksia attenuata* - *Banksia menziesii* woodlands, SCP23b is located within this section of the Project Area.

#### **Swan Coastal Plain *Banksia attenuata* - *Banksia menziesii* woodlands, SCP23b**

The Swan Coastal Plain *Banksia attenuata* - *Banksia menziesii* woodlands, SCP23b is Listed as a Priority 3 PEC by the DEC. The desktop assessment identified this PEC as occurring within the northern section of the Project Area.

This vegetation community occurs on the Bassendean system in *Banksia* woodlands north of Perth.

Field Assessment: This PEC is recorded in the northern section of the Project Area. The vegetation type *Banksia* Low Open Forest recorded in the northern section of the Project Area shares similar plant species composition with this PEC.

#### ***Banksia ilicifolia* woodlands, SCP22**

The *Banksia ilicifolia* woodlands are listed as a Priority 3 PEC by the DEC. The desktop assessment identified this PEC as occurring within the Project Area.

Field Assessment: The buffer zone for this PEC is located over the Project Area where rehabilitated vegetation of *Kunzea*, *Banksia* and *Jacksonia* Shrubland and Highly Disturbed areas were identified during the field survey (Figure 3). *Banksia ilicifolia* was not recorded during the survey. This PEC was not recorded during the field survey.

#### **4.1.6 Conservation Significant flora**

The Federal conservation level of flora species and their significance status is assessed under the EPBC Act. The State conservation level of flora are listed under the WC Act, the State Minister for the Environment may declare species of flora to be protected if they are considered to be in danger of extinction, rare or otherwise in need of special protection.

Additionally, in Western Australia, DEC produces a supplementary list of Priority Flora, these being species that are not considered Threatened under the WC Act but for which the Department feels there is a cause for concern. These species have no special legislative protection, but their presence would normally be considered relevant to an assessment of the conservation status of an area. Such taxa need further survey and evaluation of conservation status before consideration can be given to declaration as threatened flora or fauna.

For the purposes of this assessment, all species listed under the EPBC Act, WC Act and DEC Priority species are considered conservation significant. Further information on the conservation codes relevant to this report is provided in Appendix C.

A search of the DEC's Threatened Flora, the Western Australian Herbarium (WAHERB) databases, EPBC Act and Western Australian Museum NatureMap records identified 23 species of conservation significance as potentially occurring within 5 km of the Project Area.

#### **Likelihood of occurrence assessment**

A likelihood of occurrence assessment of conservation significant species (based on the range, habitat requirements and previous records of the species) (Appendix D) determined that three species are likely to occur within the Project Area (one EPBC Act- and WC Act-listed species and two DEC Priority species). Seven conservation significant species were identified as possibly occurring within the Project Area (Table 8).

Table 8 Summary of flora likelihood of occurrence assessment

Family	Species	Status		Source		Likelihood of Occurrence Assessment
		State	Federal	DEC/NatureMap	EPBC	
Apiaceae	<i>Eryngium pinnatifidum</i> subsp. <i>palustre</i>	P3		X		Possible
Dasypogonaceae	<i>Calectasia</i> sp. Pinjar	P1		X		Possible
Euphorbiaceae	<i>Stachystemon</i> sp. Keysbrook	P1		X		Possible
Haemodoraceae	<i>Phlebocarya pilosissima</i> subsp. <i>pilosissima</i>	P3		X		Likely
Myrtaceae	<i>Chamelaucium</i> sp. Gingin	T	E		X	Possible
Myrtaceae	<i>Darwinia foetida</i>	T	CE		X	Possible
Myrtaceae	<i>Verticordia lindleyi</i> subsp. <i>Lindleyi</i>	P4		X		Possible
Orchidaceae	<i>Caladenia huegelii</i>	T	E	X		Likely
Orchidaceae	<i>Thelymitra stellata</i>	T	E		X	Possible
Restionaceae	<i>Hypolaena robusta</i>	P4		X		Likely

No Threatened Flora (previously called Declared Rare Flora) listed under the *Wildlife Conservation Act 1950*, species of national conservation significance listed under the EPBC Act or Priority flora listed by the DEC were recorded within the Project Area during the time of the survey.

#### 4.1.7 Introduced flora

A total of 14 introduced (exotic) species were recorded from the Project Area. Introduced grasses and herb species were scattered throughout the understorey of much of the native vegetation in the Project Area and dominant in highly disturbed areas.

No Weeds of National Significance (WONS) listed by the Federal Government were recorded in the Project Area.

No weeds listed as Declared Plants under the Section 37 of the *Agricultural and Related Resources Protection Act 1976* were recorded in the Project Area.

## 4.2 Fauna

### 4.2.1 Fauna habitats

Two fauna habitat types were identified within the Project Area, which are closely aligned with the vegetation types outlined in section 4.1.1.

- *Banksia* Woodland (14.5 ha)

This habitat type is the dominant vegetation type present within the Project Area.

Woodland habitats offer particularly high habitat value for fauna species due to the variety of microhabitats and various resource niches available in the woodland habitat. The *Banksia* woodland is relatively uniform across the site and no large trees were recorded. Throughout the *Banksia* Woodland there are areas of loose coastal sand that are suitable for burrowing reptiles, and in particular provide potential habitat for the conservation significant *Neelaps calonotos* (Black-striped Snake). The *Banksia* Woodland is dominated by *Banksia attenuata* and *Banksia menziesii* with other proteaceous species. The vegetation in this area is very dense and provides good habitat for a number of fauna species including potential feeding habitat for the conservation significant for Black Cockatoos. The Project Area is located within a larger area of foraging habitat to the north and east and provides regionally significant contiguous bushland linkages, which are a contiguous or largely contiguous corridor of bushland areas. These areas are of particular significance as they provide corridors through otherwise highly cleared lands and provide linkages of regional significance for fauna species.

- Revegetated *Banksia* Woodland (0.7 ha)

This habitat type occurred within the area of the proposed inlet and outlet mains, and consisted of mine revegetation of *Banksia* Woodland. This habitat type was still in the early stages of growth and as such had sparse lower storey vegetation and very limited leaf litter and ground cover. As a result, this habitat type would provide limited habitat for ground-dwelling fauna, particularly reptiles and mammals, due to the lack of cover for these species.

### 4.2.2 Fauna diversity

A NatureMap search identified 109 fauna species as recorded within 5 km of the Project Area, of which none are introduced (feral) species (Appendix B). During the survey 21 fauna species were recorded within the Project Area, consisting of 19 birds and two mammals (Appendix E).

### 4.2.3 Conservation Significant Fauna

The Federal conservation level of fauna species and their significance status is currently assessed under the EPBC Act. The significance levels for fauna used in the EPBC Act are

those recommended by the International Union for the Conservation of Nature and Natural Resources (IUCN).

The State conservation level of fauna species and their significance status is currently assessed under the State WC Act (*Wildlife Conservation (Specially Protected Fauna) Notice 2010(2)*). The WC Act uses a set of Schedules but also classifies species using some of the IUCN categories. Schedule 3 fauna species are those which are “subject to an agreement between the government of Australia and the governments of Japan, China and the Republic of Korea relating to the protection of migratory birds, are declared to be fauna that is in need of special protection” (Government of Western Australia, 2012) and the eight species listed as Schedule 3 are covered under the marine and migratory fauna species category.

Also in Western Australia, the DEC produces a supplementary list of Priority Fauna, these being species that are not considered Threatened under the WC Act but for which the Department feels there is a cause for concern. These species have no special legislative protection, but their presence would normally be considered relevant to an assessment of the conservation status of an area. Such taxa need further survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

The desktop queries identified 18 conservation significant species in total including 12 birds, four mammals, one reptile, and one insect (Appendix B).

Seven of the 12 bird species identified for the Project Area are listed as Migratory (i.e. migratory marine, migratory terrestrial or migratory wetland) under the EPBC Act. Species solely listed as migratory marine (e.g. Fork-tailed Swift, *Apus pacificus*) and/or migratory wetland (e.g. Great Egret, *Ardea alba* and Cattle Egret, *Ardea ibis*, Australian Painted Snipe *Rostratula benghalensis australis*) were excluded from this assessment as no marine or wetland habitat was present within the Project Area. The remaining three species are listed as migratory terrestrial and are considered as part of this assessment.

### **Likelihood of Occurrence**

An assessment on the likelihood of these species occurring in the Project Area was conducted. This assessment was based on species biology, habitat requirements, the quality and availability of suitable habitat and records of the species in the area. The assessment concluded that seven species were likely to occur within the Project Area and one species could possibly occur within the Project Area and four species were unlikely to occur (Table 9).

No conservation fauna species were recorded during the field study.

Table 9 Fauna likelihood of occurrence

Species	Federal listing	State listing	Likelihood of occurrence
Birds			
<i>Falco peregrinus</i> Peregrine Falcon	-	S	Possible The species has been recorded within 5 km of the site and there is some suitable habitat. The surrounding levels of development and disturbance may limit habitat values of the site however the proximity of the site to semi-rural areas may increase the likelihood of the species utilising the Project Area.
<i>Leipoa ocellata</i> Malleefowl	V	T	Unlikely The Malleefowl usually occurs in shrublands and low woodlands that are dominated by mallee vegetation. There is no suitable habitat present within the Project Area and the species has not been recorded within 5 km of the Project Area.
<i>Calyptorhynchus banksii naso</i> Forest Red-tailed Black Cockatoo	V	T	Likely Suitable foraging habitat present within Project Area and has been recorded within 5 km of the site.
<i>Calyptorhynchus baudinii</i> Baudin's Black Cockatoo	V	T	Likely Suitable foraging habitat present within Project Area and has been recorded within 5 km of the site.
<i>Calyptorhynchus latirostris</i> Carnaby's Black Cockatoo	E	T	Likely Suitable foraging habitat present within Project Area and has been recorded within 5 km of the site.

Species	Federal	State	Likelihood of occurrence
<i>Rostratula australis</i> Australian Painted Snipe	V	T	Unlikely The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. There is no suitable habitat within the Project Area and the species has not been recorded within 5 km of the Project Area.
Mammals			
<i>Dasyurus geoffroii</i> Chuditch, Western Quoll	V	T	Unlikely The Project Area has some vegetated connectivity between the northern Ellenbrook Tanksite and surrounding Gnangara-Moore River State Forest that would provide some habitat for the Quoll, however, the high levels of disturbance from the mine, development, cats and foxes within the Project Area and in surrounding areas would greatly limit the likelihood of occurrence.
<i>Isodon obesulus fusciventer</i> Southern Brown Bandicoot	-	P5	Likely Suitable habitat present within Project Area and has been recorded within 5 km of the site. This species is known to occur in urban bushland in some parts of Perth, and has been recorded both in Ellenbrook and within Whiteman Park.
<i>Macropus irma</i> Western Brush Wallaby	-	P4	Likely The Wallaby is known to occur at Whiteman Park and there is some connectivity to the surrounding undeveloped land that could provide suitable habitat. However, the high levels of disturbance, development and foxes within the Project Area and in surrounding areas would limit the population size of this species.
<i>Hydromys chrysogaster</i> Water-rat	-	P4	Unlikely The Project Area does not contain any permanent water bodies which would provide habitat for the water-rat. The Project Area is also not well connected to any other habitat which would provide habitat for the species. The species has been recorded within 5 km of the site, and may travel through the Project Area in search of suitable habitat such as to the south near Ellen Brook. However, the high levels of disturbance, development, cats and foxes within the Project Area and in surrounding areas would limit the likelihood of occurrence.
Reptiles			



Species	Federal	State	Likelihood of occurrence
<i>Neelaps calonotos</i> Black-striped Snake	-	P3	Likely This species is restricted to the sandy coastal strip of dune habitat between Mandurah and Lancelin, and occurs on dunes and sand-plains vegetated with heaths and eucalypt/banksia woodlands. There is suitable habitat within the Project area, with the loose coastal sand providing burrowing habitat for the Black-striped snake. The species has also been recorded within 5 km of the Project Area.
Insects			
<i>Synemon gratiosa</i> Graceful Sun-moth	E	P4	Likely The Graceful Sun-moth is closely associated with <i>Banksia</i> woodland and this vegetation occurs within the Project Area. The species is also dependent upon <i>Lomandra maritima</i> and <i>L. hermaphrodita</i> being present for breeding, of which <i>L. hermaphrodita</i> was found to be present within the Project Area. It has also been recorded within 5 km of the Project Area, and therefore likely to occur

Conservation codes are presented in Appendix C and definitions of likelihood of occurrence are presented in Appendix E.

Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

CE Critically Endangered (EPBC Act)

E Endangered (EPBC Act)

V Vulnerable (EPBC Act)

Ma Marine (EPBC Act)

Mi Migratory (EPBC Act)

Wildlife Conservation Act 1950 (WC Act)

T Threatened (–WC Act)

S Other specially protected fauna (WC Act)

Department of Environment and Conservation (DEC)

P1 Priority 1 (DEC)

P2	Priority 2 (DEC)
P3	Priority 3 (DEC)
P4	Priority 4 (DEC)
P5	Priority 5 (DEC)

#### 4.2.4 Black Cockatoos

There are three species of Black Cockatoo that occur on the Swan Coastal Plain (potentially present in the Project Area):

- *Calyptrorhynchus latirostris* (Carnaby's Black Cockatoo) is listed as *Endangered* by the EPBC Act and *Threatened* by the WC Act. This species has been recorded within 5 km of the Project Area;
- *Calyptrorhynchus baudinii* (Baudin's Black Cockatoo) is listed as *Vulnerable* by the EPBC Act and *Threatened* by the WC Act; This species has been recorded within 5 km of the Project Area; and
- *Calyptrorhynchus banksii naso* (Forest Red-tailed Black Cockatoo) is listed as *Vulnerable* by the EPBC Act. This species has not been recorded within 5 km of the Project Area.

#### Foraging

These cockatoo species are known to feed on *Allocasuarina*, *Eucalyptus*, and *Banksia* species (DSEWPac, 2012c; Groom, 2011), of which *Allocasuarina* and *Banksia* species were identified within the Project Area. The *Banksia attenuata* and *Banksia menziesii* present throughout the Project Area would provide potential foraging habitat for Black Cockatoo species, and is regarded as a high value foraging species for Carnaby's Black Cockatoo (Groom, 2011). Some Sheoak (*Allocasuarina fraseriana*) was recorded within Project Area and also provides potential foraging habitat for Black Cockatoo species. The Project Area is also classified as potential feeding vegetation for Carnaby's Black Cockatoo on the Swan Coastal Plain (Department of Planning, 2011).

A total of 14.5 hectares (ha) of *Banksia* Low Open Forest vegetation type and 0.7 ha of *Kunzea*, *Banksia* and *Jacksonia* Shrubland vegetation type within the Project Area contain *Banksia* and *Allocasuarina* species, making up a total area of 15.2 ha of Black Cockatoo foraging habitat (Figure 5). The majority of this area is located within the Ellenbrook Tanksite. Black Cockatoos are also known to opportunistically use a wide variety of plant taxa as food resources; therefore all vegetation within the Project Area was generally assessed for signs of use by Black Cockatoos. There was no evidence found during the field survey that the Project Area was being used by Black Cockatoos for foraging.

#### Roosting

Baudin's and Carnaby's Black Cockatoos generally roost in or near riparian environments, or permanent water sources, in *Eucalyptus* species; Forest Red-tailed Black Cockatoos generally roost in tall Jarrah (*Eucalyptus marginata*) or Marri (*Corymbia calophylla*) trees within or on the edges of forests (DSEWPac, 2012c). As the Project Area is not situated within a riparian environment or forest, it is unlikely that the area is used by Black Cockatoo species for roosting. However, there is one Carnaby's Cockatoo known roosting site located approximately 2 km west of the Project Area, in *Melaleuca* trees (Department of Planning, 2011). Therefore, the Project Area is likely to provide a habitat linkage between other foraging and roosting sites.

#### Breeding

Trees with potential nesting qualities are Tuart (*Eucalyptus gomphocephala*), Wandoo (*Eucalyptus wandoo*), Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) with a diameter at breast height (DBH) of greater than 500 mm for Jarrah, Marri and Tuart and 300

mm for Wandoo. Trees of this size are considered to have nesting potential now, or will develop hollows within 100 years. No trees with a DBH of greater than 500 mm for Jarrah, Marri and Tuart or 300 mm for Wandoo were recorded in the Project Area.

### Assessing the Impact on Black Cockatoos

DSEWPaC (2012c) provides a risk table that gives guidance on what the Department views as risks/impacts to Black Cockatoos that will trigger referral. Risk is broken into three categories (high, uncertain and low) and primarily focuses on breeding, feeding and roosting areas as well as indirect impacts. If there is uncertainty in regards to risks to Black Cockatoos then the Department recommends referring the project or contacting the Department to ensure legal certainty. There are one high risk and three uncertain risks where the Project Area is likely to impact on Black Cockatoos. As detailed in Table 11 it is likely that the project will trigger referral to the DSEWPaC due to this potential impact. Some of the impacts to Black Cockatoos may be avoided through appropriate selection and design of the project.

Table 10 DSEWPaC Black Cockatoo risk referral table.

Risk type	Referral trigger
<b>High risk of significant impacts: referral to DSEWPaC recommended</b>	
Clearing of any known nesting tree.	Referral is not triggered There are no known breeding trees within the Project Area.
Clearing or degradation of any part of a vegetation community known to contain breeding habitat	Referral is not triggered There are no vegetation communities containing breeding habitat that will be cleared within the Project Area.
Clearing of more than 1 ha of quality foraging habitat.	Referral is triggered. There is more than 1 ha of high quality foraging habitat present within the Project Area (up to 15.2 ha).
Clearing or degradation (including pruning the top canopy) of a known roosting site.	Referral is not triggered
Creating a gap or greater than 4 km between patches of Black Cockatoo habitat (breeding, foraging or roosting).	Referral is not triggered
<b>Uncertainty: referral recommended or contact DSEWPaC</b>	
Degradation (such as through altered hydrology or fire regimes) of more than 1 ha of foraging habitat. Significance will depend on the level and extent of degradation and the quality of the habitat.	Referral is likely to be triggered. Clearing of up to 15.2 ha of quality foraging habitat within the Project Area will further degrade the surrounding foraging habitat through altered hydrology.
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 effect, hydrological changes, increase human visitation or fire.	Referral may be triggered. The Project Area is located within a larger area of foraging habitat to the north and east and therefore clearing of 15.2 ha of quality foraging habitat will further degrade the surrounding foraging habitat through edge effects and introduction of exotic species.
Actions that do not directly affect the listed species but that have the potential for indirect impacts such as increasing competitors for nest hollows.	Referral is not triggered.

Risk type	Referral trigger
Actions with the potential to introduce known plant diseases such as <i>Phytophthora</i> spp. to an area where the pathogen was not previously known.	Referral may be triggered. <i>Phytophthora</i> spp. is known to occur widely on the Swan Coastal Plain and is also known to occur in vegetation to the west of the Project Area. As such, <i>Phytophthora</i> spp. may already be present at the Project Area. A <i>Phytophthora</i> spp. assessment would need to be conducted to confirm whether the disease is present. If not, then it is likely that clearing of the Project Area may introduce <i>Phytophthora</i> spp. to areas where the pathogen was not previously known. Given the urban development and somewhat fragmented nature of the area, the vegetation would be considered highly susceptible to diseases such as <i>Phytophthora</i> spp.
Low risk of significant impacts: referral may not be required but may refer to DSEWPac for legal certainty	
Actions that do not affect Black Cockatoo habitat or individuals.	Not applicable.
Actions whose impacts occur outside the modelled distribution of the three Black Cockatoos.	Not applicable.

#### 4.2.5 Graceful Sun Moth

The Graceful Sun Moth (*Synemon gratiosa*) (GSM) is a day-flying moth endemic to the south-west of Western Australia. Once widespread on the Swan Coastal Plain, the moth is now only present in a few scattered conservation areas, due to dramatically increased urban development destroying the moths' habitat. The species is listed as Priority 4 by DEC, and endangered under the EPBC Act. Until recently, the GSM was listed under the WC Act list as Threatened, but as of November 2012 it has been delisted to Priority 4, meaning it is "considered to have been adequately surveyed and which, whilst being rare (in Australia), is not currently threatened by any identifiable factors" (Appendix C).

