



Main Roads Western Australia
Mitchell Freeway
BGC Quarry Access Realignment
Preliminary Environmental Impact Assessment

June 2014

Summary

Project Title: BGC Quarry Access realignment

Project location: The project is located between Hidden Valley Retreat and Wanneroo Road in the City of Wanneroo. The project area is accessed via Hester Avenue in Neerabup, and is adjacent to and/or partly includes the existing BGC Quarry Access Road.

Area proposed to be cleared: The project area is 1.58 hectares (ha) in size and includes approximately 0.73 ha of the existing Quarry Access Road. The total clearing area is 0.85 ha in size (0.74 ha of native vegetation and 0.11 ha of revegetation).

Project purpose / components: The BGC Quarry Access Road occurs adjacent to and/or partly within the project area for Stage 1 of the Mitchell Freeway Extension Project. In order to progress the proposed Mitchell Freeway interchange with Hester Avenue and Hester Avenue duplication (components of Stage 1 of the Mitchell Freeway Extension Project), the Quarry Access Road needs to be realigned.

The Quarry Access Road will be realigned largely adjacent to the existing Access Road and will utilise the existing Access Road where possible. During the realignment process the Quarry Access Road will be widened (average width of 20 meters (m)) and sealed.

Temporary clearing required: None

A Preliminary Environmental Impact Assessment (PEIA) was undertaken of the existing environment and the activities associated with the road project. This assessment provided an evaluation of the potential impacts the project may have on key environmental aspects.

Details regarding native vegetation clearing and an assessment against the clearing principles are addressed separately in the Preliminary Clearing Impact Assessment (PCIA) report.

Impacts to key environmental aspects

The key potential impacts associated with the project include:

- Dust has the potential to be a minor issue during works. Some sensitive receivers (residences) are located approximately 150 – 200 m west of the project area and may be impacted by dust during construction.
- The project area is located in the Perth *Rights in Water and Irrigation Act 1914* (RIWI Act) Groundwater Area and the Perth Coastal and Gwelup Underground Water Pollution Control Area Public Drinking Water Source Area (PDWSA), which is a Priority 3 Protection Zone. It is unlikely that the proposed works will impact upon groundwater. However, if dewatering is required for the project, a licence under the RIWI Act for groundwater extraction will be required.
- The project area is located within Neerabup National Park (Class A Reserve, R 27575), which is managed by DPaW and vested with the Conservation Commission of Western Australia. The project area will need to be excised from Neerabup National Park prior to the commencement of any works. Furthermore, the project area is located within Bush Forever site No. 383 and an environmentally sensitive area (ESA). Potential impacts from the project include increased loss of native vegetation, increased potential for weed incursion, and potential loss of conservation significant flora and fauna and their habitats in these areas.

- The project area comprised native vegetation, revegetation and cleared areas. The most dominant vegetation type was *Banksia* Woodland, which occurred on the southern and western sides of the existing Access Road. This vegetation type was rated from *Very Good* (3) to *Good* (4), and *Degraded* (5), depending on the extent of disturbances observed. The revegetated area occurred in the northern part of the project area and was rated as *Degraded* (5). The remainder of the project area included cleared areas, which were rated as *Completely Degraded* (6). Potential impacts from the project include the loss of native vegetation (*Banksia* Woodland and Revegetation).
- One Priority Ecological Community (PEC), the '*Banksia* dominated woodlands on the Swan Coastal Plain IBRA region' Priority 3 PEC was considered likely to occur within the project area. Additional survey work and consultation with DPaW is required to confirm this occurrence. Potential impacts from the project include loss of this PEC, increased potential for weed incursion into the PEC, and potential loss of conservation significant flora and fauna and their habitats.
- Desktop searches identified the presence/potential presence of 29 conservation significant flora s within 10 km of the project area. Two DPaW Priority-listed flora taxa were recorded during the site visit: *Acacia benthamii* (Priority 2) and *Jacksonia sericea* (Priority 4). Potential impacts from the project include the loss of individuals of these taxa.
- Desktop searches identified the presence/potential presence of 112 introduced taxa within 10 km of the project area. Nine introduced taxa were recorded within the project area during the site visit, with one, *Gomphocarpus fruticosus* (Narrow leaf cotton bush), listed as a Declared Pest under the *Biosecurity and Agriculture Management Act 2007*. Potential impacts from the project include increased spread of this Declared Pest.
- The project area comprises two broad fauna habitat types, *Banksia* woodland and a small area of revegetated vegetation, as well as previously cleared and highly degraded areas. The dominant habitat throughout the project area is *Banksia* woodland which is predominantly in very good condition which provides high value habitat for fauna species due to high species and structural diversity. The *Banksia* woodland also provides suitable foraging habitat for the conservation significant Black Cockatoo species.
- The remainder to the project area consists of a small strip of revegetation in the northern part of the project area and previously cleared and highly degraded areas, including the existing Quinns Quarry Access Road. These areas provide limited to no habitat value for fauna species.
- Desktop searches identified the presence/potential presence of 19 conservation significant faunas within 10 km of the project area. No conservation significant fauna species were recorded during the site visit.
- A likelihood of occurrence assessment was undertaken for conservation significant fauna considered potentially occurring in the Project area. This assessment found that eight species are considered likely to occur within the project area, including Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*), Baudin's Black Cockatoo (*Calyptorhynchus baudinii*), Rainbow Bee-eater (*Merops ornatus*), Western Brush Wallaby (*Macropus irma*), Carpet Python (*Morelia spilota* subsp. *imbricata*), Black-striped Snake (*Neelaps calonotos*), a native bee (*Hylaeus globuliferus*) and the Graceful Sun Moth (*Synemon gratiosa*).

Additional actions and referrals

The PEIA identified a number environmental or heritage constraints associated with the proposed project activities. No further heritage approvals, permits or licences are needed for

implementation of the project. However, further assessment to determine presence/absence of Dieback in the project area is recommended.

Several environmental approvals are needed for implementation of the project, these are discussed below.

Department of the Environment

The project is not likely to impact on Matters of National Environmental Significance and for these reasons the project does not warrant referral to the Commonwealth Department of the Environment (DotE).

Environmental Protection Authority

The project is likely to have a significant impact to the surrounding environment. The project is located within Neerabup National Park, a Bush Forever site and an ESA. Any development of the project area is not considered consistent with the purpose of a National Park or Bush Forever site, and with the objectives of the EPA. As the project has the potential to impact on a national park it is likely to be considered a significant impact, and therefore require referral to the EPA.

Western Australian Planning Commission/City of Wanneroo

Land within the project area is currently reserved as Parks and Recreation and designated as a Bush Forever site under the Metropolitan Region Scheme (MRS), and zoned as Regional Parks and Recreation under the City of Wanneroo Town Planning Scheme 2. In order to progress the project an amendment to the MRS will be required and should be submitted to Western Australian Planning Commission for their consideration and approval. Under Section 38 of the *Planning and Development Act 2005*, all region scheme amendments require referral to the EPA

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.

Table of contents

1.	Introduction	1
1.1	Background	1
1.2	Project description	1
1.3	Purpose of this report	2
2.	Methodology	3
2.1	Preliminary desktop study	3
2.2	Site inspection	4
2.3	Referral assessment	4
2.4	Limitations and assumptions	4
3.	Assessment of aspects and impacts	6
3.1	Aspects and impacts	6
4.	Commonwealth aspects and impacts	13
5.	Stakeholder consultation	15
6.	Additional actions and referrals	16
6.1	Additional actions required	16
6.2	Environmental Management	16
6.3	Decision to refer	16
6.4	Additional approvals	17
7.	References	18
	Vegetation and flora	27
	Broad vegetation mapping	27
	Broad vegetation extents	27
	Site description	28
	Vegetation types and condition	28
	Conservation significant ecological communities	30
	Flora diversity	34
	Conservation significant flora	35
	Weeds	42
	Fauna	43
	Fauna habitats	43
	Fauna habitat connectivity	43
	Fauna diversity	44
	Conservation significant fauna	44

Table index

Table 1	Information sources.....	3
Table 2	Project Aspects and Impacts	7
Table 3	Assessment of existing environment, Matters of National Environmental Significance and likely impact	13
Table 4	Summary of further assessment or approval(s) required	16

Figure index

Figure 1	Project location.....	22
Figure 2	Environmental context: Biological	22
Figure 3	Environmental context: Wetlands.....	22
Figure 4	Heritage	22
Figure 5	Vegetation types and conservation significant flora locations	22
Figure 6	Vegetation condition and weed locations	22
Figure 7	Fauna habitats	22

Appendices

Appendix A – Figures

Appendix B – Background information and codes

Appendix C – Desktop searches

Appendix D – Reconnaissance vegetation, flora and fauna survey

1. Introduction

1.1 Background

The Mitchell Freeway provides the primary road access route from the City of Perth to the north-west corridor; however, the freeway currently terminates at Burns Beach Road. The freeway has been constructed in several stages since the 1960s, with further extensions and widening works planned. Further development of the freeway is now required to provide a more direct route for traffic in the far northern suburbs, take pressure off smaller local roads and facilitate residential and business development in the area.

The proposed Mitchell Freeway Extension Project will be constructed in three stages with Stage 1 planned for 2015-2017. The Stage 1 scope of works will include:

- Mitchell Freeway extension from Burns Beach Road to Hester Avenue.
- Grade separated interchanges (including road bridges) at Burns Beach Road, Neerabup Road and Hester Avenue.
- Principal Shared Path (PSP) on western side of the Mitchell Freeway extension from Burns Beach Road to Hester Avenue including a PSP bridge over Burns Beach Road.
- Underpasses at Currambine Station, Neerabup Road and Hester Avenue.
- Hester Avenue duplication from Hidden Valley Retreat to Wanneroo Road.
- Neerabup Road upgrade from Connolly Drive to Wanneroo Road connection to freeway.
- Wanneroo Road duplication from just south of relocated Flynn Drive to Hall Road.

As part of the Mitchell Freeway Extension Project related upgrade/development activities are also being investigated.

1.2 Project description

The Quinns Quarry (managed by BGC), located on Hester Avenue is an inert landfill facility that provides a number of services including: solid waste depot, disposal of special waste (asbestos), storage and treatment of top soil, treatment of green waste and screening of material. The quarry is accessed from Hester Avenue via a single-carriage, sealed road that carries both light and heavy vehicles. The quarry access road occurs adjacent to and/or partly within the project area for Stage 1 of the Mitchell Freeway Extension Project. In order to progress the proposed Mitchell Freeway interchange with Hester Avenue and Hester Avenue duplication (components of Stage 1 of the Mitchell Freeway Extension Project), the quarry access road needs to be realigned.

The quarry access road will be realigned largely adjacent to the existing access road and will utilise the existing access road where possible. As part of the realignment process the quarry access road will be widened (average width of 20 metres (m)) and sealed. At present, no detailed design of the realigned proposed access road has been undertaken or is available.

1.2.1 Project location

The project is located between Hidden Valley Retreat and Wanneroo Road in the City of Wanneroo. The project area is accessed via Hester Avenue in Neerabup, and is adjacent to and/or partly includes the existing quarry access road. The project area is 1.58 hectares (ha) in size and includes approximately 0.73 ha of the existing quarry access road. The project area is shown in Figure 1 (Appendix A).

1.3 Purpose of this report

This preliminary environmental impact assessment (PEIA) report involved a desktop analysis of environmental aspects and impacts, a site investigation and an assessment of native vegetation clearing. The study area is confined to a local area of a 10 km radius. Details regarding native vegetation clearing are addressed in the PCIA/VMP report.

This PEIA report will be used by Main Roads to determine whether an Environmental Impact Assessment (EIA) is necessary and whether referral to State and/or Commonwealth authorities is required.

2. Methodology

2.1 Preliminary desktop study

A preliminary assessment of the project area and the potential constraints of the proposed works were undertaken by viewing ArcGIS shapefiles and reviewing government agency managed databases. In addition, a number of reports relevant to the Mitchell Freeway Extension Project were also reviewed.

The following information sources were used to identify the existing environment surrounding the project and potential impacts associated with project development (Table 1).

Table 1 Information sources

Aspect	Information Source
Matters of National Environmental Significance	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) Protected Matters Search Tool (DotE 2014a)
Reserves	Department of Parks and Wildlife (DPaW) Estate spatial dataset
Environmentally Sensitive Areas	Department of Environment Regulation (DER) Native Vegetation Map Viewer (DER 2014b)
Vegetation	Beard vegetation mapping (1979), flora and fauna site visit
Threatened and Priority Ecological Communities	DPaW Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) spatial datasets, DPaW Priority Ecological Communities List (DPaW 2013a). Threatened Ecological Communities Endorsed by the Minister for Environment (DPaW 2013b)
Conservation Significant Flora and Fauna	DPaW <i>NatureMap</i> database (DPaW 2007–) DPaW Threatened and Priority Fauna datasets (DEFL) DPaW Declared Rare and Priority Flora datasets Western Australian Herbarium database (WAHERB) Flora and fauna site visit.
Declared Pests	DPaW <i>NatureMap</i> database (DPaW 2007–) EPBC Protected Matters Search Tool (DotE 2014a) Flora and fauna site visit.
Acid Sulfate Soils	Australian Soil Resources Information System (ASRIS 2014) Acid Sulfate Soil risk mapping (DEC spatial layer – GoWA 2014b).
Hydrology	Department of Water (DoW) Geographic Data Atlas (DoW 2014a) Department of Agriculture and Food WA (DAFWA) WetlandBase (DAFWA 2014) DoW Perth Groundwater Atlas (DoW 2014b)
Contaminated sites	DER Contaminated Sites Database (DER 2014a)
Heritage	Department of Aboriginal Affairs (DAA) Heritage Inquiry System Search Tool (DAA 2014) EPBC Protected Matters Search Tool (DotE 2014a) Heritage Council InHerit database (GoWA 2014a) Relevant reports (Brad Goode and Associates 2013, Nayton 2013a, 2013b, O'Connor and O'Connor 2013)
Dieback	Flora and fauna site visit. Dieback assessment for adjacent areas (Glevan Consulting 2013)

2.2 Site inspection

The preliminary reconnaissance flora and fauna survey was designed to identify the main flora and fauna constraints present within the project area to inform the assessment of environmental aspects. The desktop assessment was carried out prior to the commencement of the field survey to identify relevant environmental information pertaining to the project area and surrounds. Two GHD ecologists conducted a one day reconnaissance survey on 3 April 2014. This survey involved the following key aspects:

- Opportunistic recordings of flora species
- Opportunistic recordings of fauna species
- Assessment of fauna habitat values
- A preliminary Black Cockatoo assessment that recorded the presence of potential and actual (with evidence of use) breeding and feeding habitat.

The project area was traversed by foot and vehicle.

2.3 Referral assessment

2.3.1 Commonwealth Referral

The decision whether to refer the project to the Commonwealth Department of the Environment (DotE) was based upon whether the project may have a significant impact upon Matters of National Environmental Significance (MNES), which are protected under the EPBC Act (1999). These include; World Heritage properties, National Heritage places, Wetlands of International Importance (listed under the Ramsar convention), Commonwealth land or marine areas, migratory species protected under international agreements, nuclear actions, nationally threatened species and ecological communities and water resources.

The DotE Protected Matters Search Tool (PMST) was used to determine whether the project will impact upon MNES. Section 4 details the outcome of the search and a discussion on the report findings. The results of the PMST are provided in Appendix C.

2.3.2 State Referral

The decision to refer the project to the Western Australian (WA) Environmental Protection Authority (EPA) was based on whether the project would impact on environmental factors significantly enough to require referral under Section 38 of the *Environmental Protection Act 1986* (EP Act).

2.4 Limitations and assumptions

This report has been prepared by GHD for Main Roads WA and may only be used and relied on by Main Roads WA for the purpose agreed between GHD and the Main Roads WA as set out in section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than Main Roads WA 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 site investigation was a preliminary assessment aimed at identifying the major ecological constraints within the project area; it was not a full flora and fauna assessment.

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.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Main Roads and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. It is assumed that the information provided by Main Roads WA and online database sources is both current and correct. 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.

3. Assessment of aspects and impacts

3.1 Aspects and impacts

Table 2 provides an evaluation of the potential impacts that the project may have on key environmental aspects. The information source(s) referenced for each environmental aspect evaluation is detailed in Section 2. The environmental constraints and heritage aspects identified have been mapped in Figure 2, Figure 3 and Figure 4 (Appendix A).

3.1.1 Site investigation

The findings of the site investigation were used to inform the aspects and impacts assessment summarised in Table 2 below. These findings also informed the Commonwealth aspects and impacts assessment (Section 4) and additional actions (Section 6).

The site investigation desktop information and field results are provided in Appendix D. This includes photos from the site investigation to provide examples of the vegetation and habitat observed, which provides context to the assessment completed.

Table 2 Project Aspects and Impacts

Aspect	Evaluation of Potential Impacts
Aboriginal Heritage	Main Roads has commissioned a number of Aboriginal Heritage assessments for the Mitchell Freeway Extension Project to determine whether project activities may have an adverse impact on Aboriginal heritage. Two of these reports are of relevance to the project area and include: - Aboriginal Heritage Desktop Assessment: Mitchell Freeway Extension from Burns Beach Road to Romeo Road and Associated Projects (O'Connor and O'Connor 2013) - Report of an Ethnographic Aboriginal Heritage Survey of the Mitchell Freeway Extension, from Burns Beach Road (SLK 29900) in Kinross to Romeo Road (SLK 41600) in Alkimos, Perth Western Australia (Brad Goode and Associates 2013) The reports identified that there are no known sites of Aboriginal heritage significance within the vicinity of the project area. No Aboriginal heritage sites will be impacted and no further Aboriginal heritage investigations are required.
Heritage (non-indigenous)	Main Roads has commissioned a number of non-Indigenous heritage assessments for the Mitchell Freeway Extension Project to determine whether project activities may have an adverse impact on non-Indigenous heritage. Two of these reports are of relevance to the project area and include: - Desktop Assessment of Non-Indigenous Heritage Places within Study Area associated with the Mitchell Freeway Extension between Burns Beach Road and Romeo Road (Nayton 2013a). - Archaeological Survey of non-Indigenous Heritage Places within the Stage 1 Construction Area associated with the Mitchell Freeway Extension from Burns Beach Road to Hester Avenue (Nayton 2013b). The reports identified that there are no known non-Indigenous sites within the vicinity of the project area. No direct impacts to non-Indigenous heritage sites are expected from project works. Although unlikely, the project may impact unidentified non-Indigenous heritage sites with the project area.
Acid Sulphate Soils (ASS)	The ASS Swan Coastal Plain dataset did not identify any known ASS within the project area. The ASRIS database indicates that the area is classified as 'Extremely Low Probability of Occurrence' with a high degree of confidence. No further investigations are likely to be required unless ASS is identified during works.
Contamination	A search of DER's contaminated sites database indicates there are no identified contaminated sites within the project area. Any contamination identified during works should be managed in accordance with a project CEMP. Furthermore, any pollution generating activities such as refuelling or storage of chemicals during works should also be managed in accordance with a CEMP.
Hazardous substances	The project requires no hazardous substances to be used. However, should hazardous substances be required for the project they should be managed in accordance with material safety data sheets via a project specific CEMP. Discussion with DoW should also occur to ensure relevant guidelines are followed and approvals are gained to store and/or use hazardous products within the proclaimed groundwater area.
Air quality	A local air quality assessment is not required for the project as additional vehicle movements are not expected and predicted traffic flow is less than 10,000 vehicles per day (in urban areas). There is a potential for localised air quality impacts during construction works and these should be managed in accordance with a CEMP for the project. According to Main Roads standards, a local air quality assessment is not required for the project as it is a minor upgrade and widening.

Aspect	Evaluation of Potential Impacts
Dust	Dust has the potential to be a minor issue during works. Some sensitive receivers (residences) are located approximately 150-200 m west of the project area and may be impacted by dust during construction. Standard dust suppression techniques such as use of water carts are considered sufficient due to the small scale of the project and should be incorporated into a project CEMP.
Visual amenity	Visual amenity will not be impacted by the project activities.
Noise and vibration	A sensitive receptor has been identified adjacent to the project area, the Quinns Quarry site office. Construction works are not expected to significantly contribute to noise levels, provided works are limited to normal working hours. The requirements of the City of Wanneroo must be met in respect to noise management and construction hours. Where works occur outside normal hours, noise management plans are required to be approved by the City of Wanneroo under delegated authority from the DER.
Groundwater	A search of the DoW Geographic Data Atlas indicates that the project area is located in the Perth <i>Rights in Water and Irrigation Act 1914</i> (RIWI Act) Groundwater Area and the Perth Coastal and Gwelup Underground Water Pollution Control Area Public Drinking Water Source Area (PDWSA), which is a Priority 3 Protection Zone. Priority 3 areas are declared over land where water supply sources need to coexist with other land uses such as residential, commercial and light industrial developments. No dewatering is expected for the project and therefore a licence under the RIWI Act for groundwater extraction is not required. It is unlikely that the proposed works will impact upon groundwater.
Surface water/drainage	A search of the DoW Geographic Data Atlas indicates there are no drainage lines or lakes in the project area. It is unlikely that the proposed works will disturb or interrupt any natural drainage and surface run-off patterns due to the deep sandy soils present in the area.
Wetlands	A search of the DoW Perth Groundwater Atlas and DAFWA WetlandBase indicates that there are no wetlands in the project area. It is unlikely that the proposed works will impact any wetlands in the vicinity of the project area. A search of ArcGIS shapefiles indicates that there are no Environmental Protection Policy (EPP) lakes protected under the <i>Environmental Protection (Swan Coastal Plain Lakes) Policy 1992</i> located within the project area.
Land Vesting	The project area is located within Neerabup National Park (Class A Reserve, R 27575), which is managed by DPaW and vested with the Conservation Commission of Western Australia. In order to undertake any activities within the project area, it will need to be excised from Neerabup National Park.
Reserves / Conservation areas	A search of ArcGIS shapefiles indicates that the project area is located within Neerabup National Park (Class A Reserve, R 27575) and within Bush Forever site No. 383. Clearing for the project will impact directly upon the Neerabup National Park and Bush Forever site. Other likely impacts from the project include loss of remnant vegetation, increased potential for weed incursion into the National Park, and potential loss of conservation significant flora and fauna and their habitats.
Environmentally Sensitive Areas (ESAs)	A search of ArcGIS shapefiles indicates that the project area is located within an ESA, which is most likely associated with Neerabup National Park and Bush Forever site No. 383.

Aspect	Evaluation of Potential Impacts
Vegetation	Broad scale (1:250,000) vegetation mapping by Beard (1979) at an association level indicates that one vegetation association is present within the project area: Low woodland; banksia (association 949). The vegetation mapping of Heddle <i>et al.</i> (1980) indicates the Cottesloe complex – central and south vegetation complex on Aeolian Deposits of the Swan Coastal Plain present within the project area. This vegetation is described as a mosaic of woodland of <i>Eucalyptus gomphocephala</i> and open forest of <i>E. gomphocephala</i> – <i>E. marginata</i> – <i>E. calophylla</i> [now <i>Corymbia calophylla</i>]; closed heath on the Limestone outcrops. Beard mapping has been adapted and digitised by Shepherd <i>et al.</i> (2002). The extent of Beard's (1979) vegetation associations has been determined by the state-wide vegetation remaining extent calculations maintained by DPaW (latest update 2012 – Government of Western Australia 2013). The current extent of Beard (1979) vegetation association 949 is greater than 30 percent of the pre-European extent at the State (54.73%), Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (55.33%), IBRA sub-region (58.53%) and local government authority (LGA) (68.10%) levels. The Local biodiversity Program (2010, 2013) provides information on the extent of vegetation complexes mapped by Heddle <i>et al.</i> (1980) in the south west portion of Western Australia. The current extent of Heddle <i>et al.</i> (1980) Cottesloe complex – central and south vegetation complex is greater than 30 percent of the pre-European extent on the Swan Coastal Plain and within the City of Wanneroo. Thirty percent is considered to be the threshold level below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia 2001; EPA 2000). The project area is located alongside (and in some parts overlapping) the existing Quinns Quarry access road. <i>Banksia</i> Woodland was the most dominant vegetation type within the project area occurring on the southern and western sides of the existing access road. This vegetation type was rated from <i>Very Good</i> (3) to <i>Good</i> (4), and <i>Degraded</i> (5), depending on the extent of disturbances observed. The remainder of the project area included the existing Quinns Quarry access road, which was rated as <i>Completely Degraded</i> (6) and an area which had been previously cleared and subsequently revegetated with native species. The revegetated area occurs in the northern part of the project area, with the vegetation planted to provide a buffer between Hester Avenue and the Quinns Quarry access road. The revegetated area occurs adjacent to the access road and was rated as <i>Degraded</i> (5). The vegetation type and condition project area is mapped in Figure 5 and Figure 6 respectively.
Conservation significant Ecological Communities	A search of the EPBC Act Protected Matters database (DotE 2014a) and DPaW Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) databases identified the potential presence of three TECs and five PECs within 10 km of the project area. In addition a new PEC has been listed by DPaW and may occur in the vicinity of the project area. During the site visit one PEC, the '<i>Banksia</i> dominated woodlands on the Swan Coastal Plain IBRA region' Priority 3 PEC was considered likely to occur within the project area. Additional survey work and consultation with DPaW is required to confirm this occurrence. Likely impacts from the project include loss of this PEC, increased potential for weed incursion into the PEC, and potential loss of conservation significant flora and fauna and their habitats.

Aspect	Evaluation of Potential Impacts
Conservation significant flora	A search of the EPBC Act Protected Matters database (DotE 2014a), DPaW NatureMap records (DPaW 2007–), DPaW Threatened and Priority Flora database and Western Australian Herbarium database identified the presence/potential presence of 29 conservation significant flora taxa within 10 km of the project area. A likelihood of occurrence assessment (based on the range, habitat requirements and previous records of the species) was conducted for all conservation significant taxa identified in the desktop assessment. The assessment concluded that two taxa have been recorded, three taxa are likely to occur, ten taxa could possibly occur, 13 taxa are unlikely to occur and one taxon is highly unlikely to occur in the project area. Two DPaW Priority-listed flora taxa were recorded during the site visit: <i>Acacia benthamii</i> (Priority 2) and <i>Jacksonia sericea</i> (Priority 4). <i>Acacia benthamii</i> was recorded in the central part of the project area and approximately five individuals of <i>Jacksonia sericea</i> recorded in the north west part of the project area. Likely impacts from the project include loss of conservation significant flora individuals.
Declared Pests (plants)	A search of the EPBC Act Protected Matters database (DotE 2014a) and DPaW NatureMap records (DPaW 2007–) identified the presence/potential presence of 112 introduced taxa within 10 km of the project area. This total included 13 Declared Pests and/or Weeds of National Significance (WoNS). One Declared Pest, <i>Gomphocarpus fruticosus</i> (Narrow leaf cotton bush), was identified within the project area during the site visit. Main Roads is required to contact the Department of Agriculture and Food WA (DAFWA) regarding <i>Gomphocarpus fruticosus</i>. Weed management strategies will be developed and implemented in the project area and should be included in the project CEMP.
Fauna habitat	The project area comprises both remnant native vegetation, a small area of revegetated vegetation and previously cleared and highly degraded areas. The project area is dominated by <i>Banksia</i> woodland on grey sandy soils which is predominantly in very good condition and has high species and structural diversity. The woodland provides high habitat value for fauna species due to the various microhabitats and habitat resources available, such as fallen logs and sandy soil. The presence of <i>Banksia</i> spp. <i>Hakea</i> spp. and other proteaceous species throughout the <i>Banksia</i> woodland provides foraging habitat for the conservation significant Black Cockatoo species. There are some small areas adjacent to the access road which show evidence of ongoing disturbance including weed invasion, rubbish and dust. There is also a small strip of revegetation in the northern part of the project area, adjacent to the access road. This area has previously been cleared and subsequently revegetated with native species, and provides some shelter and opportunistic use value for bird species. The remainder of the project area consists of previously cleared and highly degraded areas, including the existing Quinns Quarry access road. These areas provide very little to no habitat value for fauna species and are devoid of native vegetation.

