Appendix 2

Environmental Assessment Report

LOT 1 BALDIVIS ROAD, BALDIVIS

ENVIRONMENTAL ASSESSMENT REPORT

Prepared for:	Baldivis Homes Pty Ltd
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pgv ENVIRONMENTAL

CONTENTS

LIST OF ATTACHMENTS

Tables

Plates

Figures

Appendices

1 INTRODUCTION

1.1 Background

Lot 1 Baldivis Road, Baldivis (the site) is located approximately 40km south of the Perth Central Business District (Figure 1). The site is 4.04ha in size and is bound by Baldivis Road to the east, Fifty Road to the north and cleared rural properties to the south and west (Figure 2). Currently the site is zoned 'Urban' under the Metropolitan Region Scheme (MRS) and 'Development' under the City of Rockingham Local Planning Scheme No. 2 (WAPC, 2004).

PGV Environmental was commissioned by Baldivis Property Investments (WA) Pty Ltd to prepare an Environmental Assessment Report to determine the environmental values on the site with respect to the potential impacts of urban development.

1.2 Scope of Works

1.2.1 Environmental Assessment Report

The Environmental Assessment includes a desktop assessment of the key environmental attributes of the site to ascertain the potential environmental limitations to development.

The Environmental Assessment includes the results of a Significant Tree Survey and Black Cockatoo Habitat Assessment outlined below as well as the following:

- Physical characteristics including a description of:
  - Landform;
  - Drainage and water bodies; and
  - Geological, hydrogeological and hydrological characteristics;
- Recent and present land use including:
  - Surrounding land uses; and
  - Assessment of current and historical activities on the subject site and surrounding areas which have the potential to result in contamination issues at the site;
- Database searches including:
  - Department of Water and Environmental Regulation Contaminated Sites and Water Information databases;
  - Department of Biodiversity, Conservation and Attractions (DBCA) Naturemap database;
  - Department of the Environment and Energy (DoEE) Protected Matters Search Tool; and
  - Department of Planning, Lands and Heritage (DPLH) and Heritage databases.
- Description of the Flora and Vegetation on the site;
- Description of fauna habitat values on the site;
- Implications, if any, under Western Australian policies and legislation such as the *Environmental Protection Act 1986* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*;
- Potential future management plans; and

- Other public information available.

1.2.2 Significant Tree Survey

A Significant Tree Survey was undertaken as per Australian Standard 4970 (AS4970). According to AS4970 a significant tree can be one that has a single trunk diameter greater than an agreed size as measured at breast height (dbh) or, for trees with multiple trunks the appropriate formula can be applied to achieve the minimum measurement. The agreed minimum dbh for the trees on the site was 500mm.

The survey recorded the following information for each significant tree:

- Location (hand-held GPS);
- Species;
- Size;
- Structural health;
- Habitat value; and
- Landscape amenity value.

Additionally trees >100mm were mapped during a features survey.

1.2.3 Black Cockatoo Habitat Assessment

An assessment of the Black Cockatoo habitat on the site (foraging, breeding and roosting) was undertaken and included the following:

- Any evidence of foraging such as chewed Banksia cones and Jarrah/Marri/Sheoak nuts; and
- Recording the location of any potential breeding habitat trees with a diameter greater than 500mm at breast height.

The Black Cockatoo Habitat Assessment included:

- A description of the Black Cockatoo habitat on the site;
- An assessment the impact of potential development of the site on Black Cockatoos using the EPBC Act Significant Impact Guidelines 1.1.

2 EXISTING ENVIRONMENT

2.1 Land Use

The site was significantly cleared by 1953 as shown in historical aerial photography (Plate 1) (Landgate, 2018). A shed was constructed on the site in 2003 (Plate 2) and a house was built around 2006 (Landgate, 2018). Land use of the site has not changed since that time.

Plate 1: Aerial Photography from 1953

Plate 2: Aerial Photography from 2006

The site is not listed on the Contaminated Sites database (DWER, 2018). The site is not currently used for grazing but is likely to have been in the past.

2.2 Surrounding Land Use

To the north of the site is the Baldivis Nature Park that includes sporting facilities. The eastern side of Baldivis road is the Baldivis Tramway Reserve and further east is land that is currently being developed as residential. To the west of the site is cleared land that was previously used for an orchard and market gardening and is now unoccupied with no horticultural activity.

The southern boundary of the site adjoins the Baldivis Layertech Services Poultry Farm. The egg layer and hatchery facility has been identified as potentially having odorous impacts on surrounding land if developed as a sensitive land use. An odour buffer study was conducted by the Odour Unit in 2010 (Odour Unit, 2010) using field assessment and dispersion modelling. The resulting buffer impacts on the southern part of Lot 1 Baldivis Road (Plate 3).