There is limited information on the ecology and biology of the GSM, however, it appears that the remaining populations are severely fragmented and declining (DEC, 2010a). The larvae of the GSM inhabit sandy soils and feed upon root mats formed by *Lomandra maritima* and *L. hermaphrodita*. The GSM is only active in autumn, unlike the majority of Lepidoptera that are most active during spring and summer months. The active periods for the GSM dictate the scheduling for field surveys for the species; DEC has published species and habitat survey guidelines for the GSM (DEC, 2010b).

The GSM is closely associated with *Banksia* woodlands. The vegetation type *Banksia* Low Open Forest located within the proposed Ellenbrook Tanksite, in the northern section of the Project Area, is considered potential GSM habitat. *Lomandra hermaphrodita*, a known food source for the moth, was also recorded during the field survey and locations of this plant species have been mapped in Figure 5. This indicates that the Project Area may be used by the Graceful Sun Moth and there are potentially 14.5 ha of GSM habitat within the Project Area.

#### 4.2.6 Migratory Species

Desktop investigations resulted in seven migratory species recorded within 5 km of the Project Area.

No important habitat for any of the migratory terrestrial species mentioned in this report would be substantially removed or modified as part of the proposed works. The proposed works are unlikely to disrupt the lifecycle of an ecologically significant proportion of a population of listed migratory species. The Project is unlikely to result in an invasive species that is harmful to a listed migratory species becoming established in an area of important habitat for listed migratory species. It is unlikely that listed migratory species would be significantly impacted by the proposed works.

## 5. Legislation and Approvals

### 5.1 Federal - Environment Protection and Biodiversity Conservation Act 1999

#### Black Cockatoos

The Commonwealth EPBC Act promotes the conservation of biodiversity by providing protection for threatened species, threatened ecological communities, migratory and marine species and other protected matters.

In October 2012, DSEWPac released the referral guidelines for the assessment of projects for potential impacts on Black Cockatoos (DSEWPac, 2012c). These guidelines are for all Black Cockatoo species, and do not provide information relative to particular areas of the State, but provide information to decide whether a project may trigger referral.

Within these guidelines, DSEWPac provides a risk table that gives guidance on what it views as risks/impacts to Black Cockatoos that will trigger referral. Risk is broken into three categories, high, uncertain and low, and primarily focuses on breeding, feeding and roosting areas as well as indirect impacts. If there is uncertainty in regards to risks on Black Cockatoos then the DSEWPac recommends referring the project or contacting the Department to ensure legal certainty.

Given the presence and extent of known foraging habitat (approximately 15.2 ha) within the Project Area, DSEWPac (2012c) considers impacts of greater than 1 ha of quality foraging habitat as a high risk activity. As such, should the Project require more than 1 ha of clearing within the *Banksia* Woodland it is recommended that the Project be referred.

#### Graceful Sun Moth

In 1999, DSEWPac released the significant impact guidelines 1.1 for the assessment of Matters of National Environmental Significance (DSEWPac, 1999). These draft guidelines are for all listed Threatened species, and do not provide information relative to particular areas of the State, but provide information to decide whether a project may trigger referral.

Within these guidelines, DSEWPac provides advice that gives guidance on what it views as risks/impacts to Threatened species that will trigger referral. Based on the risk guidelines, “*an action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will*”:

- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- interfere with the recovery of the species; and
- adversely affect habitat critical to the survival of a species.

There is up to 14.5 ha of potential GSM habitat present within the Ellenbrook Tanksite. Confirmation of this species presence requires a targeted assessment. Should GSM be present, the Project is likely to trigger a referral to DSEWPac as there is a real chance or possibility that it will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

## 5.2 Assessment Against the 10 Clearing Principles

Any clearing of native vegetation will require a permit under Part V Division 2 of the *Environmental Protection Act 1986* (EP Act), except where an exemption applies under Schedule 6 of the Act or is prescribed by regulation in the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*, and it is not in an Environmentally Sensitive Area (ESA).

To assist with the consideration of potential vegetation clearing an assessment against the “10 Clearing Principles” has been undertaken and is provided in Table 11. Clearing for the proposed Ellenbrook Tanksite and inlet and outlet mains is at variance to Principles (a) and (b) and may be at variance with Principle (h).



Table 11 Assessment against the Ten Clearing Principles for the Project Area

Principle	Assessment	Variance
(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	<p>A total 116 plant taxa representing 33 families and 80 plant genera were recorded in the Project Area. This total is comprised of 102 native species and 14 introduced (exotic) species.</p> <p>The Priority 3 PEC Swan Coastal Plain <i>Banksia attenuata</i> - <i>Banksia menziesii</i> woodlands, SCP23b is located in the Project Area and is presented in the GHD vegetation mapping as <i>Banksia</i> Low Open Forest. There is 14.5 ha of the Priority 3 PEC Swan Coastal Plain <i>Banksia attenuata</i> - <i>Banksia menziesii</i> woodlands, SCP23b located within the Project Area. This PEC is considered a naturally occurring unique assemblage of plants in a specific habitat.</p> <p>No Priority flora was identified during the time of the field survey.</p> <p>A total of 21 fauna species, comprising of 19 birds, and two mammals were recorded during the survey. All of the species recorded during the survey are typical of the Perth Swan Coastal Plain</p>	The proposal is at variance with the Principle.
(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	<p>The Project Area has been identified as likely to be or possibly being an area of habitat for eight conservation significant fauna species:</p> <ul style="list-style-type: none"> <li>• Peregrine Falcon (<i>Falco peregrinus</i> - State Schedule 4);</li> <li>• Forest Red-tailed Black Cockatoo (<i>Calyptorhynchus banksii naso</i> - State Threatened, Federally Vulnerable);</li> <li>• Baudin's Black Cockatoo (<i>Calyptorhynchus baudinii</i> - State Threatened, Federally Endangered);</li> <li>• Carnaby's Black Cockatoo (<i>Calyptorhynchus latirostris</i> - State Threatened, Federally Endangered);</li> <li>• Black-striped Snake (<i>Neelaps calonotos</i> – State Priority 3);</li> <li>• Graceful Sun-moth (<i>Synemon gratiosa</i> – State Priority 4, Federally</li> </ul>	The proposal is at variance with the Principle.

	<p>Endangered);</p> <ul style="list-style-type: none"> <li>• Southern Brown Bandicoot (<i>Isoodon obesulus fusciventer</i> - State Priority 5); and</li> <li>• Western Brush Wallaby (<i>Macropus irma</i> -State Priority 4).</li> </ul> <p>The Swan Coastal Plain has been extensively cleared and as a result, the habitats present at the Project Area are not well-represented in the area. The Project Area, although small, is potentially an area of important habitat for the conservation significant species as well as being a habitat corridor for other species of fauna. Clearing of the Project Area would lead to a further decrease in habitat available for these species.</p> <p>Habitat for the threatened Black Cockatoos is present within the Project Area. Approximately 15.2 ha of Cockatoo foraging habitat occur within the Project Area. Though not observed during the field survey it is considered likely that the Black-striped Snake, Southern Brown Bandicoot and Western Brush Wallaby may also be present with the Project Area.</p> <p>A targeted search and fauna survey for the Graceful Sun Moth would need to be undertaken to determine whether this species occurs within the Project Area.</p>	
(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	No Threatened flora was identified during the time of the field survey.	The proposal is not at variance with the Principle.
(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.	<p>Desktop Assessments identified two Threatened Ecological Communities within the area: Organic Mound Springs and Shrublands and Woodlands on Muchea Limestone of the Swan Coastal Plain.</p> <p>Field surveys did not identify these TECs within the Project area.</p>	The proposal is not at variance with the Principle.
(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	<p>Under this principle, clearing in areas with greater than 30% native vegetation is not likely to be at variance if there is greater than 30% of the total vegetation in the local area and within the bioregion in good condition.</p> <p>The vegetation of the Project Area is within Heddlé <i>et al.</i> (1980) vegetation complexes 45 and 43. These complexes are classified as <i>Least Concern</i> (present at more than 72 %).</p> <p>The vegetation of the Project Area is within Beards (1979) vegetation associations</p>	The proposal is not at variance with the Principle.

	1001 and 949. The remaining extents of the vegetation associations present within the Project Area are considered <i>Vulnerable</i> for vegetation association 1001 and of <i>Least Concern</i> for vegetation associations 949. A total of 0.68 ha of vegetation association 1001 is located within the Project Area along the road in the south of the Project Area. The area where vegetation association 1001 is located, vegetation condition is Completely Degraded and no native vegetation will be cleared in this area if the Project proceeds.	
(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	The Project Area is not intersected by and does not contain any watercourses or wetlands.	The proposal is not at variance with the Principle.
(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	<p>Land degradation can be caused or exacerbated by uncontrolled runoff and wind or water erosion. Clearing the Project Area would create additional runoff. Drainage design and suitable controls during construction should minimise potential degradation to surrounding land.</p> <p>The condition of the native vegetation <i>Banksia</i> Low Open Forest vegetation type within the Project Area where the proposed clearing for the Ellenbrook Tanksite is to occur ranges from Pristine to Excellent. Areas where the proposed inlet and outlet mains are located predominantly follow roads and the sand mine site.</p> <p>Proposed clearing for the Ellenbrook Tanksite would lead to further land degradation of vegetation. However, due to the small size of the Project Area, the degradation impact of clearing the native vegetation is likely to be relatively minimal.</p> <p>Works should be undertaken in accordance with a Construction Environmental Management Plan (CEMP) that will include management measures for weeds, dieback, erosion and sediment contract, hydrocarbon management and runoff.</p>	<p>The proposal is unlikely to be at variance with the Principle.</p> <p>Potential impacts can be minimised with appropriate management plans.</p>
(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	The Project Area lies within Bush Forever Site No. 399 and is adjacent to Bush Forever Site No. 300, both of which are listed as being part of a regionally significant contiguous bushland/wetland linkage and are of particular significance as they provide corridors through otherwise highly cleared lands and provide linkages of regional significance. It is generally accepted that large consolidated areas are the best options for viable conservation of natural ecosystems and populations and isolated vegetation less than 100 ha in size are of particular concern as this limits the movement and dispersal of fauna, isolates flora and fauna from other populations in	The proposal may be at variance with the Principle.

	the area and results in loss of genetic diversity through inbreeding. Clearing of 15.2 ha of native vegetation would break up a small linkage to Bush Forever Site No. 399 as well as to the surrounding DEC Gngangara-Moore River State Forest. Clearing of the Project Area will have a moderate impact on the environmental values of the surrounding area.	
(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	The clearing of native vegetation is not considered likely to significantly alter the quality of surface or ground waters within the Project Area. A CEMP to address the potential impacts expected to be experienced during the clearing of native vegetation for the proposed Ellenbrook Tanksite and inlet and outlet mains should make provisions for surface water, groundwater and drainage management actions	The proposal is unlikely to be at variance with the principle.
(j) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	The clearing of native vegetation is not expected to cause or exacerbate the incidence or intensity of flooding. Road drainage design should ensure that any additional runoff is managed effectively.	The proposal is unlikely to be at variance with the principle.

## 6. Discussion

### 6.1 Environmentally Sensitive Areas and Bush Forever

A desktop assessment identified an ESA extending over the Project Area. This ESA is associated with several geomorphic wetlands and a Bush Forever Site in the Project surrounds. No Geomorphic Wetlands are present within the Project Area, however Bush Forever Site 399 is located over the Project Area. This Bush Forever Site is listed as being 'part of a regionally significant contiguous bushland/wetland linkage, which is a contiguous or largely contiguous corridor of bushland/wetland areas' (The Government of Western Australia, 2000).

There are no conservation areas managed by the DEC within the Project Area, however the Project Area is surrounded by the DEC Gnamptarra-Moore River State Forest.

As there is an ESA and Bush Forever Site located over the Project Area, the exemptions to clearing regulations do not apply and an application to the DEC for a clearing permit will need to be submitted to clear native vegetation within the Project Area.

### 6.2 Flora and Vegetation

#### 6.2.1 Local and Regional Significance of Vegetation within the Study Area

A vegetation association is considered regionally and locally under-represented if there is less than 30% of its original distribution remaining. Vegetation association mapping undertaken by Heddle *et al.* (1980) identified the Bassendean complexes within the Project Area. These vegetation complexes are present at more than 72 % of the pre-1750 extent and are regarded as *Least Concern*.

Vegetation association mapping undertaken by Beard (1979) identified vegetation associations 1001 and 949 within the Project Area. The remaining extents of the vegetation associations present within the Project Area are considered *Vulnerable* for vegetation association 1001 and of *Least Concern* for vegetation associations 949. A total of 0.68 ha of vegetation association 1001 is located within the Project Area along the road in the south of the Project Area. The area where vegetation association 1001 is located, vegetation condition is *Completely Degraded* and no native vegetation will be cleared in this area if the Project proceeds.

The vegetation survey did not identify the presence of any TECs within the Project Area. However, the PEC Swan Coastal Plain *Banksia attenuata* - *Banksia menziesii* woodlands, SCP23b, Listed as a Priority 3 PEC by the DEC is present within the northern section of the Project Area and is associated with the vegetation type *Banksia* Low Open Forest. Approximately 14.5 ha of this PEC is located within the Project Area.

#### 6.2.2 Conservation Significant Flora

No Threatened (previously called Declared Rare Flora) or Priority Flora as listed by the DEC (2012a), species of national conservation significance listed under the EPBC Act (DSEWPaC, 2021a) were recorded from the Project Area.

A likelihood of occurrence assessment of conservation significant species determined that five species of conservation significance were determined to be likely to occur within the Project Area (one EPBC Act- and WC Act-listed species and four DEC Priority species). Twelve conservation significant species were identified as possibly occurring within the Project Area.

## 6.3 Fauna

### 6.3.1 Fauna Habitats

The *Banksia* Woodland habitat type is the dominant vegetation type present within the Project Area. This habitat type offers particularly high habitat value for fauna species due to the variety of microhabitats and various resource niches available in these areas and it would be expected to support a high diversity of bird species. The *Banksia* woodland is relatively uniform across the site and no large trees were recorded. A small area of mine revegetation of *Banksia* Woodland was located near the proposed outlet and inlet mains. This habitat type would provide limited habitat for ground-dwelling fauna, particularly reptiles and mammals, due to the lack of cover for these species. The Swan Coastal Plain has been extensively cleared and as a result, the habitats present at the Project Area are not well-represented in the area. The Project Area, although small, is potentially an area of important habitat for the fauna species as well as being a habitat corridor. Clearing of the Project Area would lead to a further decrease in habitat available for fauna species.

### 6.3.2 Conservation Significant Fauna likely to occur

The desktop assessment identified 18 conservation significant species as occurring/potentially occurring within the Project Area. Of these, eight conservation significant fauna species were identified as likely to occur or possibly to occur within the Project Area. Conservation significant species identified from the likelihood of occurrence assessment are:

- Peregrine Falcon (*Falco peregrinus* - State Schedule 4);
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso* - State Threatened, Federally Vulnerable);
- Baudin's Black Cockatoo (*Calyptorhynchus baudinii* - State Threatened, Federally Endangered);
- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris* - State Threatened, Federally Endangered);
- Black-striped Snake (*Neelaps calonotos* – State Priority 3);
- Graceful Sun-moth (*Synemon gratiosa* – State Priority 4, Federally Endangered);
- Southern Brown Bandicoot (*Isodon obesulus fusciventer* - State Priority 5); and
- Western Brush Wallaby (*Macropus irma* -State Priority 4).

Black Cockatoos were identified from the desktop assessment as likely to occur within the Project Area. A total of 15.2 ha of potential Black Cockatoo feeding habitat was identified. The majority of this area is located within the Ellenbrook Tanksite.

The Project Area is not situated within a riparian environment or forest and it is unlikely that the area is used by Black Cockatoo species for roosting. However, there is one Carnaby's Cockatoo known roosting site located approximately 2 km west of the Project Area, in *Melaleuca* trees (Department of Planning, 2011). Therefore, the Project Area is likely to provide a habitat linkage between other foraging and roosting sites. No trees with a DBH of greater than 500 mm were recorded in the Project Area.

The vegetation type *Banksia* Low Open Forest located within the proposed Ellenbrook Tanksite is considered potential Graceful Sun Moth habitat. *Lomandra hermaphrodita*, a known food source for the moth, was also recorded during the field survey throughout the *Banksia* Low Open Forest. This indicates that the Project Area may be used by the Graceful Sun Moth and there is 14.5 ha of potential GSM habitat within the Project Area.

Database searches indicate that seven bird species listed under the EPBC Act as Migratory and/or Marine occur or potentially occur within 5 km of the Project Area. While there is the potential for a number of terrestrial migratory bird species to occur occasionally within the Project Area, the Project Area is not considered to contain significant habitat for these species.

## 7. Conclusions and Recommendations

### 7.1 Conclusions

Based on the results of the flora, vegetation and fauna assessment, the following conclusions and associated recommendations have been made about the proposed Ellenbrook Tank and inlet and outlet Main (Project Area):

#### Flora and Vegetation

1. The Project Area is located within a much larger ESA, which is associated with several geomorphic wetlands and Bush Forever Sites in the area;
2. There are no conservation areas managed by the DEC within the Project Area, however the Project Area is surrounded by the DEC Gnaragarra-Moore River State Forest;
3. Bush Forever Site No. 399 is present at the Project Area and Bush Forever Site No. 300 is adjacent to Bush Forever Site No. 399. Both are noted for being corridors through otherwise highly cleared lands and provide linkages of regional significance. Development through this area is likely to fragment the linkage, potentially resulting in limitation of movement and dispersal of fauna, isolation of flora and fauna from other populations in the area and a loss of genetic diversity through inbreeding;
4. The vegetation types present in the Project Area correspond to Beard (1979) vegetation associations 1001 and 949. According to information provided in the Government of Western Australia (2010) these associations are classified as *Vulnerable* for vegetation association 1001 and of *Least Concern* for vegetation associations 949. A total of 0.68 ha of vegetation association 1001 is located within the Project Area in the *Completely Degraded* section along the road in the south of the Project Area;
5. Two vegetation types were identified within the Project Area during the survey: *Banksia* Low Open Forest and *Kunzea, Banksia* and *Jacksonia* Shrubland;
6. The vegetation condition of the Project Area ranged from *Pristine* (1) to *Completely Degraded* (6). The native vegetation located in the northern section of the Project Area rated between *Pristine* (1) to *Excellent* (2). A small section of rehabilitated vegetation in the Project Area rated between *Good* (3) to *Degraded* (5) as signs of clearing in the past were evident. Areas south of the rehabilitated area rated as *Completely Degraded* (6) as the proposed outlet and inlet main traverses previously disturbed /cleared mine and road areas;
7. A preliminary assessment for *Phytophthora* spp. Dieback) as part of the vegetation condition assessment recorded some *Banksia* deaths suspected to be related to Dieback during the field survey;
8. A total of 116 plant taxa were recorded within the Project Area, comprising of 33 plant families and 80 plant genera;
9. A total of 14 introduced (exotic) species were recorded during the survey. No Weeds of National Significance (WONS) listed by the Federal Government or Declared Plants under the Section 37 of the *Agricultural and Related Resources Protection Act 1976* were recorded in the Project Area;
10. No TECs were recorded during the survey;
11. The PEC Swan Coastal Plain *Banksia attenuata* - *Banksia menziesii* woodlands, SCP23b, listed as a Priority 3 PEC by the DEC, is present within the northern section of



the Project Area and is associated with the vegetation type *Banksia* Low Open Forest. Approximately 14.5 ha of this PEC is located within the Project Area;

12. The buffer zone for the PEC *Banksia ilicifolia* woodlands, SCP22, listed as a Priority 3 PEC at the State level, was identified from desktop assessments as located over the Project Area. The buffer for this PEC is located within the rehabilitated vegetation of *Kunzea*, *Banksia* and *Jacksonia* Shrubland and other areas that have previously been cleared. *Banksia ilicifolia* was not recorded during the time of the survey. This PEC was not recorded during the field survey;
13. No Threatened Flora (previously called Declared Rare Flora) listed under the *Wildlife Conservation Act 1950*, species of national conservation significance listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), Priority flora listed by the DEC were recorded from the Project Area;
14. A likelihood of occurrence assessment of conservation significant species determined that five species of conservation significance were determined to be likely to occur within the Project Area and 12 conservation significant species were identified as possibly occurring within the Project Area;
15. The Project Area contains two broad fauna habitat types, based on the predominant landforms, soil and vegetation structure of the area. These habitat types are broadly based on the vegetation types identified within the Project Area;
16. A total of 21 fauna species were recorded within the Project Area, consisting of 19 birds and two mammals. All of the species recorded during the survey are typical of the Perth Swan Coastal Plain;
17. A likelihood of occurrence assessment of conservation significant fauna species based on the known locations of and distributions of species and habitat requirements identified eight conservation significant fauna species were identified as likely to occur or possibly to occur within the Project Area;
18. It is likely that the project will trigger referral to the DSEWPaC due to the clearing of Black Cockatoo foraging habitat. A total of 15.2 ha of Black Cockatoo foraging habitat is located within the Project Area. The majority of this area is located within the Ellenbrook Tanksite, where there is 14.5 ha of quality foraging habitat. There is one Carnaby's Cockatoo known roosting site located approximately 2 km west of the Project Area, in *Melaleuca* trees and the Project Area has been identified as likely to provide a habitat linkage between other foraging and roosting sites;
19. There is up to 14.5 ha of potential GSM habitat present within the Ellenbrook Tanksite. Confirmation of this species presence requires a targeted assessment. Should GSM be present, the Project is likely to trigger a referral to DSEWPaC as there is a real chance or possibility that it will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline; and
20. Database searches indicate that seven bird species listed under the EPBC Act as Migratory and/or Marine occur or potentially occur within 5 km of the Project Area. While there is the potential for a number of migratory bird species to occur occasionally within the Project Area, the Project Area is not considered to be important habitat for any of the migratory species and it is unlikely that listed migratory species would be significantly impacted by the proposed works.