Aspect	Evaluation of Potential Impacts
Conservation significant fauna	Desktop searches of the PMST and NatureMap databases identified the potential presence of 19 conservation significant fauna taxa within the Project area. An assessment on the likelihood of these species occurring in the project area was undertaken. This assessment was based on the species biology, habitat requirements, the quality and availability of suitable habitat and records of the species in the area. The assessment is provided in Appendix D. The assessment concluded that eight species are considered likely to occur, five species are unlikely to occur and six species are highly unlikely to occur in with project area. The species likely to occur include: • Carnaby's Black Cockatoo (<i>Calyptorhynchus latirostris</i>) • Baudin's Black Cockatoo (<i>Calyptorhynchus baudinii</i>) • Rainbow Bee-eater (<i>Merops ornatus</i>) • Western Brush Wallaby (<i>Macropus irma</i>) • Carpet Python (<i>Morelia spilota</i> subsp. <i>imbricata</i>) • Black-striped Snake (<i>Neelaps calonotos</i>) • A native bee (<i>Hylaeus globuliferus</i>) • Graceful Sun Moth (<i>Synemon gratiosa</i>) During the field survey, no conservation significant fauna species listed under the EPBC Act and WC Act, or Priority-listed by DPaW were recorded within the project area. The project area contains <i>Banksia</i> spp. <i>Hakea</i> spp. and other proteaceous species that provide suitable foraging habitat for the conservation significant Black Cockatoo species. There is 0.74 ha of Banksia woodland foraging habitat within the project area (Figure 7). There is however no potential breeding habitat or suitable roosting habitat for Black Cockatoos within the project area.
Biodiversity	The project area is located within the Swan Coastal Plain IBRA bioregion, and Perth IBRA subregions (DotE 2014b). The Project Area includes remnant vegetation (0.74 ha), and highly disturbed/cleared areas (0.84 ha). The results of the site visit indicates that the remnant vegetation within the project area consists of <i>Banksia</i> Woodland (0.74 ha) in <i>Very Good</i> (3) to <i>Good</i> (4) and <i>Degraded</i> (5) condition (Keighery 1994). The remainder of the project area includes the existing Quinns Quarry Access Road (rated as <i>Completely Degraded</i> (6)) and an area which had been previously cleared and subsequently revegetated with native species (rated as <i>Degraded</i> (5)). The project area is located within Neerabup National Park (Class A Reserve, R 27575) and within Bush Forever site No. 383 'Neerabup National Park, Lake Nowergup Nature Reserve and adjacent bushland, Neerabup'. Clearing for the project will result in the direct loss of 0.74 ha of vegetation within Neerabup National Park and Bush Forever site No. 383. The project area is also located within an Environmentally Sensitive Area (ESA), which is most likely associated with Neerabup National Park and Bush Forever site No. 383. Desktop s identified that the '<i>Banksia</i> dominated woodlands on the Swan Coastal Plain IBRA region' Priority 3 PEC was likely to occur within the project area. There is 0.74 ha of Banksia woodland vegetation considered likely to be this PEC located within the project area. Desktop searches identified the presence/potential presence of 29 conservation significant flora taxa within 10 km of the project area. During the site visit two DPaW Priority-listed taxa were recorded within the project area:

Aspect	Evaluation of Potential Impacts
	• <i>Acacia benthamii</i> (Priority 2) • <i>Jacksonia sericea</i> (Priority 4) A further three flora species are considered likely to occur in the project area: • <i>Leucopogon</i> sp. Yanchep (M. Hislop 1986) (Priority 3) • <i>Baeckea</i> sp. Limestone (N. Gibson & M.N. Lyons 1425) (Priority 1) • <i>Pimelea calcicola</i> (Priority 3) Two broad fauna habitats associated with remnant vegetation were recorded within the project area, <i>Banksia</i> woodland and revegetation. The <i>Banksia</i> woodland is well represented in the immediate vicinity of the project area within Neerabup National Park and in the broader City of Wanneroo region. Desktop searches (DotE 2014a, DPaW 2007–) identified the presence/potential presence of 19 conservation significant fauna within 10 km of the project area. No fauna species of conservation significance were recorded within the project area during the fauna field survey. However, eight conservation significant fauna species are considered likely to occur in the project area. These include: • Carnaby's Black Cockatoo (<i>Calyptorhynchus latirostris</i>) • Baudin's Black Cockatoo (<i>Calyptorhynchus baudinii</i>) • Rainbow Bee-eater (<i>Merops ornatus</i>) • Western Brush Wallaby (<i>Macropus irma</i>) • Carpet Python (<i>Morelia spilota</i> subsp. <i>imbricata</i>) • Black-striped Snake (<i>Neelaps calonotos</i>) • A native bee (<i>Hylaeus globuliferus</i>) • Graceful Sun Moth (<i>Synemon gratiosa</i>) The project area contains <i>Banksia</i> spp. <i>Hakea</i> spp. and other proteaceous species that provide suitable foraging habitat for the conservation significant Black Cockatoo species. There is 0.74 ha of <i>Banksia</i> woodland foraging habitat within the project area. There is however no potential breeding habitat or suitable roosting habitat for Black Cockatoos within the project area.
Dieback	Glevan Consulting (2013) has previously undertaken dieback mapping for the Mitchell Freeway Extension Project. Glevan Consulting (2013) mapping shows areas adjacent to Hester Avenue and along the western boundary of the project area as uninfested (of phytophthora occurrence). Possible evidence of dieback was noted in the site visit, with approximately 35 <i>Banksia</i> trees throughout the project area recorded as senesced (dead or dying). The project is in a dieback susceptible area and additional investigations may be warranted to determine if dieback is present prior to works.

4. Commonwealth aspects and impacts

A preliminary assessment, involving a desktop analysis of MNES and a site investigation, was undertaken for the project. The assessment was used to determine whether the project is likely to significantly impact on MNES and therefore require referral to the Commonwealth.

The existing environment, nature and extent of impact or potential impact to the following nine MNES were assessed with regard to the project and are detailed below in Table 3.

Table 3 Assessment of existing environment, Matters of National Environmental Significance and likely impact

Matter of NES	Relevant to the project area	Likely Impact
World Heritage Properties	None present	No impacts
National Heritage Places	None present	No impacts
Wetlands of International Importance	None present	No impacts
Nationally Threatened species and ecological communities	The PMST identified one EPBC Act listed TEC within 10 km of the project area, 'Sedgeland in Holocene dune swales of the southern Swan Coastal Plain'. This TEC is listed as Endangered under the EPBC Act and Critically Endangered under the WC Act. No TECs were identified in the project area during the site visit. The PMST identified 43 Threatened flora and fauna species within 10 km of the project area. This search included one flora species which no longer has a conservation listing. No nationally Threatened flora species were identified in the project area during the site visit. However, three EPBC Act listed Threatened species were considered as possibly occurring in the project area. These included: - Wabbling Hill Mallee (<i>Eucalyptus argutifolia</i>) - King Spider-orchid (<i>Caladenia huegelii</i>) - Dwarf Hammer-orchid (<i>Drakaea micrantha</i>) No nationally Threatened fauna species were identified in the project area during the site visit. However, two EPBC Act listed Threatened species were considered possibly occurring in the project area, including: - Baudin's Black Cockatoo (<i>Calyptorhynchus baudinii</i>) - Carnaby's Black Cockatoo (<i>Calyptorhynchus latirostris</i>)	No impacts to the EPBC Act listed TEC are expected from the project. No impacts to Wabbling Hill Mallee are expected from the project. Wabbling Hill Mallee is considered an easily identifiable, conspicuous species, and was not identified in the project area nor is recorded in the vicinity of the project area. Impacts King Spider-orchid and Dwarf Hammer-orchid are limited to 0.74 ha of habitat loss. These orchid species are seasonally dependent and cryptic. Although not observed during the site visit, a spring flora survey would be required to determine whether these orchid species occur within the project area. Impacts to Baudin's and Carnaby's Black Cockatoos will be limited to the loss of 0.74 ha of Banksia woodland foraging habitat.

Matter of NES	Relevant to the project area	Likely Impact
Migratory species	Thirty-nine listed migratory species were identified within 10 km of the Project according to the PMST. One migratory species, the Rainbow Bee-eater (<i>Merops ornatus</i>), was identified as likely to occur.	Impacts to the Rainbow Bee-eater are limited to the loss of 0.85 ha of foraging and dispersal habitat. In the south-west of Western Australia, Rainbow Bee-eaters will utilise a wide-range of habitats and this species is likely to use the project area for foraging and dispersal only. However, the species is unlikely to rely on the habitats available in the project area.
Commonwealth Marine areas	None present	No impacts
Great Barrier Reef Marine Park	Not present	No impacts
Nuclear actions	No nuclear actions	Not relevant to the proposed activity.
A water resource, in relation to coal seam gas development and large coal mining development	None applicable	Not relevant to the proposed activity.

5. Stakeholder consultation

It's understood Main Roads has consulted with DPaW and the Conservation Commission about the relocation of the Access Road with the Neerabup National Park. Further stakeholder consultation will be required prior to native vegetation clearing and the implementation of the project. Recommended stakeholder consultation includes:

- DPaW – to confirm the occurrence of the '*Banksia* dominated woodlands on the Swan Coastal Plain IBRA region' Priority 3 PEC within the project area that considered likely to occur based on the desktop study and site visit.
- DAFWA – to discuss Declared Pest, *Gomphocarpus fruticosus* (Narrow leaf cotton bush), which was identified within the project area during the site visit.
- BGC (Quinns Quarry) – to discuss project timeframes and alternate traffic flow options during construction of the project.

6. Additional actions and referrals

6.1 Additional actions required

The following table summarises what further assessment and management is required in relation to the project.

Table 4 Summary of further assessment or approval(s) required

Aspect	Permit, Approval or Licence
Dieback	Further assessment to determine presence/absence of Dieback recommended.

6.2 Environmental Management

Main Roads will work to minimise impacts upon the environment associated with road construction projects.

A project specific Environmental Management Plan (EMP) should be developed to manage environmental impacts associated with the project. The EMP should include management measures to:

- Manage any contamination identified during works
- Control dust generation including standard dust suppression techniques such as the use of water carts
- Manage pollution generating activities such as refuelling or storage of chemicals during works
- Manage noise generation and complaints
- Manage hazardous substances on site in accordance with material safety data sheets
- Control Declared Plants
- Manage Dieback infested material and prevent the spread of Dieback if present
- Prevent unauthorised clearing.

6.3 Decision to refer

6.3.1 Referral to the Department of the Environment

The PEIA determined the project is not likely to have a significant impact on MNES or impact Commonwealth land as outlined in Table 3 of this report. For this reason the project does not require referral to the Commonwealth DoE.

0.74 ha of Black Cockatoo quality foraging habitat was identified within the project area. The EPBC Act referral guidelines for Black Cockatoo species (DSEWPaC 2012) specify a number of factors that result in the recommendation to refer a project. One of these factors includes clearing of more than one hectare of quality foraging habitat. Therefore, given only 0.74 ha of Black Cockatoo quality foraging habitat was identified within the project area, the project will not require referral to DoE for this MNES.

6.3.2 Referral to the Environmental Protection Authority

The PEIA determined the project is likely to have an impact on conservation estate (Neerabup National Park) as outlined in Table 2 of this report.

The project is located within Neerabup National Park, which is also a Bush Forever site and an ESA. Any development of the project area is not considered consistent with the purpose of a National Park or Bush Forever site, and with the objectives of the EPA. As the project has the potential to impact on a national park it is likely to be considered a significant impact, and therefore is likely to require referral to the EPA.

Furthermore, under Section 38 of the *Planning and Development Act 2005* all region planning schemes and amendments require referral to the EPA. Referral requirements are set out in the Act and include a requirement that the EPA is given such written information about the scheme or amendment as is sufficient to enable the EPA to comply with section 48A of the EP Act in relation to the scheme or amendment. All region planning schemes and amendments (including rezoning) are to be referred to the EPA by the relevant authority i.e. Western Australian Planning Commission (WAPC) or LGA. As the project will require an amendment to the Metropolitan Region Scheme (MRS) it will require referral to the EPA.

6.4 Additional approvals

6.4.1 Western Australian Planning Commission/City of Wanneroo

Land within the project area is currently reserved as Parks and Recreation and designated as a Bush Forever site under the Metropolitan Region Scheme (MRS), and zoned as Regional Parks and Recreation under the City of Wanneroo Town Planning Scheme 2. In order to progress the project an amendment to the MRS will be required and should be submitted to WAPC for their consideration and approval. Under Section 38 of the *Planning and Development Act 2005*, all region scheme amendments require referral to the EPA.

Consultation with the WAPC is recommended to determine whether rezoning of the land would be supported. This would be dependent upon release of the land from the National Park.

7. References

- Australian Soil Resource Information System (ASRIS) 2014, *Australian Soil Resource Information Viewer*, retrieved March 2014, from http://www.asris.csiro.au/index_ie.html.
- Beard, JS 1979, *Vegetation Survey of Western Australia: Perth Map and Explanatory Memoir 1:250,000 series*, Perth, Vegmap Publications.
- Brad Goode and Associates 2013, *Report of an Ethnographic Aboriginal Heritage Survey of the Mitchell Freeway Extension, from Burns Beach Road (SLK 29900) in Kinross to Romeo Road (SLK 41600) in Alkimos, Perth Western Australia*, Unpublished report prepared for Main Roads Western Australia.
- Burbidge, AA 2004, *Threatened Animals of Western Australia*, Perth, Department of Conservation and Land Management.
- Bureau of Meteorology 2013, *Climate Data Online*, retrieved April 2014, from <http://www.bom.gov.au/climate/data/?ref=ftr>.
- Bush, B, Maryan, B, Browne-Cooper, R, and Robinson, D 2010, *Field guide to the reptiles and frogs of the Perth region*. Western Australian Museum, Western Australia.
- Commonwealth of Australia 2001, *National Targets and Objectives for Biodiversity Conservation 2001–2005*, Canberra, AGPS.
- Department of Aboriginal Affairs (DAA) 2014, *Aboriginal Heritage Inquiry System*, retrieved April 2014, from <http://maps.dia.wa.gov.au/AHIS2/default.aspx>.
- Department of Agriculture and Food WA (DAFWA) 2014, *WetlandBase: The Western Australian Wetlands Database*, retrieved April 2014, from <http://spatial.agric.wa.gov.au/wetlands/framesetup.asp>.
- Department of Environment Regulation (DER) 2014a, *Contaminated Sites Database*, retrieved April 2014, from <https://secure.dec.wa.gov.au/idelve/css/>.
- Department of Environment Regulation (DER) 2014b, *Native Vegetation Map Viewer*, retrieved April 2014, from <http://maps.dec.wa.gov.au/idelve/nv/index.jsp>.
- Department of Parks and Wildlife (DPAW) 2007–, *NatureMap: Mapping Western Australia's Biodiversity: V 1.5.1.8* (last updated 01/06/2013), retrieved April 2014, from <http://naturemap.dec.wa.gov.au/>.
- Department of Parks and Wildlife (DPAW) 2013a, *Priority ecological communities for Western Australia*, Version 19, September 2013.
- Department of Parks and Wildlife (DPAW) 2013b, *List of Threatened Ecological Communities endorsed by the Western Australian Minister for the Environment*, May 2013.
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPac) 2012, *'EPBC Act referral guidelines for three threatened black cockatoo species'*, Department of Sustainability, Environment, Water, Population and Communities, Australian Government Canberra.
- Department of the Environment (DotE) 2014a, *Protected Matters Search Tool Results*, retrieved April 2014, from <http://www.environment.gov.au/epbc/pmst/index.html>.
- Department of the Environment (DotE) 2014b, *Interim Biogeographic Regionalisation for Australia, Version 7, In: Australia's bioregions (IBRA)*, retrieved April 2014, from <http://www.environment.gov.au/parks/nrs/science/bioregionframework/ibra/index.html>.

- Department of the Environment (DotE) 2014c, '*Species Profile and Threats Database (SPRAT)*', Department of the Environment, Australian Government Canberra.
- Department of Water (DoW) 2014a, *Geographic Data Atlas*, retrieved April 2014, from <http://www.water.wa.gov.au/idelve/dowdataext/index.jsp>.
- Department of Water (DoW) 2014b, *Perth Groundwater Atlas*, retrieved April 2014, from <http://www.water.wa.gov.au/idelve/gwa/>.
- Environmental Protection Authority (EPA) 2000, *Environmental Protection of Native Vegetation in Western Australia. Clearing of native vegetation, with particular reference to the agricultural area. Position Statement No. 2*, Perth, Environmental Protection Authority.
- Glevan Consulting 2013, *Mitchell Freeway Extension, Phytophthora Dieback occurrence assessment and Management Plan*, Unpublished report prepared for GHD Pty Ltd.
- Gibson, N, Keighery, BJ, Keighery, GJ, Burbidge, AH and Lyons, MN 1994, *A Floristic Survey of the Southern Swan Coastal Plain*, unpublished report prepared for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and The Conservation Council of Western Australia (Inc.).
- Government of Western Australia (GoWA) 2013, *2013 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report)*, Current as of June 2013, WA Department of Parks and Wildlife, Perth, retrieved April 2014, from <https://www2.landgate.wa.gov.au/web/guest/downloader>.
- Government of Western Australia (GoWA) 2014a, *Heritage Council InHerit database*, retrieved April 2014, from <http://inherit.stateheritage.wa.gov.au>.
- Government of Western Australia (GoWA) 2014b, *Shared land Information Platform: WA Atlas*, retrieved April 2014, from <https://www2.landgate.wa.gov.au/bmvf/app/waatlas/>.
- Government of Western Australia 2000, *Bush Forever – Keeping the Bush in the City. Volumes 1 (Policies, Principals and Processes) & 2 (Directory of Bush Forever Sites)*, Perth, Government of Western Australia.
- Heddl, EM, Loneragan, OW and Havel, JJ 1980, *Vegetation Complexes of the Darling System, Western Australia*, In Atlas of Natural Resources, Darling System, Western Australia, Perth, Department of Conservation and Environment.
- Hill, AL, Semeniuk, CA, Semeniuk, V and Del Marco, A 1996, *Wetlands of the Swan Coastal Plain, Volume 2A*, Perth, Water and Rivers Commission.
- How, RA & Shine, R 1999, '*Ecological traits and conservation biology of five fossorial "sand-swimming" snake species (Simoselaps: Elapidae) in south-western Australia*', Journal of Zoology, vol 249, pp 269-282.
- Johnstone, RE and Storr, GM 1998, *Handbook of Western Australian Birds Vol. 1: Non-passerines (Emu to Dollarbird)*, Perth, West Australian Museum.
- Keighery, BJ 1994, *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*, Wildflower Society of WA (Inc), Nedlands, Western Australia.
- Local Biodiversity Program 2013, *2013 Native vegetation by vegetation complex dataset for the South West of Western Australia*, retrieved 2014, from <http://pbp.walga.asn.au/Publications.aspx>.
- Mitchell, D, Williams, K, and Desmond, A 2002, *Swan Coastal Plain 2 (SWA2 — Swan Coastal Plain subregion)*, In A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002, Perth, Department of Conservation and Land Management.

- Morcombe, M 2004, *Field Guide to Australian Birds*, Steve Parish Publishing Archer Field Queensland Australia.
- Nayton, G 2013a, *Desktop Assessment of Non-Indigenous Heritage Places within Study Area associated with the Mitchell Freeway Extension between Burns Beach Road and Romeo Road*, Unpublished report prepared for GHD and Main Roads.
- Nayton, G 2013b, *Archaeological Survey of non-Indigenous Heritage Places within the Stage 1 Construction Area associated with the Mitchell Freeway Extension from Burns Beach Road to Hester Avenue*, Unpublished report prepared for GHD and Main Roads.
- Nevill, S 2008, *Birds of the Greater South West Western Australia*, Perth, Simon Nevill Publications.
- O'Connor, R and O'Connor E 2013, *Aboriginal Heritage Analysis: Mitchell Freeway Extension from Burns Beach Road to Romeo Rod and Associated Projects*, Unpublished report prepared for GHD Pty Ltd.
- Perth Biodiversity Project 2010, *2010 Native vegetation extent by vegetation complexes for each Local Government in Perth and Peel*, retrieved 2014, from <http://pbp.walga.asn.au/Publications.aspx>.
- Shepherd, DP, Beeston, GR and Hopkins, AJM 2002, *Native Vegetation in Western Australia: Extent, Type and Status*, Natural Resource Management Technical Report No. 249: Department of Agriculture.
- Tingay, Alan and Associates 1998, *A Strategic Plan for Perth's Greenways – Final Report*, prepared for Environment Australia, Ministry for Planning.
- Van Dyke S and Strahan R 2008, *The Mammals of Australia*, Third Edition, New Holland Publishing, Sydney Australia.
- Western Australia (WA) Herbarium 1998–, *FloraBase—the Western Australian Flora*, Department of Parks and Wildlife, retrieved April 2014, from <http://florabase.dpaw.wa.gov.au/>.
- Wilson, S and Swan, G 2013, *A complete guide to reptiles of Australia* (Fourth edition), Australia, New Holland Publishers.

Appendices

Appendix A – Figures

Figure 1 Project location

Figure 2 Environmental context: Biological

Figure 3 Environmental context: Wetlands

Figure 4 Heritage

Figure 5 Vegetation types and conservation significant flora locations

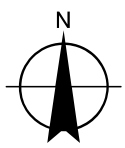
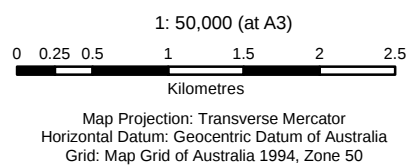
Figure 6 Vegetation condition and weed locations

Figure 7 Fauna habitats



LEGEND

 Project area



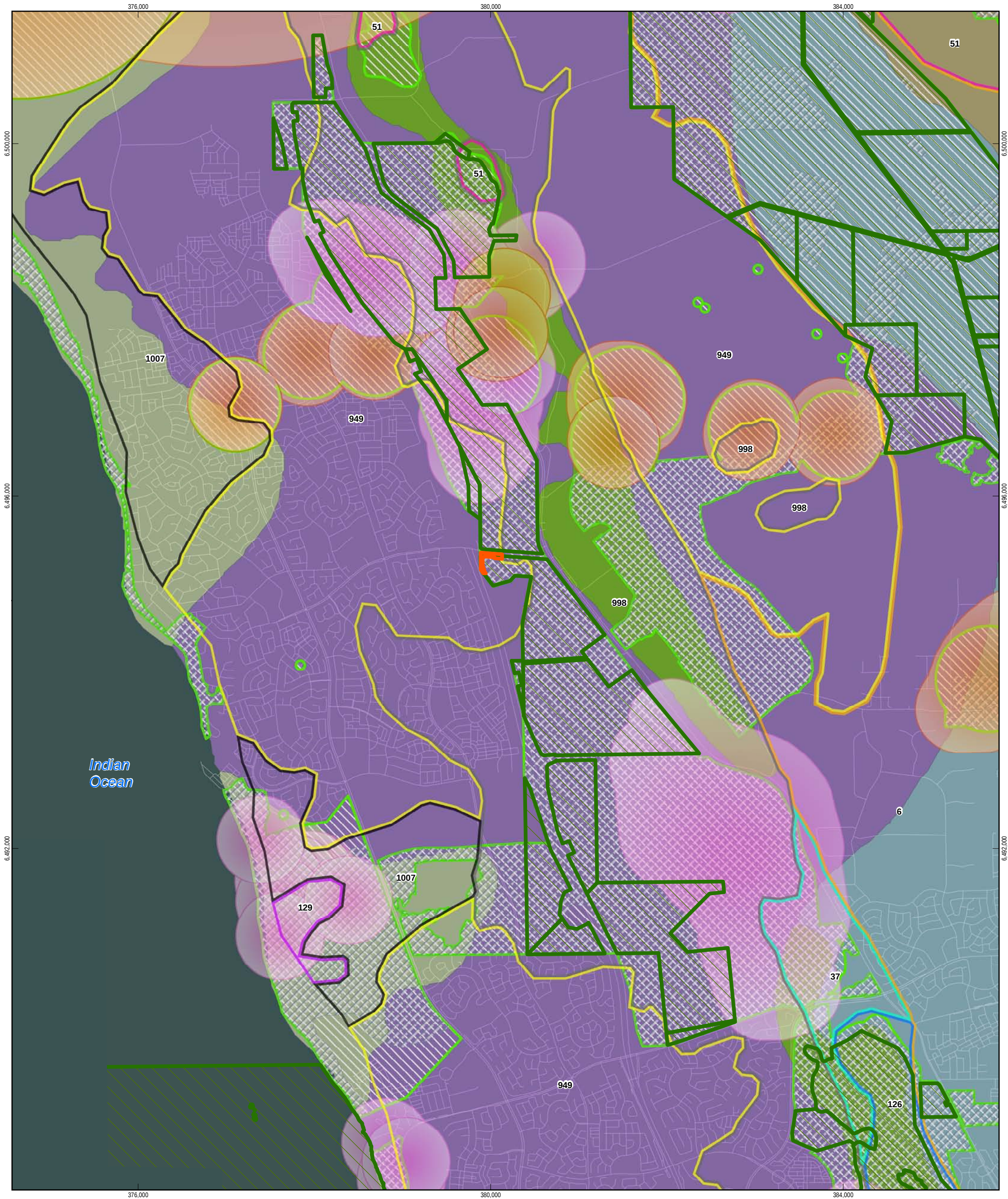
powered by
SLIP ENABLER

Main Roads Western Australia
Mitchell Freeway BGC Quarry Access Realignment

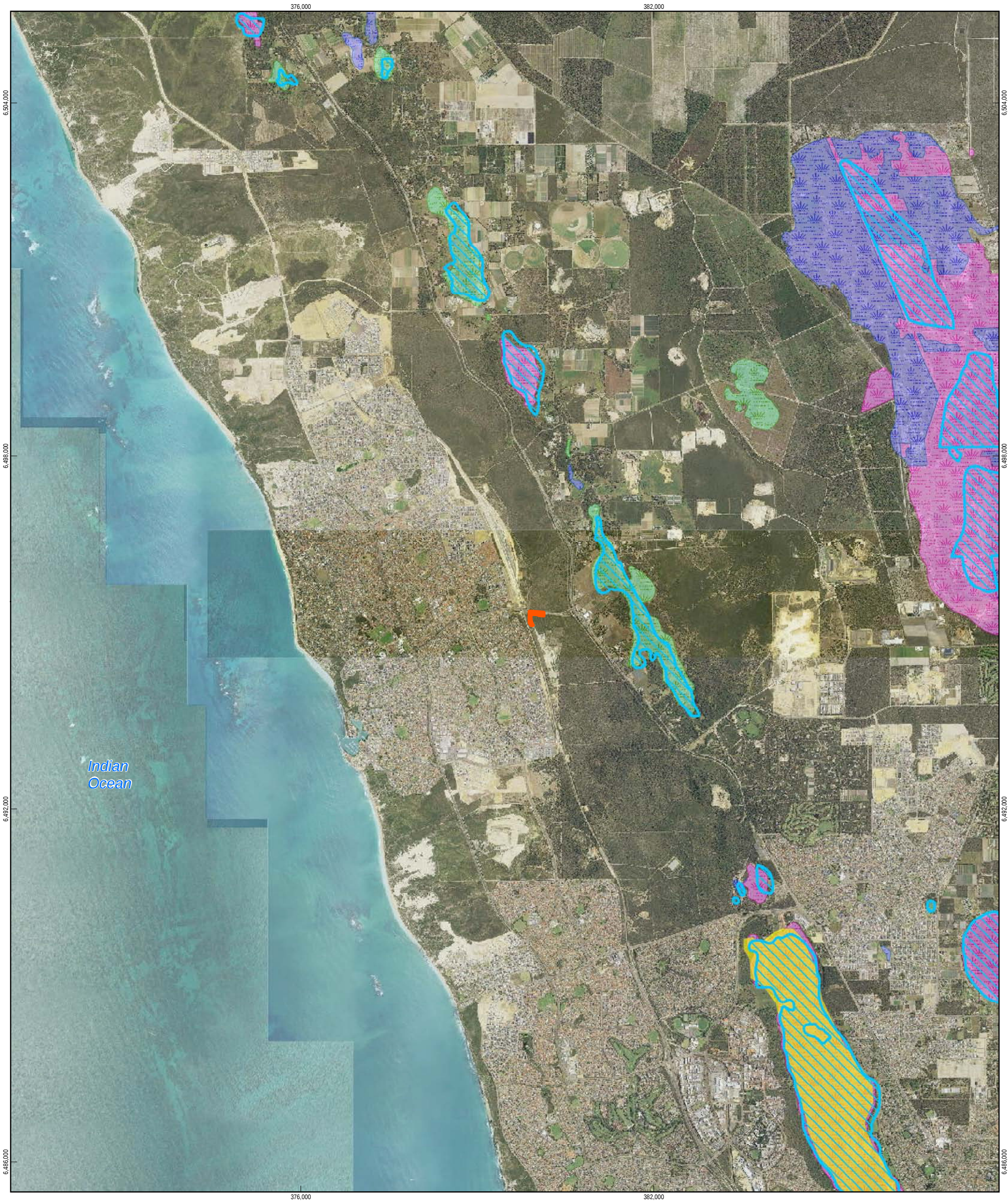
Job Number	61-2943513
Revision	0
Date	06 Jun 2014