Plate 3: Odour buffer to Baldivis Layertech Services Poultry Farm

Source: Odour Unit, 2010

2.3 Topography

The site is flat at 10m Australian Height Datum (AHD) (Figure 2) with some small surface variations.

2.4 Geology and Soils

2.4.1 Geology

The site is mapped as part of the Spearwood System, the second oldest of the three dune systems on the Swan Coastal Plain (Bolland, 1998). The Spearwood System contains sand dunes and plains and consists of aeolian sand and limestone over sedimentary rocks (DPIRD, 2018).

2.4.2 Soils

The soil on the site has been mapped and described as:

- Spearwood 2a Phase (211Sp_2a) which are on lower slopes (1-5%) of dune ridge with moderately deep to deep siliceous yellow-brown sands or pale sands with yellow-brown subsoils and minor limestone outcrops (DPIRD, 2018). The Spearwood 2a Phase is mapped on the western side of the site.
- Spearwood S4a Phase (211Sp_S4a) is located on a flat to gently undulating sandplain. These soils are deep, pale and sometimes bleached, sands with yellow-brown subsoils. This phase is mapped on the eastern part of the site.

2.4.3 Acid Sulphate Soils

Acid sulphate soils (ASS) are wetland soils and unconsolidated sediments that contain iron sulphides which, when exposed to atmospheric oxygen in the presence of water, form sulphuric acid. ASS form in protected low energy environments such as barrier estuaries and coastal lakes and commonly occurs in low-lying coastal lands such as Holocene marine muds and sands. When disturbed, these soils are prone to produce sulphuric acid and mobilise iron, aluminium, manganese and other heavy metals. The release of these reaction products can be detrimental to biota, human health and built infrastructure (WAPC, 2009).

The ASS Risk on the site has been mapped as Moderate to Low (<3m from the surface) (National Map, 2018).

2.5 Hydrology

The top of the superficial groundwater aquifer is approximately 2m AHD, which is 8m below the surface level. The groundwater generally flows to the west (DoW, 2018). There are no surface water features present on the site including no rivers, creek lines or wetlands.

2.6 Vegetation

2.6.1 Vegetation Complex

Native vegetation on the site consists of native trees over a cleared understorey. The vegetation is mapped as being part of the Karrakatta Complex-Central And -South vegetation complex. Vegetation of the Karrakatta Complex – Central and South is described by Heddle *et al.* (1980) as an open forest of Tuart-Jarrah-Marri, with Jarrah and Marri replacing Tuart while progressing eastwards. *Banksia attenuata, B. menziesii, B. grandis* and *Allocasuarina fraseriana* are also common tree species.

2.6.2 Vegetation Types

An assessment of the vegetation on the site was undertaken by PGV Environmental on 6 July 2018. The vegetation is described as an Open Woodland of *Corymbia calophylla* (Marri) and *Eucalyptus marginata* (Jarrah) over weeds. The vegetation is too degraded to determine a Floristic Community Type (FCT). As a result, the vegetation on the site is not representative of a Threatened or Priority Ecological Community (TEC or PEC).

2.6.3 Vegetation Condition

The condition of the vegetation was assessed as Completely Degraded according to the system of Keighery as described in Bush Forever (Government of Western Australia, 2000) (Table 1).

Table 1: Vegetation Condition Rating Scale

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.

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

Source: Government of Western Australia, 2000

2.7 Flora

The site has been parkland cleared for many decades and no native vegetation remains intact. It is highly unlikely that any threatened or priority flora species occur on the site.

2.8 Significant Tree Survey

2.8.1 Trees Recorded on the Site

The significant tree survey recorded 82 trees that had a diameter at breast height greater than 500mm using the AS4970 methodology (Figure 3) (which excludes the two Standing Dead Trees). There were several trees that were just under the 500mm cut-off. The trees were mostly Marri (*Corymbia calophylla*) with some Jarrah (*Eucalyptus marginata*) with one planted Tuart (*Eucalyptus gomphocephala*), one Sheoak (*Allocasuarina fraseriana*) and one Christmas tree (*Nuytsia floribunda*) (Table 2). All of the species are native and endemic to the area (Table 2). Full details of the trees are in Appendix 1.

Table 2: Significant Tree Species on the Site

Species	Common Name	Native/Introduced	Number
Corymbia calophylla	Marri	Native	68
Eucalyptus marginata	Jarrah	Native	11
Eucalyptus gomphocephala	Tuart	Native – Planted	1
Allocasuarina fraseriana	Sheoak	Native	1
Nuytsia floribunda	Christmas Tree	Native	1
Total			82

Additionally, trees with a 100 to 500mm DBH were mapped during a features survey by the project surveyors and are shown on the Tree Retention Plan (Appendix 2). Eighteen trees were recorded on the site between 100 and 500mm DBH.