## 7.2 Recommendations

With respect to the conclusions made in section 7.1, the following recommendations have been made:

### Recommendation 1

The proposed clearing of native vegetation for the proposed Ellenbrook Tanksite is to be limited or avoided, as this area of bushland is the PEC Swan Coastal Plain *Banksia attenuata* - *Banksia menziesii* woodlands, SCP23b, listed as a Priority 3 PEC by the DEC. If clearing for the proposed Ellenbrook Tanksite cannot be avoided, it is recommended the project is discussed with the DEC, in regards to potential environmental offsets as a means to offset the clearing of the *Banksia attenuata* - *Banksia menziesii* woodlands, SCP23b.

Rehabilitation of cleared areas is recommended, to reinstate the *Banksia attenuata* - *Banksia menziesii* woodlands, SCP23b.

### Recommendation 2

Clearing of the Ellenbrook Tanksite is likely to trigger referral to the DSEWPaC due to the clearing of more than 1 ha of quality Black Cockatoo foraging habitat. A total of 14.5 ha of Black Cockatoo foraging habitat is located within this section of the Project Area. It is recommended the project be discussed with DSEWPaC before a final decision to refer is made.

### Recommendation 3

GHD recommends a targeted Graceful Sun Moth survey in the native vegetation proposed to be cleared for the Ellenbrook Tanksite. This survey will determine their presence or absence within the Project Area.

### Recommendation 4

As there is an ESA and Bush Forever Site located over the Project Area, the exemptions to clearing regulations do not apply and an application to the DEC for a clearing permit will need to be submitted to clear native vegetation within the Project Area.

### Recommendation 5

A formal dieback assessment consistent with DEC requirements should be conducted prior to works to determine if *Phytophthora* spp. are present within native bushland proposed to be cleared in the Project Area. A Dieback Management plan to address issues and the management of the disease should be employed.

### Recommendation 6

A Construction Environmental Management Plan (CEMP) to address the potential impacts expected to be experienced during the clearing of native vegetation for the proposed Ellenbrook Tanksite and inlet and outlet mains should include:

- weed control measures such as weed inspections and wash-down procedures for equipment entering the Project Area to ensure that the development of the Project Area does not introduce and/or spread weeds;
- Rehabilitation with native/endemic species;
- Undertake a general fauna clearance program by qualified fauna relocation personnel;
- Ensure drainage design reduces the risk of erosion and flooding;
- Development of an appropriate stormwater management system to protect and enhance the receiving environments located adjacent to the Project Area;

- Surface water, groundwater and drainage management actions and requirements should be incorporated into the project design;
- Dust suppression may be required during clearing and construction activities depending on the timing of the proposed clearing;
- Dieback management to address issues and the management of the disease in the area; and
- A licence for the construction of bores and for the abstraction of groundwater will be required from the Department of Water (DoW), should groundwater be required for dust suppression or construction activities.

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## Appendices

# Appendix A -Figures

Figure 1 Locality

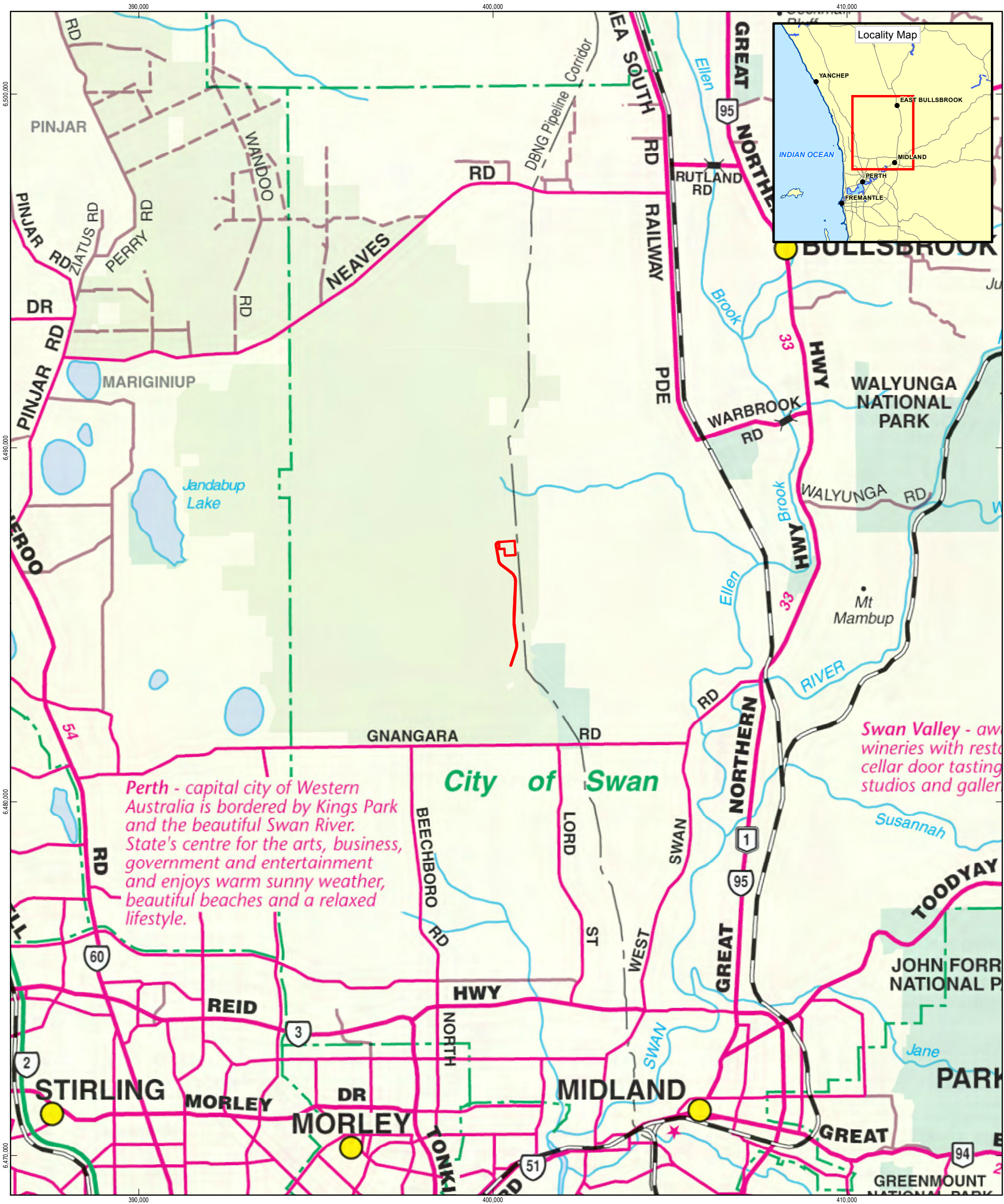
Figure 2 Environmental Constraints

Figure 3 Vegetation Types and Quadrat Locations

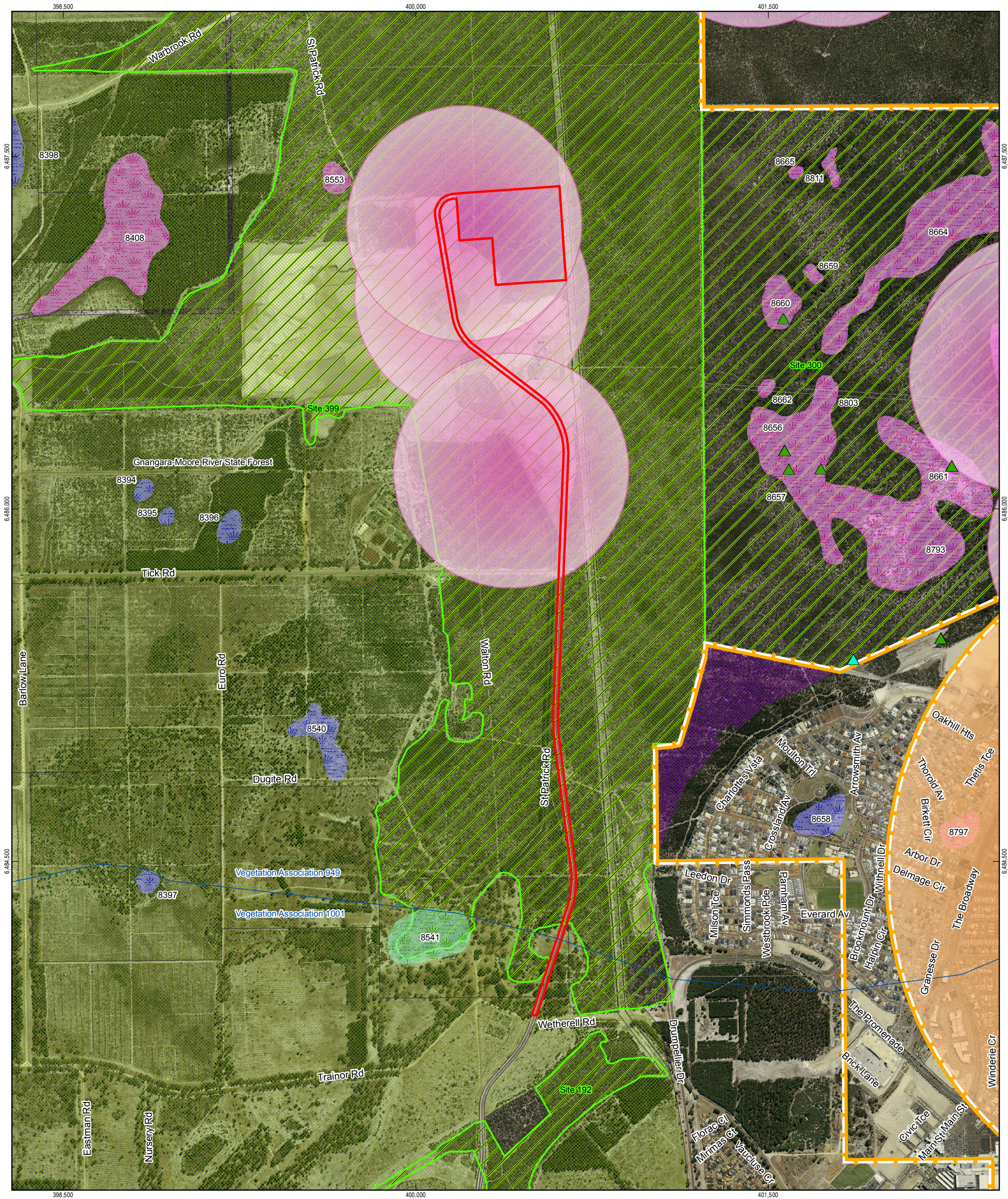
Figure 4 Vegetation Condition and Suspected Dieback Locations

Figure 5 Black Cockatoo and Grace Sun Moth Habitat







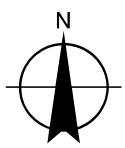


**LEGEND**  
**Threatened (Declared Rare) & Priority Flora**  
▲ (T) Threatened Rare Flora - Extant Taxa  
▲ Priority 1 - Poorly Known Taxa  
▲ Priority 2 - Poorly Known Taxa  
▲ Priority 3 - Poorly Known Taxa  
▲ Priority 4 - Rare Taxa  
▲ Priority 5 - Conservation Dependent Taxa  
— Pre European Vegetation Association

Project Area  
Environmentally Sensitive Areas  
Threatened and Priority Ecological Communities  
Threatened Ecological Community  
Priority Ecological Community

**Geomorphic Wetlands**  
Conservation  
Resource Enhancement  
Multiple Use  
Not Assessed  
Bush Forever Sites  
**DEC Estates**  
Nature Reserve  
State Forest  
Cadastral

1: 15,000 (at A3)  
0 75 150 300 450 600 750  
Metres  
Map Projection: Transverse Mercator  
Horizontal Datum: Geocentric Datum of Australia  
Grid: Map Grid of Australia 1994, Zone 50



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Revision 1  
Date 18 Dec 2012

Environmental Constraints

Figure 2

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Data source: Landgate: Metro Central 2012 Mosaic - 20121022, Roads - 20121022, Cadastre - 20121018; DEC: Geomorphic Wetlands - 20121022, Threatened (Declared Rare) & Priority Flora - 20121023, Threatened and Priority Ecological Communities - 20121105, DEC Estates - 20121022, Environmentally Sensitive Areas - 20121022; DoP: Bush Forever Sites - 20121022; GHD: Vegetation Association - 20121218, Project Area - 20121018. Created by: bflorczak, vdmh

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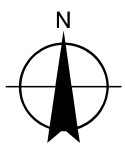
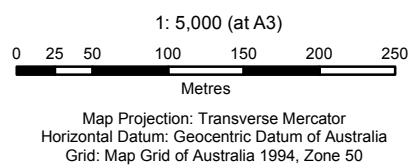






LEGEND

- Quadrats
- Project Area
- Vegetation Type**
- BaPIAxAcLb : *Banksia* Low Open Forest
- KgRcCa : *Kunzea*, *Banksia* and *Jacksonia* Shrubland
- HD : Highly Disturbed



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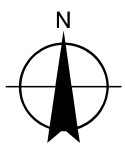
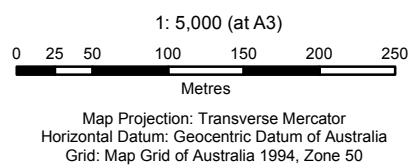
Vegetation Types and Quadrat Locations **Figure 3**





LEGEND

- Quadrats
- Project Area
- Vegetation Type
- BaPIAxAcLb : *Banksia* Low Open Forest
- KgRcCa : *Kunzea*, *Banksia* and *Jacksonia* Shrubland
- HD : Highly Disturbed



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Sheet 3 of 3

Vegetation Types and Quadrat Locations Figure 3





**LEGEND**

Suspected Dieback Locations

Project Area

**Vegetation Condition**

1 : Pristine or nearly so

2 : Excellent

3 : Very good

4 : Good

5 : Degraded

5-6

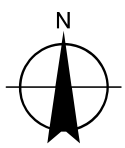
6 : Completely degraded

1: 5,000 (at A3)

0 25 50 100 150 200 250

Metres

Map Projection: Transverse Mercator  
Horizontal Datum: Geocentric Datum of Australia  
Grid: Map Grid of Australia 1994, Zone 50



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## Vegetation Condition and Suspected Dieback Locations

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Figure 4





LEGEND

Suspected Dieback Locations

Project Area

**Vegetation Condition**

1 : Pristine or nearly so

2 : Excellent

3 : Very good

3-4

4 : Good

4-5

5 : Degraded

5-6

6 : Completely degraded

02550100150200250

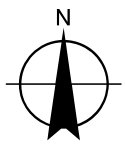
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Metres

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Horizontal Datum: Geocentric Datum of Australia

Grid: Map Grid of Australia 1994, Zone 50



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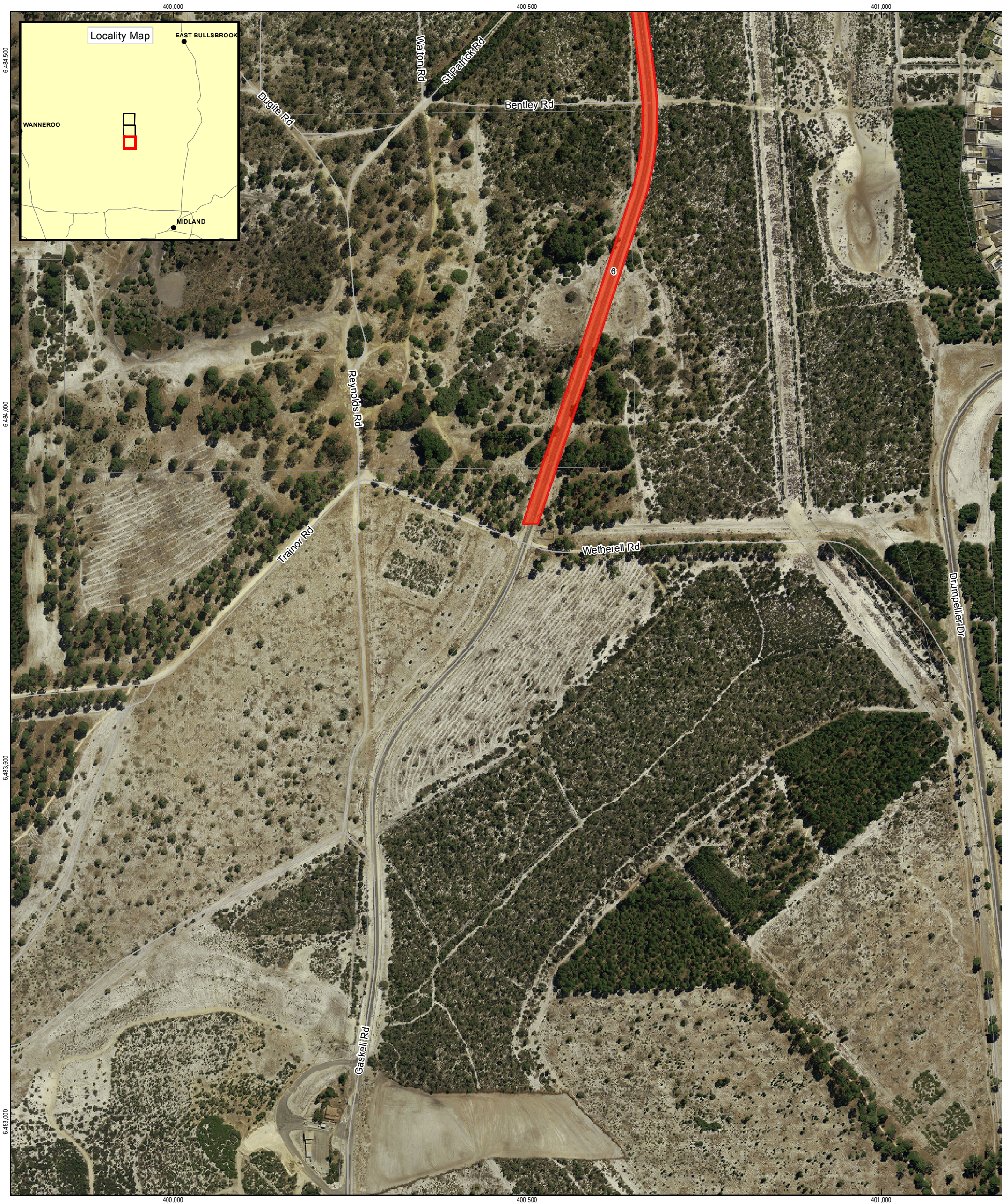
Vegetation Condition and  
Suspected Dieback Locations