Locality

Figure 1



LEGEND				
	Roads		Bush Forever Sites	
	Project area		Environmental Sensitive Area	
	Threatened Ecological Community		Heddle et al. (1980) vegetation complexes	
	Priority Ecological Community		Cottesloe complex - central and south	
	DPaW-managed estates		Herdsmen Complex	
			Karrakatta complex - central and south	
			Pinjar complex	
			Quindalup complex	
			Pre-European vegetation (Beard, 1979)	
			Medium woodland; tuart & jarrah (association 6)	
			Shrublands; teatree thicket (association 37)	
			Sedgeland; reed swamps, occasionally with heath (association 51)	
			Bare areas; freshwater lakes (association 126)	
			Bare areas; rock outcrops (association 129)	
			Low woodland; banksia (association 949)	
			Medium woodland; tuart (association 998)	
			Mosaic: Shrublands; <i>Acacia lasiocarpa</i> & <i>Melaleuca acerosaheath</i> / Shrublands; <i>Acacia rostellifera</i> & <i>Acacia cyclops</i> thicket (association 1007)	



LEGEND

Project area

EPP Lakes

Nationally Important Wetland

Geomorphic Wetlands

Conservation

Multiple Use

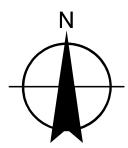
Resource Enhancement

1: 60,000 (at A3)

0 0.25 0.5 1 1.5 2 2.5 3

Kilometres

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

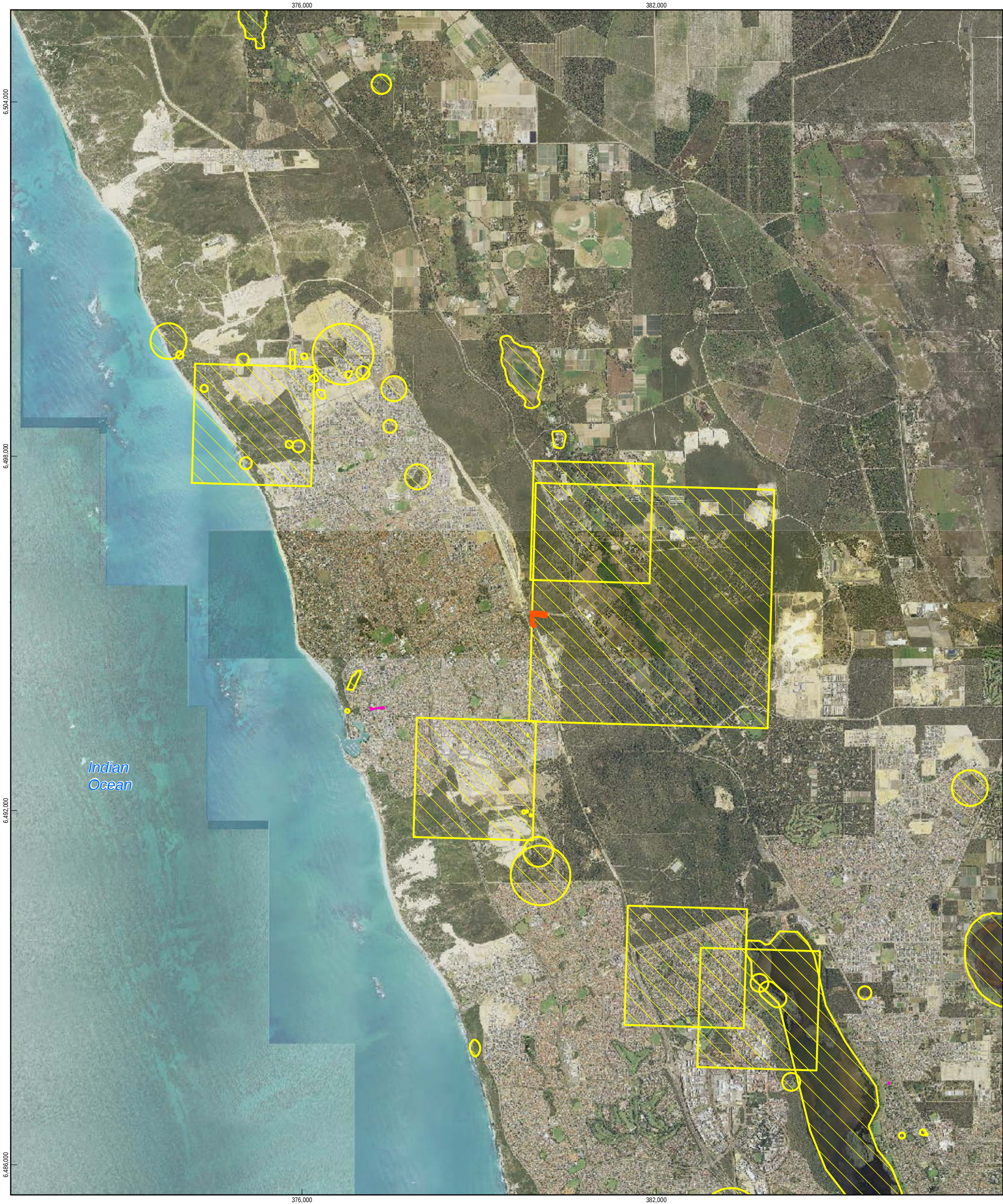


Main Roads Western Australia
Mitchell Freeway BGC Quarry Access Realignment

Job Number	61-2943513
Revision	0
Date	06 Jun 2014

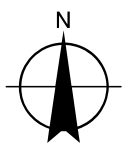
Environmental Context: Wetlands

Figure 3



- LEGEND
- Project area
 - Permanent Heritage Place
 - Aboriginal Heritage Sites

1: 60,000 (at A3)
0 0.25 0.5 1 1.5 2 2.5 3
Kilometres
Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Grid: Map Grid of Australia 1994, Zone 50

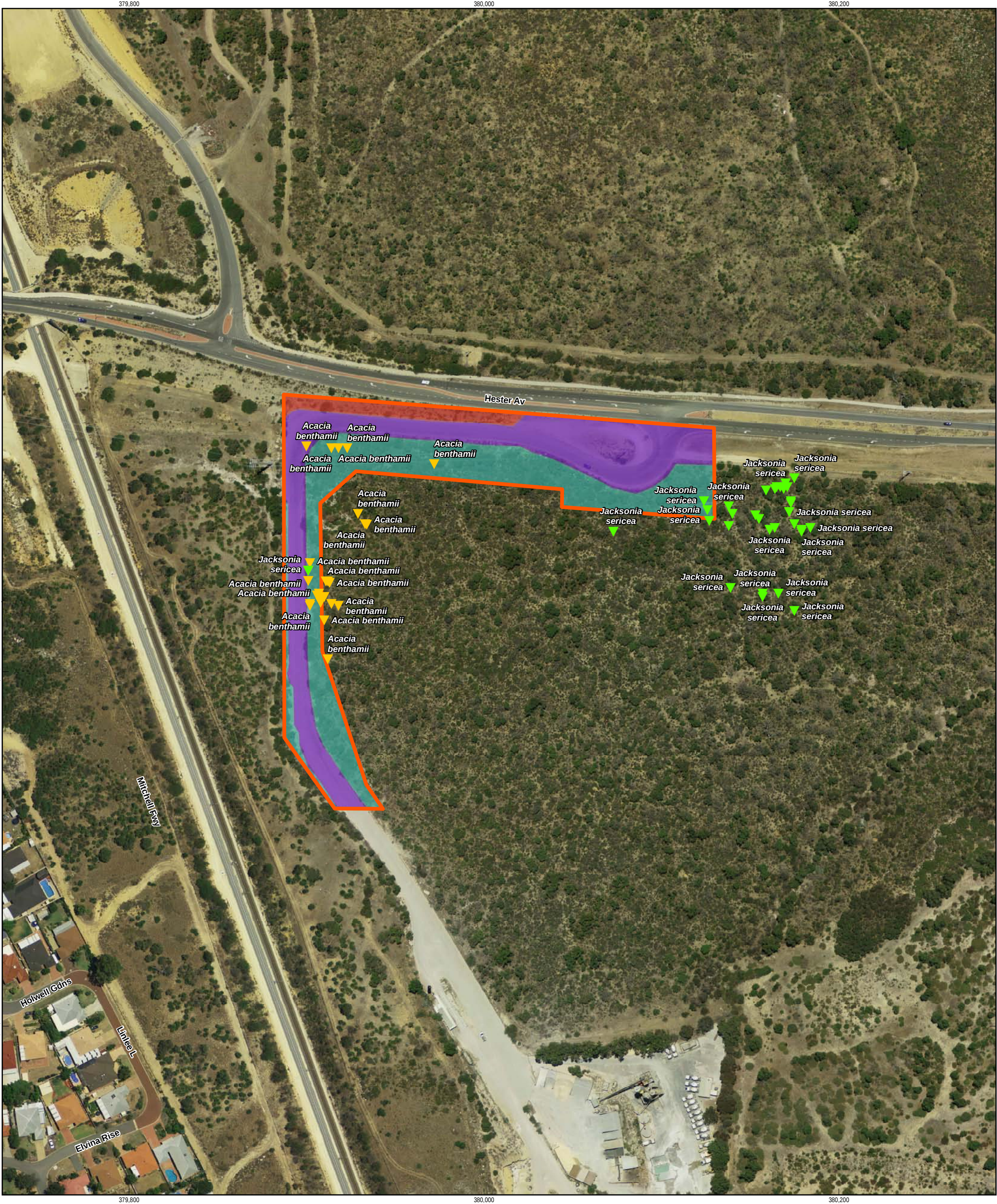


Main Roads Western Australia
Mitchell Freeway BGC Quarry Access Realignment

Job Number 61-2943513
Revision 0
Date 06 Jun 2014

Heritage

Figure 4



LEGEND

Acacia benthamii
(DPaW Priority 2)

Jacksonia sericea
(DPaW Priority 4)

Banksia woodland

Highly disturbed/cleared

Revegetated areas

Project area

01020406080100

1: 2,000 (at A3)

Meters

Map Projection: Transverse Mercator

Horizontal Datum: Geocentric Datum of Australia

Grid: Map Grid of Australia 1994, Zone 50

Main Roads Western Australia
Mitchell Freeway BGC Quarry Access Realignment

Job Number	61-2943513
Revision	0
Date	06 Jun 2014

Vegetation types and conservation
significant flora locations

Figure 5

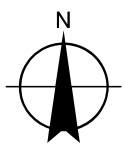
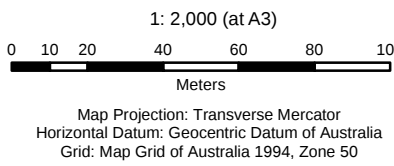
G:\6129435\GIS\Maps\MXD\612943513_G037_Fig05_Rev0.mxd
© 2014. Whilst every care has been taken to prepare this map, GHD, GA, Landgate and MRWA make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
Data source: GHD: Project area - 20140411; Vegetation type - 20140414; Priority flora - 20140414; MRWA - Road name - 20130604; Landgate: Metro Central Jan 2013 mosaic - 20140414; GA: Topo 250k Series 3 - 2006 . Created by: jcmatic

239 Adelaide Terrace Perth WA 6004 Australia T 61 8 6222 8222 F 61 8 6222 8555 E permail@ghd.com.au W www.ghd.com.au



LEGEND

Declared Pests (under the BAM Act)		Vegetation Condition (Keighery, 1994)	
	*Gomphocarpus fruticosus (Narrow leaf cotton bush)		1. Pristine or Nearly So
	Project area		1-2
			2. Excellent
			3. Very Good
			3-4
			4. Good
			4-5
			5. Degraded
			5-6
			6. Completely Degraded

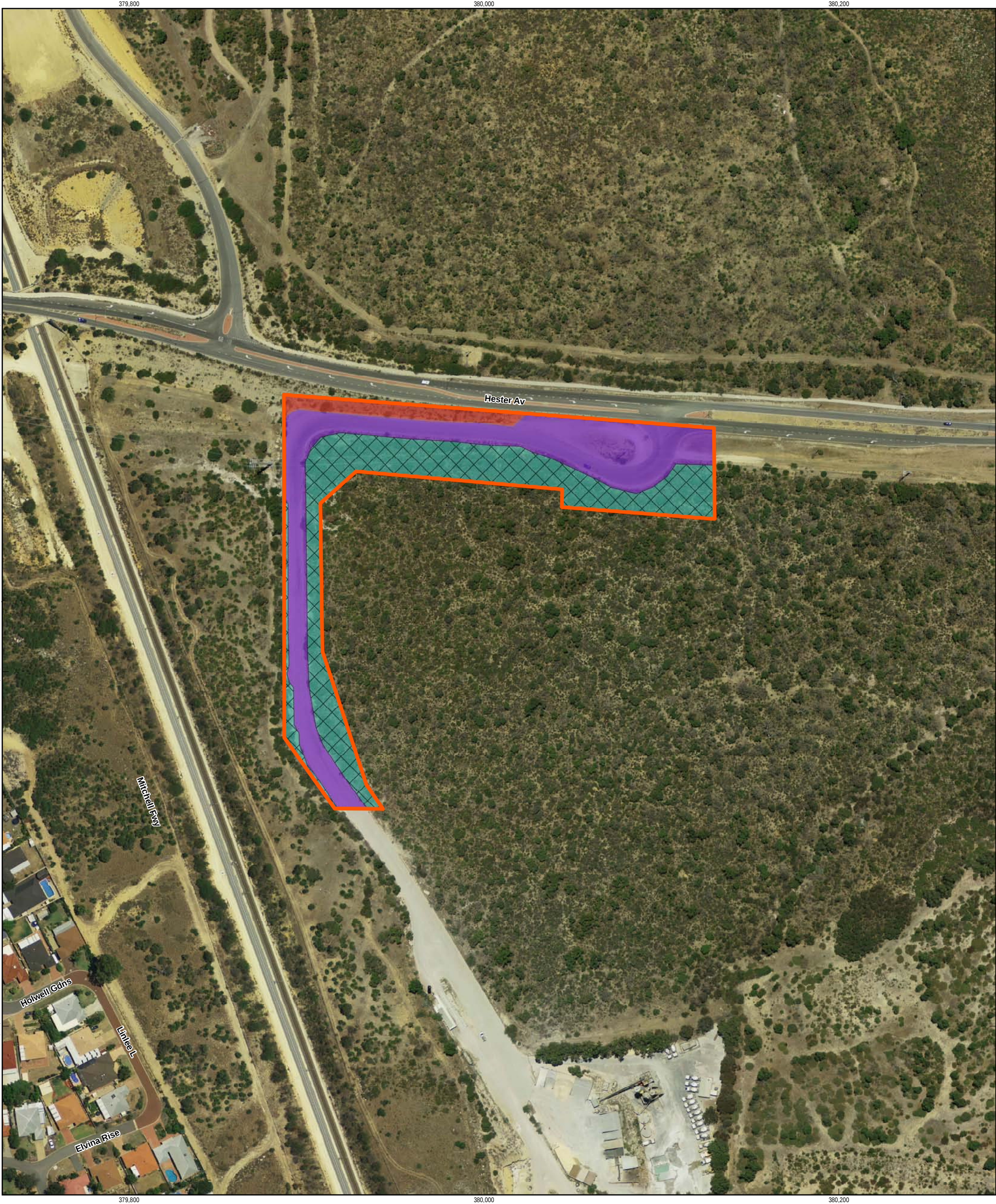


Main Roads Western Australia
Mitchell Freeway BGC Quarry Access Realignment

Job Number | 61-2943513
Revision | 0
Date | 06 Jun 2014

Vegetation condition
and weed location

Figure 6



Appendix B – Background information and codes

B.1 Legislation

B.1.1 Federal *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Federal Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as Matters of National Environmental Significance (MNES).

There are currently nine MNES protected under the EPBC Act, these include:

- World heritage properties
- National heritage places
- Wetlands of international importance (listed under the Ramsar Convention)
- Listed Threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mines)
- A water resource, in relation to coal seam gas development and large coal mining development

A person must not undertake an action that has, will have, or is likely to have a significant impact (direct or indirect) on MNES, without approval from the Australian Government Minister for the Environment.

B.1.2 State *Environmental Protection Act 1986*

The *Environmental Protection Act 1986* (EP Act) is the primary legislative Act dealing with the protection of the environment in Western Australia. It provides for an Environmental Protection Authority (EPA), for the prevention, control and abatement of pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the above.

Clearing of native vegetation in Western Australia requires a permit from the Department of Environment Regulation (DER) (formerly the Department of Environment and Conservation – DEC), unless exemptions apply. Native vegetation includes aquatic and terrestrial vegetation indigenous to Western Australia, and intentionally planted vegetation declared by regulation to be native, but not vegetation planted in a plantation or planted with commercial intent.

In the EP Act Section 51A, clearing is defined as the killing or destruction of; the removal of; the severing or ringbarking of trunks or stems of; or the doing of substantial damage of some or all of the native vegetation in an area, including the flooding of land, the burning of vegetation, the grazing of stock or an act or activity that results in the above.

When making a decision to grant or refuse a permit to clear native vegetation the assessment considers clearing against the ten clearing principles as specified in Schedule 5 of the EP Act:

- a) Native vegetation should not be cleared if it comprises a high level of biodiversity.
- b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significance habitat for fauna indigenous to Western Australia.
- c) Native vegetation should not be cleared if it includes, or is necessary, for the continued existence of rare flora.

- d) Native vegetation should not be cleared if it comprises the whole or part of native vegetation in an area that has been extensively cleared.
- 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.
- f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
- g) 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.
- h) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.
- 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.
- j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

There are a number of Environmentally Sensitive Areas (ESAs) within Western Australia where exemptions in regulations do not apply. ESAs include locations of threatened communities and species.

B.1.3 State *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*

ESAs are declared by a notice under Section 51B of the EP Act. Table B.1 outlines the aspects of areas declared as ESA (under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 – Reg 6).

Table B.1 Aspects of Environmentally Sensitive Areas

Aspects of Environmentally Sensitive Areas	
A declared World Heritage property as defined in Section 13 of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act).	
An area that is registered on the Register of the National Estate (RNE), because of its natural values, under the <i>Australian Heritage Commission Act 1975</i> of the Commonwealth (the RNE was closed in 2007 and is no longer a statutory list – all references to the RNE were removed from the EPBC Act on 19 February 2012).	
A defined wetland and the area within 50 m of the wetland.	
The area covered by vegetation within 50 m of rare flora, to the extent to which the vegetation is continuous with the vegetation in which the rare flora is located.	
The area covered by a TEC.	
A Bush Forever Site.	
The areas covered by the following policies:	
a)	The <i>Environmental Protection (Gnangara Mound Crown Land) Policy 1992</i> .
b)	The <i>Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002</i> .
The areas covered by the lakes to which the <i>Environmental Protection (Swan Coastal Plain Lakes) Policy 1992</i> (SCPL) (EPP Lakes) applies.	

Aspects of Environmentally Sensitive Areas

Protected wetlands as defined in the *Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998*.

Areas of fringing native vegetation in the policy area as defined in the *Environmental Protection (Swan and Canning Rivers) Policy 1997*.

B.1.4 State *Wildlife Conservation Act 1950*

The *Wildlife Conservation Act 1950* (WC Act) provides for the conservation and protection of wildlife. It is administered by the Department of Parks and Wildlife (DPaW) (formerly the DEC) and applies to both flora and fauna. Any person wanting to capture, collect, disturb or study fauna requires a permit to do so. A permit is required under the WC Act if removal of threatened species is required.

B.1.5 State *Biosecurity and Agriculture Management Act 2007*

Under the *Biosecurity and Agriculture Management Act 2007* (BAM Act), a Declared Pest is a prohibited organism or an organism for which a declaration under Section 22(2) is in force. The Department of Agriculture and Food Western Australia (DAFWA) maintains a list of Declared Pests for Western Australia. If a Pest is declared for the whole of the State or for particular

Local Government Areas, all landholders are obliged to comply with the specific category of control. Declared plants are gazetted under categories, which define the action required. The category may apply to the whole of the State, districts, individual properties or even paddocks. Categories of control are defined in Table B.2. Among the factors considered in categorising Declared Pests are:

- The impact of the plant on individuals, agricultural production and the community in general
- Whether it is already established in the area
- The feasibility and cost of possible control measures

The BAM Act replaces the repealed *Agriculture and Related Resources Protection Act 1976* (ARRP Act).

Table B.2 Department of Agriculture and Food (Western Australia) Categories for Declared Pests under the *Biosecurity and Agriculture Management Act 2007*

Control class code	Description
C1 (Exclusion)	Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 (Eradication)	Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 (Management)	Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

B.2 Background information and conservation codes

B.2.1 Reserves and conservation areas

Bush Forever

Bush Forever, which was released in December 2000 and proclaimed in 2010, is a Government initiative aimed to retain and protect regionally significant bushland on the Swan Coastal Plain within the Perth Metropolitan Region. Bush Forever aims to protect more than 51,000 hectares of regionally significant bushland within 287 sites across the metropolitan portion of the Swan Coastal Plain (Government of Western Australia 2000). Bush Forever sites constitute ESAs as declared by a notice under Section 51B of the EP Act.

Department of Parks and Wildlife managed lands and waters

DPaW manages lands and waters throughout Western Australia to conserve ecosystems and species, and to provide for recreation and appreciation of the natural environment. DPaW managed lands and waters include national parks, conservation parks and reserves, marine parks and reserves, regional parks, nature reserves, State forest and timber reserves. DPaW managed conservation estate, is vested with the Conservation Commission of Western Australia. Access to, or through, some areas of DPaW managed lands may require a permit or could be restricted due to management activities. Proposed land use changes and development proposals that abut DPaW managed lands will generally be referred to DPaW throughout the assessment process.

B.2.2 Wetlands

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

Though extensive in area, 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 percent of all the wetlands that were present on the Swan Coastal Plain prior to European settlement. Of these, an estimated 15 percent of the wetland area has retained high ecological values (Hill et al. 1996).

Ramsar Listed Wetlands

The Convention of Wetlands of International Importance was signed in 1971 at the Iranian town of Ramsar. The Convention has since been referred to as the Ramsar Convention. Ramsar Listed wetlands are “sites containing representative, rare or unique wetlands, or wetlands that are important for conserving biological diversity ... because of their ecological, botanical, zoological, limnological or hydrological importance” (DoE 2014b). Once a Ramsar Listed Wetland is designated, the country agrees to manage its conservation and ensure its wise use. Under the Convention, wise use is broadly defined as “maintaining the ecological character of a wetland” (DoE 2014b).

Nationally important wetlands

Wetlands of national significance are listed under the Directory of Important Wetlands in Australia. Nationally important wetlands are wetlands which meet at least one of the following criteria (DoE 2014a):

- It is a good example of a wetland type occurring within a biogeographic region in Australia
- It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex

- It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail
- The wetland supports one percent or more of the national populations of any native plant or animal taxa
- The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level
- The wetland is of outstanding historical or cultural significance

Lakes covered under the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992*

The *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* (EPP Lakes) protects the environmental values of selected lakes/wetlands on the Swan Coastal Plain.

Geomorphic wetlands

Categorisation of wetlands has been conducted by Hill et al. (1996), delineating Swan Coastal Plain wetlands 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 with few attributes that still provide important wetland functions. Multiple Use wetlands 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.

B.2.3 Vegetation extent and status

The National Objectives and Targets for Biodiversity Conservation 2001–2005 (Commonwealth of Australia 2001) recognise that the retention of 30 percent or more of the pre-clearing extent of each ecological community is necessary if Australia's biological diversity is to be protected. This is the threshold level below which species loss appears to accelerate exponentially and loss below this level should not be permitted. This level of recognition is in keeping with the targets recommended in the review of the National Strategy for the Conservation of Australia's Biological Diversity (ANZECC 2000) and in Environmental Protection Authority (EPA) Position Statement No. 2 on environmental protection of native vegetation in Western Australia (EPA 2000).

From a purely biodiversity perspective and taking no account of any other land degradation issues, there are a number of key criteria now being applied to the clearing of native vegetation in Western Australia (EPA 2000).

- The "threshold level" below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at a level of 30 percent of the pre-European extent of the vegetation type.
- A level of 10 percent of the original extent is regarded as being a level representing Endangered.
- Clearing which would put the threat level into the class below should be avoided.
- From a biodiversity perspective, stream reserves should generally be in the order of at least 200 metres (m) wide.

Within the Swan Coastal Plain, EPA Position Statement No. 9 (EPA 2006a) identifies vegetation complexes with 30 percent or less of their pre-clearing extent remaining in a bioregion, or 10 percent or less of their pre-clearing extent remaining in constrained areas (i.e. areas of urban development in cities and major towns) on the Swan Coastal Plain, to be critical assets.

The extent of remnant native vegetation has been assessed by Shepherd et al. (2002) and the Government of Western Australia (2013), based on broadscale vegetation association mapping by Beard (1979).

The Local Biodiversity Program (2013) and Perth Biodiversity Project (2010) assess the extent of Heddle et al. (1980) vegetation complexes currently present against presumed pre-European extents. At the regional scale, information is available on 2013 native vegetation extent by vegetation complexes and administrative planning categories on the Swan Coastal Plain, Jarrah Forest and Warren IBRA bioregions (Local Biodiversity Program 2013). At the local scale, information is available on 2010 remnant vegetation extent by vegetation complexes, administrative planning categories and land use categories for each Local Government in the Perth Metropolitan and Peel Region Scheme areas and for the Region Scheme areas (Perth Biodiversity Project 2010).

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
- 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 percent” (EPA 2006b). Furthermore, as a result of the clearing of the Swan Coastal Plain since 1998, it is likely that the actual percentage remaining of each vegetation type is less.

B.2.4 Conservation codes

Species of significant flora, fauna and communities are protected under both Federal and State Acts. The Federal EPBC Act provides a legal framework to protect and manage nationally important flora and communities. The State WC Act is the primary wildlife conservation legislation in Western Australia. Information on the conservation codes is summarised in the following sections.