Job Number	61-28780
Revision	0
Date	13 Dec 2012

Sheet 2 of 3

Figure 4





LEGEND

Suspected Dieback Locations

Project Area

**Vegetation Condition**

1 : Pristine or nearly so

2 : Excellent

3 : Very good

3-4

4 : Good

4-5

5 : Degraded

5-6

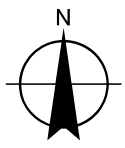
6 : Completely degraded

1: 5,000 (at A3)

02550100150200250

Metres

Map Projection: Transverse Mercator  
Horizontal Datum: Geocentric Datum of Australia  
Grid: Map Grid of Australia 1994, Zone 50



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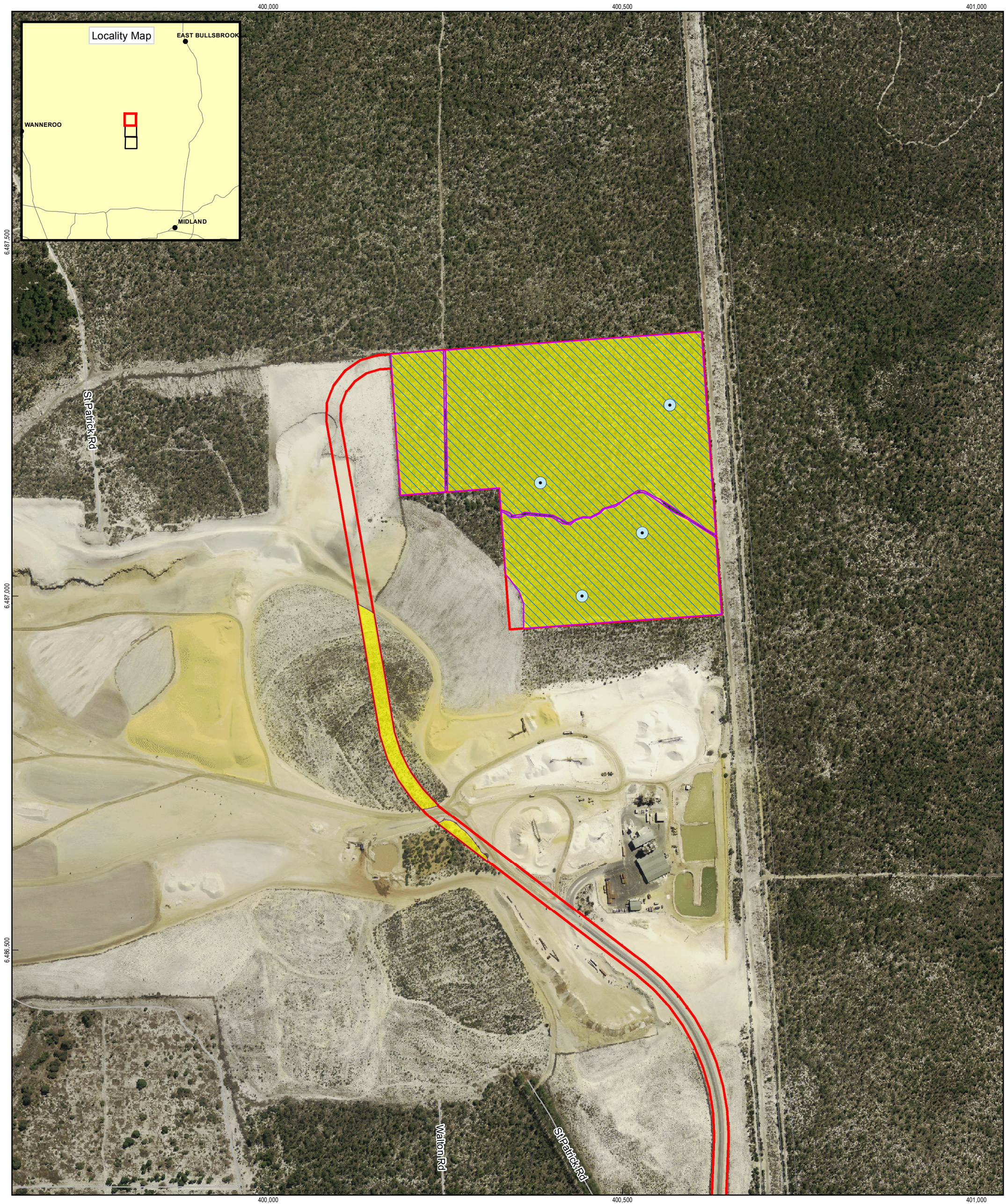
Vegetation Condition and  
Suspected Dieback Locations

Job Number 61-28780  
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Date 13 Dec 2012

Sheet 3 of 3

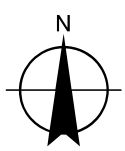
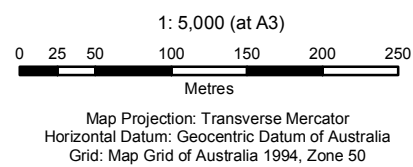
Figure 4





LEGEND

- Roads
- ▭ Cadastre
- ▭ Project Area
- ▨ Black Cockatoo Foraging Habitat
- Graceful Sun Moth Habitat**
- *Lomandra hermaphrodita* Locations
- ▨ Graceful Sun Moth habitat



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Black Cockatoo  
and Graceful Sun Moth habitat

Sheet 1 of 3

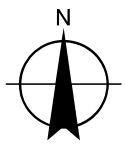
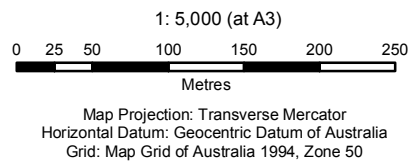
Figure 5





LEGEND

- Roads
- ▭ Cadastre
- ▭ Project Area
- ▭ Black Cockatoo Foraging Habitat
- Graceful Sun Moth Habitat**
- *Lomandra hermaphrodita* Locations
- ▨ Graceful Sun Moth habitat



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Black Cockatoo  
and Graceful Sun Moth habitat

Sheet 2 of 3

Figure 5





**LEGEND**

Roads

Cadastre

Project Area

Black Cockatoo Foraging Habitat

**Graceful Sun Moth Habitat**

*Lomandra hermaphrodita*  
Locations

Graceful Sun Moth habitat

02550100150200250

Metres

1: 5,000 (at A3)

Map Projection: Transverse Mercator  
Horizontal Datum: Geocentric Datum of Australia  
Grid: Map Grid of Australia 1994, Zone 50

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**Black Cockatoo  
and Graceful Sun Moth habitat**

Job Number  
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**Figure 5**

*Sheet 3 of 3*

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Data source: Landgate: Metro Central 2012 Mosaic - 20121022, Roads - 20121022, Cadastre - 20121018; GHD: Project Area - 20121018, Habitat Areas - 20121126; GA: 250K Topo Series 3 -2006. Created by: bforczak, vdnih

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## Appendix B - Desktop Searches

# NatureMap All Flora Report (5km)

Created By Guest user on 23/10/2012

Kingdom Plantae  
Current Names Only Yes  
Core Datasets Only Yes  
Method 'By Line'  
Group By Family

Family	Species	Records
Aizoaceae	1	1
Amaranthaceae	1	1
Anarthriaceae	2	14
Apiaceae	3	9
Araliaceae	1	5
Asparagaceae	20	73
Asteraceae	27	57
Campanulaceae	6	13
Cannabaceae	1	1
Caryophyllaceae	3	3
Casuarinaceae	2	3
Celastraceae	2	3
Centrolepidaceae	4	15
Chenopodiaceae	1	1
Colchicaceae	3	6
Commelinaceae	1	1
Crassulaceae	3	6
Cyperaceae	23	54
Dasypogonaceae	3	15
Dennstaedtiaceae	1	1
Dilleniaceae	10	56
Droseraceae	14	44
Elaeocarpaceae	1	3
Ericaceae	21	130
Euphorbiaceae	3	8
Fabaceae	39	116
Gentianaceae	1	2
Geraniaceae	2	2
Goodeniaceae	5	17
Haemodoraceae	16	54
Haloragaceae	1	4
Hemerocallidaceae	8	19
Hypoxidaceae	1	1
Iridaceae	7	23
Lamiaceae	3	6
Lauraceae	6	16
Lentibulariaceae	1	1
Loganiaceae	1	7
Loranthaceae	1	3
Menyanthaceae	1	1
Molluginaceae	2	4
Myrtaceae	42	141
Orchidaceae	29	57
Orobanchaceae	1	1
Oxalidaceae	1	2
Papaveraceae	1	1
Phyllanthaceae	2	7
Phytolaccaceae	1	1
Poaceae	17	49
Polygalaceae	2	3
Portulacaceae	1	2
Primulaceae	1	1
Proteaceae	17	78
Restionaceae	10	43
Rhamnaceae	1	1
Rubiaceae	1	1
Rutaceae	6	18
Santalaceae	2	8
Selaginellaceae	1	2
Solanaceae	2	3
Stylidiaceae	22	98
Thymelaeaceae	2	2
Violaceae	1	1
Xanthorrhoeaceae	1	5
Zamiaceae	1	1
<b>TOTAL</b>	<b>417</b>	<b>1325</b>

Name ID Species Name

Naturalised

Conservation Code

<sup>1</sup>Endemic To Query Area

## Aizoaceae

1. 2795 *Carpobrotus edulis* (Hottentot Fig)

Y

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Amaranthaceae</b>				
2.	2751 <i>Ptilotus polystachyus</i> (Prince of Wales Feather)			
<b>Anarthriaceae</b>				
3.	1097 <i>Lyginia barbata</i>			
4.	18049 <i>Lyginia imberbis</i>			
<b>Apiaceae</b>				
5.	14553 <i>Eryngium pinnatifidum</i> subsp. <i>palustre</i>		P3	
6.	6222 <i>Homalosciadium homalocarpum</i>			
7.	6289 <i>Xanthosia huegelii</i>			
<b>Araliaceae</b>				
8.	6280 <i>Trachymene pilosa</i> (Native Parsnip)			
<b>Asparagaceae</b>				
9.	8779 <i>Asparagus asparagoides</i> (Bridal Creeper)	Y		
10.	11299 <i>Chamaescilla corymbosa</i> var. <i>corymbosa</i>			
11.	1307 <i>Laxmannia ramosa</i> (Branching Lily)			
12.	11911 <i>Laxmannia ramosa</i> subsp. <i>ramosa</i>			
13.	1309 <i>Laxmannia squarrosa</i>			
14.	1223 <i>Lomandra caespitosa</i> (Tufted Mat Rush)			
15.	1228 <i>Lomandra hermaphrodita</i>			
16.	14542 <i>Lomandra micrantha</i> subsp. <i>micrantha</i>			
17.	1234 <i>Lomandra nigricans</i>			
18.	1239 <i>Lomandra preissii</i>			
19.	1243 <i>Lomandra sericea</i> (Silky Mat Rush)			
20.	1312 <i>Sowerbaea laxiflora</i> (Purple Tassels)			
21.	1318 <i>Thysanotus arbuscula</i>			
22.	1319 <i>Thysanotus arenarius</i>			
23.	1338 <i>Thysanotus manglesianus</i> (Fringed Lily)			
24.	1339 <i>Thysanotus multiflorus</i> (Many-flowered Fringe Lily)			
25.	1351 <i>Thysanotus sparteus</i>			
26.	1354 <i>Thysanotus tenellus</i>			
27.	1357 <i>Thysanotus thyrsoides</i>			
28.	1358 <i>Thysanotus triandrus</i>			
<b>Asteraceae</b>				
29.	7838 <i>Arctotheca calendula</i> (Cape Weed)	Y		
30.	7851 <i>Asteridea pulverulenta</i> (Common Bristle Daisy)			
31.	7878 <i>Brachyscome iberidifolia</i>			
32.	7916 <i>Centaurea melitensis</i> (Maltese Cockspur)	Y		
33.	7991 <i>Gnephosis drummondii</i>			
34.	28253 <i>Hedypnois rhagadioloides</i> subsp. <i>cretica</i>	Y		
35.	12741 <i>Hyalosperma cotula</i>			
36.	8086 <i>Hypochaeris glabra</i> (Smooth Catsear)	Y		
37.	9352 <i>Hypochaeris radicata</i> (Flat Weed)	Y		
38.	8092 <i>Ixiolaena viscosa</i> (Sticky Ixiolaena)			
39.	18585 <i>Lagenophora huegelii</i>			
40.	8105 <i>Millotia myosotidifolia</i>			
41.	8106 <i>Millotia tenuifolia</i> (Soft Millotia)			
42.	29418 <i>Monoculus monstrosus</i>	Y		
43.	8165 <i>Pithocarpa pulchella</i> (Beautiful Pithocarpa)			
44.	18353 <i>Pithocarpa pulchella</i> var. <i>pulchella</i>			
45.	8175 <i>Podolepis gracilis</i> (Slender Podolepis)			
46.	8182 <i>Podotricha angustifolia</i> (Sticky Longheads)			
47.	8183 <i>Podotricha chrysantha</i> (Yellow Podotricha)			
48.	8184 <i>Podotricha gnaphalioides</i> (Golden Long-heads)			
49.	8195 <i>Quinetia urvillei</i>			
50.	13300 <i>Rhodanthe citrina</i>			
51.	8224 <i>Siloxerus filifolius</i>			
52.	8225 <i>Siloxerus humifusus</i> (Procumbent Siloxerus)			
53.	8255 <i>Ursinia anthemoides</i> (Ursinia)	Y		
54.	38388 <i>Ursinia anthemoides</i> subsp. <i>anthemoides</i>	Y		
55.	8282 <i>Waitzia suaveolens</i> (Fragrant Waitzia)			
<b>Campanulaceae</b>				
56.	9289 <i>Lobelia anceps</i> (Angled Lobelia)			
57.	7407 <i>Lobelia rhytidospema</i> (Wrinkled-seeded Lobelia)			
58.	7408 <i>Lobelia tenuior</i> (Slender Lobelia)			
59.	37440 <i>Monopsis debilis</i> var. <i>depressa</i>	Y		
60.	7384 <i>Wahlenbergia capensis</i> (Cape Bluebell)	Y		
61.	7389 <i>Wahlenbergia preissii</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Cannabaceae</b>				
62.	18296 <i>Humulus lupulus</i>	Y		
<b>Caryophyllaceae</b>				
63.	19825 <i>Petrorhagia dubia</i>	Y		
64.	15972 <i>Silene gallica</i> var. <i>gallica</i>	Y		
65.	2918 <i>Stellaria media</i> (Chickweed)	Y		
<b>Casuarinaceae</b>				
66.	1728 <i>Allocasuarina fraseriana</i> (Sheoak)			
67.	1732 <i>Allocasuarina humilis</i> (Dwarf Sheoak)			
<b>Celastraceae</b>				
68.	4733 <i>Stackhousia monogyna</i>			
69.	4737 <i>Tripterococcus brunonis</i> (Winged Stackhousia)			
<b>Centrolepidaceae</b>				
70.	1121 <i>Centrolepis aristata</i> (Pointed Centrolepis)			
71.	1125 <i>Centrolepis drummondiana</i>			
72.	1131 <i>Centrolepis inconspicua</i>			
73.	1133 <i>Centrolepis pilosa</i>			
<b>Chenopodiaceae</b>				
74.	2501 <i>Dysphania glomulifera</i>			
<b>Colchicaceae</b>				
75.	1383 <i>Burchardia bairdiae</i>			
76.	12770 <i>Burchardia congesta</i>			
77.	1385 <i>Burchardia multiflora</i> (Dwarf Burchardia)			
<b>Commelinaceae</b>				
78.	1162 <i>Cartonema philydroides</i>			
<b>Crassulaceae</b>				
79.	17701 <i>Crassula closiana</i>			
80.	3137 <i>Crassula colorata</i> (Dense Stonecrop)			
81.	11563 <i>Crassula colorata</i> var. <i>colorata</i>			
<b>Cyperaceae</b>				
82.	740 <i>Baumea arthropphylla</i>			
83.	741 <i>Baumea articulata</i> (Jointed Rush)			
84.	747 <i>Baumea rubiginosa</i>			
85.	768 <i>Cyathochaeta avenacea</i>			
86.	16245 <i>Cyathochaeta teretifolia</i>		P3	
87.	792 <i>Cyperus eragrostis</i> (Umbrella Sedge)	Y		
88.	894 <i>Fimbristylis velata</i>			
89.	917 <i>Isolepis marginata</i> (Coarse Club-rush)	Y		
90.	925 <i>Lepidosperma angustatum</i>			
91.	936 <i>Lepidosperma leptostachyum</i>			
92.	937 <i>Lepidosperma longitudinale</i> (Pithy Sword-sedge)			
93.	944 <i>Lepidosperma scabrum</i>			
94.	36060 <i>Lepidosperma</i> sp. Coastal Dunes (R.J. Cranfield 9963)			
95.	945 <i>Lepidosperma squamatum</i>			
96.	946 <i>Lepidosperma striatum</i>			
97.	953 <i>Mesomelaena graciliceps</i>			
98.	955 <i>Mesomelaena pseudostygia</i>			
99.	978 <i>Schoenus brevisetis</i>			
100.	979 <i>Schoenus caespititius</i>			
101.	984 <i>Schoenus curvifolius</i>			
102.	986 <i>Schoenus efoliatus</i>			
103.	1002 <i>Schoenus nanus</i> (Tiny Bog Rush)			
104.	1018 <i>Schoenus subfascicularis</i>			
<b>Dasypogonaceae</b>				
105.	19309 <i>Calectasia narragara</i>			
106.	29103 <i>Calectasia</i> sp. <i>Pinjar</i> (C. Tauss 557)		P1	
107.	1218 <i>Dasypogon bromeliifolius</i> (Pineapple Bush)			
<b>Dennstaedtiaceae</b>				
108.	57 <i>Pteridium esculentum</i> (Bracken)			
<b>Dilleniaceae</b>				
109.	5112 <i>Hibbertia aurea</i>			
110.	5133 <i>Hibbertia helianthemoides</i>		P3	
111.	5134 <i>Hibbertia huegelii</i>			
112.	5135 <i>Hibbertia hypericoides</i> (Yellow Buttercups)			

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113.	5153	<i>Hibbertia pachyrrhiza</i>			
114.	5154	<i>Hibbertia perfoliata</i>			
115.	5162	<i>Hibbertia racemosa</i> (Stalked Guinea Flower)			
116.	20034	<i>Hibbertia</i> sp. Gngara (J.R. Wheeler 2329)			
117.	5172	<i>Hibbertia stellaris</i> (Orange Stars)			
118.	5173	<i>Hibbertia subvaginata</i>			

### Droseraceae

119.	3095	<i>Drosera erythrorhiza</i> (Red Ink Sundew)			
120.	13217	<i>Drosera erythrorhiza</i> subsp. <i>erythrorhiza</i>			
121.	15453	<i>Drosera gigantea</i> subsp. <i>gigantea</i>			
122.	3098	<i>Drosera glanduligera</i> (Pimpernel Sundew)			
123.	3106	<i>Drosera macrantha</i> (Bridal Rainbow)			
124.	14298	<i>Drosera macrantha</i> subsp. <i>macrantha</i>			
125.	11853	<i>Drosera menziesii</i> subsp. <i>menziesii</i>			
126.	13216	<i>Drosera menziesii</i> subsp. <i>penicillaris</i>			
127.	3114	<i>Drosera nitidula</i> (Shining Sundew)			
128.	3117	<i>Drosera paleacea</i> (Dwarf Sundew)			
129.	13188	<i>Drosera paleacea</i> subsp. <i>paleacea</i>			
130.	3118	<i>Drosera pallida</i> (Pale Rainbow)			
131.	3119	<i>Drosera parvula</i> (Small Sundew)			
132.	3124	<i>Drosera pulchella</i> (Pretty Sundew)			

### Elaeocarpaceae

133.	4524	<i>Platytheca galioides</i>			
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### Ericaceae

134.	6311	<i>Andersonia heterophylla</i>			
135.	6314	<i>Andersonia lehmanniana</i>			
136.	11471	<i>Andersonia lehmanniana</i> subsp. <i>lehmanniana</i>			
137.	6339	<i>Astroloma xerophyllum</i>			
138.	6341	<i>Brachyloma preissii</i> (Globe Heath)			
139.	30142	<i>Brachyloma preissii</i> subsp. <i>obtusifolium</i>			
140.	6347	<i>Conostephium minus</i> (Pink-tipped Pearl flower)			
141.	6348	<i>Conostephium pendulum</i> (Pearl Flower)			
142.	6349	<i>Conostephium preissii</i>			
143.	13527	<i>Croninia kingiana</i>			
144.	6360	<i>Leucopogon australis</i> (Spiked Beard-heath)			
145.	6374	<i>Leucopogon conostephioides</i>			
146.	6420	<i>Leucopogon oldfieldii</i>			
147.	6425	<i>Leucopogon oxycedrus</i>			
148.	6434	<i>Leucopogon polymorphus</i>			
149.	6436	<i>Leucopogon propinquus</i>			
150.	19579	<i>Leucopogon</i> sp. Murdoch (M. Hislop 1037)			
151.	40803	<i>Leucopogon squarrosus</i> subsp. <i>squarrosus</i>			
152.	6456	<i>Lysinema ciliatum</i> (Curry Flower)			
153.	6458	<i>Lysinema elegans</i>			
154.	34736	<i>Lysinema pentapetalum</i>			

### Euphorbiaceae

155.	4666	<i>Monotaxis occidentalis</i>			
156.	4713	<i>Stachystemon axillaris</i> (Leafy Stachystemon)			
157.	20666	<i>Stachystemon</i> sp. Keysbrook (R. Archer 17/11/99)		P1	

### Fabaceae

158.	15466	<i>Acacia applanata</i>			
159.	3374	<i>Acacia huegelii</i>			
160.	17861	<i>Acacia longifolia</i>	Y		
161.	3502	<i>Acacia pulchella</i> (Prickly Moses)			
162.	15481	<i>Acacia pulchella</i> var. <i>glaberrima</i>			
163.	15483	<i>Acacia pulchella</i> var. <i>pulchella</i>			
164.	30032	<i>Acacia saligna</i> subsp. <i>saligna</i>			
165.	3541	<i>Acacia sessilis</i>			
166.	3557	<i>Acacia stenoptera</i> (Narrow Winged Wattle)			
167.	3686	<i>Aotus cordifolia</i>			
168.	3688	<i>Aotus gracillima</i>			
169.	3692	<i>Aotus procumbens</i>			
170.	3710	<i>Bossiaea eriocarpa</i> (Common Brown Pea)			
171.	3807	<i>Daviesia divaricata</i> (Marno)			
172.	3832	<i>Daviesia physodes</i>			
173.	3845	<i>Daviesia triflora</i>			
174.	3872	<i>Euchilopsis linearis</i> (Swamp Pea)			
175.	3880	<i>Eutaxia virgata</i>			



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176.	20475	<i>Gastrolobium capitatum</i>			
177.	20473	<i>Gastrolobium ebracteolatum</i>			
178.	20483	<i>Gastrolobium linearifolium</i>			
179.	10909	<i>Gompholobium confertum</i>			
180.	3957	<i>Gompholobium tomentosum</i> (Hairy Yellow Pea)			
181.	3966	<i>Hovea pungens</i> (Devil's Pins)			
182.	3968	<i>Hovea trisperma</i> (Common Hovea)			
183.	12859	<i>Hovea trisperma</i> var. <i>trisperma</i>			
184.	14783	<i>Jacksonia calcicola</i>			
185.	4010	<i>Jacksonia floribunda</i> (Holly Pea)			
186.	4012	<i>Jacksonia furcellata</i> (Grey Stinkwood)			
187.	4029	<i>Jacksonia sternbergiana</i> (Stinkwood)			
188.	4042	<i>Kennedia nigricans</i> (Black Kennedia)			
189.	4044	<i>Kennedia prostrata</i> (Scarlet Runner)			
190.	4052	<i>Latrobea tenella</i>			
191.	4100	<i>Mirbelia spinosa</i>			
192.	4114	<i>Ornithopus pinnatus</i> (Slender Serradella)	Y		
193.	4181	<i>Pultenaea reticulata</i>			
194.	4211	<i>Sphaerolobium vimineum</i> (Leafless Globe Pea)			
195.	17145	<i>Trifolium angustifolium</i> var. <i>angustifolium</i>	Y		
196.	17542	<i>Trifolium arvense</i> var. <i>arvense</i>	Y		
<b>Gentianaceae</b>					
197.	6543	<i>Cicendia filiformis</i> (Slender Cicendia)	Y		
<b>Geraniaceae</b>					
198.	4332	<i>Erodium botrys</i> (Long Storksbill)	Y		
199.	4343	<i>Pelargonium capitatum</i> (Rose Pelargonium)	Y		
<b>Goodeniaceae</b>					
200.	12724	<i>Anthotium junciforme</i>			
201.	7454	<i>Dampiera linearis</i> (Common Dampiera)			
202.	7538	<i>Goodenia pulchella</i>			
203.	7574	<i>Lechenaultia floribunda</i> (Free-flowering Leschenaultia)			
204.	13182	<i>Scaevola repens</i> var. <i>repens</i>			
<b>Haemodoraceae</b>					
205.	1409	<i>Anigozanthos humilis</i> (Catspaw)			
206.	11434	<i>Anigozanthos humilis</i> subsp. <i>humilis</i>			
207.	1411	<i>Anigozanthos manglesii</i> (Mangles Kangaroo Paw)			
208.	11261	<i>Anigozanthos manglesii</i> subsp. <i>manglesii</i>			
209.	1417	<i>Blancoa canescens</i> (Winter Bell)			
210.	1418	<i>Conostylis aculeata</i> (Prickly Conostylis)			
211.	11826	<i>Conostylis aculeata</i> subsp. <i>aculeata</i>			
212.	11513	<i>Conostylis aculeata</i> subsp. <i>cygnorum</i>			
213.	1423	<i>Conostylis aurea</i> (Golden Conostylis)			
214.	11438	<i>Conostylis candicans</i> subsp. <i>candicans</i>			
215.	1436	<i>Conostylis juncea</i>			
216.	1468	<i>Haemodorum laxum</i>			
217.	1472	<i>Haemodorum simplex</i>			
218.	1475	<i>Haemodorum spicatum</i> (Mardja)			
219.	1478	<i>Phlebocarya ciliata</i>			
220.	11557	<i>Phlebocarya pilosissima</i> subsp. <i>pilosissima</i>		P3	
<b>Haloragaceae</b>					
221.	6161	<i>Gonocarpus pithyoides</i>			
<b>Hemerocallidaceae</b>					
222.	1264	<i>Arnocrinum preissii</i>			
223.	11283	<i>Corynotheca micrantha</i> var. <i>micrantha</i>			
224.	1293	<i>Hensmania turbinata</i>			
225.	1295	<i>Johnsonia acaulis</i>			
226.	1298	<i>Johnsonia pubescens</i> (Pipe Lily)			
227.	1260	<i>Stypandra glauca</i> (Blind Grass)			
228.	1361	<i>Tricoryne elatior</i> (Yellow Autumn Lily)			
229.	1363	<i>Tricoryne tenella</i>			
<b>Hypoxidaceae</b>					
230.	11736	<i>Hypoxis occidentalis</i> var. <i>occidentalis</i>			
<b>Iridaceae</b>					
231.	1517	<i>Gladiolus alatus</i>	Y		
232.	1520	<i>Gladiolus caryophyllaceus</i> (Wild Gladiolus)	Y		
233.	1524	<i>Gladiolus undulatus</i> (Wild Gladiolus)	Y		

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234.	19180	<i>Moraea miniata</i> (Two-leaf Cape Tulip)	Y		
235.	11749	<i>Orthrosanthus laxus</i> var. <i>laxus</i> (Morning Iris)			
236.	1550	<i>Patersonia occidentalis</i> (Purple Flag)			
237.	14924	<i>Romulea rosea</i> var. <i>communis</i>	Y		
<b>Lamiaceae</b>					
238.	6838	<i>Hemiandra linearis</i> (Speckled Snakebush)			
239.	6839	<i>Hemiandra pungens</i> (Snakebush)			
240.	6930	<i>Stachys arvensis</i> (Staggerweed)	Y		
<b>Lauraceae</b>					
241.	2951	<i>Cassytha flava</i> (Dodder Laurel)			
242.	2952	<i>Cassytha glabella</i> (Tangled Dodder Laurel)			
243.	11211	<i>Cassytha glabella</i> forma <i>dispar</i>			
244.	2956	<i>Cassytha pomiformis</i> (Dodder Laurel)			
245.	11242	<i>Cassytha racemosa</i> forma <i>pilosa</i>			
246.	11799	<i>Cassytha racemosa</i> forma <i>racemosa</i>			
<b>Lentibulariaceae</b>					
247.	7138	<i>Utricularia inaequalis</i>			
<b>Loganiaceae</b>					
248.	16177	<i>Phyllangium paradoxum</i>			
<b>Loranthaceae</b>					
249.	2401	<i>Nuytsia floribunda</i> (Christmas Tree)			
<b>Menyanthaceae</b>					
250.	36177	<i>Ornduffia albiflora</i>			
<b>Molluginaceae</b>					
251.	2838	<i>Macarthuria apetala</i>			
252.	2839	<i>Macarthuria australis</i>			
<b>Myrtaceae</b>					
253.	5330	<i>Astartea fascicularis</i>			
254.	20283	<i>Astartea scoparia</i>			
255.	5382	<i>Beaufortia elegans</i>			
256.	5415	<i>Calothamnus lateralis</i>			
257.	5429	<i>Calothamnus sanguineus</i> (Silky-leaved Blood flower)			
258.	5439	<i>Calytrix angulata</i> (Yellow Starflower)			
259.	5458	<i>Calytrix flavescens</i> (Summer Starflower)			
260.	5460	<i>Calytrix fraseri</i> (Pink Summer Calytrix)			
261.	5461	<i>Calytrix glutinosa</i>			
262.	5476	<i>Calytrix sapphirina</i>			
263.	5498	<i>Chamelaucium uncinatum</i> (Geraldton Wax)			
264.	5541	<i>Eremaea pauciflora</i>			
265.	14104	<i>Eremaea pauciflora</i> var. <i>pauciflora</i>			
266.	5542	<i>Eremaea purpurea</i>			
267.	13547	<i>Eucalyptus marginata</i> subsp. <i>marginata</i> (Jarrah)			
268.	5790	<i>Eucalyptus todtiana</i> (Coastal Blackbutt)			
269.	5817	<i>Hypocalymma angustifolium</i> (White Myrtle)			
270.	5825	<i>Hypocalymma robustum</i> (Swan River Myrtle)			
271.	5832	<i>Kunzea ericifolia</i> (Spearwood)			
272.	15498	<i>Kunzea glabrescens</i> (Spearwood)			
273.	5835	<i>Kunzea micrantha</i>			
274.	5847	<i>Leptospermum erubescens</i> (Roadside Teatree)			
275.	5850	<i>Leptospermum laevigatum</i> (Coast Teatree)	Y		
276.	5926	<i>Melaleuca lateritia</i> (Robin Redbreast Bush)			
277.	5952	<i>Melaleuca preissiana</i> (Moonah)			
278.	5959	<i>Melaleuca raphiophylla</i> (Swamp Paperbark)			
279.	19365	<i>Melaleuca ryeae</i>			
280.	5964	<i>Melaleuca seriosa</i>			
281.	5978	<i>Melaleuca teretifolia</i> (Banbar)			
282.	5983	<i>Melaleuca trichophylla</i>			
283.	6006	<i>Pericalymma ellipticum</i> (Swamp Teatree)			
284.	16477	<i>Pericalymma ellipticum</i> var. <i>ellipticum</i>			
285.	6012	<i>Regelia ciliata</i>			
286.	6014	<i>Regelia inops</i>			
287.	6033	<i>Scholtzia involucrata</i> (Spiked Scholtzia)			
288.	20135	<i>Taxandria linearifolia</i>			
289.	15431	<i>Verticordia acerosa</i> var. <i>acerosa</i>			
290.	15432	<i>Verticordia densiflora</i> var. <i>densiflora</i>			
291.	6077	<i>Verticordia drummondii</i> (Drummond's Featherflower)			

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292.	14714	<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>		P4	
293.	6101	<i>Verticordia nitens</i> (Morrison Featherflower)			
294.	6103	<i>Verticordia ovalifolia</i>			
<b>Orchidaceae</b>					
295.	11136	<i>Caladenia denticulata</i>			
296.	1586	<i>Caladenia discoidea</i> (Dancing Orchid)			
297.	1592	<i>Caladenia flava</i> (Cowslip Orchid)			
298.	15348	<i>Caladenia flava</i> subsp. <i>flava</i>			
299.	1596	<i>Caladenia huegelii</i> (Grand Spider Orchid)		T	
300.	1599	<i>Caladenia latifolia</i> (Pink Fairy Orchid)			
301.	1605	<i>Caladenia marginata</i> (White Fairy Orchid)			
302.	15503	<i>Caladenia paludosa</i>			
303.	18019	<i>Caladenia vulgata</i>			
304.	19649	<i>Disa bracteata</i>	Y		
305.	12943	<i>Diuris brumalis</i>			
306.	11049	<i>Diuris corymbosa</i>			
307.	1645	<i>Epiblema grandiflorum</i> (Babe-in-a-cradle)			
308.	1653	<i>Leporella fimbriata</i> (Hare Orchid)			
309.	12761	<i>Microtis media</i> subsp. <i>densiflora</i>			
310.	15419	<i>Microtis media</i> subsp. <i>media</i>			
311.	23500	<i>Paracaleana hortiorum</i>			
312.	1667	<i>Paracaleana nigrita</i> (Flying Duck Orchid)			
313.	1680	<i>Prasophyllum parvifolium</i> (Autumn Leek Orchid)			
314.	1686	<i>Pterostylis barbata</i> (Bird Orchid)			
315.	1693	<i>Pterostylis recurva</i> (Jug Orchid)			
316.	12217	<i>Pterostylis sanguinea</i>			
317.	19342	<i>Pterostylis</i> sp. <i>clubbed snail orchid</i> (R. Davis 8088)			
318.	18658	<i>Pterostylis</i> sp. <i>short sepals</i> (W. Jackson BJ259)			
319.	1698	<i>Pterostylis vittata</i> (Banded Greenhood)			
320.	16367	<i>Pyrorchis nigricans</i> (Red beaks)			
321.	1702	<i>Thelymitra campanulata</i> (Shirt Orchid)			
322.	1705	<i>Thelymitra crinita</i> (Blue Lady Orchid)			
323.	20731	<i>Thelymitra vulgaris</i>			
<b>Orobanchaceae</b>					
324.	7090	<i>Parentucellia viscosa</i> (Sticky Bartsia)	Y		
<b>Oxalidaceae</b>					
325.	4356	<i>Oxalis pes-caprae</i> (Soursob)	Y		
<b>Papaveraceae</b>					
326.	2969	<i>Fumaria capreolata</i> (Whiteflower Fumitory)	Y		
<b>Phyllanthaceae</b>					
327.	4689	<i>Poranthera ericoides</i> (Heath Poranthera)			
328.	4691	<i>Poranthera microphylla</i> (Small Poranthera)			
<b>Phytolaccaceae</b>					
329.	2793	<i>Phytolacca octandra</i> (Red Ink Plant)	Y		
<b>Poaceae</b>					
330.	184	<i>Aira caryophyllea</i> (Silvery Hairgrass)	Y		
331.	200	<i>Amphipogon turbinatus</i>			
332.	17234	<i>Austrostipa compressa</i>			
333.	17240	<i>Austrostipa flavescens</i>			
334.	17241	<i>Austrostipa hemipogon</i>			
335.	8661	<i>Brachypodium distachyon</i> (False Brome)	Y		
336.	244	<i>Briza maxima</i> (Blowfly Grass)	Y		
337.	245	<i>Briza minor</i> (Shivery Grass)	Y		
338.	346	<i>Ehrharta brevifolia</i> (Annual Veldt Grass)	Y		
339.	347	<i>Ehrharta calycina</i> (Perennial Veldt Grass)	Y		
340.	485	<i>Microlaena stipoides</i> (Weeping Grass)			
341.	492	<i>Neurachne alopecuroides</i> (Foxtail Mulga Grass)			
342.	40424	<i>Pentameris airoides</i> subsp. <i>airoides</i>	Y		
343.	40422	<i>Pentameris pallida</i>	Y		
344.	571	<i>Poa annua</i> (Winter Grass)	Y		
345.	582	<i>Polypogon monspeliensis</i> (Annual Beardgrass)	Y		
346.	724	<i>Vulpia myuros</i> (Rat's Tail Fescue)	Y		
<b>Polygalaceae</b>					
347.	4554	<i>Comesperma flavum</i>			
348.	4564	<i>Comesperma virgatum</i> (Milkwort)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Portulacaceae</b>				
349.	2856 <i>Calandrinia liniflora</i> (Parakeelya)			
<b>Primulaceae</b>				
350.	36375 <i>Lysimachia arvensis</i> (Pimpernel)	Y		
<b>Proteaceae</b>				
351.	1775 <i>Adenanthos cygnorum</i> (Common Woollybush)			
352.	11837 <i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i> (Common Woollybush)			
353.	1791 <i>Adenanthos obovatus</i> (Basket Flower)			
354.	1800 <i>Banksia attenuata</i> (Slender Banksia)			
355.	1822 <i>Banksia ilicifolia</i> (Holly-leaved Banksia)			
356.	1830 <i>Banksia littoralis</i> (Swamp Banksia)			
357.	1834 <i>Banksia menziesii</i> (Firewood Banksia)			
358.	1876 <i>Conospermum incurvum</i> (Plume Smokebush)			
359.	1882 <i>Conospermum stoechadis</i> (Common Smokebush)			
360.	15520 <i>Conospermum stoechadis</i> subsp. <i>sclerophyllum</i>			
361.	14408 <i>Grevillea curviloba</i> subsp. <i>curviloba</i>		T	
362.	2229 <i>Isopogon dubius</i> (Pincushion Coneflower)			
363.	2273 <i>Persoonia saccata</i> (Snottygobble)			
364.	2299 <i>Petrophile linearis</i> (Pixie Mops)			
365.	2316 <i>Stirlingia latifolia</i> (Blueboy)			
366.	2329 <i>Synaphea spinulosa</i>			
367.	15532 <i>Synaphea spinulosa</i> subsp. <i>spinulosa</i>			
<b>Restionaceae</b>				
368.	1056 <i>Alexgeorgea nitens</i>			
369.	17833 <i>Chordifex microcodon</i>			
370.	31112 <i>Chordifex</i> sp. <i>Ellenbrook</i> (M. Trudgen MET 20790)			Y
371.	17663 <i>Desmocladius asper</i>			
372.	16595 <i>Desmocladius flexuosus</i>			
373.	17838 <i>Dielsia stenostachya</i>			
374.	1070 <i>Hypolaena exsulca</i>			
375.	17622 <i>Hypolaena robusta</i>		P4	
376.	17694 <i>Meeboldina scariosa</i>			
377.	17843 <i>Meeboldina tephрина</i>			
<b>Rhamnaceae</b>				
378.	4809 <i>Cryptandra pungens</i>			
<b>Rubiaceae</b>				
379.	18255 <i>Opercularia vaginata</i> (Dog Weed)			
<b>Rutaceae</b>				
380.	4437 <i>Boronia purdieana</i> (Winter Boronia)			
381.	17665 <i>Boronia purdieana</i> subsp. <i>purdieana</i>			
382.	4438 <i>Boronia ramosa</i>			
383.	11381 <i>Boronia ramosa</i> subsp. <i>anethifolia</i>			
384.	11564 <i>Boronia ramosa</i> subsp. <i>ramosa</i>			
385.	18529 <i>Philotheca spicata</i> (Pepper and Salt)			
<b>Santalaceae</b>				
386.	2344 <i>Leptomeria empetriiformis</i>			
387.	2350 <i>Leptomeria pauciflora</i> (Sparse-flowered Currant Bush)			
<b>Selaginellaceae</b>				
388.	6 <i>Selaginella gracillima</i> (Tiny Clubmoss)			
<b>Solanaceae</b>				
389.	6988 <i>Solanum americanum</i> (Glossy Nightshade)	Y		
390.	7022 <i>Solanum nigrum</i> (Black Berry Nightshade)	Y		
<b>Stylidiaceae</b>				
391.	7676 <i>Levenhookia pusilla</i> (Midget Stylewort)			
392.	7677 <i>Levenhookia stipitata</i> (Common Stylewort)			
393.	30278 <i>Stylidium androsaceum</i>			
394.	25831 <i>Stylidium araeophyllum</i>			
395.	7693 <i>Stylidium brunonianum</i> (Pink Fountain Triggerplant)			
396.	7696 <i>Stylidium calcaratum</i> (Book Triggerplant)			
397.	7699 <i>Stylidium carnosum</i> (Fleshy-leaved Triggerplant)			
398.	7709 <i>Stylidium crossocephalum</i> (Posy Triggerplant)			
399.	7713 <i>Stylidium dichotomum</i> (Pins-and-needles)			
400.	7716 <i>Stylidium diuroides</i> (Donkey Triggerplant)			
401.	7745 <i>Stylidium junceum</i> (Reed Triggerplant)			
402.	7756 <i>Stylidium longitubum</i> (Jumping Jacks)		P3	