Conservation significant communities

Ecological communities are defined as naturally occurring biological assemblages that occur in a particular type of habitat (English and Blyth 1997). Federally listed Threatened Ecological Communities (TECs) are protected under the EPBC Act administered by the Department of the Environment (DotE) (formerly Department of Sustainability, Environment, Water, Population and Communities – DSEWPaC). The DPaW also maintains a list of TECs for Western Australia; some of which are also protected under the EPBC Act. 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 (Table B.3).

Possible TEC that do not meet survey criteria are added to the DPaW Priority Ecological Community (PEC) List under Priorities 1, 2 and 3 (Table B.4). These 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. PECs are not listed under any formal Federal or State legislation.

Table B.3 Conservation codes and definitions for Threatened Ecological Communities endorsed by the Western Australian Minister for the Environment and listed under the *Environment Protection and Biodiversity Conservation Act 1999*

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.		

Table B.4 Conservation categories and definitions for Priority Ecological Communities as listed by the Department of Parks and Wildlife

Category	Description
Priority 1	Poorly known ecological communities. Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤ 5 occurrences or a total area of ≤ 100 ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
Priority 2	Poorly known ecological communities. Communities that are known from few occurrences with a restricted distribution (generally ≤ 10 occurrences or a total area of ≤ 200 ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
Priority 3	Poorly known ecological communities. (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; (iii) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.
Priority 4	Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. (i) Rare. Ecological communities known from few occurrences 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 communities are usually represented on conservation lands. (ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Category	Description
Priority 5	Conservation Dependent ecological communities. Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Other significant vegetation

Vegetation may be significant for a range of reasons, other than a statutory listing as TEC or because the extent is below a threshold level. The EPA (2004) states that significant vegetation may include vegetation that includes the following:

- Scarcity
- Unusual species
- Novel combinations of species
- A role as a refuge
- A role as a key habitat for Threatened species or large population representing a significant proportion of the local to regional total population of a species
- Being representative of the range of a unit (particularly, a good local and/or regional example of a unit in 'prime' habitat, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- A restricted distribution

This may apply at a number of levels, so the unit may be significant when considered at the fine-scale (intra-locality), intermediate-scale (locality or inter-locality) or broad-scale (local to region).

Conservation significant flora and fauna

Species of significant flora are protected under both Federal and State legislation. Any activities that are deemed to have a significant impact on species that are recognised by the EPBC Act, and/or the WC Act can warrant referral to the DoE and/or the EPA. According to the DPaW (WA Herbarium, 1998–): "Threatened flora are plants which have been assessed as being at risk of extinction. In Western Australia the term Declared Rare Flora (DRF) is applied to Threatened flora due to the laws regarding threatened flora conservation. The WC Act is the primary wildlife conservation legislation in the State and the Minister for the Environment can declare taxa (species, subspecies or variety) as "Rare Flora" if they are considered to be in danger of extinction, rare or otherwise in need of special protection." For the purposes of this report, flora listed by the WC Act as DRF is described as Threatened.

The Federal conservation level of flora and fauna species and their significance status is assessed under the EPBC Act (Table B.5). 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 assessed under the State WC Act (*Wildlife Conservation (Specially Protected Fauna) Notice 2010(2)*). This Act uses a set of Schedules (Table B.6) 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".

In Western Australia, the DPaW also maintains a list of Priority listed flora species. Conservation codes for Priority species are assigned by the DPaW to define the level of conservation significance (Table B.6). Priority species are not currently protected under the WC Act.

In addition to conservation significant species flora and fauna can be considered important if they are significant either on the Swan Coastal Plain or in the Perth metropolitan region. This includes species discussed in Government of Western Australia (2000) as being rare, poorly known, restricted in distribution or with some other distinctive feature.

For the purposes of this assessment, all species listed under the EPBC Act, WC Act and DPaW Priority species are considered conservation significant.

Table B.5 Conservation categories and definitions for *Environment Protection and Biodiversity Conservation Act 1999* listed flora & 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

Table B.6 Conservation codes and descriptions for Western Australian flora and fauna

Code	Conservation category	Description
<i>Wildlife Conservation Act 1950</i>		
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.
DPaW Priority Listed		
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.

Code	Conservation category	Description
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 monitoring	(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. (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.

Migratory species listed under the EPBC Act

The EPBC Act also protects land and migratory species that are listed under International Agreements. The list of migratory species established under section 209 of the EPBC Act comprises:

- Migratory species which are native to Australia and are included in the appendices to the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals Appendices I and II)
- Migratory species included in annexes established under the Japan-Australia Migratory Bird Agreement (JAMBA) and the China–Australia Migratory Bird Agreement (CAMBA)
- Native, migratory species identified in a list established under, or an instrument made under, an international agreement approved by the Minister, such as the republic of Korea–Australia Migratory Bird Agreement (ROKAMBA)

Other significant flora and fauna

Flora species, subspecies, varieties, hybrids and ecotypes may be significant for a range of reasons, other than as Threatened (Declared Rare) Flora or Priority Flora. The EPA (2004) states that significant flora may include taxa that have:

- A keystone role in a particular habitat for threatened species or supporting large populations representing a significant proportion of the local regional population of a species
- Relic status
- Anomalous features that indicate a potential new discovery
- Being representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
- The presence of restricted subspecies, varieties, or naturally occurring hybrids
- Local endemism/a restricted distribution
- Being poorly reserved

The application of the degree of significance may apply at a range of scales.

A total of “178 vascular plant taxa recorded on the Swan Coastal Plain are of particular interest as they are rare, poorly known, restricted in distribution or have some other distinctive feature” (Government of Western Australia 2000).

Other significant fauna are “those birds that are habitat specialists with a reduced distribution on the Swan Coastal Plain or wide-ranging species with reduced populations on the Swan Coastal Plain; those mammals that have few populations on the Swan Coastal Plain; and those reptile species that have reduced ranges or few recent records on the Swan Coastal Plain” (Government of Western Australia 2000).

Introduced plants (weeds)

Declared Pests

Information on species considered to be Declared Pests is provided in B.1.5.

Weeds of National Significance

The spread of weeds across a range of land uses or ecosystems is important in the context of socio-economic and environmental values. The assessment of Weeds of National Significance (WoNS) is based on four major criteria:

- Invasiveness
- Impacts
- Potential for spread
- Socio-economic and environmental values

Australian state and territory governments have identified thirty two Weeds of National Significance (WoNS); a list of 20 WoNS was endorsed in 1999 and a further 12 were added in 2012 (Australian Government 2014).

Environmental weeds

“Environmental weeds are plants that establish themselves in natural ecosystems (marine, aquatic and terrestrial) and proceed to modify natural processes, usually adversely, resulting in the decline of the communities they invade” (CALM 1999). The Environmental Weed Strategy for Western Australia (EWSWA) was published in 1999. This document provides direction and an approach to tackling

environmental weeds in Western Australia (CALM 1999). Following on from this strategy (in 2008), in an effort to address invasive weeds and implement an integrated approach to weed management on DPaW-managed lands in WA, the Weed Prioritisation Process was developed. A series of workshops were held in each of the nine DPaW regions with the purpose of scoring all weeds which occurred in each of the DPaW regions according to the following key attributes (DPaW 2013):

- Potential distribution and impact
- Invasiveness
- Current distribution
- Feasibility of control
- Weed management ability
- Weed risk

This process resulted in the following five ratings for each weed species (DPaW 2013):

- Very high (VH)
- High (H)
- Medium (M)
- Low (L)
- Negligible (N)

The suggested management actions for each species ranged from no action required (the weed species ranking is as low as to not warrant any investment in regional strategic management actions), through targeted control to reduce infestation or spread, to species requiring state-wide eradication (DPaW 2013).

The prioritisation for individual weeds within a DPaW region should be treated as a guide and does not diminish any other requirements of land managers or developers e.g. Declared Pest requirements of the BAM Act or Ministerial requirements under Part IV of the EP Act (DPaW 2013).

B.3 References

- Australia New Zealand Environment and Conservation Council (ANZECC) 2000, *Core Environmental Indicators for Reporting on the State of Environment*, ANZECC State of the Environment Reporting Task Force.
- Australian Government 2014, *Weeds in Australia*, retrieved 2014, from <http://www.environment.gov.au/biodiversity/invasive/weeds/index.html>.
- Beard, JS 1979, *Vegetation Survey of Western Australia: Perth Map and Explanatory Memoir 1:250,000 series*, Perth, Vegmap Publications.
- Commonwealth of Australia 2001, *National Targets and Objectives for Biodiversity Conservation 2001–2005*, Canberra, AGPS.
- Department of Conservation and Land Management (CALM) 1999, *Environmental Weed Strategy for Western Australia*, Como, Western Australia, Department of Conservation and Land Management.
- Department of Parks and Wildlife (DPaW) 2013, *Weed Prioritisation Process*, retrieved 2014, from <http://www.dpaw.wa.gov.au/plants-and-animals/plants/weeds/156-how-does-dpaw-manage-weeds>.
- Department of the Environment (DotE) 2014a, *Criteria for determining nationally important wetlands*, retrieved 2014, from <http://www.environment.gov.au/topics/water/water-our-environment/wetlands/australian-wetlands-database/directory-important>.
- Department of the Environment (DotE) 2014b, *The Ramsar Convention on Wetlands*, retrieved 2014, from <http://www.environment.gov.au/topics/water/water-our-environment/wetlands/ramsar-convention-wetlands>.
- English, V and Blyth, J 1997, *Identifying and Conserving Threatened Ecological Communities in the South West Botanical Province*, Perth, Department of Conservation and Land Management.
- Environmental Protection Authority (EPA) 2000, *Environmental Protection of Native Vegetation in Western Australia. Clearing of native vegetation, with particular reference to the agricultural area. Position Statement No. 2*, Perth, Environmental Protection Authority.
- Environmental Protection Authority (EPA) 2004, *Guidance Statement No. 51, Guidance for the Assessment of Environmental Factors: Vegetation and Flora Surveys for Environmental Impact Assessment in Western Australia*, Perth, Environmental Protection Authority.
- Environmental Protection Authority (EPA) 2006a, *Position Statement No. 9: Environmental Offsets*, Perth, Environmental Protection Authority.
- Environmental Protection Authority (EPA) 2006b, *Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986): Level of Assessment for Proposals Affecting Natural Areas Within the System 6 Region and Swan Coastal Plain Portion of the System 1 Region (No. 10)*, Perth, Environmental Protection Authority.
- Government of Western Australia 2000, *Bush Forever – Keeping the Bush in the City. Volumes 1 (Policies, Principals and Processes) & 2 (Directory of Bush Forever Sites)*, Perth, Government of Western Australia.
- Government of Western Australia 2013, *2012 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report): current as of October 2012*, retrieved 2014, from <https://www2.landgate.wa.gov.au/web/guest/downloader>.
- Heddl, EM, Loneragan, OW, & Havel, JJ 1980, 'Vegetation Complexes of the Darling System, Western Australia', In *Atlas of Natural Resources, Darling System, Western Australia*, Perth, Department of Conservation and Environment.

- Hill, AL, Semeniuk, CA, Semeniuk, V and del Marco, A 1996, *Wetlands of the Swan Coastal Plain. Volume 2: Wetland Mapping, Classification and Evaluation – Wetland Atlas*, Prepared for the Water and Rivers Commission and the Department of Environmental Protection, Perth, Western Australia.
- Local Biodiversity Program 2013, *2013 Native vegetation by vegetation complex dataset for the South West of Western Australia*, retrieved 2014, from <http://pbp.walga.asn.au/Publications.aspx>.
- Perth Biodiversity Project 2010, *2010 Native vegetation extent by vegetation complexes for each Local Government in Perth and Peel*, retrieved 2014, from <http://pbp.walga.asn.au/Publications.aspx>.
- Shepherd, DP, Beeston, GR & Hopkins, AJM 2002, *Native Vegetation in Western Australia – Extent, Type and Status, Resource Management Technical Report 249*, Perth, Department of Agriculture.
- Western Australian Herbarium 1998–, *FloraBase—the Western Australian Flora*. Department of Parks and Wildlife, retrieved 2014, from <http://florabase.dpaw.wa.gov.au/>.

Appendix C – Desktop searches

Environment Protection Biodiversity Conservation Act 1999 Protected Matters Search report

NatureMap Flora report

NatureMap Fauna report



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: 31/03/14 19:53:33

[Summary](#)

[Details](#)

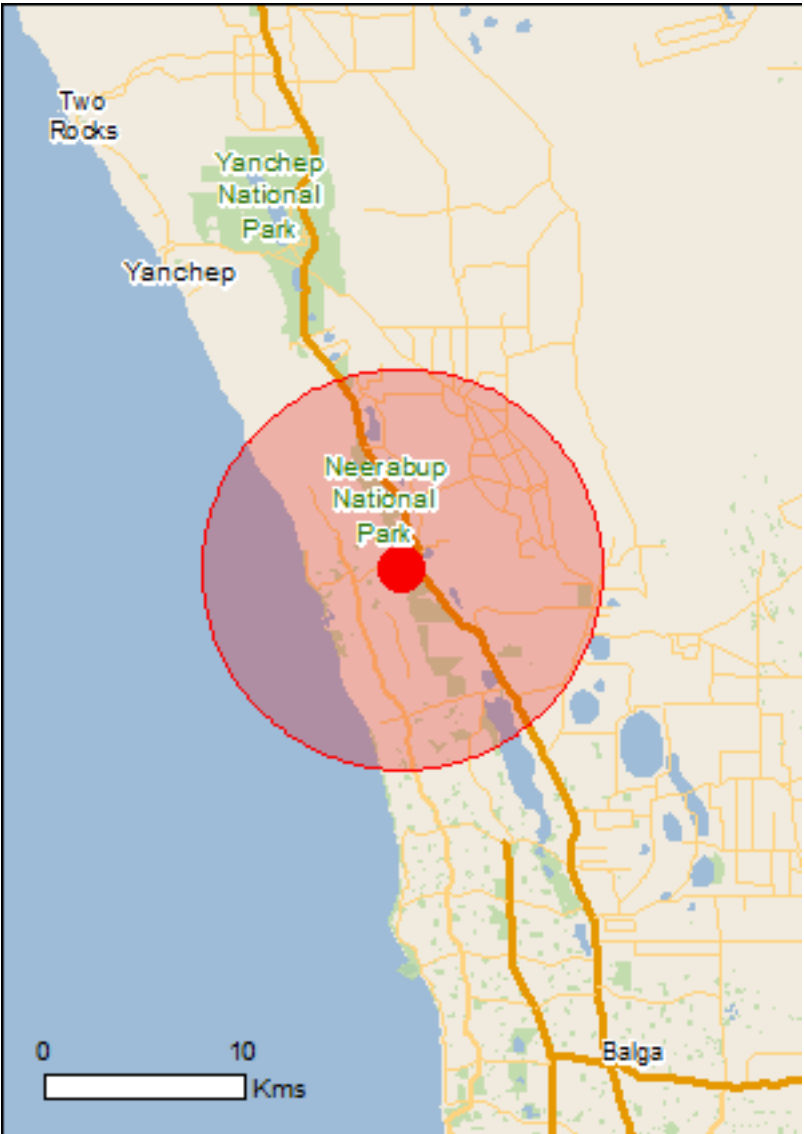
[Matters of NES](#)

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

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
©Commonwealth of Australia
(Geoscience Australia), ©PSMA 2010

[Coordinates](#)

[Buffer: 10.0Km](#)



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	43
Listed Migratory Species:	39

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.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	62
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine	None

Extra Information

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

Place on the RNE:	8
State and Territory Reserves:	5
Regional Forest Agreements:	None
Invasive Species:	36
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

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

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

Name	Status	Type of Presence
Sedgelands in Holocene dune swales of the southern Swan Coastal Plain	Endangered	Community known to occur within area

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

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Calyptorhynchus latirostris Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Diomedea epomophora epomophora Southern Royal Albatross [25996]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora sanfordi Northern Royal Albatross [82331]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans amsterdamensis Amsterdam Albatross [82330]	Endangered	Species or species habitat may occur within area
Diomedea exulans exulans Tristan Albatross [82337]	Endangered	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence
area		
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Neophoca cinerea Australian Sea-lion [22]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
Anigozanthos viridis subsp. terraspectans Dwarf Green Kangaroo Paw [3435]	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
Centrolepis caespitosa [6393]	Endangered	Species or species habitat likely to occur within area
Darwinia foetida Muchea Bell [83190]	Critically Endangered	Species or species habitat likely to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat may occur within area
Drakaea elastica Glossy-leaved Hammer-orchid, Praying Virgin [16753]	Endangered	Species or species habitat likely to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat may occur within area
Epiblema grandiflorum var. cyaneum Baby Blue Orchid, Blue Babe-in-the-cradle Orchid, Blue Babe-in-a-cradle [67182]	Endangered	Species or species habitat may occur within area
Eucalyptus argutifolia Yanchep Mallee, Wabling Hill Mallee [24263]	Vulnerable	Species or species habitat likely to occur within area
Lepidosperma rostratum Beaked Lepidosperma [14152]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sharks		
Carcharias taurus (west coast population) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered*	Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		

Name	Threatened	Type of Presence
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Ardea ibis Cattle Egret [59542]	Endangered*	Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[Resource Information]
-------------------	--

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

Name
Commonwealth Land -

Listed Marine Species	[Resource Information]
-----------------------	--

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

Name	Threatened	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]	Endangered*	Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]		Species or species habitat may occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within

Name	Threatened	Type of Presence
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	area Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area
Himantopus himantopus Black-winged Stilt [870]		Species or species habitat known to occur within area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour may occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area
Puffinus assimilis Little Shearwater [59363]		Foraging, feeding or related behaviour known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Sterna anaethetus Bridled Tern [814]		Foraging, feeding or related behaviour likely to occur within area
Sterna caspia Caspian Tern [59467]		Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Fish		
Acentronura australe Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
Campichthys galei Gale's Pipefish [66191]		Species or species habitat may occur within area
Choeroichthys suillus Pig-snouted Pipefish [66198]		Species or species habitat may occur within area
Halicampus brocki Brock's Pipefish [66219]		Species or species habitat may occur within area
Hippocampus angustus Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
Hippocampus breviceps Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Arctocephalus forsteri New Zealand Fur-seal [20]		Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion [22]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Reptiles		
Aipysurus pooleorum Shark Bay Seasnake [66061]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area
Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]	Endangered	Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]	Endangered	Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]		Breeding known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		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		
Marmion Marine Park	WA	Indicative Place
Wanneroo Wetlands Eastern Chain	WA	Indicative Place
Lake Joondalup Reserves	WA	Registered
Neerabup National Park	WA	Registered
Nowergup Lake Fauna Reserve	WA	Registered
Indigenous		

Name	State	Status
Doogarch Site	WA	Indicative Place
Orchestra Shell Cave	WA	Registered
Historic		
Eglinton Shipwreck	WA	Registered
State and Territory Reserves		[Resource Information]
Name	State	
Lake Joondalup	WA	
Neerabup	WA	
Neerabup	WA	
Unnamed WA21176	WA	
Unnamed WA43290	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
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara 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
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding		Species or species

Name	Status	Type of Presence
Pine [20780]		habitat may occur within area
Rubus fruticosus aggregate		
Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Tamarix aphylla		
Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area
Ramphotyphlops braminus		
Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area

Nationally Important Wetlands		[Resource Information]
Name		State
Joondalup Lake		WA

Coordinates

-31.67124 115.73384

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.

NatureMap Flora Species Report

Created By Guest user on 31/03/2014

Kingdom Plantae
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115°44' 02" E, 31°40' 15" S
Buffer 10km
Group By Family

Family	Species	Records
Acrotylaceae	1	2
Aizoaceae	4	8
Amaranthaceae	8	15
Apiaceae	9	44
Apocynaceae	1	1
Araceae	1	2
Araliaceae	5	23
Arecaceae	1	2
Areschougaceae	2	3
Asparagaceae	19	63
Asteraceae	34	108
Bonnemaisoniaceae	1	1
Brassicaceae	4	10
Campanulaceae	2	6
Caryophyllaceae	4	15
Casuarinaceae	3	10
Celastraceae	4	5
Centrolepidaceae	3	12
Ceramiaceae	2	2
Chenopodiaceae	6	8
Codiaceae	1	1
Colchicaceae	1	2
Commelinaceae	1	2
Convolvulaceae	1	1
Corallinaceae	2	2
Crassulaceae	3	11
Cucurbitaceae	1	1
Cyperaceae	25	87
Dasyaceae	1	1
Dasypogonaceae	2	3
Delesseriaceae	1	1
Dilleniaceae	6	31
Droseraceae	7	37
Elaeocarpaceae	1	2
Ericaceae	13	43
Euphorbiaceae	2	3
Fabaceae	47	139
Fabroniaceae	1	7
Frankeniaceae	1	1
Gelidiaceae	1	1
Geraniaceae	5	16
Goodeniaceae	8	14
Gracilariaceae	1	1
Gyrostemonaceae	1	1
Haemodoraceae	14	46
Haloragaceae	5	9
Halymeniaceae	3	4
Hemerocallidaceae	8	29
Hydatellaceae	1	1
Hypnaceae	3	3
Iridaceae	6	32
Juncaginaceae	1	1
Lamiaceae	2	7
Lauraceae	2	5
Loganiaceae	1	1
Loranthaceae	1	1
Malvaceae	2	4
Menyanthaceae	1	1
Myrtaceae	32	98
Nitrariaceae	1	1
Olacaceae	1	1
Onagraceae	2	2
Orchidaceae	22	57
Orobanchaceae	1	2
Oxalidaceae	1	1
Phyllanthaceae	3	20
Phytolaccaceae	1	2
Pittosporaceae	1	4
Plantaginaceae	1	1
Plocamiaceae	1	1
Poaceae	32	106
Polygalaceae	3	7
Polygonaceae	2	3
Portulacaceae	5	6
Proteaceae	24	80

Restionaceae	4	6
Rhamnaceae	3	9
Rhodomelaceae	9	13
Rubiaceae	2	5
Rutaceae	3	6
Santalaceae	3	4
Sapindaceae	2	2
Schizymeniaceae	2	2
Scrophulariaceae	4	7
Solanaceae	4	5
Stylidiaceae	13	26
Thymelaeaceae	6	10
Ulvaceae	1	1
Urticaceae	1	3
Verbenaceae	1	2
Violaceae	1	8
Xanthorrhoeaceae	1	16
Zamiaceae	1	7
TOTAL	491	1416

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Acrotylaceae				
1.	26665 <i>Clavicladium ovatum</i>			
Aizoaceae				
2.	2798 <i>Carpobrotus virescens</i> (Coastal Pigface, Kolboko)			
3.	11571 <i>Galenia pubescens</i> var. <i>pubescens</i>	Y		
4.	17543 <i>Sarcozona bicarinata</i>		P3	
5.	2820 <i>Tetragonia decumbens</i> (Sea Spinach)	Y		
Amaranthaceae				
6.	2668 <i>Amaranthus powellii</i> (Powell's Amaranth)	Y		
7.	2671 <i>Amaranthus viridis</i> (Green Amaranth)	Y		
8.	2718 <i>Ptilotus drummondii</i> (Narrowleaf Mulla Mulla)			
9.	11260 <i>Ptilotus drummondii</i> var. <i>drummondii</i> (Pussytail)			
10.	2742 <i>Ptilotus manglesii</i> (Pom Poms, Mulamula)			
11.	2751 <i>Ptilotus polystachyus</i> (Prince of Wales Feather)			
12.	15856 <i>Ptilotus sericostachyus</i> subsp. <i>sericostachyus</i>			
13.	40841 <i>Ptilotus stirlingii</i> subsp. <i>stirlingii</i>			
Apiaceae				
14.	6205 <i>Actinotus leucocephalus</i> (Flannel Flower)			
15.	6210 <i>Apium annuum</i>			
16.	8595 <i>Apium graveolens</i> (Wild Celery)	Y		
17.	6214 <i>Centella asiatica</i>			
18.	6218 <i>Daucus glochidiatus</i> (Australian Carrot)			
19.	6219 <i>Eryngium pinnatifidum</i> (Blue Devils)			
20.	15446 <i>Eryngium pinnatifidum</i> subsp. <i>pinnatifidum</i>			
21.	6222 <i>Homalosciadium homalocarpum</i>			
22.	6289 <i>Xanthosia huegelii</i>			
Apocynaceae				
23.	11051 <i>Gomphocarpus physocarpus</i>	Y		
Araceae				
24.	28342 <i>Landoltia punctata</i> (Thin Duckweed)			
Araliaceae				
25.	6226 <i>Hydrocotyle callicarpa</i> (Small Pennywort)			
26.	6229 <i>Hydrocotyle diantha</i>			
27.	6232 <i>Hydrocotyle hispidula</i>			
28.	20649 <i>Tetrapanax papyrifer</i>	Y		Y
29.	6280 <i>Trachymene pilosa</i> (Native Parsnip)			
Arecaceae				
30.	17910 <i>Washingtonia filifera</i>	Y		
Areschougaceae				
31.	26535 <i>Callophycus harveyanus</i>			
32.	26536 <i>Callophycus oppositifolius</i>			
Asparagaceae				
33.	1208 <i>Acanthocarpus preissii</i>			
34.	1280 <i>Chamaescilla corymbosa</i> (Blue Squill)			
35.	1287 <i>Dichopogon capillipes</i>			
36.	16091 <i>Lachenalia bulbifera</i>	Y		
37.	1309 <i>Laxmannia squarrosa</i>			
38.	1223 <i>Lomandra caespitosa</i> (Tufted Mat Rush)			
39.	1228 <i>Lomandra hermaphrodita</i>			
40.	1231 <i>Lomandra maritima</i>			
41.	1232 <i>Lomandra micrantha</i> (Small-flower Mat-rush)			
42.	14542 <i>Lomandra micrantha</i> subsp. <i>micrantha</i>			
43.	1234 <i>Lomandra nigricans</i>			
44.	1239 <i>Lomandra preissii</i>			
45.	1243 <i>Lomandra sericea</i> (Silky Mat Rush)			
46.	1246 <i>Lomandra suaveolens</i>			
47.	1312 <i>Sowerbaea laxiflora</i> (Purple Tassels)			
48.	1338 <i>Thysanotus manglesianus</i> (Fringed Lily)			
49.	1339 <i>Thysanotus multiflorus</i> (Many-flowered Fringe Lily)			
50.	1343 <i>Thysanotus patersonii</i>			
51.	1351 <i>Thysanotus sparteus</i>			
Asteraceae				

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
52.	7818	<i>Actites megalocarpus</i> (Dune Thistle)			
53.	7838	<i>Arctotheca calendula</i> (Cape Weed)	Y		
54.	7840	<i>Arctotis stoechadifolia</i> (White Arctotis)	Y		
55.	7851	<i>Asteridea pulverulenta</i> (Common Bristle Daisy)			
56.	7909	<i>Carduus pycnocephalus</i> (Slender Thistle)	Y		
57.	7937	<i>Cirsium vulgare</i> (Spear Thistle)	Y		
58.	20074	<i>Conyza sumatrensis</i>	Y		
59.	42009	<i>Craspedia</i> sp. Yalgorup National Park (G.J. Keighery 14449)			
60.	15137	<i>Euchiton sphaericus</i>			
61.	7976	<i>Galinsoga parviflora</i> (Potato Weed)	Y		
62.	8005	<i>Gnephosis uniflora</i>			
63.	8086	<i>Hypochaeris glabra</i> (Smooth Catsear)	Y		
64.	8096	<i>Lactuca serriola</i> (Prickly Lettuce)	Y		
65.	17852	<i>Leptorhynchos scaber</i> (Lanky Buttons)			
66.	8105	<i>Millotia myosotidifolia</i>			
67.	8106	<i>Millotia tenuifolia</i> (Soft Millotia)			
68.	8127	<i>Olearia axillaris</i> (Coastal Daisybush)			
69.	32716	<i>Olearia lehmanniana</i>			
70.	42281	<i>Pithocarpa cordata</i>			
71.	8175	<i>Podolepis gracilis</i> (Slender Podolepis)			
72.	8177	<i>Podolepis lessonii</i>			
73.	8183	<i>Podotheca chrysanthra</i> (Yellow Podotheca)			
74.	8184	<i>Podotheca gnaphalioides</i> (Golden Long-heads)			
75.	8195	<i>Quinetia urvillei</i>			
76.	15035	<i>Rhodanthe corymbosa</i>			
77.	13312	<i>Rhodanthe pyrethrum</i>			
78.	8225	<i>Siloxerus humifusus</i> (Procumbent Siloxerus)			
79.	8230	<i>Sonchus asper</i> (Rough Sowthistle)	Y		
80.	9367	<i>Sonchus hydrophilus</i> (Native Sowthistle)			
81.	8231	<i>Sonchus oleraceus</i> (Common Sowthistle)	Y		
82.	8254	<i>Urospermum picroides</i> (False Hawkbit)	Y		
83.	8255	<i>Ursinia anthemoides</i> (Ursinia)	Y		
84.	38388	<i>Ursinia anthemoides</i> subsp. <i>anthemoides</i>	Y		
85.	8282	<i>Waitzia suaveolens</i> (Fragrant Waitzia)			