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
403.	25829 <i>Stylidium neurophyllum</i>			
404.	25800 <i>Stylidium paludicola</i>			
405.	7773 <i>Stylidium petiolare</i> (Horn Triggerplant)			
406.	7774 <i>Stylidium piliferum</i> (Common Butterfly Triggerplant)			
407.	7785 <i>Stylidium repens</i> (Matted Triggerplant)			
408.	20521 <i>Stylidium rigidulum</i>			
409.	25806 <i>Stylidium scariosum</i>			
410.	7798 <i>Stylidium schoenoides</i> (Cow Kicks)			
411.	20603 <i>Stylidium trudgenii</i>		P3	
412.	7806 <i>Stylidium utricularioides</i> (Pink Fan Triggerplant)			

#### Thymelaeaceae

413.	5254 <i>Pimelea leucantha</i>			
414.	5268 <i>Pimelea sulphurea</i> (Yellow Banjine)			

#### Violaceae

415.	5216 <i>Hybanthus calycinus</i> (Wild Violet)			
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#### Xanthorrhoeaceae

416.	1256 <i>Xanthorrhoea preissii</i> (Grass tree)			
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#### Zamiaceae

417.	85 <i>Macrozamia riedlei</i> (Zamia)			
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#### Conservation Codes

T - Rare or likely to become extinct  
X - Presumed extinct  
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S - Other specially protected fauna  
1 - Priority 1  
2 - Priority 2  
3 - Priority 3  
4 - Priority 4  
5 - Priority 5

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

# NatureMap All fauna Report (5km)

Created By Guest user on 23/10/2012

Kingdom Animalia  
Current Names Only Yes  
Core Datasets Only Yes  
Method 'By Line'  
Group By Family

Family	Species	Records
Acanthizidae	6	87
Accipitridae	3	9
Agamidae	2	45
Anatidae	2	2
Artamidae	2	14
Campephagidae	1	39
Castriidae	1	1
Columbidae	3	17
Corvidae	2	110
Cracticidae	2	130
Cuculidae	1	4
Dasyuridae	1	2
Dicaeidae	1	3
Dicruridae	3	16
Diplodactylidae	1	1
Elapidae	4	8
Falconidae	5	13
Felidae	1	1
Halcyonidae	2	25
Hirundinidae	1	2
Hylidae	2	11
Limnodynastidae	1	18
Macropodidae	1	3
Maluridae	2	35
Meliphagidae	7	318
Meropidae	1	24
Muridae	4	21
Myobatrachidae	5	51
Neosittidae	1	2
Pachycephalidae	3	86
Pardalotidae	2	29
Peramelidae	1	92
Petroicidae	1	22
Phalangeridae	1	2
Podargidae	1	1
Psittacidae	7	36
Pygopodidae	3	7
Scincidae	14	71
Strigidae	1	1
Tarsipedidae	1	4
Threskiornithidae	2	2
Turnicidae	1	1
Typhlopidae	1	1
Varanidae	1	1
Zosteropidae	1	47
<b>TOTAL</b>	<b>109</b>	<b>1415</b>

Name ID Species Name Naturalised Conservation Code <sup>1</sup>Endemic To Query Area

## Acanthizidae

- 24260 *Acanthiza apicalis* (Broad-tailed Thornbill)
- 24261 *Acanthiza chrysorrhoa* (Yellow-rumped Thornbill)
- 24262 *Acanthiza inornata* (Western Thornbill)
- 25530 *Gerygone fusca* (Western Gerygone)
- 25534 *Sericornis frontalis* (White-browed Scrubwren)
- 30948 *Smicromis brevirostris* (Weebill)

## Accipitridae

- 25535 *Accipiter cirrocephalus* (Collared Sparrowhawk)
- 25536 *Accipiter fasciatus* (Brown Goshawk)
- 24285 *Aquila audax* (Wedge-tailed Eagle)

## Agamidae

- 30899 *Ctenophorus adelaidensis* (Southern Heath Dragons)
- 25510 *Pogona minor*

## Anatidae

	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
12.	24316	<i>Anas superciliosa</i> (Pacific Black Duck)			
13.	24321	<i>Chenonetta jubata</i> (Australian Wood Duck)			
<b>Artamidae</b>					
14.	25566	<i>Artamus cinereus</i> (Black-faced Woodswallow)			
15.	24353	<i>Artamus cyanopterus</i> (Dusky Woodswallow)			
<b>Campephagidae</b>					
16.	25568	<i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
<b>Castniidae</b>					
17.	33992	<i>Synemon gratiosa</i> (Graceful Sunmoth)		T	
<b>Columbidae</b>					
18.	24407	<i>Ocyphaps lophotes</i> (Crested Pigeon)			
19.	24409	<i>Phaps chalcoptera</i> (Common Bronzewing)			
20.	25590	<i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)			
<b>Corvidae</b>					
21.	24416	<i>Corvus bennetti</i> (Little Crow)			
22.	25592	<i>Corvus coronoides</i> (Australian Raven)			
<b>Cracticidae</b>					
23.	25595	<i>Cracticus tibicen</i> (Australian Magpie)			
24.	25596	<i>Cracticus torquatus</i> (Grey Butcherbird)			
<b>Cuculidae</b>					
25.	25598	<i>Cacomantis flabelliformis</i> (Fan-tailed Cuckoo)			
<b>Dasyuridae</b>					
26.	24092	<i>Dasyurus geoffroyi</i> (Chuditch, Western Quoll)		T	
<b>Dicaeidae</b>					
27.	25607	<i>Dicaeum hirundinaceum</i> (Mistletoebird)			
<b>Dicruridae</b>					
28.	24443	<i>Grallina cyanoleuca</i> (Magpie-lark)			
29.	25610	<i>Myiagra inquieta</i> (Restless Flycatcher)			
30.	25614	<i>Rhipidura leucophrys</i> (Willie Wagtail)			
<b>Diplodactylidae</b>					
31.	25518	<i>Strophurus spinigerus</i>			
<b>Elapidae</b>					
32.	25251	<i>Echiopsis curta</i> (Bardick)			
33.	25249	<i>Neelaps calonotos</i> (Black-striped Snake)		P3	
34.	25253	<i>Parasuta gouldii</i>			
35.	25259	<i>Pseudonaja affinis</i> subsp. <i>affinis</i> (Dugite)			
<b>Falconidae</b>					
36.	25621	<i>Falco berigora</i> (Brown Falcon)			
37.	25622	<i>Falco cenchroides</i> (Australian Kestrel)			
38.	24472	<i>Falco cenchroides</i> subsp. <i>cenchroides</i>			
39.	25624	<i>Falco peregrinus</i> (Peregrine Falcon)		S	
40.	24475	<i>Falco peregrinus</i> subsp. <i>macropus</i> (Australian Peregrine Falcon)		S	
<b>Felidae</b>					
41.	24041	<i>Felis catus</i> (Cat)			
<b>Halcyonidae</b>					
42.	30901	<i>Dacelo novaeguineae</i> (Laughing Kookaburra)			
43.	25549	<i>Todiramphus sanctus</i> (Sacred Kingfisher)			
<b>Hirundinidae</b>					
44.	24491	<i>Hirundo neoxena</i> (Welcome Swallow)			
<b>Hylidae</b>					
45.	25378	<i>Litoria adelaidensis</i> (Slender Tree Frog)			
46.	25388	<i>Litoria moorei</i> (Motorbike Frog)			
<b>Limnodynastidae</b>					
47.	25410	<i>Heleioporus eyrei</i> (Moaning Frog)			
<b>Macropodidae</b>					
48.	24133	<i>Macropus irma</i> (Western Brush Wallaby)		P4	
<b>Maluridae</b>					
49.	25652	<i>Malurus leucopterus</i> (White-winged Fairy-wren)			
50.	25654	<i>Malurus splendens</i> (Splendid Fairy-wren)			

	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Meliphagidae</b>					
51.	24560	<i>Acanthorhynchus superciliosus</i> (Western Spinebill)			
52.	24561	<i>Anthochaera carunculata</i> (Red Wattlebird)			
53.	24562	<i>Anthochaera lunulata</i> (Western Little Wattlebird)			
54.	24581	<i>Lichenostomus virescens</i> (Singing Honeyeater)			
55.	25661	<i>Lichmera indistincta</i> (Brown Honeyeater)			
56.	24583	<i>Manorina flavigula</i> (Yellow-throated Miner)			
57.	24596	<i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
<b>Meropidae</b>					
58.	24598	<i>Merops ornatus</i> (Rainbow Bee-eater)		IA	
<b>Muridae</b>					
59.	24215	<i>Hydromys chrysogaster</i> (Water-rat)		P4	
60.	24223	<i>Mus musculus</i> (House Mouse)			
61.	24230	<i>Pseudomys albocinereus</i> (Ash-grey Mouse)			
62.	24245	<i>Rattus rattus</i> (Black Rat)			
<b>Myobatrachidae</b>					
63.	25398	<i>Crinia georgiana</i> (Quacking Frog)			
64.	25399	<i>Crinia glauerti</i> (Clicking Frog)			
65.	25400	<i>Crinia insignifera</i> (Squelching Froglet)			
66.	25420	<i>Myobatrachus gouldii</i> (Turtle Frog)			
67.	25433	<i>Pseudophryne guentheri</i> (Crawling Toadlet)			
<b>Neosittidae</b>					
68.	25673	<i>Daphoenositta chrysoptera</i> (Varied Sittella)			
<b>Pachycephalidae</b>					
69.	25675	<i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
70.	25679	<i>Pachycephala pectoralis</i> (Golden Whistler)			
71.	25680	<i>Pachycephala rufiventris</i> (Rufous Whistler)			
<b>Pardalotidae</b>					
72.	25681	<i>Pardalotus punctatus</i> (Spotted Pardalote)			
73.	25682	<i>Pardalotus striatus</i> (Striated Pardalote)			
<b>Peramelidae</b>					
74.	24153	<i>Isoodon obesulus</i> subsp. <i>fusciventer</i> (Quenda, Southern Brown Bandicoot)		P5	
<b>Petroicidae</b>					
75.	24659	<i>Petroica goodenovii</i> (Red-capped Robin)			
<b>Phalangeridae</b>					
76.	25521	<i>Trichosurus vulpecula</i> (Common Brushtail Possum)			
<b>Podargidae</b>					
77.	25703	<i>Podargus strigoides</i> (Tawny Frogmouth)			
<b>Psittacidae</b>					
78.	25714	<i>Cacatua pastinator</i> (Western Long-billed Corella)			
79.	24729	<i>Cacatua tenuirostris</i> (Eastern Long-billed Corella)			
80.	25717	<i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
81.	24733	<i>Calyptorhynchus baudinii</i> (Baudin's Cockatoo (long-billed black-cockatoo))		T	
82.	24734	<i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo (short-billed black-cockatoo))		T	
83.	24738	<i>Neophema elegans</i> (Elegant Parrot)			
84.	25723	<i>Trichoglossus haematodus</i> (Rainbow Lorikeet)			
<b>Pygopodidae</b>					
85.	25005	<i>Lialis burtonis</i>			
86.	25509	<i>Pletholax gracilis</i> (Keeled Legless Lizard)			
87.	25007	<i>Pletholax gracilis</i> subsp. <i>gracilis</i>			
<b>Scincidae</b>					
88.	25011	<i>Acritoscincus trilineatus</i>			
89.	30893	<i>Cryptoblepharus buechananii</i>			
90.	25039	<i>Ctenotus fallens</i>			
91.	25047	<i>Ctenotus impar</i>			
92.	25096	<i>Egernia kingii</i> (King's Skink)			
93.	25115	<i>Hemiergis initialis</i> subsp. <i>initialis</i>			
94.	25128	<i>Lerista christinae</i>			
95.	25133	<i>Lerista elegans</i>			
96.	25165	<i>Lerista praepedita</i>			
97.	25184	<i>Menetia greyii</i>			
98.	25191	<i>Morethia lineoocellata</i>			
99.	25192	<i>Morethia obscura</i>			
100.	25519	<i>Tiliqua rugosa</i>			



Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
101.	25207 <i>Tiliqua rugosa subsp. rugosa</i>			
<b>Strigidae</b>				
102.	25748 <i>Ninox novaeseelandiae</i> (Boobook Owl)			
<b>Tarsipedidae</b>				
103.	24167 <i>Tarsipes rostratus</i> (Honey Possum)			
<b>Threskiornithidae</b>				
104.	24843 <i>Plegadis falcinellus</i> (Glossy Ibis)		IA	
105.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
<b>Turnicidae</b>				
106.	24851 <i>Turnix velox</i> (Little Button-quail)			
<b>Typhlopidae</b>				
107.	25288 <i>Ramphotyphlops waitii</i>			
<b>Varanidae</b>				
108.	25218 <i>Varanus gouldii</i> (Bungarra or Sand Monitor)			
<b>Zosteropidae</b>				
109.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye)			

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T - Rare or likely to become extinct  
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# EPBC Act Protected Matters Report

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

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

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

Report created: 23/10/12 12:53:01

[Summary](#)

[Details](#)

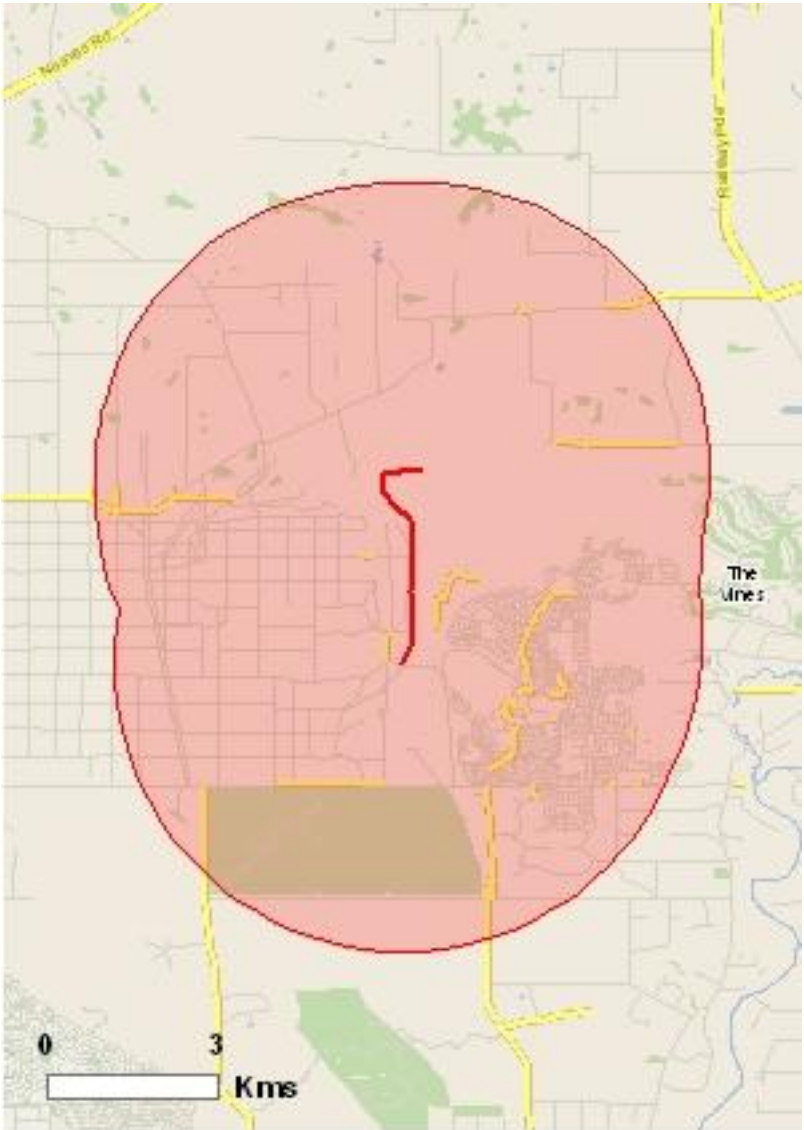
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

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# Summary

## Matters of National Environmental Significance

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

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Areas:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	2
<a href="#">Listed Threatened Species:</a>	19
<a href="#">Listed Migratory Species:</a>	9

## Other Matters Protected by the EPBC Act

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

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As [heritage values](#) of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

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

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

<a href="#">Commonwealth Land:</a>	1
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	6
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves:</a>	None

## Extra Information

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

<a href="#">Place on the RNE:</a>	3
<a href="#">State and Territory Reserves:</a>	4
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	16
<a href="#">Nationally Important Wetlands:</a>	None
<a href="#">Key Ecological Features (Marine)</a>	None

## Details

### Matters of National Environmental Significance

#### Listed Threatened Ecological Communities [\[ Resource Information \]](#)

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

Name	Status	Type of Presence
<a href="#">Assemblages of plants and invertebrate animals of tumulus (organic mound) springs of the Swan Coastal Plain</a>	Endangered	Community known to occur within area
<a href="#">Shrublands and Woodlands on Muchea Limestone of the Swan Coastal Plain</a>	Endangered	Community known to occur within area

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

Name	Status	Type of Presence
Birds		
<a href="#">Calyptrorhynchus banksii naso</a> Forest Red-tailed Black-Cockatoo [67034]	Vulnerable	Species or species habitat may occur within area
<a href="#">Calyptrorhynchus baudinii</a> Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Calyptrorhynchus latirostris</a> Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Vulnerable	Species or species habitat may occur within area
Insects		
<a href="#">Synemon gratiosa</a> Graceful Sun Moth [66757]	Endangered	Species or species habitat may occur within area
Mammals		
<a href="#">Dasyurus geoffroii</a> Chuditch, Western Quoll [330]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Plants		
<a href="#">Andersonia gracilis</a> Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area
<a href="#">Centrolepis caespitosa</a> [6393]	Endangered	Species or species habitat likely to occur within area
<a href="#">Chamelaucium sp. Gingin (N.G.Marchant 6)</a> Gingin Wax [64649]	Endangered	Species or species habitat may occur within area
<a href="#">Darwinia foetida</a> Muchea Bell [83190]	Critically Endangered	Species or species habitat likely to occur within area
<a href="#">Epiblema grandiflorum var. cyaneum</a> Baby Blue Orchid, Blue Babe-in-the-cradle Orchid, Blue Babe-in-a-cradle [67182]	Endangered	Species or species habitat may occur within area
<a href="#">Grevillea curviloba subsp. curviloba</a> Curved-leaf Grevillea [64908]	Endangered	Species or species habitat likely to occur within area
<a href="#">Grevillea curviloba subsp. incurva</a> Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat likely to occur within area
<a href="#">Hydatella dioica</a> One-sexed Hydatella [4898]	Endangered	Species or species habitat likely to occur within area
<a href="#">Lepidosperma rostratum</a> Beaked Lepidosperma [14152]	Endangered	Species or species habitat likely to occur within area
<a href="#">Thelymitra manginii K.Dixon &amp; Batty ms.</a> [67443]	Endangered	Species or species habitat likely to occur within area
<a href="#">Thelymitra stellata</a> Star Sun-orchid [7060]	Endangered	Species or species habitat likely to occur within area
<a href="#">Villarsia calthifolia</a> Mountain Villarsia [10886]	Endangered	Species or species habitat likely to occur within area
Listed Migratory Species		[ <a href="#">Resource Information</a> ]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat may occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
Migratory Terrestrial Species		
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area



Name	Threatened	Type of Presence
<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat may occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	<a href="#">[ Resource Information ]</a>
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The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -

Listed Marine Species	<a href="#">[ Resource Information ]</a>
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\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat may occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area

Extra Information

Places on the RNE [ Resource Information ]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
<a href="#">Ellenbrook National Estate Area</a>	WA	Registered
<a href="#">Melaleuca Park</a>	WA	Registered
Historic		
<a href="#">Belhus Estate</a>	WA	Registered

State and Territory Reserves [ Resource Information ]

Name	State
Unnamed WA46875	WA
Unnamed WA46919	WA
Unnamed WA46920	WA
Unnamed WA49300	WA

Invasive Species [ Resource Information ]

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

Name	Status	Type of Presence
Mammals		
<a href="#">Felis catus</a> Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
<a href="#">Oryctolagus cuniculus</a> Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
<a href="#">Vulpes vulpes</a> Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
<a href="#">Asparagus asparagoides</a> Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
<a href="#">Brachiaria mutica</a> Para Grass [5879]		Species or species habitat may occur within area
<a href="#">Cenchrus ciliaris</a> Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
<a href="#">Chrysanthemoides monilifera</a> Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
<a href="#">Genista sp. X Genista monspessulana</a> Broom [67538]		Species or species habitat may occur within area
<a href="#">Lantana camara</a> Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
<a href="#">Lycium ferocissimum</a> African Boxthorn, Boxthorn [19235]		Species or species habitat may occur within area

Name	Status	Type of Presence
<a href="#">Olea europaea</a> Olive, Common Olive [9160]		Species or species habitat may occur within area
<a href="#">Pinus radiata</a> Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
<a href="#">Rubus fruticosus aggregate</a> Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
<a href="#">Salix spp. except S.babylonica, S.x calodendron &amp; S.x reichardtii</a> Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
<a href="#">Salvinia molesta</a> Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
<a href="#">Tamarix aphylla</a> Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area



# Coordinates

-31.776439 115.949246,-31.773088 115.950845,-31.771185 115.950921,-31.765322  
115.95054,-31.759459 115.950692,-31.75451 115.950921,-31.753139 115.950083,-31.751997  
115.948408,-31.74956 115.946124,-31.747352 115.946048,-31.746667 115.9462,-31.746286  
115.948865,-31.74621 115.952291

# Caveat

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

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

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

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

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

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

- migratory and
- marine

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

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

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

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

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

# Acknowledgements

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

- [Department of Environment, Climate Change and Water, New South Wales](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment and Natural Resources, South Australia](#)
- [Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [Environmental and Resource Management, Queensland](#)
- [Department of Environment and Conservation, Western Australia](#)
- [Department of the Environment, Climate Change, Energy and Water](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Museum Victoria](#)
- [Australian Museum](#)
- [SA Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Atherton and Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence](#)
- [State Forests of NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- Other groups and individuals

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

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

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## Appendix C - Conservation Codes

## EPBC Act Fauna Conservation Categories

### Listed threatened species and ecological communities

An action will require approval from the Environment Minister if the action has, will have, or is likely to have a significant impact on a species listed in any of the following categories:

- extinct in the wild,
- critically endangered,
- endangered, or
- vulnerable.

### Critically endangered and endangered species

An action has, will have, or is likely to have a significant impact on a critically endangered or endangered species if it does, will, or is likely to:

- lead to a long-term decrease in the size of a population, or
- reduce the area of occupancy of the species, or
- fragment an existing population into two or more populations, or
- adversely affect habitat critical to the survival of a species, or
- disrupt the breeding cycle of a population, or
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat\*, or
- interfere with the recovery of the species.

\*Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a critically endangered or endangered species by direct competition, modification of habitat, or predation.

### Vulnerable species

An action has, will have, or is likely to have a significant impact on a vulnerable species if it does, will, or is likely to:

- lead to a long-term decrease in the size of an important population of a species, or
- reduce the area of occupancy of an important population, or
- fragment an existing important population into two or more populations, or
- adversely affect habitat critical to the survival of a species, or
- disrupt the breeding cycle of an important population, or
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- result in invasive species that are harmful a vulnerable species becoming established in the vulnerable species' habitat\*, or

- interferes substantially with the recovery of the species.
- An important population is one that is necessary for a species' long-term survival and recovery. This may include populations that are:
  - key source populations either for breeding or dispersal,
  - populations that are necessary for maintaining genetic diversity, and/or
  - populations that are near the limit of the species range.

\*Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a vulnerable species by direct competition, modification of habitat, or predation.

#### Listed migratory species

The EPBC Act protects lands and migratory species that are listed under International Agreements.

- Appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals) for which Australia is a Range State under the Convention;
- The Agreement between the Government of Australia and the Government of the Peoples Republic of China for the Protection of Migratory Birds and their Environment (CAMBA);
- The Agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA); and
- The Agreement between the Government of Australia and the Government of the Republic of Korea on the Protection of Migratory Birds (ROKAMBA).
- other international agreements approved by the Commonwealth Environment Minister.

An action will require approval from the Environment Minister if the action has, will have, or is likely to have a significant impact on a listed migratory species. Note that some migratory species are also listed as threatened species.

The criteria below are relevant to migratory species that are not threatened.

An action has, will have, or is likely to have a significant impact on a migratory species if it does, will, or is likely to:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species, or
- result in invasive species that is harmful to the migratory species becoming established\* in an area of important habitat of the migratory species, or
- Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species.
- An area of important habitat is:
  - habitat utilized by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, or
  - habitat utilized by a migratory species which is at the limit of the species range, or
  - habitat within an area where the species is declining.

Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an ecologically significant proportion of the population varies with the species (each circumstance will need to be evaluated).

\*Introducing an invasive species into the habitat may result in that species becoming established. An invasive species may harm a migratory species by direct competition, modification of habitat, or predation.

**Conservation categories and definitions for *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed flora and fauna species**

Conservation Category	Definition
Extinct	Taxa not definitely located in the wild during the past 50 years
Extinct in the Wild	Taxa known to survive only in captivity
Critically Endangered	Taxa facing an extremely high risk of extinction in the wild in the immediate future
Endangered	Taxa facing a very high risk of extinction in the wild in the near future
Vulnerable	Taxa facing a high risk of extinction in the wild in the medium-term
Near Threatened	Taxa that risk becoming Vulnerable in the wild
Conservation Dependent	Taxa whose survival depends upon ongoing conservation measures. Without these measures, a conservation dependent taxon would be classified as Vulnerable or more severely threatened.
Data Deficient (Insufficiently Known)	Taxa suspected of being Rare, Vulnerable or Endangered, but whose true status cannot be determined without more information.
Least Concern	Taxa that are not considered Threatened

**Conservation codes for Western Australian Flora and Fauna listed under the *Wildlife Conservation Act 1950* (WC Act) and the Department of Environment and Conservation**

Code	Conservation Category	Description
T	Schedule 1 under the WC Act	Threatened Fauna (Fauna that is rare or is likely to become extinct) Threatened Flora (Declared Rare Flora – Extant) Taxa that have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such. CR: Critically Endangered – considered to be facing an extremely high risk of extinction in the wild. EN: Endangered – considered to be facing a very high risk of extinction in the wild. VU: Vulnerable – considered to be facing a high risk of extinction in the wild.
X	Schedule 2 under the WC Act	Presumed Extinct Fauna Presumed Extinct Flora (Declared rare Flora – Extinct) Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such.
IA	Schedule 3 under the WC Act	Birds protected under an international agreement Birds that are subject to an agreement between governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction.
S	Schedule 4 under the WC Act	Other specially protected fauna Fauna that is in need of special protection, otherwise than for the reasons mentioned in the above schedules.
1	Priority One: Poorly-known taxa	Taxa that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
2	Priority Two: Poorly-known taxa	Taxa that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
3	Priority Three: Poorly-known taxa	Taxa that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Taxa may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.
4	Priority Four: Rare, Near Threatened and other taxa in need of	(a) Rare. Taxa that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.

Code	Conservation Category	Description
	monitoring	(b) Near Threatened. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Taxa that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
5	Priority 5: Conservation Dependent taxa	Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxon becoming threatened within five years.

### Conservation Codes for Threatened Ecological Communities (TECs) under the EPBC Act and Western Australia

Western Australia Conservation Categories		Federal Government Conservation Categories (EPBC Act)	
Presumed Totally Destroyed (PD)	The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.	Critically Endangered (CR)	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future
Critically Endangered (CR)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated	Endangered (EN)	If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future
Endangered (EN)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.	Vulnerable (VU)	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future
Vulnerable (VU)	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.		



## Appendix D – Flora data

Flora species recorded within the Project Area during the spring 2012 field survey

Family	Species	Status
Anarthriaceae	<i>Lyginia barbata</i>	
Apiaceae	<i>Xanthosia huegelii</i>	
Araliaceae	<i>Trachymene pilosa</i>	
Asparagaceae	<i>Laxmannia squarrosa</i>	
Asparagaceae	<i>Lomandra hermaphrodita</i>	
Asparagaceae	<i>Lomandra</i> sp.	
Asparagaceae	<i>Thysanotus patersonii/manglesianus</i>	
Asparagaceae	<i>Thysanotus thyrsoides</i>	
Asteraceae	<i>Conyza</i> sp.	*
Asteraceae	<i>Hypochaeris</i> sp.	*
Asteraceae	<i>Podothea chrysantha</i>	
Asteraceae	<i>Podothea gnaphalioides</i>	
Asteraceae	<i>Sonchus oleraceus</i>	*
Asteraceae	<i>Ursinia anthemoides</i>	*
Campanulaceae	<i>Wahlenbergia</i> sp.	
Caryophyllaceae	<i>Silene gallica</i>	*
Casuarinaceae	<i>Allocasuarina fraseriana</i>	
Casuarinaceae	<i>Allocasuarina humilis</i>	
Colchicaceae	<i>Burchardia congesta</i>	
Crassulaceae	<i>Crassula</i> sp.	
Cyperaceae	<i>Schoenus curvifolius</i>	
Dasypogonaceae	<i>Dasypogon bromeliifolius</i>	
Dilleniaceae	<i>Hibbertia</i> ? <i>spicata</i>	
Dilleniaceae	<i>Hibbertia huegelii</i>	
Dilleniaceae	<i>Hibbertia hypericoides</i>	
Dilleniaceae	<i>Hibbertia</i> sp.	
Dilleniaceae	<i>Hibbertia</i> sp. Gnangara (J.R. Wheeler 2329)	
Dilleniaceae	<i>Hibbertia subvaginata</i>	
Ericaceae	<i>Andersonia</i> ? <i>gracilis</i>	
Ericaceae	<i>Astroloma xerophyllum</i>	
Ericaceae	<i>Croninia kingiana</i>	
Ericaceae	<i>Ericaceae</i> sp.	
Ericaceae	<i>Leucopogon polymorphus</i>	
Ericaceae	<i>Leucopogon</i> sp.	
Ericaceae	<i>Lysinema</i> ? <i>pentapetalum</i>	
Euphorbiaceae	<i>Euphorbia</i> sp.	
Fabaceae	<i>Acacia pulchella</i>	
Fabaceae	<i>Bossiaea eriocarpa</i>	
Fabaceae	<i>Daviesia hakeoides</i>	

Family	Species	Status
Fabaceae	<i>Daviesia triflora</i>	
Fabaceae	<i>Gastrolobium capitatum</i>	
Fabaceae	<i>Gompholobium tomentosum</i>	
Fabaceae	<i>Hovea chorizemifolia</i>	
Fabaceae	<i>Jacksonia furcellata</i>	
Fabaceae	<i>Trifolium angustifolium</i>	*
Geraniaceae	<i>Pelargonium capitatum</i>	*
Goodeniaceae	<i>Dampiera linearis</i>	
Goodeniaceae	<i>Lechenaultia biloba</i>	
Goodeniaceae	<i>Scaevola repens</i>	
Haemodoraceae	<i>Anigozanthos ? viridis</i>	
Haemodoraceae	<i>Anigozanthos</i> sp.	
Haemodoraceae	<i>Blancoa canescens</i>	
Haemodoraceae	<i>Conostylis ? aculeata</i>	
Haemodoraceae	<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	
Haemodoraceae	<i>Conostylis candicans</i>	
Iridaceae	<i>Gladiolus caryophyllaceus</i>	*
Iridaceae	<i>Patersonia occidentalis</i>	
Lauraceae	<i>Cassytha</i> sp.	
Loranthaceae	<i>Nuytsia floribunda</i>	
Molluginaceae	<i>Macarthuria australis</i>	
Myrtaceae	<i>Calothamnus quadrifidus</i>	
Myrtaceae	<i>Calytrix flavescens</i>	
Myrtaceae	<i>Calytrix fraseri</i>	
Myrtaceae	<i>Calytrix</i> sp.	
Myrtaceae	<i>Calytrix strigosa</i>	
Myrtaceae	<i>Eremaea pauciflora</i>	
Myrtaceae	<i>Eucalyptus rudis</i>	
Myrtaceae	<i>Eucalyptus todtiana</i>	
Myrtaceae	<i>Hypocalymma angustifolium</i>	
Myrtaceae	<i>Hypocalymma robustum</i>	
Myrtaceae	<i>Kunzea glabrescens</i>	
Myrtaceae	<i>Kunzea micrantha</i>	
Myrtaceae	<i>Melaleuca ? trichophylla</i>	
Myrtaceae	<i>Melaleuca parviceps</i>	
Myrtaceae	<i>Melaleuca preissiana</i>	
Myrtaceae	<i>Melaleuca trichophylla</i>	
Myrtaceae	<i>Myrtaceae</i> sp.	
Myrtaceae	<i>Regelia ciliata</i>	
Myrtaceae	<i>Regelia inops</i>	
Myrtaceae	<i>Scholtzia involucrata</i>	
Myrtaceae	<i>Verticordia ovalifolia</i>	
Onagraceae	<i>Oenothera</i> sp.	
Phyllanthaceae	<i>Poranthera microphylla</i>	
Poaceae	<i>Aira</i> sp.	*
Poaceae	<i>Amphipogon turbinatus</i>	
Poaceae	<i>Austrostipa compressa</i>	
Poaceae	<i>Avena barbata</i>	*
Poaceae	<i>Briza maxima</i>	*

Family	Species	Status
Poaceae	<i>Bromus ? diandrus</i>	
Poaceae	<i>Ehrharta longiflora</i>	*
Poaceae	<i>Lolium rigidum</i>	*
Poaceae	<i>Rytidosperma caespitosum</i>	
Primulaceae	<i>Lysimachia arvensis</i>	*
Proteaceae	<i>Adenanthos cygnorum</i>	
Proteaceae	<i>Banksia attenuata</i>	
Proteaceae	<i>Banksia menziesii</i>	
Proteaceae	<i>Conospermum acerosum</i>	
Proteaceae	<i>Conospermum stoechadis</i> subsp. <i>stoechadis</i>	
Proteaceae	<i>Petrophile linearis</i>	
Proteaceae	<i>Stirlingia latifolia</i>	
Restionaceae	<i>Alexgeorgea nitens</i>	
Restionaceae	<i>Desmocladus flexuosus</i>	
Restionaceae	<i>Hypolaena exsulca</i>	
Rutaceae	<i>Boronia ramosa</i> subsp. <i>anethifolia</i>	
Rutaceae	<i>Philotheca spicata</i>	
Stylidiaceae	<i>Levenhookia stipitata</i>	
Stylidiaceae	<i>Stylidium ? araephyllum</i>	
Stylidiaceae	<i>Stylidium brunonianum</i>	
Stylidiaceae	<i>Stylidium crossocephalum</i>	
Stylidiaceae	<i>Stylidium diuroides</i>	
Stylidiaceae	<i>Stylidium divaricatum</i>	
Stylidiaceae	<i>Stylidium repens</i>	
Stylidiaceae	<i>Stylidium piliferum</i>	
Stylidiaceae	<i>Stylidium rigidulum</i>	
Stylidiaceae	<i>Stylidium</i> sp.	
Zamiaceae	<i>Macrozamia fraseri</i>	

#### Definitions for flora and fauna likelihood of occurrence assessment

Likelihood of occurrence	Definition
Known	Species definitely recorded within the Project Area from previous records or field survey results.
Likely	Species previously recorded within 5 km and suitable habitat occurs at the Project Area.
Possible	Species previously recorded within 5 km with marginally suitable habitat occurring at the Project Area. OR Species not previously recorded within 5 km, but suitable habitat occurs at the Project Area.
Unlikely	Species previously recorded within 5 km but suitable habitat does not occur at the Project Area.
Highly unlikely	Species not previously recorded within 5 km, suitable habitat does not occur at the Project Area and/ or Project Area is outside the species' natural distribution.

Flora likelihood of assessment for the Ellenbrook Project Area

Family	Species	Status		Source		Details and Habitat	Likelihood of Occurrence Assessment
		State	Federal	DEC/NatureMap	EPBC		
Apiaceae	<i>Eryngium pinnatifidum</i> subsp. <i>palustre</i>	P3		X		-	Possible
Centrolepidaceae	<i>Centrolepis caespitosa</i>	P4	E		X	Tufted annual, herb (forming a rounded cushion up to 25 mm across). Fl. Oct–Dec. White sand, clay. Salt flats, wet areas	Unlikely - habitat not present
Cyperaceae	<i>Cyathochaeta teretifolia</i>	P3		X		Rhizomatous, clumped, robust perennial, grass-like or herb (sedge), to 2 m high, to 1.0 m wide. Fl. brown. Grey sand, sandy clay. Swamps, creek edges.	Unlikely - habitat not present
Cyperaceae	<i>Lepidosperma rostratum</i>	T	E		X	Rhizomatous, tufted perennial, grass-like or herb (sedge), 0.5 m high. Fl. brown. Peaty sand, clay	Unlikely - habitat not present
Dasypogonaceae	<i>Calectasia</i> sp. Pinjar	P1		X		Perennial, herb, to 0.4 m high, with multiple stems and roots. Deep grey quartz soils. Gentle slopes, above damplands.	Possible - some habitat present and recorded within 5 km of the Project Area

Family	Species	Status		Source		Details and Habitat	Likelihood of Occurrence Assessment
		State	Federal	DEC/NatureMap	EPBC		
Dilleniaceae	<i>Hibbertia helianthemoides</i>	P3		X		Spreading to erect, low or prostrate shrub, to 0.3 m high. Fl. yellow, Jul or Sep to Oct. Clayey sand over sandstone or loam over quartzite. Hills and scree slopes.	Unlikely - habitat not present
Ericaceae	<i>Andersonia gracilis</i>	T	E		X	Slender erect or open straggly shrub, 0.1–0.5(–1) m high. Fl. white, pink, purple, Sep–Nov. White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	Unlikely - habitat not present
Euphorbiaceae	<i>Stachystemon</i> sp. Keysbrook	P1		X		Flowers Oct	Possible
Haemodoraceae	<i>Phlebocarya pilosissima</i> subsp. <i>pilosissima</i>	P3		X		Shortly rhizomatous, compactly tufted perennial, grass-like or herb, 0.15-0.4 m high. Fl. cream-white, Aug to Oct. White or grey sand, lateritic gravel.	Likely - habitat present and has been recorded within 5 km of Project Area

Family	Species	Status		Source		Details and Habitat	Likelihood of Occurrence Assessment
		State	Federal	DEC/NatureMap	EPBC		
Menyanthaceae	<i>Villarsia calthifolia</i> (Name changed to <i>Ornduffia calthifolia</i> )	T	E		X	Upright tuberous rhizomatous herb 0.1—1.2 m. Fl. yellow. Granite slopes with brown sandy loam over granite	Unlikely - habitat not present
Myrtaceae	<i>Chamelaucium</i> sp. Gingin	T	E		X	This species is restricted to the Gingin area. The species occurs on white/yellow sand supporting open low woodland over open scrub, with <i>Eucalyptus tottiana</i> , <i>Banksia attenuata</i> and <i>Hibbertia</i> sp. <i>Chamelaucium</i> sp.	Possible - habitat present
Myrtaceae	<i>Darwinia foetida</i>	T	CE		X	-	Possible
Myrtaceae	<i>Verticordia lindleyi</i> subsp. <i>Lindleyi</i>	P4		X		Erect shrub, 0.2–0.75 m high. Fl. pink, May/Nov–Jan. Sand, sandy clay. Winter-wet depressions.	Possible - some habitat present and has been recorded within 5 km of Project Area