Bonnemaisoniaceae

86. 26486 *Asparagopsis taxiformis*

Brassicaceae

87. 11187 *Brassica barrelieri* subsp. *oxyrrhina* (Smooth-stem Turnip) Y
88. 3000 *Brassica tournefortii* (Mediterranean Turnip) Y
89. 3016 *Heliophila pusilla* Y
90. 3080 *Stenopetalum robustum*

Campanulaceae

91. 7408 *Lobelia tenuior* (Slender Lobelia)
92. 7389 *Wahlenbergia preissii*

Caryophyllaceae

93. 2889 *Cerastium glomeratum* (Mouse Ear Chickweed) Y
94. 16693 *Minuartia mediterranea* Y
95. 2910 *Silene nocturna* (Mediterranean Catchfly) Y
96. 2918 *Stellaria media* (Chickweed) Y

Casuarinaceae

97. 1728 *Allocasuarina fraseriana* (Sheoak, Kondil)
98. 1732 *Allocasuarina humilis* (Dwarf Sheoak)
99. 18314 *Casuarina cunninghamiana* subsp. *cunninghamiana* Y

Celastraceae

100. 4733 *Stackhousia monogyna*
101. 9070 *Stackhousia pubescens* (Downy Stackhousia)
102. 4737 *Tripterococcus brunonis* (Winged Stackhousia)
103. 16998 *Tripterococcus paniculatus* P4

Centrolepidaceae

104. 1125 *Centrolepis drummondiana*
105. 1132 *Centrolepis mutica*
106. 1134 *Centrolepis polygyna* (Wiry Centrolepis)

Ceramiaceae

107. 26468 *Anotrichium lichenophorum*
108. 26830 *Euptilota articulata*

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Chenopodiaceae				
109.	2452 <i>Atriplex cinerea</i> (Grey Saltbush)			
110.	2483 <i>Chenopodium album</i> (Fat Hen)	Y		
111.	2490 <i>Chenopodium glaucum</i> (Glaucous Goosefoot)	Y		
112.	2491 <i>Chenopodium macrospermum</i>	Y		
113.	11341 <i>Rhagodia baccata</i> subsp. <i>baccata</i>			
114.	11930 <i>Rhagodia baccata</i> subsp. <i>dioica</i> (Sea Berry Saltbush)			
Codiaceae				
115.	26675 <i>Codium laminarioides</i>			
Colchicaceae				
116.	12770 <i>Burchardia congesta</i>			
Commelinaceae				
117.	1162 <i>Cartonema philydroides</i>			
Convolvulaceae				
118.	11021 <i>Cuscuta planiflora</i>	Y		
Corallinaceae				
119.	26988 <i>Jania verrucosa</i>			
120.	27068 <i>Metagoniolithon radiatum</i>			
Crassulaceae				
121.	3137 <i>Crassula colorata</i> (Dense Stonecrop)			
122.	3140 <i>Crassula glomerata</i>	Y		
123.	3146 <i>Crassula thunbergiana</i>	Y		
Cucurbitaceae				
124.	7370 <i>Citrullus lanatus</i> (Pie Melon)	Y		
Cyperaceae				
125.	740 <i>Baumea arthropphylla</i>			
126.	743 <i>Baumea juncea</i> (Bare Twigrush)			
127.	745 <i>Baumea preissii</i>			
128.	43241 <i>Carex thecata</i>			
129.	18318 <i>Cyperus involucratus</i>	Y		
130.	910 <i>Isolepis cernua</i> (Nodding Club-rush)			
131.	917 <i>Isolepis marginata</i> (Coarse Club-rush)	Y		
132.	925 <i>Lepidosperma angustatum</i>			
133.	42742 <i>Lepidosperma calcicola</i>			
134.	937 <i>Lepidosperma longitudinale</i> (Pithy Sword-sedge)			
135.	944 <i>Lepidosperma scabrum</i>			
136.	945 <i>Lepidosperma squamatum</i>			
137.	946 <i>Lepidosperma striatum</i>			
138.	955 <i>Mesomelaena pseudostygia</i>			
139.	969 <i>Schoenoplectus validus</i> (Lake Club-rush)			
140.	973 <i>Schoenus asperocarpus</i> (Poison Sedge)			
141.	982 <i>Schoenus clandestinus</i>			
142.	984 <i>Schoenus curvifolius</i>			
143.	985 <i>Schoenus discifer</i>			
144.	992 <i>Schoenus grandiflorus</i> (Large Flowered Bogrush)			
145.	997 <i>Schoenus lanatus</i> (Woolly Bog-rush)			
146.	1006 <i>Schoenus odontocarpus</i>			
147.	1018 <i>Schoenus subfascicularis</i>			
148.	1023 <i>Schoenus tenellus</i>			
149.	1036 <i>Tetraria octandra</i>			
Dasyaceae				
150.	26735 <i>Dasya cliftonii</i>			
Dasypogonaceae				
151.	1213 <i>Calectasia cyanea</i> (Blue Tinsel Lily)		T	
152.	19309 <i>Calectasia narragara</i>			
Delesseriaceae				
153.	26622 <i>Chauviniella coriifolia</i>			
Dilleniaceae				
154.	5112 <i>Hibbertia aurea</i>			
155.	5134 <i>Hibbertia huegelii</i>			
156.	5135 <i>Hibbertia hypericoides</i> (Yellow Buttercups)			
157.	5162 <i>Hibbertia racemosa</i> (Stalked Guinea Flower)			
158.	43280 <i>Hibbertia sericosepala</i>			
159.	11461 <i>Hibbertia spicata</i> subsp. <i>leptotheca</i>		P3	

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Droseraceae				
160.	3095 <i>Drosera erythrorhiza</i> (Red Ink Sundew)			
161.	3106 <i>Drosera macrantha</i> (Bridal Rainbow)			
162.	3109 <i>Drosera menziesii</i> (Pink Rainbow)			
163.	13216 <i>Drosera menziesii</i> subsp. <i>penicillaris</i>			
164.	3118 <i>Drosera pallida</i> (Pale Rainbow)			
165.	31233 <i>Drosera patens</i>			
166.	30712 <i>Drosera x sidjamesii</i>		P1	
Elaeocarpaceae				
167.	4524 <i>Platytheca galioides</i>			
Ericaceae				
168.	6295 <i>Acrotriche cordata</i> (Coast Ground Berry)			
169.	6311 <i>Andersonia heterophylla</i>			
170.	6314 <i>Andersonia lehmanniana</i>			
171.	6323 <i>Astroloma ciliatum</i> (Candle Cranberry)			
172.	6331 <i>Astroloma microcalyx</i> (Native Cranberry)			
173.	6334 <i>Astroloma pallidum</i> (Kick Bush)			
174.	6348 <i>Conostephium pendulum</i> (Pearl Flower)			
175.	6427 <i>Leucopogon parviflorus</i> (Coast Beard-heath)			
176.	6434 <i>Leucopogon polymorphus</i>			
177.	6436 <i>Leucopogon propinquus</i>			
178.	19460 <i>Leucopogon</i> sp. <i>Yanchep</i> (M. Hislop 1986)		P3	
179.	6456 <i>Lysinema ciliatum</i> (Curry Flower)			
180.	34736 <i>Lysinema pentapetalum</i>			
Euphorbiaceae				
181.	4648 <i>Euphorbia terracina</i> (Geraldton Carnation Weed)	Y		
182.	4713 <i>Stachystemon axillaris</i> (Leafy Stachystemon)			
Fabaceae				
183.	15470 <i>Acacia barbinervis</i> subsp. <i>borealis</i>			
184.	3237 <i>Acacia benthamii</i>		P2	
185.	3271 <i>Acacia costata</i>			
186.	3282 <i>Acacia cyclops</i> (Coastal Wattle)			
187.	3409 <i>Acacia lasiocarpa</i> (Panjang)			
188.	11611 <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i>			
189.	17861 <i>Acacia longifolia</i>	Y		
190.	3502 <i>Acacia pulchella</i> (Prickly Moses)			
191.	15481 <i>Acacia pulchella</i> var. <i>glaberima</i>			
192.	15482 <i>Acacia pulchella</i> var. <i>goadbyi</i>			
193.	3525 <i>Acacia rostellifera</i> (Summer-scented Wattle)			
194.	3527 <i>Acacia saligna</i> (Orange Wattle, Kudjong)			
195.	30032 <i>Acacia saligna</i> subsp. <i>saligna</i>			
196.	3584 <i>Acacia truncata</i>			
197.	3602 <i>Acacia willdenowiana</i> (Grass Wattle)			
198.	3710 <i>Bossiaea eriocarpa</i> (Common Brown Pea)			
199.	3793 <i>Daviesia angulata</i>			
200.	3805 <i>Daviesia decurrens</i> (Prickly Bitter-pea)			
201.	3807 <i>Daviesia divaricata</i> (Marno)			
202.	18560 <i>Daviesia divaricata</i> subsp. <i>divaricata</i>			
203.	3824 <i>Daviesia nudiflora</i>			
204.	3845 <i>Daviesia triflora</i>			
205.	20483 <i>Gastrolobium linearifolium</i>			
206.	20482 <i>Gastrolobium nervosum</i>			
207.	3957 <i>Gompholobium tomentosum</i> (Hairy Yellow Pea)			
208.	3961 <i>Hardenbergia comptoniana</i> (Native Wisteria)			
209.	3966 <i>Hovea pungens</i> (Devil's Pins, Puyenak)			
210.	12859 <i>Hovea trisperma</i> var. <i>trisperma</i>			
211.	3992 <i>Isotropis cuneifolia</i> (Granny Bonnets)			
212.	14783 <i>Jacksonia calcicola</i>			
213.	4027 <i>Jacksonia sericea</i> (Waldjumi)		P4	
214.	4029 <i>Jacksonia sternbergiana</i> (Stinkwood, Kapur)			
215.	4044 <i>Kennedia prostrata</i> (Scarlet Runner)			
216.	4066 <i>Lupinus cosentinii</i>	Y		
217.	4075 <i>Medicago littoralis</i> (Strand Medic)	Y		
218.	4079 <i>Medicago polymorpha</i> (Burr Medic)	Y		
219.	4085 <i>Melilotus indicus</i>	Y		
220.	4207 <i>Sphaerolobium medium</i>			
221.	4256 <i>Templetonia retusa</i> (Cockies Tongues)			
222.	4292 <i>Trifolium campestre</i> (Hop Clover)			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
223.	17763 <i>Trifolium campestre</i> var. <i>campestre</i> (Hop Clover)	Y		
224.	4295 <i>Trifolium dubium</i> (Suckling Clover)	Y		
225.	4297 <i>Trifolium glomeratum</i> (Cluster Clover)	Y		
226.	4309 <i>Trifolium scabrum</i> (Rough Clover)	Y		
227.	4322 <i>Vicia sativa</i> (Common Vetch)	Y		
228.	11474 <i>Vicia sativa</i> subsp. <i>nigra</i>	Y		
229.	4325 <i>Viminaria juncea</i> (Swishbush, Koweda)			

Fabroniaceae

230.	20162 <i>Fabronia hampeana</i>		P2	
------	--------------------------------	--	----	--

Frankeniaceae

231.	5209 <i>Frankenia pauciflora</i> (Seaheath)			
------	---	--	--	--

Gelidiaceae

232.	26848 <i>Gelidium crinale</i>			
------	-------------------------------	--	--	--

Geraniaceae

233.	4332 <i>Erodium botrys</i> (Long Storksbill)	Y		
234.	4339 <i>Geranium molle</i> (Dove's Foot Cranesbill)	Y		
235.	4341 <i>Geranium solanderi</i> (Native Geranium)			
236.	4343 <i>Pelargonium capitatum</i> (Rose Pelargonium)	Y		
237.	4346 <i>Pelargonium littorale</i>			

Goodeniaceae

238.	12724 <i>Anthotium junciforme</i>			
239.	19286 <i>Goodenia pulchella</i> subsp. <i>Coastal Plain A (M. Hislop 634)</i>			
240.	7574 <i>Lechenaultia floribunda</i> (Free-flowering Leschenaultia)			
241.	7580 <i>Lechenaultia linarioides</i> (Yellow Leschenaultia)			
242.	7603 <i>Scaevola canescens</i> (Grey Scaevola)			
243.	7606 <i>Scaevola crassifolia</i> (Thick-leaved Fan-flower)			
244.	13182 <i>Scaevola repens</i> var. <i>repens</i>			
245.	13152 <i>Scaevola thesioides</i> subsp. <i>thesioides</i>			

Gracilariaceae

246.	26871 <i>Gracilaria flagelliformis</i>			
------	--	--	--	--

Gyrostemonaceae

247.	2784 <i>Gyrostemon ramulosus</i> (Corkybark)			
------	--	--	--	--

Haemodoraceae

248.	1409 <i>Anigozanthos humilis</i> (Catspaw)			
249.	11434 <i>Anigozanthos humilis</i> subsp. <i>humilis</i>			
250.	1418 <i>Conostylis aculeata</i> (Prickly Conostylis)			
251.	11826 <i>Conostylis aculeata</i> subsp. <i>aculeata</i>			
252.	11513 <i>Conostylis aculeata</i> subsp. <i>cygnorum</i>			
253.	1425 <i>Conostylis bracteata</i>		P3	
254.	1427 <i>Conostylis candicans</i> (Grey Cottonhead)			
255.	11438 <i>Conostylis candicans</i> subsp. <i>candicans</i>			
256.	1443 <i>Conostylis pauciflora</i> (Dawesville Conostylis)			
257.	1454 <i>Conostylis setigera</i> (Bristly Cottonhead)			
258.	11597 <i>Conostylis setigera</i> subsp. <i>setigera</i>			
259.	11870 <i>Conostylis teretifolia</i> subsp. <i>teretifolia</i>			
260.	1468 <i>Haemodorum laxum</i>			
261.	1478 <i>Phlebocarya ciliata</i>			

Haloragaceae

262.	33620 <i>Glischrocaryon angustifolium</i>			
263.	6143 <i>Glischrocaryon aureum</i> (Common Popflower)			
264.	6161 <i>Gonocarpus pithyoides</i>			
265.	6192 <i>Myriophyllum drummondii</i>			
266.	6199 <i>Myriophyllum tillaeoides</i>			

Halymeniaceae

267.	26709 <i>Cryptonemia undulata</i>			
268.	26850 <i>Gelinaria ulvoidea</i>			
269.	37640 <i>Halymenia floresii</i>			

Hemerocallidaceae

270.	1276 <i>Caesia micrantha</i> (Pale Grass Lily)			
271.	1285 <i>Corynotheca micrantha</i> (Sand Lily)			
272.	11283 <i>Corynotheca micrantha</i> var. <i>micrantha</i>			
273.	1259 <i>Dianella revoluta</i> (Blueberry Lily)			
274.	11636 <i>Dianella revoluta</i> var. <i>divaricata</i>			
275.	1293 <i>Hensmania turbinata</i>			

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
276.	1260	<i>Stypandra glauca</i> (Blind Grass)			
277.	1361	<i>Tricoryne elatior</i> (Yellow Autumn Lily)			
Hydatellaceae					
278.	1141	<i>Trithuria submersa</i>			
Hypneaceae					
279.	35922	<i>Hypnea cornuta</i>			
280.	35898	<i>Hypnea musciformis</i>			
281.	26973	<i>Hypnea valentiae</i>			
Iridaceae					
282.	1520	<i>Gladiolus caryophyllaceus</i> (Wild Gladiolus)	Y		
283.	19179	<i>Moraea flaccida</i> (One-leaf Cape Tulip)	Y		
284.	1537	<i>Orthrosanthus laxus</i> (Morning Iris)			
285.	11749	<i>Orthrosanthus laxus</i> var. <i>laxus</i> (Morning Iris)			
286.	1556	<i>Romulea rosea</i> (Guildford Grass)	Y		
287.	1558	<i>Sparaxis bulbifera</i>	Y		
Juncaginaceae					
288.	152	<i>Triglochin trichophora</i>			
Lamiaceae					
289.	16934	<i>Hemiandra glabra</i> subsp. <i>glabra</i>			
290.	6839	<i>Hemiandra pungens</i> (Snakebush)			
Lauraceae					
291.	2952	<i>Cassytha glabella</i> (Tangled Dodder Laurel)			
292.	2957	<i>Cassytha racemosa</i> (Dodder Laurel)			
Loganiaceae					
293.	16177	<i>Phyllangium paradoxum</i>			
Loranthaceae					
294.	2401	<i>Nuytsia floribunda</i> (Christmas Tree, Mudja)			
Malvaceae					
295.	5011	<i>Guichenotia ledifolia</i>			
296.	5105	<i>Thomasia triphylla</i>			
Menyanthaceae					
297.	36177	<i>Ornduffia albiflora</i>			
Myrtaceae					
298.	20283	<i>Astartea scoparia</i>			
299.	34161	<i>Baeckea</i> sp. Limestone (N. Gibson & M.N. Lyons 1425)		P1	
300.	5382	<i>Beaufortia elegans</i>			
301.	5415	<i>Calothamnus lateralis</i>			
302.	5426	<i>Calothamnus quadrifidus</i> (One-sided Bottlebrush, Kwowdjard)			
303.	5429	<i>Calothamnus sanguineus</i> (Silky-leaved Blood flower, Pindak)			
304.	5458	<i>Calytrix flavescens</i> (Summer Starflower)			
305.	5460	<i>Calytrix fraseri</i> (Pink Summer Calytrix)			
306.	17104	<i>Corymbia calophylla</i> (Marri)			
307.	13091	<i>Eucalyptus argutifolia</i> (Wabbling Hill Mallee)		T	
308.	13536	<i>Eucalyptus decipiens</i> subsp. <i>decipiens</i>			
309.	5649	<i>Eucalyptus foecunda</i> (Narrow-leaved Red Mallee)			
310.	5659	<i>Eucalyptus gomphocephala</i> (Tuart, Duart)			
311.	5708	<i>Eucalyptus marginata</i> (Jarrah, Djara)			
312.	13547	<i>Eucalyptus marginata</i> subsp. <i>marginata</i> (Jarrah)			
313.	20808	<i>Eucalyptus petiolaris</i>	Y		
314.	13541	<i>Eucalyptus petrensis</i>			
315.	5763	<i>Eucalyptus rudis</i> (Flooded Gum, Kulurda)			
316.	13511	<i>Eucalyptus rudis</i> subsp. <i>rudis</i>			
317.	5825	<i>Hypocalymma robustum</i> (Swan River Myrtle)			
318.	5847	<i>Leptospermum erubescens</i> (Roadside Teatree)			
319.	5887	<i>Melaleuca cardiophylla</i> (Tangling Melaleuca)			
320.	5920	<i>Melaleuca huegelii</i> (Chenille Honey myrtle)			
321.	13271	<i>Melaleuca huegelii</i> subsp. <i>huegelii</i>			
322.	5952	<i>Melaleuca preissiana</i> (Moonah)			
323.	5959	<i>Melaleuca raphiophylla</i> (Swamp Paperbark)			
324.	33022	<i>Melaleuca</i> sp. Wanneroo (G.J. Keighery 16705)		P1	Y
325.	18598	<i>Melaleuca systema</i>			
326.	5978	<i>Melaleuca teretifolia</i> (Banbar)			
327.	5986	<i>Melaleuca urceolaris</i>			
328.	6012	<i>Regelia ciliata</i>			
329.	15432	<i>Verticordia densiflora</i> var. <i>densiflora</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Nitrariaceae				
330.	4366 <i>Nitraria billardiarei</i> (Nitre Bush)			
Olacaceae				
331.	2365 <i>Olax benthamiana</i>			
Onagraceae				
332.	6132 <i>Epilobium ciliatum</i>	Y		
333.	6133 <i>Epilobium hirtigerum</i> (Hairy Willow Herb)			
Orchidaceae				
334.	15330 <i>Caladenia arenicola</i>			
335.	11038 <i>Caladenia bicalliata</i>			
336.	1592 <i>Caladenia flava</i> (Cowslip Orchid)			
337.	15348 <i>Caladenia flava</i> subsp. <i>flava</i>			
338.	15352 <i>Caladenia georgei</i>			
339.	1595 <i>Caladenia hirta</i> (Sugar Candy Orchid)			
340.	1599 <i>Caladenia latifolia</i> (Pink Fairy Orchid)			
341.	15361 <i>Caladenia longicauda</i> subsp. <i>calcigena</i>			
342.	10916 <i>Cyrtostylis huegelii</i>			
343.	19649 <i>Disa bracteata</i>	Y		
344.	11049 <i>Diuris corymbosa</i>			
345.	1635 <i>Diuris longifolia</i> (Common Donkey Orchid)			
346.	1643 <i>Elythranthera brunonis</i> (Purple Enamel Orchid)			
347.	1645 <i>Epiblema grandiflorum</i> (Babe-in-a-cradle)			
348.	1646 <i>Eriochilus dilatatus</i> (White Bunny Orchid)			
349.	1653 <i>Leporella fimbriata</i> (Hare Orchid)			
350.	15419 <i>Microtis media</i> subsp. <i>media</i>			
351.	1672 <i>Prasophyllum fimbria</i> (Fringed Leek Orchid)			
352.	17267 <i>Pterostylis brevisepala</i>			
353.	12217 <i>Pterostylis sanguinea</i>			
354.	18658 <i>Pterostylis</i> sp. <i>short sepals</i> (W. Jackson BJ259)			
355.	1698 <i>Pterostylis vittata</i> (Banded Greenhood)			
Orobanchaceae				
356.	7122 <i>Orobanche minor</i> (Lesser Broomrape)	Y		
Oxalidaceae				
357.	4356 <i>Oxalis pes-caprae</i> (Soursob)	Y		
Phyllanthaceae				
358.	4675 <i>Phyllanthus calycinus</i> (False Boronia)			
359.	17794 <i>Phyllanthus tenellus</i>	Y		
360.	4691 <i>Poranthera microphylla</i> (Small Poranthera)			
Phytolaccaceae				
361.	2793 <i>Phytolacca octandra</i> (Red Ink Plant)	Y		
Pittosporaceae				
362.	25819 <i>Marianthus paralius</i>		T	
Plantaginaceae				
363.	16346 <i>Bacopa monnieri</i>	Y		
Plocamiaceae				
364.	27155 <i>Plocamium cartilagineum</i>			
Poaceae				
365.	184 <i>Aira caryophyllea</i> (Silvery Hairgrass)	Y		
366.	17234 <i>Austrostipa compressa</i>			
367.	17240 <i>Austrostipa flavescens</i>			
368.	35317 <i>Austrostipa mundula</i>		P2	
369.	231 <i>Avellinia michelii</i>	Y		
370.	233 <i>Avena barbata</i> (Bearded Oat)	Y		
371.	244 <i>Briza maxima</i> (Blowfly Grass)	Y		
372.	245 <i>Briza minor</i> (Shivery Grass)	Y		
373.	249 <i>Bromus diandrus</i> (Great Brome)	Y		
374.	277 <i>Cortaderia selloana</i> (Pampas Grass)	Y		
375.	283 <i>Cynodon dactylon</i> (Couch)	Y		
376.	306 <i>Dichelachne crinita</i> (Longhair Plumegrass)			
377.	320 <i>Digitaria sanguinalis</i> (Crab Grass)	Y		
378.	347 <i>Ehrharta calycina</i> (Perennial Veldt Grass)	Y		
379.	349 <i>Ehrharta longiflora</i> (Annual Veldt Grass)	Y		
380.	376 <i>Eragrostis curvula</i> (African Lovegrass)	Y		
381.	439 <i>Hemarthria uncinata</i> (Matgrass)			

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
382.	444	<i>Holcus lanatus</i> (Yorkshire Fog)	Y		
383.	445	<i>Holcus setiger</i> (Annual Fog)	Y		
384.	449	<i>Hordeum leporinum</i> (Barley Grass)	Y		
385.	467	<i>Lagurus ovatus</i> (Hare's Tail Grass)	Y		
386.	8682	<i>Lolium loliaceum</i> (Stiff Ryegrass)	Y		
387.	475	<i>Lolium multiflorum</i> (Italian Ryegrass)	Y		
388.	485	<i>Microlaena stipoides</i> (Weeping Grass)			
389.	571	<i>Poa annua</i> (Winter Grass)	Y		
390.	573	<i>Poa drummondiana</i> (Knotted Poa)			
391.	578	<i>Poa porphyroclados</i>			
392.	582	<i>Polypogon monspeliensis</i> (Annual Beardgrass)	Y		
393.	635	<i>Sporobolus virginicus</i> (Marine Couch)			
394.	10874	<i>Thinopyrum distichum</i>	Y		
395.	11137	<i>Vulpia fasciculata</i>	Y		
396.	724	<i>Vulpia myuros</i> (Rat's Tail Fescue)	Y		

Polygalaceae

397.	4550	<i>Comesperma calymega</i> (Blue-spike Milkwort)			
398.	4552	<i>Comesperma confertum</i>			
399.	4554	<i>Comesperma flavum</i>			

Polygonaceae

400.	13911	<i>Persicaria decipiens</i>			
401.	16984	<i>Persicaria lapathifolia</i>	Y		

Portulacaceae

402.	2845	<i>Calandrinia brevipedata</i> (Short-stalked Purslane)			
403.	2848	<i>Calandrinia corrigioloides</i> (Strap Purslane)			
404.	2854	<i>Calandrinia granulifera</i> (Pygmy Purslane)			
405.	2856	<i>Calandrinia liniflora</i> (Parakeelya)			
406.	40827	<i>Calandrinia tholiformis</i>			

Proteaceae

407.	1800	<i>Banksia attenuata</i> (Slender Banksia, Piara)			
408.	11386	<i>Banksia leptophylla</i> var. <i>melletica</i>			
409.	1834	<i>Banksia menziesii</i> (Firewood Banksia)			
410.	32077	<i>Banksia sessilis</i> var. <i>cygnorum</i>			
411.	15511	<i>Conospermum boreale</i>			
412.	1876	<i>Conospermum incurvum</i> (Plume Smokebush)			
413.	15611	<i>Conospermum stoechadis</i> subsp. <i>stoechadis</i> (Common Smokebush)			
414.	1885	<i>Conospermum triplinervium</i> (Tree Smokebush)			
415.	15839	<i>Grevillea preissii</i> subsp. <i>preissii</i>			
416.	33737	<i>Grevillea</i> sp. Ocean Reef (D. Pike Joon 4)		P1	Y
417.	2119	<i>Grevillea vestita</i>			
418.	12824	<i>Grevillea vestita</i> subsp. <i>vestita</i>			
419.	2146	<i>Hakea costata</i> (Ribbed Hakea)			
420.	2175	<i>Hakea lissocarpha</i> (Honey Bush)			
421.	2203	<i>Hakea ruscifolia</i> (Candle Hakea)			
422.	2214	<i>Hakea trifurcata</i> (Two-leaf Hakea)			
423.	2258	<i>Persoonia comata</i>			
424.	2273	<i>Persoonia saccata</i> (Snottygobble)			
425.	20368	<i>Petrophile axillaris</i>			
426.	2299	<i>Petrophile linearis</i> (Pixie Mops)			
427.	2301	<i>Petrophile macrostachya</i>			
428.	2309	<i>Petrophile serruriae</i>			
429.	2316	<i>Stirlingia latifolia</i> (Blueboy)			
430.	15532	<i>Synaphea spinulosa</i> subsp. <i>spinulosa</i>			

Restionaceae

431.	17663	<i>Desmocladus asper</i>			
432.	1070	<i>Hypolaena exsulca</i>			
433.	1090	<i>Lepyrodia muirii</i>			
434.	17694	<i>Meeboldina scariosa</i>			

Rhamnaceae

435.	4802	<i>Cryptandra mutila</i>			
436.	4810	<i>Cryptandra scoparia</i>			
437.	4828	<i>Spyridium globulosum</i> (Basket Bush)			

Rhodomelaceae

438.	26688	<i>Coeloclonium tasmanicum</i>			
439.	26762	<i>Dictyomenia sonderi</i>			
440.	26763	<i>Dictyomenia tridens</i>			
441.	26995	<i>Kuetzingia canaliculata</i>			

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
442.	26998	<i>Laurencia brongniartii</i>			
443.	27001	<i>Laurencia filiformis</i>			
444.	27013	<i>Lenormandia spectabilis</i>			
445.	27107	<i>Osmundaria prolifera</i>			
446.	27162	<i>Pollexfenia pedicellata</i>			
Rubiaceae					
447.	7323	<i>Galium murale</i> (Small Goosegrass)	Y		
448.	18255	<i>Opercularia vaginata</i> (Dog Weed)			
Rutaceae					
449.	17665	<i>Boronia purdieana</i> subsp. <i>purdieana</i>			
450.	4453	<i>Diplolaena angustifolia</i> (Yanchep Rose)			
451.	18529	<i>Philotheca spicata</i> (Pepper and Salt)			
Santalaceae					
452.	10765	<i>Exocarpos sparteus</i> (Broom Ballart, Djuk)			
453.	2344	<i>Leptomeria empetrififormis</i>			
454.	2352	<i>Leptomeria preissiana</i>			
Sapindaceae					
455.	4746	<i>Diplopeltis huegelii</i>			
456.	18541	<i>Diplopeltis huegelii</i> subsp. <i>huegelii</i>			
Schizymeniaceae					
457.	27144	<i>Platoma cyclocolpum</i>			
458.	27268	<i>Schizymenia dubyi</i>			
Scrophulariaceae					
459.	7054	<i>Dischisma arenarium</i>	Y		
460.	7215	<i>Eremophila glabra</i> (Tar Bush)			
461.	17175	<i>Eremophila glabra</i> subsp. <i>albicans</i>			
462.	7291	<i>Myoporum insulare</i> (Blueberry Tree, boobialla)			
Solanaceae					
463.	6949	<i>Anthocercis littorea</i> (Yellow Tailflower)			
464.	6988	<i>Solanum americanum</i> (Glossy Nightshade)	Y		
465.	7020	<i>Solanum linnaeanum</i> (Apple of Sodom)	Y		
466.	7022	<i>Solanum nigrum</i> (Black Berry Nightshade)	Y		
Stylidiaceae					
467.	7677	<i>Levenhookia stipitata</i> (Common Stylewort)			
468.	30278	<i>Stylidium androsaceum</i>			
469.	25831	<i>Stylidium araeophyllum</i>			
470.	7693	<i>Stylidium brunonianum</i> (Pink Fountain Triggerplant)			
471.	7696	<i>Stylidium calcaratum</i> (Book Triggerplant)			
472.	7717	<i>Stylidium divaricatum</i> (Daddy-long-legs)			
473.	7745	<i>Stylidium junceum</i> (Reed Triggerplant)			
474.	7756	<i>Stylidium longitubum</i> (Jumping Jacks)		P3	
475.	13127	<i>Stylidium maritimum</i>		P3	
476.	25829	<i>Stylidium neurophyllum</i>			
477.	7774	<i>Stylidium piliferum</i> (Common Butterfly Triggerplant)			
478.	20521	<i>Stylidium rigidulum</i>			
479.	7806	<i>Stylidium utricularioides</i> (Pink Fan Triggerplant)			
Thymelaeaceae					
480.	5232	<i>Pimelea argentea</i> (Silvery Leaved Pimelea)			
481.	5237	<i>Pimelea calcicola</i>		P3	
482.	5243	<i>Pimelea ferruginea</i>			
483.	18117	<i>Pimelea rosea</i> subsp. <i>rosea</i>			
484.	5268	<i>Pimelea sulphurea</i> (Yellow Banjine)			
485.	5272	<i>Pimelea villifera</i>			
Ulvaceae					
486.	35263	<i>Ulva flexuosa</i>			
Urticaceae					
487.	1762	<i>Parietaria debilis</i> (Pellitory)			
Verbenaceae					
488.	6734	<i>Phyla nodiflora</i> var. <i>nodiflora</i>	Y		
Violaceae					
489.	5216	<i>Hybanthus calycinus</i> (Wild Violet)			
Xanthorrhoeaceae					
490.	1256	<i>Xanthorrhoea preissii</i> (Grass tree, Palga)			

Name ID Species Name

Naturalised

Conservation Code

¹Endemic To Query Area

Zamiaceae

491. 85 *Macrozamia riedlei* (*Zamia*, *Djiridji*)

Conservation Codes

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

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

NatureMap Fauna Species Report

Created By Guest user on 31/03/2014

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115°44' 02" E, 31°40' 15" S
Buffer 10km
Group By Family

Family	Species	Records
Acanthizidae	7	552
Accipitridae	9	321
Actinopodidae	1	1
Aegothelidae	1	1
Agamidae	3	36
Anatidae	12	1599
Apodidae	1	3
Araneidae	5	12
Ardeidae	4	181
Artamidae	2	10
Atemnidae	1	1
Balaenidae	1	1
Balaenopteridae	1	1
Barychelidae	1	4
Boidae	2	6
Bothriuridae	2	2
Bovidae	2	2
Camelidae	1	1
Campephagidae	2	74
Canidae	2	5
Caprimulgidae	1	2
Carangidae	1	1
Castniidae	1	390
Casuariidae	1	3
Chaetodontidae	1	1
Charadriidae	3	41
Cheilodactylidae	2	2
Cheloniidae	2	4
Cheluidae	1	1
Colletidae	1	4
Columbidae	5	648
Corvidae	3	358
Cracticidae	6	609
Cuculidae	3	20
Dasyuridae	1	1
Dermochelyidae	1	1
Dicaeidae	1	5
Dicruridae	4	539
Diomedidae	2	2
Diplodactylidae	4	14
Elapidae	12	70
Engraulidae	1	1
Falconidae	5	78
Felidae	1	4
Gekkonidae	1	9
Halcyonidae	2	255
Hirundinidae	2	196
Hylidae	2	10
Hyriidae	1	1
Idiopidae	2	2
Ixodidae	1	2
Julidae	1	4
Labridae	2	2
Lamponidae	1	2
Laridae	2	4
Leporidae	1	4
Limnodynastidae	2	53
Lycosidae	2	3
Macropodidae	3	15
Maluridae	6	210
Meliphagidae	12	706
Meropidae	1	25
Micropholcommatidae	3	5
Mimetidae	1	1
Molossidae	1	2
Monacanthidae	1	3
Mullidae	2	2
Muraenidae	1	1
Muridae	4	49
Myobatrachidae	3	14
Nemesiidae	1	8
Neosittidae	1	12
Odacidae	1	1
Oecobiidae	1	1
Otariidae	1	9

Pachycephalidae	6	125
Paradoxosomatidae	1	7
Pararchaeidae	1	1
Pardalotidae	2	158
Pataecidae	1	1
Pelecanidae	1	139
Peramelidae	2	47
Peripatopsidae	1	1
Petroicidae	5	10
Phalacrocoracidae	4	150
Phalangeridae	1	4
Phasianidae	1	5
Pholcidae	1	1
Physeteridae	1	1
Podargidae	1	6
Podicipedidae	3	303
Pomacentridae	1	1
Potoroidae	2	2
Procellariidae	5	10
Psittacidae	17	687
Pygopodidae	8	46
Rallidae	6	518
Recurvirostridae	3	291
Salticidae	1	1
Scincidae	18	329
Scolopacidae	5	39
Scolopendridae	5	63
Sillaginidae	1	1
Sparassidae	1	1
Spheniscidae	1	1
Strigidae	1	8
Sylviidae	3	94
Tachyglossidae	1	2
Tarsipedidae	1	11
Tettigoniidae	1	2
Threskiornithidae	5	497
Typhlopidae	3	9
Tytonidae	1	1
Urodacidae	1	13
Varanidae	2	4
Veliferidae	1	1
Vespertilionidae	2	2
Zodariidae	1	3
Zosteropidae	1	256
TOTAL	318	11075

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Acanthizidae				
1.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
2.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
3.	24262 <i>Acanthiza inornata</i> (Western Thornbill)			
4.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
5.	25534 <i>Sericornis frontalis</i> (White-browed Scrubwren)			
6.	24279 <i>Sericornis frontalis</i> subsp. <i>maculatus</i> (White-browed Scrubwren)			
7.	30948 <i>Smicronis brevirostris</i> (Weebill)			
Accipitridae				
8.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
9.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
10.	24282 <i>Accipiter fasciatus</i> subsp. <i>fasciatus</i> (Brown Goshawk)			
11.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
12.	25538 <i>Aquila morphnoides</i> (Little Eagle)			
13.	24286 <i>Aquila morphnoides</i> subsp. <i>morphnoides</i> (Little Eagle)			
14.	24288 <i>Circus approximans</i> (Swamp Harrier)			
15.	24293 <i>Haliaeetus leucogaster</i> (White-bellied Sea-Eagle)		IA	
16.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
Actinopodidae				
17.	-11748 <i>Missulena occatoria</i>			
Aegothelidae				
18.	25544 <i>Aegotheles cristatus</i> (Australian Owlet-nightjar)			
Agamidae				
19.	30899 <i>Ctenophorus adelaidensis</i> (Southern Heath Dragon, Western Heath Dragon)			
20.	25510 <i>Pogona minor</i> (Dwarf Bearded Dragon)			
21.	24907 <i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)			
Anatidae				
22.	24310 <i>Anas castanea</i> (Chestnut Teal)			
23.	24312 <i>Anas gracilis</i> (Grey Teal)			
24.	24313 <i>Anas platyrhynchos</i> (Mallard)			
25.	24315 <i>Anas rhynchotis</i> (Australasian Shoveler)			
26.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
27.	24318 <i>Aythya australis</i> (Hardhead)			
28.	24319 <i>Biziura lobata</i> (Musk Duck)			
29.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
30.	24322 <i>Cygnus atratus</i> (Black Swan)			
31.	24326 <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)			
32.	24328 <i>Oxyura australis</i> (Blue-billed Duck)			
33.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
Apodidae				
34.	25554 <i>Apus pacificus</i> (Fork-tailed Swift)		IA	
Araneidae				
35.	-12293 <i>Araneus cyphoxis</i>			
36.	-11820 <i>Araneus senicaudatus</i>			
37.	-12529 <i>Austracantha minax</i>			
38.	-11734 <i>Eriophora biapicata</i>			
39.	-12321 <i>Paraplectanoides crassipes</i>			
Ardeidae				
40.	41324 <i>Ardea modesta</i> (Eastern Great Egret)		IA	
41.	24340 <i>Ardea novaehollandiae</i> (White-faced Heron)			
42.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
43.	25564 <i>Nycticorax caledonicus</i> (Rufous Night Heron)			
Artamidae				
44.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
45.	24353 <i>Artamus cyanopterus</i> (Dusky Woodswallow)			
Atemnidae				
46.	-11719 <i>Oratemnus curtus</i>			
Balaenidae				
47.	24043 <i>Eubalaena australis</i> (Southern Right Whale)		T	
Balaenopteridae				
48.	24051 <i>Megaptera novaeangliae</i> (Humpback Whale)		T	

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Barychelidae				
49.	-12201 <i>Idiomata blackwalli</i>			
Boidae				
50.	25241 <i>Antaresia stimsoni</i> subsp. <i>stimsoni</i> (Stimson's Python)			
51.	25240 <i>Morelia spilota</i> subsp. <i>imbricata</i> (Carpet Python)		S	
Bothriuridae				
52.	-1805 <i>Cercophonius granulosus</i>			
53.	-11741 <i>Cercophonius sulcatus</i>			
Bovidae				
54.	24251 <i>Bos taurus</i> (European Cattle)	Y		
55.	34016 <i>Ovis aries</i> (Sheep)			
Camelidae				
56.	24254 <i>Camelus dromedarius</i> (Dromedary, Camel)	Y		
Campephagidae				
57.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
58.	24367 <i>Lalage tricolor</i> (White-winged Triller)			
Canidae				
59.	25454 <i>Canis lupus</i> (Dog, Dingo)	Y		
60.	24040 <i>Vulpes vulpes</i> (Red Fox)	Y		
Caprimulgidae				
61.	24368 <i>Eurostopodus argus</i> (Spotted Nightjar)			
Carangidae				
62.	-15872 <i>Seriola lalandi</i>			
Castniidae				
63.	33992 <i>Synemon gratiosa</i> (Graceful Sunmoth)		P4	
Casuariidae				
64.	24470 <i>Dromaius novaehollandiae</i> (Emu)			
Chaetodontidae				
65.	-17499 <i>Chelmonops curiosus</i>			
Charadriidae				
66.	25575 <i>Charadrius leschenaultii</i> (Greater Sand Plover)		IA	
67.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
68.	24379 <i>Erythronyx cinctus</i> (Red-kneed Dotterel)			
Cheilodactylidae				
69.	-18013 <i>Cheilodactylus gibbosus</i>			
70.	-17168 <i>Cheilodactylus rubrolabiatus</i>			
Cheloniidae				
71.	25335 <i>Caretta caretta</i> (Loggerhead Turtle)		T	
72.	25336 <i>Chelonia mydas</i> (Green Turtle)		T	
Cheluidae				
73.	43380 <i>Chelodina colleei</i> (Oblong Turtle)			
Colletidae				
74.	33977 <i>Hylaeus globuliferus</i> (bee)		P3	
Columbidae				
75.	24399 <i>Columba livia</i> (Domestic Pigeon)	Y		
76.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
77.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
78.	25589 <i>Streptopelia chinensis</i> (Spotted Turtle-Dove)	Y		
79.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
Corvidae				
80.	24416 <i>Corvus bennetti</i> (Little Crow)			
81.	25592 <i>Corvus coronoides</i> (Australian Raven)			
82.	24417 <i>Corvus coronoides</i> subsp. <i>perplexus</i> (Australian Raven)			
Cracticidae				
83.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
84.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
85.	24422 <i>Cracticus tibicen</i> subsp. <i>dorsalis</i> (White-backed Magpie)			
86.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
87.	24424 <i>Cracticus torquatus</i> subsp. <i>torquatus</i> (Grey Butcherbird)			
88.	25597 <i>Strepera versicolor</i> (Grey Currawong)			

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Cuculidae					
89.	25598	<i>Cacomantis flabelliformis</i> (Fan-tailed Cuckoo)			
90.	42307	<i>Cacomantis pallidus</i> (Pallid Cuckoo)			
91.	24431	<i>Chrysococcyx basalis</i> (Horsfield's Bronze Cuckoo)			
Dasyuridae					
92.	24092	<i>Dasyurus geoffroi</i> (Chuditch, Western Quoll)		T	
Dermochelyidae					
93.	25346	<i>Dermochelys coriacea</i> (Leatherback Turtle)		T	
Dicaeidae					
94.	25607	<i>Dicaeum hirundinaceum</i> (Mistletoebird)			
Dicruridae					
95.	24443	<i>Grallina cyanoleuca</i> (Magpie-lark)			
96.	25610	<i>Myiagra inquieta</i> (Restless Flycatcher)			
97.	25613	<i>Rhipidura fuliginosa</i> (Grey Fantail)			
98.	25614	<i>Rhipidura leucophrys</i> (Willie Wagtail)			
Diomedaeidae					
99.	30908	<i>Diomedea chlororhynchos</i> (Yellow-nosed Albatross)		T	
100.	24468	<i>Diomedea chrysostoma</i> (Grey-headed Albatross)		T	
Diplodactylidae					
101.	24918	<i>Crenadactylus ocellatus</i> subsp. <i>ocellatus</i> (Clawless Gecko)			
102.	24939	<i>Diplodactylus polyophthalmus</i>			
103.	24943	<i>Strophurus spinigerus</i> subsp. <i>inornatus</i>			
104.	24942	<i>Strophurus spinigerus</i> subsp. <i>spinigerus</i>			
Elapidae					
105.	42380	<i>Brachyuropsis fasciolatus</i> subsp. <i>fasciolatus</i> (Narrow-banded Shovel-nosed Snake)			
106.	42381	<i>Brachyuropsis semifasciatus</i> (Southern Shovel-nosed Snake)			
107.	25296	<i>Demansia psammophis</i> subsp. <i>reticulata</i> (Yellow-faced Whipsnake)			
108.	25251	<i>Echiopsis curta</i> (Bardick)			
109.	43384	<i>Hydrophis platurus</i> (Yellow-bellied Seasnake)			
110.	25248	<i>Neelaps bimaculatus</i> (Black-naped Snake)			
111.	25249	<i>Neelaps calonotos</i> (Black-striped Snake)		P3	
112.	25252	<i>Notechis scutatus</i> (Tiger Snake)			
113.	25253	<i>Parasuta gouldii</i>			
114.	25511	<i>Pseudonaja affinis</i> (Dugite)			
115.	25259	<i>Pseudonaja affinis</i> subsp. <i>affinis</i> (Dugite)			
116.	25266	<i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
Engraulidae					
117.	-15048	<i>Engraulis australis</i>			
Falconidae					
118.	25621	<i>Falco berigora</i> (Brown Falcon)			
119.	25622	<i>Falco cenchroides</i> (Australian Kestrel)			
120.	25623	<i>Falco longipennis</i> (Australian Hobby)			
121.	25624	<i>Falco peregrinus</i> (Peregrine Falcon)		S	
122.	24475	<i>Falco peregrinus</i> subsp. <i>macropus</i> (Australian Peregrine Falcon)		S	
Felidae					
123.	24041	<i>Felis catus</i> (Cat)	Y		
Gekkonidae					
124.	24980	<i>Christinus marmoratus</i> (Marbled Gecko)			
Halcyonidae					
125.	30901	<i>Dacelo novaeguineae</i> (Laughing Kookaburra)	Y		
126.	25549	<i>Todiramphus sanctus</i> (Sacred Kingfisher)			
Hirundinidae					
127.	24491	<i>Hirundo neoxena</i> (Welcome Swallow)			
128.	25629	<i>Hirundo nigricans</i> (Tree Martin)			
Hylidae					
129.	25378	<i>Litoria adelaidensis</i> (Slender Tree Frog)			
130.	25388	<i>Litoria moorei</i> (Motorbike Frog)			
Hyridae					
131.	34113	<i>Westralunio carteri</i> (Carter's Freshwater Mussel)		P4	
Idiopidae					
132.	33917	<i>Idiosoma nigrum</i> (Shield-backed Trapdoor Spider)		T	
133.	-12943	<i>Idiosoma sigillatum</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Ixodidae				
134.	-13367 <i>Amblyomma triguttatum</i>			
Julidae				
135.	-13106 <i>Ommatoiulus moreletii</i>			
Labridae				
136.	-14027 <i>Coris auricularis</i>			
137.	-16927 <i>Notolabrus parilus</i>			
Lamponidae				
138.	-1741 <i>Lampona cylindrata</i>			
Laridae				
139.	25637 <i>Larus novaehollandiae</i> (Silver Gull)			
140.	25638 <i>Larus pacificus</i> (Pacific Gull)			
Leporidae				
141.	24085 <i>Oryctolagus cuniculus</i> (Rabbit)	Y		
Limnodynastidae				
142.	25410 <i>Heleioporus eyrei</i> (Moaning Frog)			
143.	25415 <i>Limnodynastes dorsalis</i> (Western Banjo Frog)			
Lycosidae				
144.	-12219 <i>Tasmanicosa leuckartii</i>			
145.	-12507 <i>Venator immansueta</i>			
Macropodidae				
146.	24132 <i>Macropus fuliginosus</i> (Western Grey Kangaroo)			
147.	24133 <i>Macropus irma</i> (Western Brush Wallaby)		P4	
148.	24142 <i>Petrogale lateralis</i> subsp. <i>lateralis</i> (Black-flanked Rock-wallaby, Black-footed Rock-wallaby)		T	
Maluridae				
149.	25651 <i>Malurus lamberti</i> (Variegated Fairy-wren)			
150.	24544 <i>Malurus lamberti</i> subsp. <i>assimilis</i> (Variegated Fairy-wren)			
151.	25652 <i>Malurus leucopterus</i> (White-winged Fairy-wren)			
152.	24547 <i>Malurus leucopterus</i> subsp. <i>edouardi</i> (Barrow Is. White-winged Fairy-wren)		T	
153.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
154.	24552 <i>Malurus splendens</i> subsp. <i>splendens</i> (Splendid Fairy-wren)			
Meliphagidae				
155.	24559 <i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
156.	24560 <i>Acanthorhynchus superciliosus</i> (Western Spinebill)			
157.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
158.	24562 <i>Anthochaera lunulata</i> (Western Little Wattlebird)			
159.	24567 <i>Epthianura albifrons</i> (White-fronted Chat)			
160.	25659 <i>Lichenostomus leucotis</i> (White-eared Honeyeater)			
161.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
162.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
163.	25663 <i>Melithreptus brevirostris</i> (Brown-headed Honeyeater)			
164.	25669 <i>Phylidonyris nigra</i> (White-cheeked Honeyeater)			
165.	24595 <i>Phylidonyris nigra</i> subsp. <i>gouldii</i> (White-cheeked Honeyeater)			
166.	24596 <i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
Meropidae				
167.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)		IA	
Micropholcommatidae				
168.	-13383 <i>Raveniella arenacea</i>			
169.	-12909 <i>Raveniella cirrata</i>			
170.	-12492 <i>Raveniella peckorum</i>			
Mimetidae				
171.	-12747 <i>Australomimetes ovidi</i>			
Molossidae				
172.	24185 <i>Tadarida australis</i> (White-striped Freetail-bat)			
Monacanthidae				
173.	-16940 <i>Meuschenia freycineti</i>			
Mullidae				
174.	-15261 <i>Parupeneus chrysopleuron</i>			
175.	-14957 <i>Upeneichthys stotti</i>			
Muraenidae				

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
176.	-16934	<i>Gymnothorax prasinus</i>			
Muridae					
177.	24223	<i>Mus musculus</i> (House Mouse)	Y		
178.	24230	<i>Pseudomys albocinereus</i> (Ash-grey Mouse)			
179.	24243	<i>Rattus fuscipes</i> (Western Bush Rat)			
180.	24245	<i>Rattus rattus</i> (Black Rat)	Y		
Myobatrachidae					
181.	25400	<i>Crinia insignifera</i> (Squelching Froglet)			
182.	25420	<i>Myobatrachus gouldii</i> (Turtle Frog)			
183.	25433	<i>Pseudophryne guentheri</i> (Crawling Toadlet)			
Nemesiidae					
184.	-12895	<i>Aname mainae</i>			
Neosittidae					
185.	25673	<i>Daphoenositta chrysoptera</i> (Varied Sittella)			
Odacidae					
186.	-14239	<i>Odax cyanomelas</i>			
Oecobiidae					
187.	-13468	<i>Oecobius navus</i>			
Otariidae					
188.	24210	<i>Neophoca cinerea</i> (Australian Sea Lion)		S	
Pachycephalidae					
189.	25675	<i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
190.	24613	<i>Colluricincla harmonica</i> subsp. <i>rufiventris</i> (Grey Shrike-thrush)			
191.	25679	<i>Pachycephala pectoralis</i> (Golden Whistler)			
192.	24623	<i>Pachycephala pectoralis</i> subsp. <i>fuliginosa</i> (Golden Whistler)			
193.	25680	<i>Pachycephala rufiventris</i> (Rufous Whistler)			
194.	24624	<i>Pachycephala rufiventris</i> subsp. <i>rufiventris</i> (Rufous Whistler)			
Paradoxosomatidae					
195.	-12498	<i>Antichiropus whistleri</i>			
Pararchaeidae					
196.	-12497	<i>Westrarchaea spinosa</i>			
Pardalotidae					
197.	25681	<i>Pardalotus punctatus</i> (Spotted Pardalote)			
198.	25682	<i>Pardalotus striatus</i> (Striated Pardalote)			
Pataeidae					
199.	-14241	<i>Aetapcus maculatus</i>			
Pelecanidae					
200.	24648	<i>Pelecanus conspicillatus</i> (Australian Pelican)			
Peramelidae					
201.	25478	<i>Isoodon obesulus</i> (Southern Brown Bandicoot)		P5	
202.	24153	<i>Isoodon obesulus</i> subsp. <i>fusciventer</i> (Quenda, Southern Brown Bandicoot)		P5	
Peripatopsidae					
203.	-13409	<i>Occiperipatoides gilesii</i>			
Petroicidae					
204.	24651	<i>Eopsaltria australis</i> subsp. <i>griseogularis</i> (Western Yellow Robin)			
205.	24652	<i>Eopsaltria georgiana</i> (White-breasted Robin)			
206.	25693	<i>Microeca fascians</i> (Jacky Winter)			
207.	24659	<i>Petroica goodenovii</i> (Red-capped Robin)			
208.	25695	<i>Petroica multicolor</i> (Scarlet Robin)			
Phalacrocoracidae					
209.	25697	<i>Phalacrocorax carbo</i> (Great Cormorant)			
210.	25698	<i>Phalacrocorax melanoleucos</i> (Little Pied Cormorant)			
211.	24667	<i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
212.	25699	<i>Phalacrocorax varius</i> (Pied Cormorant)			
Phalangeridae					
213.	25521	<i>Trichosurus vulpecula</i> (Common Brushtail Possum)			
Phasianidae					
214.	25701	<i>Coturnix ypsilophora</i> (Brown Quail)			
Pholcidae					
215.	-12657	<i>Pholcus phalangioides</i>			

Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Physeteridae				
216.	24073 <i>Physeter macrocephalus</i> (Sperm Whale)		P4	
Podargidae				
217.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
Podicipedidae				
218.	25704 <i>Podiceps cristatus</i> (Great Crested Grebe)			
219.	24681 <i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)			
220.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
Pomacentridae				
221.	-14959 <i>Parma victoriae</i>			
Potoroidae				
222.	24161 <i>Bettongia lesueur</i> subsp. <i>graii</i> (Boodie, Burrowing Bettong)			
223.	24162 <i>Bettongia penicillata</i> subsp. <i>ogilbyi</i> (Woylie, Brush-tailed Bettong)		T	
Procellariidae				
224.	24689 <i>Halobaena caerulea</i> (Blue Petrel)			
225.	24690 <i>Macronectes giganteus</i> (Southern Giant Petrel)		P4	
226.	24693 <i>Pachyptila desolata</i> (Antarctic Prion)			
227.	24712 <i>Puffinus carneipes</i> (Fleshy-footed Shearwater)		IA	
228.	24716 <i>Puffinus pacificus</i> (Wedge-tailed Shearwater)		IA	
Psittacidae				
229.	25713 <i>Cacatua galerita</i> (Sulphur-crested Cockatoo)			
230.	25714 <i>Cacatua pastinator</i> (Western Long-billed Corella)			
231.	25715 <i>Cacatua roseicapilla</i> (Galah)			
232.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
233.	24727 <i>Cacatua sanguinea</i> subsp. <i>westralensis</i> (Little Corella)			
234.	24729 <i>Cacatua tenuirostris</i> (Eastern Long-billed Corella)	Y		
235.	25717 <i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
236.	24733 <i>Calyptorhynchus baudinii</i> (Baudin's Cockatoo (long-billed black-cockatoo), Baudin's Cockatoo)		T	
237.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo (short-billed black-cockatoo), Carnaby's Cockatoo)		T	
238.	24735 <i>Glossopsitta porphyrocephala</i> (Purple-crowned Lorikeet)			
239.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
240.	25720 <i>Platycercus icterotis</i> (Western Rosella)			
241.	24747 <i>Platycercus spurius</i> (Red-capped Parrot)			
242.	25721 <i>Platycercus zonarius</i> (Australian Ringneck, Ring-necked Parrot)			
243.	24750 <i>Platycercus zonarius</i> subsp. <i>semitorquatus</i> (Twenty-eight Parrot)			
244.	25722 <i>Polytelis anthopeplus</i> (Regent Parrot)			
245.	25723 <i>Trichoglossus haematodus</i> (Rainbow Lorikeet)			
Pygopodidae				
246.	24991 <i>Aprasia repens</i> (Sand-plain Worm-lizard)			
247.	30906 <i>Delma concinna</i> (Javelin Legless Lizard)			
248.	30905 <i>Delma concinna</i> subsp. <i>concinna</i> (Javelin Legless Lizard)			
249.	25766 <i>Delma fraseri</i> (Fraser's Legless Lizard)			
250.	24999 <i>Delma grayii</i>			
251.	25005 <i>Lialis burtonis</i>			
252.	25007 <i>Pletholax gracilis</i> subsp. <i>gracilis</i> (Keeled Legless Lizard)			
253.	25008 <i>Pygopus lepidopodus</i> (Common Scaly Foot)			
Rallidae				
254.	25727 <i>Fulica atra</i> (Eurasian Coot)			
255.	25729 <i>Gallinula tenebrosa</i> (Dusky Moorhen)			
256.	25730 <i>Gallirallus philippensis</i> (Buff-banded Rail)			
257.	25731 <i>Porphyrio porphyrio</i> (Purple Swamphen)			
258.	24769 <i>Porzana fluminea</i> (Australian Spotted Crane)			
259.	24771 <i>Porzana tabuensis</i> (Spotless Crane)			
Recurvirostridae				
260.	24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt)			
261.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
262.	24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)			
Salticidae				
263.	-1698 <i>Ocrisoma leucomis</i>			
Scincidae				
264.	42368 <i>Acritoscincus trilineatus</i> (Western Three-lined Skink)			
265.	30893 <i>Cryptoblepharus buehneri</i>			

	Name ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
266.	25027	<i>Ctenotus australis</i>			
267.	25039	<i>Ctenotus fallens</i>			
268.	25087	<i>Cyclodomorphus celatus</i> (Western Slender Blue-tongue)			
269.	25096	<i>Egernia kingii</i> (King's Skink)			
270.	25100	<i>Egernia napoleonis</i>			
271.	25119	<i>Hemiergis quadrilineata</i>			
272.	25131	<i>Lerista distinguenda</i>			
273.	25133	<i>Lerista elegans</i>			
274.	25148	<i>Lerista lineopunctulata</i>			
275.	25165	<i>Lerista praepedita</i>			
276.	25184	<i>Menetia greyii</i>			
277.	25191	<i>Morethia lineoocellata</i>			
278.	25192	<i>Morethia obscura</i>			
279.	25203	<i>Tiliqua occipitalis</i> (Western Bluetongue)			
280.	25519	<i>Tiliqua rugosa</i>			
281.	25207	<i>Tiliqua rugosa subsp. rugosa</i>			
Scolopacidae					
282.	41323	<i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
283.	24784	<i>Calidris ferruginea</i> (Curlew Sandpiper)		T	
284.	24788	<i>Calidris ruficollis</i> (Red-necked Stint)		IA	
285.	25741	<i>Limosa limosa</i> (Black-tailed Godwit)		IA	
286.	24808	<i>Tringa nebularia</i> (Common Greenshank)		IA	
Scolopendridae					
287.	-1785	<i>Cormocephalus aurantiipes</i>			
288.	-12659	<i>Cormocephalus novaehollandiae</i>			
289.	-12200	<i>Cormocephalus rubriceps</i>			
290.	-1739	<i>Cormocephalus turneri</i>			
291.	-1667	<i>Ethmostigmus rubripes</i>			
Sillaginidae					
292.	-15064	<i>Sillago schomburgkii</i>			
Sparassidae					
293.	-12890	<i>Isopeda leishmanni</i>			
Spheniscidae					
294.	24818	<i>Eudyptula minor subsp. novaehollandiae</i> (Little Penguin)			
Strigidae					
295.	25748	<i>Ninox novaeseelandiae</i> (Boobook Owl)			
Sylviidae					
296.	25755	<i>Acrocephalus australis</i> (Australian Reed Warbler)			
297.	24834	<i>Cincloramphus mathewsi</i> (Rufous Songlark)			
298.	25758	<i>Megalurus gramineus</i> (Little Grassbird)			
Tachyglossidae					
299.	24207	<i>Tachyglossus aculeatus</i> (Short-beaked Echidna)			
Tarsipedidae					
300.	24167	<i>Tarsipes rostratus</i> (Honey Possum, Noolbenger)			
Tettigoniidae					
301.	33973	<i>Austrosaga spinifer</i> (cricket)		P3	
Threskiornithidae					
302.	24841	<i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
303.	24842	<i>Platalea regia</i> (Royal Spoonbill)			
304.	24843	<i>Plegadis falcinellus</i> (Glossy Ibis)		IA	
305.	24844	<i>Threskiornis molucca</i> (Australian White Ibis)			
306.	24845	<i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
Typhlopidae					
307.	25271	<i>Ramphotyphlops australis</i>			
308.	25285	<i>Ramphotyphlops pinguis</i>			
309.	25288	<i>Ramphotyphlops waitii</i>			
Tytonidae					
310.	25762	<i>Tyto alba</i> (Barn Owl)			
Urodacidae					
311.	-11701	<i>Urodacus novaehollandiae</i>			
Varanidae					
312.	25218	<i>Varanus gouldii</i> (Bungarra or Sand Monitor)			
313.	25526	<i>Varanus tristis</i> (Racehorse Monitor)			

Name	ID	Species Name	Naturalised	Conservation Code	¹ Endemic To Query Area
Veliferidae					
314.	-15138	<i>Metavelifer multiradiatus</i>			
Vespertilionidae					
315.	24186	<i>Chalinolobus gouldii</i> (Gould's Wattled Bat)			
316.	24194	<i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)			
Zodariidae					
317.	-13364	<i>Masasteron sampeyae</i>			
Zosteropidae					
318.	25765	<i>Zosterops lateralis</i> (Grey-breasted White-eye, Silveryeye)			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

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

Appendix D – Reconnaissance vegetation, flora and fauna survey

Vegetation and flora

Broad vegetation mapping

Broad scale (1:250,000) vegetation mapping of the Perth area was completed by Beard (1979) at an association level. Beard (1979) mapping indicates that one vegetation association is present within the project area:

- Low woodland; banksia (association 949).

Heddle *et al.* (1980) mapped the Perth area at a finer scale than Beard (1979). The Heddle *et al.* (1980) mapping identified the following vegetation complex on Aeolian Deposits of the Swan Coastal Plain within the project area (GoWA 2000):

Spearwood Dunes

- Cottesloe complex – central and south: Mosaic of woodland of *Eucalyptus gomphocephala* and open forest of *E. gomphocephala* – *E. marginata* – *E. calophylla* [now *Corymbia calophylla*]; closed heath on the Limestone outcrops.

Broad vegetation extents

Beard (1979) mapping has been adapted and digitised by Shepherd *et al.* (2002). The extent of Beard's (1979) vegetation associations have been determined by the state-wide vegetation remaining extent calculations maintained by the DPaW (latest update 2012 – GoWA 2013). As shown in Table D.1, the current extent of Beard (1979) vegetation association 949 is greater than 30 percent of the pre-European extent (considered to be the threshold level – Commonwealth of Australia 2001; EPA 2000) at the State, Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (DotE 2014b), IBRA sub-region and local government authority (LGA) levels.

Table D.1 Extent of Beard (1979) vegetation association within the project area (GoWA 2013)

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	Current extent in all DPaW managed lands (%)
949	Swan Coastal Plain IBRA Bioregion	1,501,221.92	586,975.23	39.10	36.48
	State: Western Australia	218,193.94	124,080.33	56.87	54.73
	IBRA Bioregion: Swan Coastal Plain	209,983.25	121,216.29	57.73	55.33
	IBRA Subregion: Perth	184,475.82	105,076.59	56.96	58.53
	LGA: City of Wanneroo	37,138.47	17,641.75	47.50	68.10

The Local biodiversity Program (2010, 2013) provides information on the extent of vegetation complexes mapped by Heddle *et al.* (1980) in the south west portion of Western Australia. As shown in Table D.2, the current extent of Heddle *et al.* (1980) Cottesloe complex – central and south vegetation complex is greater than 30 percent of the pre-European extent on the Swan Coastal Plain and within the City of Wanneroo.

Table D.2 Extent of Heddle *et al.* (1980) vegetation complex within the project area (Local Biodiversity Project 2010, 2013)

Vegetation complex	Scale	Pre-European extent (ha)	2013 extent (ha)	% of pre-European extent	% of pre-European extent with formal protection + BF
Cottesloe complex – central and south	Swan Coastal Plain	44,899.92	15,815.73	35.22	12.75
	City of Wanneroo	13,310	6,122.77	46.00	6.36

Site description

The project area occurs largely within Neerabup National Park, and is located alongside (and in some parts overlapping) the existing Quinns Quarry access road. Deep sands characterise a majority of the project area, with one small area near the corner of the access road comprising shallow sands over limestone and outcropping limestone. Native vegetation was present in the eastern and southern parts of the project area adjacent to the access road with revegetation dominating the northern part of the project area. No vegetation associated with watercourses or wetlands (riparian vegetation) was observed within the project area.

Vegetation types and condition

Banksia Woodland was the most dominant vegetation type (0.74 ha) within the project area occurring on the southern and western sides of the existing access road. This vegetation type covered 0.74 ha and was dominated by *Banksia attenuata* and *B. menziesii*, with scattered *Eucalyptus marginata* and *Allocasuarina fraseriana* trees over shrubland of *Xanthorrhoea preissii*, *Hibbertia hypericoides* and *Acacia pulchella* over an understory of *Mesomelaena pseudostygia*, *Desmodcladus flexuosus* and *Scaevola canescens*. Areas within Neerabup National Park were rated as *Very Good* (3) to *Good* (4) (0.51 ha), and showed intact vegetation structure and minimal evidence of disturbance. Areas adjacent to the access road were rated as *Degraded* (5) (0.17 ha), and showed evidence of ongoing disturbance associated with the access road, including weed invasion, rubbish and dust.

The *Banksia* Woodland vegetation type aligned with Beard (1979) vegetation association 949: Low woodland; banksia, and potentially aligned with Gibson *et al.* (1994) Floristic Community Type (FCT) 28: Spearwood *Banksia attenuata* or *Banksia attenuata/Eucalyptus* woodlands.

The remainder of the project area includes the existing Quinns Quarry access road (0.73 ha), which was rated as *Completely Degraded* (6) and an area which has been previously cleared and subsequently revegetated with native species (0.11 ha). This revegetated area occurs in the northern part of the project area, adjacent to the access road and was rated as *Degraded* (5).



Plate 1 *Banksia* woodland vegetation type in Very Good (3) to Good (4) condition within the project area



Plate 2 *Banksia* woodland vegetation type in Degraded (5) condition adjacent to the existing Quarry access road



Plate 3 Revegetation area rated as Degraded (5) and the existing Quarry access road within the project area

Conservation significant ecological communities

A search of the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters database (DotE 2014a) and DPaW Threatened Ecological Community (TEC) and Priority Ecological Community (PEC) databases identified the potential presence of three TECs and five PECs within 10 km of the project area (Table D.3). In addition a new PEC has been listed by DPaW, '*Banksia* dominated woodlands on the Swan Coastal Plain IBRA region' (Priority 3), which may occur in the vicinity of the project area.

A likelihood of occurrence assessment was conducted for the conservation significant ecological communities identified in the desktop searches (Table D.3). This assessment took into account previous records and locations, habitats present within the project area and community requirements. The assessment identified that the '*Banksia* dominated woodlands on the Swan Coastal Plain IBRA region' Priority 3 PEC was likely to occur within the project area.

Table D.3 Likelihood of occurrence assessment for conservation significant ecological communities within the vicinity of the project area

Conservation significant ecological community	Status: Federal (EPBC Act)	Status: State (DPaW)	Description	Location(s) relative to the project area	Likelihood of occurrence in project area
Sedgeland in Holocene dune swales of the southern Swan Coastal Plain	Endangered TEC	Critically Endangered TEC	This community occurs in linear damplands and occasionally sumplands, between Holocene dunes. Typical and common native species are the shrubs <i>Acacia rostellifera</i> , <i>A. saligna</i> , <i>Xanthorrhoea preissii</i> , the sedges <i>Baumea juncea</i> , <i>Ficinia nodosa</i> , <i>Lepidosperma gladiatum</i> and the grass <i>Poa porphyroclados</i> (English <i>et al.</i> 2002). Corresponds to Gibson <i>et al.</i> (1994) FCT19.	12.5 km north of the project area	Unlikely – this community occurs in damp areas on Holocene dunes. Typical and native species These species were not recorded/dominate in the project area during the site visit.
<i>Banksia attenuata</i> woodland over species rich dense shrublands		Endangered TEC	This community occurs on uplands centred on Bassendean Dunes and Dandaragan Plateau. Typical and common species include: <i>Banksia attenuata</i> , <i>Conostephium pendulum</i> , <i>Hibbertia hypericoides</i> and <i>Mesomelaena pseudostygia</i> . Corresponds to Gibson <i>et al.</i> (1994) FCT20a	6.5 km south east of the project area 9.6 km south east of the project area	Unlikely – this community occurs on uplands centred on Bassendean Dunes and Dandaragan Plateau.
<i>Melaleuca huegelii</i> - <i>Melaleuca acerosa</i> (currently <i>M. systema</i>) shrublands on limestone ridges		Endangered TEC	This community occurs on Spearwood Sands (Tamala Limestone) on large limestone ridges. Described as species rich thickets, heaths or scrubs dominated by <i>Melaleuca huegelii</i> , <i>M. acerosa</i> (currently <i>M. systema</i>), <i>Dryandra sessilis</i> over <i>Grevillea preissii</i> , <i>Acacia lasiocarpa</i> and <i>Spyridium globulosum</i> . Corresponds to Gibson <i>et al.</i> (1994) FCT26a	3 km north west of the project area 8.3 km north west of the project area 2.5 km north of the project area 1.6 km north east of the project area 4 km north east of the project area	Unlikely – this community occurs in Spearwood Sands (Tamala Limestone) on large limestone ridges. Typical species were not recorded/dominate in the project area during the site visit.

Conservation significant ecological community	Status: Federal (EPBC Act)	Status: State (DPaW)	Description	Location(s) relative to the project area	Likelihood of occurrence in project area
<i>Banksia ilicifolia</i> woodlands		Priority 3 PEC	Low lying sites generally consisting of <i>Banksia ilicifolia</i> – <i>B. attenuata</i> woodlands, but <i>Melaleuca preissiana</i> woodlands and scrubs are also recorded. Occurs on Bassendean and Spearwood systems in the central Swan Coastal Plain north of Rockingham. Typically has very open understorey, and sites are likely to be seasonally waterlogged. Corresponds to Gibson <i>et al.</i> (1994) FCT22	8.3 km east of the project area 7.5 km south east of the project area	Unlikely – this community is likely to be seasonally waterlogged. Typical species not recorded/ dominate in the project area during the site visit.
Northern Spearwood shrublands and woodlands		Priority 3 PEC	Heaths with scattered <i>Eucalyptus gomphocephala</i> occurring on deeper soils north from Woodman Point. Most sites occur on the Cottesloe unit of the Spearwood system. The heathlands in this group typically include <i>Dryandra sessilis</i> [now <i>Banksia sessilis</i>], <i>Calothamnus quadrifidus</i> and <i>Schoenus grandiflorus</i> . Corresponds to Gibson <i>et al.</i> (1994) FCT24.	2 km north of the project area 8.8 km north east of the project area 4.3 km south east of the project area 4.7 km south west of the project area	Unlikely – this community occurs on deep soils. Typical species were not recorded/ dominate in the project area during the site visit.
Southern <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands		Priority 3 PEC	Woodlands of <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> south of Woodman Point. Recorded from the Karrakatta, Cottesloe and Vasse units. Dominants other than tuart were occasionally recorded, including <i>Corymbia calophylla</i> at Paganoni block and <i>Eucalyptus decipiens</i> at Kemerton. Tuart formed the overstorey nearby however. Corresponds to Gibson <i>et al.</i> (1994) FCT25	9.5 km south east of the project area	Unlikely – typical species of this community were not recorded/ dominate in the project area during the site visit.

Conservation significant ecological community	Status: Federal (EPBC Act)	Status: State (DPaW)	Description	Location(s) relative to the project area	Likelihood of occurrence in project area
Coastal shrublands on shallow sands		Priority 3 PEC	Mostly heaths on shallow sands over limestone close to the coast. No single dominant but important species include <i>Spyridium globulosum</i> , <i>Rhagodia baccata</i> , and <i>Olearia axillaris</i> . Corresponds to Gibson et al (1994) FCT29a	7.5 km south west of the project area	Unlikely – this community occurs on shallow sands over limestone close to the coast. Important species mostly not recorded in the project area during the site visit.
Acacia shrublands on taller dunes		Priority 3 PEC	This community is dominated by <i>Acacia</i> shrublands or mixed heaths on the larger dunes. This community stretches from Seabird to south of Mandurah. No consistent dominant, but species such as <i>Acacia rostellifera</i> , <i>Acacia lasiocarpa</i> , and <i>Melaleuca acerosa</i> were important. Corresponds to Gibson et al. (1994) FCT29b	4.3 km south west of the project area	Unlikely – this community occurs on large dunes. Important species not recorded in the project area during the site visit.
<i>Banksia</i> dominated woodlands on the Swan Coastal Plain IBRA region		Priority 3 PEC	<i>Banksia attenuata</i> and/or <i>B. menziesii</i> occurring on deep sands. The species commonly co-occur. The community occurs on the Quindalup, Spearwood and Bassendean dunes and rarely on the Pinjarra Plain landforms, that comprise the dominant landforms of the Swan Coastal Plain.		Likely – this community occurs on deep sands on the Spearwood dunes (deep sands recorded in the project area). <i>Banksia</i> species recorded and dominant in the project area.

Flora diversity

A search of the *NatureMap* database (DPaW 2007–) identified 491 plant taxa, representing 93 families and 272 genera that have been previously recorded within 10 km of the project area. This total comprised 394 native flora taxa and 97 naturalised (non-native) flora taxa. Dominant families within this search included: Fabaceae (47 taxa), Asteraceae (34 taxa) and Myrtaceae (32 taxa).

A total of 47 flora taxa were recorded in the project area during the reconnaissance survey. This total comprised 36 native taxa and 11 introduced taxa. This total does not represent a comprehensive list of all taxa occurring within the project area. Opportunistic records of flora species noted during the site visit are included in Table D.4.

Table D.4 Flora taxa opportunistically recorded in the project area during the site visit

Family	Taxon	Status ¹
Aizoaceae	<i>Carpobrotus edulis</i>	*
Apocynaceae	<i>Gomphocarpus fruticosus</i>	*
Asteraceae	<i>Conyza sumatrensis</i>	*
Asteraceae	sp.	
Casuarinaceae	<i>Allocasuarina fraseriana</i>	
Casuarinaceae	<i>Allocasuarina humilis</i>	
Cyperaceae	<i>Mesomelaena pseudostygia</i>	
Dilleniaceae	<i>Hibbertia hypericoides</i>	
Ericaceae	<i>Conostephium preissii</i>	
Euphorbiaceae	<i>Ricinus communis</i>	*
Fabaceae	<i>Acacia alata</i>	
Fabaceae	<i>Acacia benthamii</i>	P2
Fabaceae	<i>Acacia huegelii</i>	
Fabaceae	<i>Acacia pulchella</i>	
Fabaceae	<i>Acacia saligna</i>	
Fabaceae	<i>Daviesia decurrens</i>	
Fabaceae	<i>Daviesia divaricata</i>	
Fabaceae	<i>Jacksonia calcicola</i>	
Fabaceae	<i>Jacksonia sericea</i>	P4
Geraniaceae	<i>Pelargonium capitatum</i>	
Goodeniaceae	<i>Goodenia</i> sp.	
Goodeniaceae	<i>Scaevola canescens</i>	
Gyrostemonaceae	<i>Gyrostemon ramulosus</i>	
Haemodoraceae	<i>Conostylis setigera</i>	
Hemerocallidaceae	<i>Dianella revoluta</i>	
Lamiaceae	<i>Lavandula angustifolia</i>	*
Myrtaceae	<i>Calothamnus sanguineus</i>	
Myrtaceae	<i>Eucalyptus marginata</i>	
Myrtaceae	<i>Melaleuca systema</i>	
Plumbaginaceae	<i>Plumbago auriculata</i>	*
Poaceae	<i>Aira</i> sp.	*

Family	Taxon	Status ¹
Poaceae	<i>Avena barbata</i>	*
Poaceae	<i>Briza minor</i>	*
Poaceae	<i>Cynodon dactylon</i>	*
Poaceae	<i>Eragrostis curvula</i>	*
Proteaceae	<i>Banksia attenuata</i>	
Proteaceae	<i>Banksia dallanneyi</i>	
Proteaceae	<i>Banksia menziesii</i>	
Proteaceae	<i>Banksia sessilis</i>	
Proteaceae	<i>Hakea lissocarpha</i>	
Proteaceae	<i>Hakea prostrata</i>	
Proteaceae	<i>Hakea trifurcata</i>	
Proteaceae	<i>Petrophile macrostachya</i>	
Restionaceae	<i>Desmocladius flexuosus</i>	
Rhamnaceae	<i>Spyridium globulosum</i>	
Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>	
Zamiaceae	<i>Macrozamia riedlei</i>	

¹P2 = Priority 2 listed by DPaW, P4 = Priority 4 listed by DPaW, * = introduced taxon.

Conservation significant flora

Desktop searches of the EPBC Act Protected Matters database (DotE 2014a), DPaW NatureMap records (DPaW 2007–), DPaW Threatened and Priority Flora (TPFL) and the Western Australian Herbarium (WAHERB) databases identified the presence/potential presence of 29 conservation significant flora taxa within 10 km of the project area (Table D.5). One conservation significant flora taxon identified in the EPBC Act Protected Matters search, *Epiblema grandiflorum* var. *cyaneum*, is synonymous with *Epiblema grandiflorum*, which has no conservation listing.

A likelihood of occurrence assessment (based on the range, habitat requirements and previous records of the species) was conducted for all conservation significant taxa identified in the desktop assessment (Table D.5). The assessment concluded that two taxa have been recorded, three taxa are likely to occur, ten taxa could possibly occur, 13 taxa are unlikely to occur and one taxon is highly unlikely to occur in the project area.

During the site visit two DPaW Priority-listed taxa were recorded within the project area:

- *Acacia benthamii* (Priority 2)
- *Jacksonia sericea* (Priority 4)

Acacia benthamii (Priority 2)

Sixty three individuals of *A. benthamii* were recorded within the project area, occurring near the corner of the access road in *Banksia* woodland. The individuals were restricted to shallow sand over limestone with small patches of outcropping limestone. No flowering or fruiting material was present at the time of the site visit.

Jacksonia sericea (Priority 4)

Thirty two individuals *J. sericea* were recorded within the project area, occurring in the south eastern part in *Banksia* woodland. Discussion with the WA Herbarium (pers. comm.) determined that within the Wanneroo region, *J. sericea* species intergrades with *J. calcicola* (Chappill *et al.*

2007), which is not listed under any legislation or as a Priority species. As a result, many individuals within the Wanneroo region possess intermediate characteristics or traits of both species.

Table D.5 Likelihood of occurrence assessment for conservation significant flora taxa potentially occurring within the project area

Likelihood of occurrence	Guiding parameters
Known	Species definitely recorded within the project area either 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 does occur at the project area.
Unlikely	Species previously/not previously recorded within 5 km and suitable habitat does not occur at the project area.
Highly unlikely	The project area is outside the species' natural distribution.