Family	Species	Status		Source		Details and Habitat	Likelihood of Occurrence Assessment
		State	Federal	DEC/NatureMap	EPBC		
Orchidaceae	<i>Caladenia huegelii</i>	T	E	X		Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green & cream & red, Sep to Oct. Grey or brown sand, clay loam	Likely - habitat present and has been recorded within 5 km of Project Area
Orchidaceae	<i>Epiblema grandiflorum</i> var. <i>cyaneum</i> (more recently known as <i>Epiblema grandiflorum</i> )	No listing (previously T)	E		X	Tuberous herb, 0.3-0.65 m high, 0.03 m wide. Fl. purple, pale blue. Black peaty sand over clay, grey white peaty sand. Swamp, in shallow water	Unlikely - habitat not present
Orchidaceae	<i>Thelymitra manginii</i> (more recently known as <i>Thelymitra dedmaniarum</i> )	T	E		X	Tuberous, perennial, herb, to 0.8 m high. Fl. yellow, Nov to Dec or Jan. Granite.	Unlikely - habitat not present
Orchidaceae	<i>Thelymitra stellata</i>	T	E		X	Tuberous, perennial, herb, 0.15–0.25 m high. Fl. yellow, brown, Oct–Nov. Sand, gravel, lateritic loam.	Possible - habitat present
Proteaceae	<i>Grevillea curviloba</i> subsp. <i>curviloba</i>	T	E	X	X	Prostrate to erect shrub, 0.1–2.5 m high. Fl. white, cream, Oct. Grey sand. Winter-wet heath.	Unlikely - habitat not present
Proteaceae	<i>Grevillea curviloba</i> subsp. <i>incurva</i>	T	E		X	Prostrate to erect shrub, 0.1–2.5 m high. Fl. white, cream, Aug–Sep. Sand, sandy loam. Winter-wet heath.	Unlikely - habitat not present

Family	Species	Status		Source		Details and Habitat	Likelihood of Occurrence Assessment
		State	Federal	DEC/NatureMap	EPBC		
Restionaceae	<i>Hypolaena robusta</i>	P4		X		Dioecious rhizomatous, perennial, herb, ca 0.5 m high. Fl. Sep to Oct. White sand. Sandplains.	Likely - habitat present and has been recorded within 5km of Project Area
Stylidiaceae	<i>Stylidium longitubum</i>	P3		X		Erect annual (ephemeral), herb, 0.05-0.12 m high. Fl. pink, Oct to Dec. Sandy clay, clay. Seasonal wetlands.	Unlikely - habitat is not present
Stylidiaceae	<i>Stylidium trudgenii</i>	P3		X		Caespitose perennial, herb, 0.05-0.5 m high. Grey sand, dark grey to black sandy peat. Margins of winter-wet swamps, depressions.	Unlikely - habitat not present

# Ellenbrook tank flora & fauna survey

Site Q01

Described by GO

Date 30/10/2012 Type Q

Location

MGA Zone

mE 400567

mN 6487270

E

S

Habitat Banksia woodland

Soil Grey sand

Vegetation

Veg Condition Pristine - Excellent

Fire Age Moderate (<5 years)

Notes Top of hill sloping E-W.

Weeds, fire in past.

Rock 0%

Bare ground 10-30%

Logs 0%

Twigs 2-10%

Leaves 30-70%



## SPECIES LIST:

Species	COVER	HEIGHT
<i>Stylidium crossocephalum</i>	<2	0.15
<i>Calytrix</i> sp.	10-30	0.2
<i>Dampiera linearis</i>	<2	0.2
<i>Andersonia</i> ? <i>gracilis</i>	2-10	0.3
<i>Gompholobium tomentosum</i>	<2	0.3
<i>Hibbertia</i> sp. Gnangara (J.R. Wheeler 2329)	<2	0.3
<i>Hibbertia subvaginata</i>	<2	0.3
<i>Lechenaultia biloba</i>	<2	0.3
<i>Leucopogon</i> sp.	<2	0.3
<i>Melaleuca parviceps</i>	2-10	0.3
<i>Stirlingia latifolia</i>	<2	0.3
<i>Croninia kingiana</i>	30-70	0.4
<i>Dasypogon bromeliifolius</i>	<2	0.4
<i>Astroloma xerophyllum</i>	30-70	0.8
<i>Hovea chorizemifolia</i>	<2	0.8
<i>Petrophile linearis</i>	2-10	0.8
<i>Scholtzia involucreata</i>	30-70	1.1
<i>Banksia attenuata</i>	30-70	4
<i>Banksia menziesii</i>	2-10	4
<i>Cassytha</i> sp.	<2	creeper
<i>Alexgeorgea nitens</i>	ADJ	
<i>Anigozanthos</i> sp.	ADJ	
<i>Eremaea pauciflora</i>	ADJ	
<i>Eremaea pauciflora</i>	ADJ	

Eucalyptus tottiana	ADJ
Lomandra hermaphrodita	ADJ
Macarthuria australis	<2
Schoenus curvifolius	ADJ
Stylidium ? araephyllum	ADJ

# Ellenbrook tank flora & fauna survey

Site Q02

Described by GO

Date 30/10/2012 Type Q

Location

MGA Zone

mE 400528

mN 6487090

E

S

Habitat Banksia woodland

Soil Grey sand

Vegetation

Veg Condition Pristine - Excellent

Fire Age Old (5-20 years)

Notes

Slope N-S.

Weeds.

Rock 0%

Bare ground 10-30%

Logs 0%

Twigs 2-10%

Leaves 30-70%



## SPECIES LIST:

Species	COVER	HEIGHT
Laxmannia squarrosa	<2	0.15
Lechenaultia biloba	<2	0.15
Lyginia barbata	<2	0.15
Andersonia ? gracilis	<2	0.2
Calytrix flavescens	2-10	0.2
Conostylis candicans	<2	0.2
Gompholobium tomentosum	<2	0.2
Hibbertia subvaginata	2-10	0.2
Lomandra hermaphrodita	<2	0.2
Melaleuca ? trichophylla	<2	0.2
Petrophile linearis	2-10	0.2
Ursinia anthemoides	<2	0.2
Patersonia occidentalis	<2	0.4
Stylidium brunonianum	<2	0.4
Bossiaea eriocarpa	<2	0.5
Astroloma xerophyllum	30-70	0.7
Conospermum acerosum	<2	0.7
Regelia ciliata	<2	0.8
Croninia kingiana	10-30	1.1
Stirlingia latifolia	2-10	1.6
Scholtzia involucrata	30-70	1.8
Hovea chorizemifolia	2-10	2
Banksia attenuata	30-70	3.5
Cassytha sp.	<2	creeper

Andersonia ? gracilis	ADJ
Astroloma xerophyllum	ADJ
Austrostipa compressa	ADJ
Conospermum acerosum	ADJ
Dasypogon bromeliifolius	ADJ
Hypolaena exsulca	ADJ
Leucopogon polymorphus	
Rytidosperma caespitosum	ADJ
Verticordia ovalifolia	ADJ

# Ellenbrook tank flora & fauna survey

Site Q03

Described by GO

Date 30/10/2012 Type Q

Location

MGA Zone mE 400384 mN 6487160 E S

Habitat Banksia woodland

Soil Grey sand

Vegetation

Veg Condition Pristine - Excellent

Fire Age Old (5-20 years)

Notes Side of dune.

S aspect.

Ursinia, ?dieback.

Rock 0%

Bare ground 30-70%

Logs 2-10%

Twigs 2-10%

Leaves 10-30%



## SPECIES LIST:

Species	COVER	HEIGHT
<i>Austrostipa compressa</i>	<2	0.2
<i>Banksia attenuata</i>	10-30	4
<i>Calytrix</i> sp.	10-30	0.2
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	<2	0.3
<i>Daviesia hakeoides</i>	<2	0.15
<i>Eremaea pauciflora</i>	30-70	0.7
<i>Ericaceae</i> sp.	2-10	0.2
<i>Hibbertia huegelii</i>	<2	0.5
<i>Hibbertia</i> sp.	<2	0.5
<i>Hibbertia subvaginata</i>	30-70	0.3
<i>Hovea chorizemifolia</i>	<2	1
<i>Hypocalymma robustum</i>	2-10	0.7
<i>Lechenaultia biloba</i>	30-70	0.2
<i>Leucopogon</i> sp.	<2	1
<i>Levenhookia stipitata</i>	2-10	0.25
<i>Lomandra hermaphrodita</i>	<2	0.2
<i>Lyginia barbata</i>	<2	0.5
<i>Lyginia barbata</i>	<2	0.3
<i>Lysinema ? pentapetalum</i>	<2	0.5
<i>Macrozamia fraseri</i>	<2	1.9
<i>Patersonia occidentalis</i>	<2	0.3
<i>Petrophile linearis</i>	<2	0.3
<i>Regelia ciliata</i>	30-70	1.2
<i>Stirlingia latifolia</i>	<2	1

Stylidium brunonianum	<2	0.3
Ursinia anthemoides	2-10	0.3



# Ellenbrook tank flora & fauna survey

Site Q04

Described by GO

Date 30/10/2012 Type Q

Location

MGA Zone

mE 400212

mN 6487260

E

S

Habitat Banksia woodland

Soil White/grey sand

Vegetation

Veg Condition Pristine - Excellent

Fire Age Old (5-20 years)

Notes Weeds, ?dieback.



## SPECIES LIST:

Species	COVER	HEIGHT
Levenhookia stipitata	<2	0.15
Podotheca chrysantha	<2	0.15
Stylidium rigidulum	<2	0.15
Ursinia anthemoides	<2	0.15
Bossiaea eriocarpa	<2	0.2
Calytrix flavescens	<2	0.2
Conostylis aculeata subsp. aculeata	<2	0.2
Hibbertia huegelii	<2	0.2
Hibbertia subvaginata	2-10	0.2
Lechenaultia biloba	2-10	0.2
Stylidium brunonianum	<2	0.2
Leucopogon sp.	2-10	0.3
Gastrolobium capitatum	<2	0.4
Gompholobium tomentosum	<2	0.4
Hibbertia hypericoides	<2	0.4
Patersonia occidentalis	<2	0.4
Daviesia hakeoides	2-10	0.5
Macarthuria australis	<2	0.5
Croninia kingiana	30-70	0.6
Petrophile linearis	10-30	1.1
Stirlingia latifolia	2-10	1.1
Acacia pulchella	<2	1.2
Hovea chorizemifolia	<2	1.2
Nuytsia floribunda	30-70	1.3
Regelia ciliata	2-10	1.4
Banksia menziesii	30-70	4
Banksia attenuata	2-10	5

# Ellenbrook tank flora & fauna survey

Site Q05

Described by GO

Date 30/10/2012 Type Q

Location

MGA Zone

mE 400148

mN 6486870

E

S

Habitat Shrubland - rehab

Soil White/grey sand

Vegetation

Veg Condition Very Good - Good

Fire Age Old (5-20 years)

Notes Flat area, was mined in the past 10 years.

Rehab - no weeds evident.

Rock 0%

Bare ground 30-70%

Logs <2%

Twigs 2-10%

Leaves 10-30%



## SPECIES LIST:

Species	COVER	HEIGHT
<i>Levenhookia stipitata</i>	<2	0.05
<i>Stylidium divaricatum</i>	<2	0.05
<i>Scaevola repens</i>	<2	0.1
<i>Laxmannia squarrosa</i>	<2	0.15
<i>Ursinia anthemoides</i>	<2	0.15
<i>Wahlenbergia</i> sp.	<2	0.15
<i>Bossiaea eriocarpa</i>	<2	0.2
<i>Conostylis</i> ? <i>aculeata</i>	<2	0.2
<i>Gastrolobium capitatum</i>	<2	0.2
<i>Regelia ciliata</i>	10-30	0.2
<i>Hibbertia subvaginata</i>	30-70	0.3
<i>Melaleuca trichophylla</i>	<2	0.3
<i>Calothamnus quadrifidus</i>	<2	0.4
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	<2	0.4
<i>Daviesia hakeoides</i>	<2	0.6
<i>Gompholobium tomentosum</i>	<2	0.6
<i>Acacia pulchella</i>	<2	0.7
<i>Gladiolus caryophyllaceus</i>	<2	0.7
<i>Allocasuarina fraseriana</i>	<2	0.8
<i>Calothamnus quadrifidus</i>	<2	0.8
<i>Patersonia occidentalis</i>	<2	0.8
<i>Regelia ciliata</i>	30-70	0.8
<i>Hovea chorizemifolia</i>	2-10	1.5
<i>Banksia attenuata</i>	2-10	1.9

Kunzea glabrescens	30-70	1.9
Jacksonia furcellata	2-10	3.5
Aira sp.	ADJ	
Briza maxima	ADJ	
Lomandra sp.	ADJ	
Stylidium crossocephalum	ADJ	

# Ellenbrook tank flora & fauna survey

Site Q06

Described by GO

Date 30/10/2012 Type Q

Location

MGA Zone

mE 400199

mN 6486730

E

S

Habitat Shrubland rehab

Soil White sand

Vegetation

Veg Condition Very Good - Good

Fire Age

Notes

Flat.

Rehab. Some minor weeds.

Rock 0%

Bare ground 30-70%

Logs <2%

Twigs 10-30%

Leaves 30-70%



## SPECIES LIST:

Species	COVER	HEIGHT
<i>Allocasuarina fraseriana</i>	<2	0.7
<i>Dampiera linearis</i>	<2	0.15
<i>Laxmannia squarrosa</i>	<2	0.15
<i>Hibbertia</i> sp. Gnarra (J.R. Wheeler 2329)	<2	0.2
<i>Kunzea glabrescens</i>	2-10	0.2
<i>Melaleuca trichophylla</i>	<2	0.2
<i>Anigozanthos</i> ? <i>viridis</i>	<2	0.3
<i>Hibbertia huegelii</i>	<2	0.3
<i>Melaleuca parviceps</i>	<2	0.3
<i>Patersonia occidentalis</i>	<2	0.3
<i>Regelia ciliata</i>	<2	0.3
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	<2	0.4
<i>Gastrolobium capitatum</i>	<2	0.4
<i>Petrophile linearis</i>	<2	0.4
<i>Regelia ciliata</i>	10-30	0.4
<i>Burchardia congesta</i>	<2	0.5
<i>Gladiolus caryophyllaceus</i>	<2	0.5
<i>Bossiaea eriocarpa</i>	<2	0.7
<i>Acacia pulchella</i>	<2	0.8
<i>Daviesia hakeoides</i>	<2	0.8
<i>Gompholobium tomentosum</i>	2-10	0.8
<i>Hypocalymma angustifolium</i>	<2	1
<i>Stirlingia latifolia</i>	<2	1
<i>Banksia attenuata</i>	10-30	1.1

Adenanthos cygnorum	30-70	1.5
Jacksonia furcellata	10-30	2.5
Bromus ? diandrus	ADJ	
Ehrharta longiflora	ADJ	
Melaleuca preissiana	ADJ	

# Ellenbrook tank flora & fauna survey

Described by \_\_\_\_\_ Date \_\_\_\_\_

Location \_\_\_\_\_

MGA Zone \_\_\_\_\_ mE \_\_\_\_\_

Habitat \_\_\_\_\_

Soil \_\_\_\_\_

Vegetation \_\_\_\_\_

Veg Condition \_\_\_\_\_

Fire Age \_\_\_\_\_

Notes \_\_\_\_\_

SPECIES LIST:

Name	Cover	C Class	Height
Allocasuarina humilis			
Amphipogon turbinatus			
Avena barbata			
Avena barbata			
Blancoa canescens			
Boronia ramosa subsp. anethifolia			
Calytrix fraseri			
Calytrix strigosa			
Conospermum stoechadis subsp. stoechadis			
Conyza sp.			
Crassula sp.			
Daviesia triflora			
Desmodcladus flexuosus			
Eucalyptus rudis			
Euphorbia sp.			
Hibbertia ? spicata			
Hypochaeris sp.			
Kunzea micrantha			
Lolium rigidum			
Lysimachia arvensis			
Myrtaceae sp.			
Oenothera sp.			
Pelargonium capitatum			
Philotheca spicata			
Podotricha gnaphalioides			
Poranthera microphylla			
Poranthera microphylla			
Regelia inops			
Silene gallica			
Sonchus oleraceus			
Stylidium diuroides			
Stylidium longitubum			
Stylidium piliferum			
Stylidium sp.			
Thysanotus patersonii/manglesianus			
Thysanotus thyrsoides			
Trachymene pilosa			
Trifolium angustifolium			
Xanthosia huegelii			

Site

Opportunistic Collections

Type O

mN

E

S

## Appendix E - Fauna data

### Summary of fauna desktop investigation results – Fauna Species of Conservation Significance

Family	Species	Common name	Status (State)	Status (Federal)	NatureMap (5 km)	EPBC (5 km)
<b>Birds</b>						
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	S3	Mi		X
Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift	S3	Mi, Ma		X
Ardeidae	<i>Ardea ibis</i>	Cattle Egret	S3	Mi, Ma		X
Ardeidae	<i>Ardea modesta</i>	Great Egret	S3	Mi, Ma		X
Falconidae	<i>Falco peregrinus subsp. macropus</i>	Australian Peregrine Falcon	S4		X	
Megapodiidae	<i>Leipoa ocellata</i>	Malleefowl	T	Vu, Mi		X
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater	S3	Mi	X	X
Psittacidae	<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo	T	Vu		X
Psittacidae	<i>Calyptorhynchus baudinii</i>	Baudin's Cockatoo	T	Vu	X	X
Psittacidae	<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	T	Vu	X	X
Rostratulidae	<i>Rostratula benghalensis australis</i>	Australian Painted Snipe	T	Vu, Mi		X
Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy Ibis	S3		X	
<b>Mammals</b>						
Dasyuridae	<i>Dasyurus geoffroii</i>	Chuditch, Western Quoll	T	Vu	X	X
Macropodidae	<i>Macropus irma</i>	Western Brush Wallaby	P4		X	
Muridae	<i>Hydromys chrysogaster</i>	Water-rat	P4		X	
Peramelidae	<i>Isodon obesulus subsp. fusciventer</i>	Quenda, SouthernBrown Bandicoot	P5		X	
<b>Reptiles</b>						
Elapidae	<i>Neelaps calonotos</i>	Black-striped Snake	P3		X	
<b>Insects</b>						
Castniidae	<i>Synemon gratiosa</i>	Graceful Sunmoth	P4	En	X	X



Fauna species recorded during the field survey for the Ellenbrook Project  
Area

Family	Species	Common Name	Status
<b>Birds</b>			
Acanthizidae	<i>Smicrornis brevirostris occidentalis</i>	Weebill	
Acanthizidae	<i>Gerygone fusca</i>	Western Gerygone	
Cacatuidae	<i>Eolophus roseicapilla</i>	Galah	
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	
Casuariidae	<i>Dromaius novaehollandiae</i>	Emu	
Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon	
Corvidae	<i>Corvus coronoides perplexus</i>	Australian Raven	
Cracticidae	<i>Cracticus tibicen dorsalis</i>	Australian Magpie	
Dicruridae	<i>Rhipidura leucophrys leucophrys</i>	Willie Wagtail	
Dicruridae	<i>Grallina cyanoleuca</i>	Magpie-lark	
Dicruridae	<i>Rhipidura fuliginosa</i>	Grey Fantail	
Hirundinidae	<i>Hirundo neoxena</i>	Welcome swallow	
Meliphagidae	<i>Anthochaera carunculata</i>	Red Wattlebird	
Meliphagidae	<i>Lichenostomus virescens virescens</i>	Singing Honeyeater	
Meliphagidae	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	
Meliphagidae	<i>Phylidonyris niger</i>	White-cheeked Honeyeater	
Meliphagidae	<i>Lichmera indistincta</i>	Brown Honeyeater	
Psittacidae	<i>Platycercus zonarius semitorquatus</i>	Twenty-eight Parrot	
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis	
<b>Mammals</b>			
Leporidae	<i>Oryctolagus cuniculus</i>	European Rabbit	*
Macropodidae	<i>Macropus fuliginosus</i>	Western Grey Kangaroo	

\*Introduced species

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