Family	Taxon	Status (EPBC Act)	Status (WC Act/ DPaW)	Description	Likelihood of occurrence	Source
Aizoaceae	<i>Sarcozona bicarinata</i>		P3	Shrub, ca 0.1 m high. Fl. white, Aug. White sand.	Possible. Species recorded within 5 km of the project area and marginally suitable habitat occurs at the project area.	NM, TPFL, WAHerb
Celastraceae	<i>Tripterococcus paniculatus</i> ms		P4	Perennial, herb, to 1 m high. Fl. yellow-green, Oct to Nov. Grey, black or peaty sand. Winter-wet flats.	Unlikely. Species not recorded within 5 km of the project area and suitable habitat does not occur at the project area.	NM
Centrolepidaceae	<i>Centrolepis caespitosa</i>	E	P4	Tufted annual, herb (forming a rounded cushion up to 25 mm across). Fl. Oct to Dec. White sand, clay. Salt flats, wet areas.	Unlikely. Species not recorded within 5 km of the project area (recorded at the foothills of the Darling Scarp) and suitable habitat does not occur at the project area.	EPBC
Cyperaceae	<i>Lepidosperma rostratum</i>	E		Rhizomatous, tufted perennial, grass-like or herb (sedge), 0.5 m high. Fl. brown. Peaty sand, clay.	Unlikely. Species not recorded within 5 km of the project area and suitable habitat does not occur at the project area.	EPBC

Family	Taxon	Status (EPBC Act)	Status (WC Act/ DPaW)	Description	Likelihood of occurrence	Source
Dasypogonaceae	<i>Calectasia cyanea</i>		T	Rhizomatous, clump forming, woody perennial, herb, 0.1-0.6 m high, to 0.3 m wide. Fl. blue/purple, Jun to Oct. White, grey or yellow sand, gravel.	Highly unlikely. Only known from a location 10 km south of Albany with records elsewhere considered to be misidentifications.	NM
Dilleniaceae	<i>Hibbertia spicata</i> subsp. <i>leptotheca</i>		P3	Erect or spreading shrub, 0.2-0.5 m high. Fl. yellow, Jul to Oct. Sand. Near-coastal limestone ridges, outcrops & cliffs.	Unlikely. Species not recorded within 5 km of the project area and suitable habitat does not occur at the project area.	NM, TPFL, WAHerb
Droseraceae	<i>Drosera x sidjamesii</i>		P1	Fibrous-rooted perennial, herb, to 0.06 m high. Fl. green-pink, Nov to Dec or Jan to Mar. Peaty sand. Along lake margins, close to winter high-water line.	Unlikely. Species not recorded within 5 km of the project area and suitable habitat does not occur at the project area.	NM, WAHerb
Ericaceae	<i>Andersonia gracilis</i>	E	T	Slender erect or open straggly shrub, 0.1-0.5(-1) m high. Fl. white-pink-purple, Sep to Nov. White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	Unlikely. Species not recorded within 5 km of the project area (closest record c. 100 km north) and suitable habitat does not occur at the project area.	EPBC
Ericaceae	<i>Leucopogon</i> sp. Yanchep (M. Hislop 1986)		P3	Erect shrub, 0.15-1 m high, to 0.6 m wide. Fl. white/pink, Apr to Jun or Sep. Light grey-yellow sand, brown loam, limestone, laterite, granite. Coastal plain, breakaways, valley slopes, low hills.	Likely. Species recorded within 5 km of the project area and suitable habitat occurs at the project area.	NM, WAHerb
Fabaceae	<i>Acacia benthamii</i>		P2	Shrub, ca 1 m high. Fl. yellow, Aug to Sep. Sand. Typically on limestone breakaways.	Known. Recorded in the project area during the site visit 2014.	NM, TPFL
Fabaceae	<i>Jacksonia sericea</i>		P4	Low spreading shrub, to 0.6 m high. Fl. orange, usually Dec or Jan to Feb. Calcareous & sandy soils.	Known. Recorded in the project area during the site visit 2014.	NM, TPFL, WAHerb

Family	Taxon	Status (EPBC Act)	Status (WC Act/ DPaW)	Description	Likelihood of occurrence	Source
Fabroniaceae	<i>Fabronia hampeana</i>		P2	Moss, white. Growing on cycad, <i>Melaleuca lanceolata</i> . Between limestone outcrops with yellow sand.	Possible. Species recorded within 5 km of the project area and marginally suitable habitat occurs at the project area.	NM, TPFL, WAHerb
Haemodoraceae	<i>Anigozanthos viridis</i> subsp. <i>terraspectans</i>	V	T	Rhizomatous, perennial, herb, 0.05-0.2 m high. Fl. green/yellow-green, Aug to Sep. Grey sand, clay loam. Winter-wet depressions.	Unlikely. Species not recorded within 5 km of the project area and suitable habitat does not occur at the project area.	EPBC
Haemodoraceae	<i>Conostylis bracteata</i>		P3	Rhizomatous, tufted or shortly proliferous perennial, grass-like or herb, 0.2-0.45 m high. Fl. yellow, Aug to Sep. Sand, limestone. Consolidated sand dunes.	Possible. Species not recorded within 5 km of the project area, but suitable habitat occurs at the project area.	NM, TPFL
Myrtaceae	<i>Baeckea</i> sp. Limestone (N. Gibson & M.N. Lyons 1425)		P1	Compact shrub, 1.2-2 m high, 1 m wide. Fl. pale pink, white, Jun, Oct- Dec. Grey/yellow-brown sand over limestone. Hill, limestone ridge.	Likely. Species recorded within 5 km of the project area and suitable habitat occurs at the project area.	NM, WAHerb
Myrtaceae	<i>Darwinia foetida</i>	CE	T	Erect, or spreading, shrub to 0.7 m high, often using other shrubs for support. Young branches are slender, green-brown with prominent, decurrent leaf bases, becoming grey and woody. Fl. green, Oct to Nov. Grey or white sand, swampy, seasonally wet sites.	Unlikely. Species not recorded within 5 km of the project area (recorded at the foothills of the Darling Scarp) and suitable habitat does not occur at the project area.	EPBC
Myrtaceae	<i>Eucalyptus argutifolia</i>	V	T	Mallee, 1.5-4 m high, bark smooth. Fl. white, Mar to Apr. Shallow soils over limestone. Slopes or gullies of limestone ridges, outcrops.	Possible. Species recorded within 5 km of the project area and marginally suitable habitat occurs at the project area.	EPBC, NM, WAHerb

Family	Taxon	Status (EPBC Act)	Status (WC Act/ DPaW)	Description	Likelihood of occurrence	Source
Myrtaceae	<i>Melaleuca</i> sp. Wanneroo (G.J. Keighery 16705)		P1	Slender erect shrub, 2-3 m high, 1-2 m wide. Fl. yellow, December. Mossy black sand. Rugged limestone ridge	Unlikely. Species recorded within 5 km of the project area, but no suitable habitat occurs at the project area.	NM, WAHerb
Orchidaceae	<i>Caladenia huegelii</i>	E	T	Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green & cream & red, Sep to Oct. Grey or brown sand, clay loam.	Possible. Species not recorded within 5 km of the project area, but suitable habitat occurs at the project area.	EPBC
Orchidaceae	<i>Diuris micrantha</i>	V	T	Tuberous, perennial, herb, 0.3-0.6 m high. Fl. yellow & brown, Sep to Oct. Brown loamy clay. Winter-wet swamps, in shallow water.	Unlikely. Species not recorded within 5 km of the project area and no suitable habitat occurs at the project area.	EPBC
Orchidaceae	<i>Diuris purdiei</i>	E	T	Tuberous, perennial, herb, 0.15-0.35 m high. Fl. yellow, Sep to Oct. Grey-black sand, moist. Winter-wet swamps.	Unlikely. Species not recorded within 5 km of the project area and no suitable habitat occurs at the project area.	EPBC
Orchidaceae	<i>Drakaea elastica</i>	E	T	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red & green & yellow, Oct to Nov. White or grey sand. Low-lying situations adjoining winter wet swamps.	Unlikely. Species not recorded within 5 km of the project area and no suitable habitat occurs at the project area.	EPBC
Orchidaceae	<i>Drakaea micrantha</i>	V	T	Tuberous, perennial, herb, 0.15-0.3 m high. Fl. red & yellow, Sep to Oct. White-grey sand.	Possible. Species not recorded within 5 km of the project area, but suitable habitat occurs at the project area.	EPBC
Pittosporaceae	<i>Marianthus paralius</i>		T	Almost prostrate, eventually scandent, woody shrub. Fl. red, Sep to Nov. White sand over limestone. Low coastal cliffs.	Possible. Species not recorded within 5 km of the project area, but suitable habitat occurs at the project area.	NM, WAHerb

Family	Taxon	Status (EPBC Act)	Status (WC Act/ DPaW)	Description	Likelihood of occurrence	Source
Poaceae	<i>Austrostipa mundula</i>		P2	Perennial caespitose grass 0.35-0.5 m high x 0.05-0.2 m wide. Fl. brown, purple, Sep-Nov. Dry grey sand, shallow cream sand and limestone. Plain, road verge, plateau of coastal cliffs, coastal dunes.	Possible. Species not recorded within 5 km of the project area, but suitable habitat occurs at the project area.	NM
Proteaceae	<i>Grevillea</i> sp. Ocean Reef (D. Pike Joon 4)		P1	Erect, spreading shrub, 1.5-2 m high, 3 m wide. Fl. November. Dry brown/grey sand, yellow-brown sand. Sandy dune, gully.	Possible. Species not recorded within 5 km of the project area, but suitable habitat occurs at the project area.	NM
Stylidiaceae	<i>Stylidium longitubum</i>		P3	Erect annual (ephemeral), herb, 0.05-0.12 m high. Fl. pink, Oct to Dec. Sandy clay, clay. Seasonal wetlands.	Unlikely. Species not recorded within 5 km of the project area and no suitable habitat occurs at the project area.	NM
Stylidiaceae	<i>Stylidium maritimum</i>		P3	Caespitose perennial, herb, 0.3-0.7 m high, Leaves tufted, linear to narrowly oblanceolate, 10-40 cm long, 1-5.5 mm wide. Inflorescence paniculate. Fl. white/purple, Sep to Nov. Sand over limestone. Dune slopes and flats. Coastal heath and shrubland, open Banksia woodland.	Possible. Species not recorded within 5 km of the project area, but suitable habitat occurs at the project area.	NM, WAHerb
Thymelaeaceae	<i>Pimelea calcicola</i>		P3	Erect to spreading shrub, 0.2-1 m high. Fl. pink, Sep to Nov. Sand. Coastal limestone ridges.	Likely. Species recorded within 5 km of the project area and suitable habitat occurs at the project area.	NM, WAHerb

See Appendix B for Conservation codes

Weeds

Desktop searches of the EPBC Act Protected Matters database (DotE 2014a) and DPaW *NatureMap* records (DPaW 2007–) identified the presence/potential presence of 112 introduced taxa within 10 km of the project area. This total included:

- 13 Declared Pests and/or Weeds of National Significance (WoNS)
- 99 environmental weeds

During the site visit nine introduced taxa were recorded within the project area, with one, *Gomphocarpus fruticosus* (Narrow leaf cotton bush), listed as a Declared Pest under the *Biosecurity and Agriculture Management Act 2007*.

Fauna

Fauna habitats

Two broad fauna habitat types were identified within project area, based on the predominant landforms, soil and vegetation structure in the area (Figure 7). These include:

- *Banksia* woodland
- Revegetation

The project area is dominated by *Banksia* woodland on grey sandy soils, consisting of a dominant overstorey of *Banksia attenuata* and *B. menziesii*, with scattered Jarrah (*Eucalyptus marginata*) and Sheoak (*Allocasuarina fraseriana*) trees. The majority of the *Banksia* woodland was in very good condition and has high species and structural diversity. As a result, the woodland provides high habitat value for fauna species due to the various microhabitats and habitat resources available, such as fallen logs and sandy soil. In particular the woodland would be expected to support a high diversity of bird species, and also provides loose sands that are suitable for burrowing reptiles. Furthermore, the presence of *Banksia* spp. *Hakea* spp. and other proteaceous species provides foraging habitat for the conservation significant Black Cockatoo species. There are also small areas of the *Banksia* woodland adjacent to the access road which show evidence of ongoing disturbance including weed invasion, rubbish and dust.

There is also a small strip of revegetation in the northern part of the project area, adjacent to the access road. This area has previously been cleared and subsequently revegetated with native species, and provides some shelter and opportunistic for bird species. The remainder of the project area consists of previously cleared and highly degraded areas, including the existing Quinns Quarry access road. These areas provide very little to no habitat value for fauna species and are devoid of native vegetation.

Fauna habitat connectivity

Locally, the habitat within the project area is well connected to the east to the surrounding remnant vegetation within Neerabup National Park. This provides a linkage to the much larger linear vegetated corridor associated with Neerabup National Park and a number of Bush Forever sites. To the north and west, the project area is immediately bound by both Hester Avenue and the railway which present barriers to the movement of ground dwelling fauna between remnant vegetation to the north, as well as to the west of the railway. However, the remnant vegetation west of the railway is limited as the landuse immediately transitions into urban development in the suburb of Clarkson.

At a larger scale, the areas of remnant *Banksia* woodland vegetation in and immediately surrounding the project area are part of a regionally significant contiguous bushland/wetland linkage (Government of Western Australia 2000). A large proportion of this vegetation is currently included as national park and a series of Bush Forever sites (Government of Western Australia 2000). There are several surrounding linkages and the habitat within Neerabup National Park (Bush Forever site 383) is linked to bushland to the north in Yanchep National Park, to the south to Bush Forever site 299 (across Wanneroo road) and to the east and west to Bush Forever Site 323 and through bushland to Bush Forever Site 397. The vegetation within project area also is part of and connected Greenways 35, 2, 5 (Tingay, Alan and Associates 1998) and overall the Neerabup National Park provides a narrow corridor to allow movement of animals along the coastal plain and associated wetlands.

Fauna diversity

A search of the *NatureMap* database (DPaW 2007–) identified 318 fauna species as previously recorded within 10 km of the project area, including 305 native and 13 introduced species (Appendix C). These results consisted of 169 birds, 57 reptiles, 29 mammals, seven amphibians, 16 fish and 40 invertebrates.

A total of 20 fauna species were recorded in the project area during the reconnaissance survey. This total consisted of 18 birds and two mammals, of which 17 are native species and three are introduced species. Opportunistic records of fauna species noted during the site visit are included in Table D.6.

Table D.6 Fauna species opportunistically recorded in the project area during the site visit

Family	Taxon	Common name	Status
Birds			
Acanthizidae	<i>Smicrornis brevirostris occidentalis</i>	Weebill	
Acanthizidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	
Acanthizidae	<i>Gerygone fusca</i>	Western Gerygone	
Artamidae	<i>Cracticus tiibicen dorsalis</i>	Australian Magpie	
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	
Columbidae	<i>Streptopelia senegalensis</i>	Laughing Dove	*
Corvidae	<i>Corvus coronoides perplexus</i>	Australian Raven	
Meliphagidae	<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	
Meliphagidae	<i>Anthochaera carunculata</i>	Red Wattlebird	
Meliphagidae	<i>Lichenostomus virescens virescens</i>	Singing Honeyeater	
Meliphagidae	<i>Lichmera indistincta</i>	Brown Honeyeater	
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark	
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler	
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote	
Psittacidae	<i>Barnardius zonarius semitorquatus</i>	Twenty-eight Parrot	
Psittacidae	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	*
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail	
Rhipiduridae	<i>Rhipidura leucophrys leucophrys</i>	Willie Wagtail	
Mammals			
Leporidae	<i>Oryctolagus cuniculus</i>	European Rabbit	*
Macropodidae	<i>Macropus fuliginosus</i>	Western Grey Kangaroo	

* = introduced species

Conservation significant fauna

Desktop searches of the EPBC Act Protected Matters database (DotE 2014a) and DPaW NatureMap records (DPaW 2007–) identified the presence/potential presence of 19 conservation significant flora taxa within 10 km of the project area (Table D.7). In addition to these, the desktop searches identified a number of marine mammal, shark, reptile and bird species. These species have been excluded from this assessment as no marine habitat is present within the project area.

A likelihood of occurrence assessment was conducted for all conservation significant fauna species identified in the desktop assessment (Table D.7). This assessment was based on the species biology, habitat requirements, the quality and availability of suitable habitat and records of the species in the area. The assessment concluded that eight species are considered likely to occur, five species are unlikely to occur and six species are highly unlikely to occur in with project area (Table D.7).

No conservation significant fauna species were recorded during the site visit.

Preliminary Black Cockatoo assessment

The project area contains *Banksia* spp. *Hakea* spp. and other proteaceous species that provide suitable foraging habitat for the conservation significant Black Cockatoo species. There is 0.74 ha of *Banksia* woodland foraging habitat within the project area.

There is no potential breeding habitat or suitable roosting habitat for Black Cockatoos within the project area.

Guiding parameters for fauna likelihood of occurrence assessment

Likelihood of occurrence	Guiding parameters
Present	Species are considered to be present in the project area as they are either: - Definitely recorded within the project area during the current field survey, or - There are very recent reliable records of the species within the project area.
Likely	Species are considered likely to occur in the project area where there is suitable habitat within the project area and / or there are recent records of occurrence of the species in close proximity to the project area (10 km). Species considered likely to occur in the project area also include: - Species that may be wide ranging, migratory and / or rare in the landscape but persist regionally in similar, connected habitat. - Species that may be rare/ dispersed in the landscape but are known to persist in the broader region in similar habitat that is subject to similar threatening processes (such as fire regimes and predation).
Unlikely	Species are considered unlikely to occur in the project area when: - There is limited or no suitable habitat in the project area (i.e. the quality and quantity of the habitat is generally poor or restricted). - The species has not been recorded recently in proximity to the project area. - The species is known to be absent in areas where the habitat condition and threatening processes present in the present area are known to exclude those species. - The project area is isolated from suitable habitat and the species has no capacity to migrate into the project area. - The project area is too small to provide any substantial resources.
Highly unlikely	Species are considered highly unlikely to occur in the project area when they: - Have not previously been recorded in proximity to the project area. - Exclusively utilise habitat that is not present within, or in proximity to the project area. - Have declined considerably or become locally extinct, or are not known to have ever been present in the region.

Table D.7 Fauna likelihood of occurrence assessment

Species Name	Common name	Status		Search		Description & habitat requirements	Likelihood of occurrence
		WC Act/ DPaW	EPBC Act	Nature Map	EPBC PMST		
Birds							
<i>Calyptrorhynchus baudinii</i>	Baudin's Black Cockatoo	T	V	X		Baudin's Black Cockatoo occurs in high-rainfall areas, usually at sites that are heavily forested and dominated by Marri (<i>Corymbia calophylla</i>) and Eucalyptus species, especially Karri (<i>E. diversicolor</i>) and Jarrah (<i>E. marginata</i>). The species also occurs in woodlands of Wandoo (<i>E. wandoo</i>), Blackbutt (<i>E. patens</i>), Flooded Gum (<i>E. rudis</i>), and Yate (<i>E. cornuta</i>). Baudin's Black Cockatoo breeds in the Jarrah, Marri and Karri forests of the deep south-west in areas averaging more than 750 mm of rainfall annually. Preferred roosts are in areas with a dense canopy close to permanent sources of water, that provide the birds with protection from weather conditions (DSEWPaC 2012).	Likely: There is suitable <i>Banksia</i> woodland foraging habitat within the project area and there are recent records of the species in close proximity (approximately 6 km south in Currambine).
<i>Calyptrorhynchus latirostris</i>	Carnaby's Black Cockatoo	T	E	X	X	This species mainly occurs in uncleared or remnant native eucalypt woodlands and in shrubland or kwongan heathland dominated by Hakea, Dryandra, Banksia and Grevillea species. The species also occurs in forests containing Marri (<i>Corymbia calophylla</i>), Jarrah (<i>Eucalyptus marginata</i>) or Karri (<i>E. diversicolor</i>). Breeding usually occurs in the Wheatbelt region of Western Australia, with flocks moving to the higher rainfall coastal areas to forage after the breeding season. Feeds on the seeds of a variety of native plants, including Allocasuarina, Banksia, Dryandra, Eucalyptus, Grevillea and Hakea, and some introduced plants (DSEWPaC 2012).	Likely: There is suitable <i>Banksia</i> woodland foraging habitat within the project area and there are recent records of the species in very close proximity (along Hester Ave).

Species Name	Common name	Status		Search		Description & habitat requirements	Likelihood of occurrence
		WC Act/ DPaW	EPBC Act	Nature Map	EPBC PMST		
<i>Falco peregrinus macropus</i>	Peregrine Falcon	S		X		The Peregrine Falcon is seen occasionally anywhere in the south-west of Western Australia. It is found everywhere from woodlands to open grasslands and coastal cliffs - though less frequently in desert regions. The species nests primarily on ledges of cliffs, shallow tree hollows, and ledges of building in cities. (Morcombe, 2004).	Unlikely: There is suitable hunting habitat for Peregrine Falcon within the project area, however it is likely to be too small to provide any substantial resources for the species. There is no suitable breeding habitat for the species within the project area.
<i>Leipoa ocellata</i>	Malleefowl	T	V		X	Shrublands and low woodlands that are dominated by mallee vegetation, as well as native pine <i>Callitris</i> woodlands, <i>Acacia</i> shrublands, Broombush <i>Melaleuca uncinata</i> vegetation or coastal heathlands (Nevill 2008). This species formally occurred on the northern Swan Coastal Plain at Beermullah (Johnstone and Storr 1998). This population died out in early this century (Johnstone and Storr 1998).	Highly unlikely: The Malleefowl has never been recorded on the Swan Coastal Plain
<i>Malurus leucopterus subsp. edouardi</i>	Barrow Is. White-winged Fairy-wren	T	V	X		The Barrow Island sub-species of the White-winged Fairy-wren is only found on Barrow Island, where it occurs in grasslands and low shrublands. These habitats consist of a dense ground cover comprised of species of <i>Triodia</i> (such as <i>T. wiseana</i> and <i>T. angusta</i>), usually more than 400 mm in height, with patches of bare ground, and often with scattered clumps of shrubs (DotE 2014c).	Highly unlikely: This sub-species of the White-winged Fairy-wren is only found on Barrow Island.
Migratory birds							

Species Name	Common name	Status		Search		Description & habitat requirements	Likelihood of occurrence
		WC Act/ DPaW	EPBC Act	Nature Map	EPBC PMST		
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	IA	Mi	X	X	The White-bellied Sea-Eagle occurs in coastal habitats (especially those close to the sea-shore as well as any habitat characterized by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). It also occurs in the vicinity of estuaries, mangroves, swamps, lagoons and floodplains, often far inland along major rivers (Morcombe, 2004).	Unlikely: There is no suitable habitat for the White-bellied Sea-Eagle within the project area.
<i>Merops ornatus</i>	Rainbow Bee-eater	IA	Mi	X	X	Open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. It also inhabits sand dune systems in coastal areas and at inland sites that are in close proximity to water (Morcombe, 2004).	Likely: The Rainbow Bee-eater has been recorded in very close proximity to the project area and there is suitable sand dune habitat present. The species may utilise the project area for foraging.
Mammals							
<i>Bettongia penicillata ogilbyi</i>	Woylie	T	En	X		The preferred habitat of the Woylie includes dense undergrowth, logs and rock-cavities and occasionally in burrows (Burbidge 2004). Scattered Woylie populations may be found throughout the Jarrah forest in the south-west corner of Western Australia. Extant naturally occurring populations are restricted to three small wheatbelt reserves in WA – Dryandra Woodland, Tutanning Nature Reserve and Perup Forest. All are characterised by the presence of thickets of the plant <i>Gastrolobium</i> (Van Dyck and Strahan 2008).	Highly unlikely: The Woylie has experienced considerable population decline in the wild, and only naturally occurs in three wheatbelt reserves in Western Australia.

Species Name	Common name	Status		Search		Description & habitat requirements	Likelihood of occurrence
		WC Act/ DPaW	EPBC Act	Nature Map	EPBC PMST		
<i>Dasyurus geoffroii</i>	Chuditch	T	V	X	X	The Chuditch inhabits eucalypt forest (especially Jarrah, <i>Eucalyptus marginata</i>), dry woodland and mallee shrublands. In Jarrah forest, Chuditch populations occur in both moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest. Most diurnal resting sites in sclerophyll forest consist of hollow logs or earth burrows (Van Dyke and Strahan, 2008). The species can travel large distances, has a large home range and is sparsely populated through a large portion of its range.	Unlikely: On the Swan Coastal Plain Chuditch have been recorded in the Byford area and adjoining areas of the Darling Range. The project area provides a very limited area of potential habitat, and therefore the species is considered unlikely to occur.
<i>Isoodon obesulus fusciventer</i>	Quenda, Southern Brown Bandicoot	P5		X		The Quenda prefers dense scrubby, often swampy, vegetation with dense cover up to one metre high. However, it also occurs in woodlands, and may use less ideal habitat where this habitat occurs adjacent to the thicker, more desirable vegetation. The species often feeds in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover (Van Dyck and Strahan, 2008).	Unlikely: There is very limited suitable habitat for the Quenda within the project area, as this species prefers vegetation with dense cover.
<i>Macropus irma</i>	Western Brush Wallaby	P4		X		The Western Brush Wallaby is a grazer found primarily in open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some larger areas of mallee and heathland, and is uncommon in karri forest. This species was once very common in the south-west of Western Australia but has undergone a reduction in range and a significant decline in abundance in its current habitat. (Van Dyke & Strahan, 2008).	Likely: The Western Brush Wallaby is known to occur in close proximity to the project area within Neerabup National Park. This species is wide ranging, and given the project area's connectivity to a larger tract of remnant vegetation, is considered likely to occur.

Species Name	Common name	Status		Search		Description & habitat requirements	Likelihood of occurrence
		WC Act/ DPaW	EPBC Act	Nature Map	EPBC PMST		
<i>Petrogale lateralis lateralis</i>	Black-flanked Rock-wallaby	T		X		The Black-flanked Rock-wallaby has undergone a large range restriction. It was once widespread but scattered in the Great Sandy, Little Sandy, Gibson and Great Victoria deserts, the Central Ranges region, Ashburton, North West Cape and the south-west from Kalbarri to the southern Wheatbelt. Their distribution is now greatly reduced, with remnant populations in the Wheatbelt, Cape Range, the southern edge of the Pilbara, Barrow and Salisbury islands and a very small colony in the Calvert Range (Burbidge 2004). The habitat varies between colonies but always involves grassland feeding habitat in close proximity to cliff, rock-pile, talus or escarpment refuge habitat.	Highly unlikely: The project area is outside the currently known distribution for the Black-flanked Rock-wallaby.

Species Name	Common name	Status		Search		Description & habitat requirements	Likelihood of occurrence
		WC Act/ DPaW	EPBC Act	Nature Map	EPBC PMST		
Reptiles							
<i>Morelia spilota imbricata</i>	Carpet Python	S		X		The Carpet Python occurs in a large range of habitats including woodlands, forests and dense coastal scrub, on granite and limestone outcrops and along watercourses. It is often arboreal and preys on birds, other reptiles and small to medium size mammals. The carpet python generally occurs in large, undisturbed bush; and areas, preferring coastal limestone and woodlands on the Swan Coastal Plain (Bush <i>et al.</i> 2010).	Likely: The Carpet Python is known to occur in close proximity to the project area within Neerabup National Park. This species is wide ranging, and given the project area's connectivity to a larger tract of remnant vegetation, is considered likely to occur.
<i>Neelaps calonotos</i>	Black-striped Snake	P3		X		This Black-striped Snake is restricted to the sandy coastal strip near Perth, between Mandurah and Lancelin. It occurs on dunes and sand-plains vegetated with heaths and eucalypt/banksia woodlands. This species is seriously threatened by increasing development within its restricted distribution (Wilson and Swan 2013). How and Shine (1999) suggest the Black-striped Snake and similar fossorial snakes require large areas of continuous habitat for long-term persistence.	Likely: There is suitable <i>Banksia</i> woodland habitat for the Black-striped Snake within the project area and the species is known to occur in close proximity to the project area within Neerabup National Park. Given the project area's connectivity to a larger tract of remnant vegetation, the species is considered likely to occur.
Invertebrates							

Species Name	Common name	Status		Search		Description & habitat requirements	Likelihood of occurrence
		WC Act/ DPaW	EPBC Act	Nature Map	EPBC PMST		
<i>Austrosaga spinifer</i>	Native cricket	P3		X		This species of cricket is an endemic to Australia. There is no habitat description available for this species.	Unlikely: There are two records of this native cricket species in proximity to the project area along Wanneroo Road from 1981 and 1982. Given that these records are not recent, and the project area is small in size, it is considered unlikely to occur.
<i>Hylaeus globuliferus</i>	Native beee	P3		X		This native bee is thought to favour flowers of <i>Adenanthos cygnorum</i> for feeding, but has also been recorded on <i>Banksia attenuata</i> .	Likely: There is suitable <i>Banksia</i> woodland habitat for this native bee in the project area and it has been recorded relatively recently 3 km east (1995-96).
<i>Idiosoma nigrum</i>	Shield-backed Trapdoor Spider	T	V	X		This spider occurs throughout the mid-west, south to Toodyay, Northam and Beverley, extending northwards to Nanga. Nests are usually located in litter within acacia woodland or shrubland, particularly in <i>Acacia acuminata</i> on granitic soils, but also in eucalypt woodlands on heavy soils (Burbidge, 2004).	Highly unlikely: The project area is outside the currently known distribution for the Shield-backed Trapdoor Spider.

Species Name	Common name	Status		Search		Description & habitat requirements	Likelihood of occurrence
		WC Act/ DPaW	EPBC Act	Nature Map	EPBC PMST		
<i>Synemon gratiosa</i>	Graceful Sun Moth	P4		X		The Graceful Sun-moth (GSM) is closely associated with <i>Banksia</i> woodland. The species is also dependent upon <i>Lomandra maritima</i> and <i>L. hermaphrodita</i> being present for breeding.	Likely: There is suitable <i>Banksia</i> woodland habitat for the Graceful Sun Moth within the project area, and the species has been recorded in close proximity.
<i>Westralunio carteri</i>	Carter's Freshwater Mussel	P4		X		This species of mussel is south-west WA's only freshwater mussel. It is known from the Avon, Blackwood and Canning Rivers and is found in ponds, lakes, rivers, streams, and has been collected from a dam in WA. It is tolerant to human disturbance and organic pesticides, but sensitive to salinity levels.	Highly unlikely: There is no suitable habitat for this species within the Study Area.

GHD

GHD House, 239 Adelaide Tce. Perth, WA 6004

P.O. Box 3106, Perth WA 6832

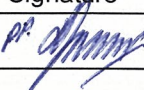
T: 61 8 6222 8222 F: 61 8 6222 8555 E: permail@ghd.com.au

© GHD 2014

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

G:\61\29435\WP\140640.docx

Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	J Reid L Zimmermann	A Napier		D Farrar		06/06/2014

www.ghd.com