2.8.2 Tree Characteristics

Condition

The condition of the significant trees on the site overall was not high (Table 3). Most were in Fair to Good condition and some in Poor to Very Poor condition (Appendix 1).

Table 3: Tree Condition on the site

Condition	Number
Good Condition	29
Fair	43
Poor	7
Very Poor	3

Several trees were coppiced and some leaning. There was termite activity observed on the site.

Height

The trees were between 8 and 18m in height (Appendix 1).

Diameter

The calculated Diameter at Breast Height varied between 500mm and 1200mm. There were four trees that had a DBH greater than 1000mm (Appendix 1).

Habitat Values

All the trees would provide some habitat for birds, including Black Cockatoos, and bats. There were no hollows observed. Some smaller birds' nests were observed (Appendix 1).

Landscape Amenity Values

The site contains 72 significant trees in Good to Fair condition and have some amenity value. The remainder are either in poor or very poor condition and have low amenity value.

2.9 Fauna

2.9.1 Desktop Studies

Desktop studies were undertaken to identify conservation significant species potentially present on the site. A search of the Department of Biodiversity, Conservation and Attractions' (DBCA) Naturemap database (Appendix 4) and the EPBC Act Protected Matters Search Tool (Appendix 5) identified 28 threatened species of fauna listed as potentially occurring within a 5km radius of the site (Table 4).

Table 4: List of Fauna Species Identified from Fauna Database Searches

Scientific Name	Common Name	Conservation Status, WA	Status under EPBC Act
Bettongia penicillata ogilbyi	Woylie, Brush-tailed Bettong	Schedule 1 - CR	Endangered
Pseudocheirus occidentalis	Western Ringtail Possum, Ngwayir	Schedule 1 - CR	Critically Endangered
Botaurus poiciloptilus	Australasian bittern	Schedule 2 - EN	Endangered
Calyptorhynchus baudinii	Baudin's Black Cockatoo	Schedule 2 - EN	Endangered

Scientific Name	Common Name	Conservation Status, WA	Status under EPBC Act
Calyptorhynchus latirostris	Carnaby's Black Cockatoo	Schedule 2 - EN	Endangered
Rostratula australis (Rostratula benghalensis australis)	Australian Painted Snipe	Schedule 2 - EN	Endangered Marine/ Migratory
Calyptorhynchus banksii naso	Forest Red-tailed Black-Cockatoo	Schedule 3 - VU	Vulnerable
Dasyurus geoffroii	Chuditch, Western Quoll	Schedule 3 - VU	Vulnerable
Leipoa ocellata	Mallee Fowl	Schedule 3 - VU	Vulnerable
Westralunio carteri	Carter's Freshwater Mussel	Schedule 3 - VU	Vulnerable
Calidris canutus piersmai	Red Knot (New Siberian Islands)	Schedule 3 - VU Schedule 5 - IA	Marine/ Migratory
Calidris ferruginea	Curlew Sandpiper	Schedule 3 - VU Schedule 5 - IA	Critically Endangered
Numenius madagascariensis	Eastern Curlew	Schedule 3 - VU Schedule 5 - IA	Critically Endangered
Actitis hypoleucos (Tringa hypoleucos)	Common Sandpiper	Schedule 5 - IA	Marine/ Migratory
Apus pacificus	Fork-tailed Swift	Schedule 5 - IA	Marine/Migratory
Calidris acuminata	Sharp-tailed Sandpiper	Schedule 5 - IA	Marine/ Migratory
Calidris melanotos	Pectoral Sandpiper	Schedule 5 - IA	Marine/ Migratory
Calidris ruficollis	Red-necked Stint	Schedule 5 - IA	Marine/ Migratory
Calidris subminuta	Long-toed Stint	Schedule 5 - IA	Marine/ Migratory
Charadrius dubius	Little Ringed Plover	Schedule 5 - IA	Marine/ Migratory
Limosa limosa	Black-tailed Godwit	Schedule 5 - IA	Migratory/ Marine
Motacilla cinerea	Grey Wagtail	Schedule 5 - IA	Migratory/ Marine
Pandion cristatus (Pandion haliaetus)	Osprey	Schedule 5 - IA	Marine/ Migratory
Philomachus pugnax	Ruff	Schedule 5 - IA	Marine/ Migratory
Plegadis falcinellus	Glossy Ibis	Schedule 5 - IA	Marine/Migratory
Sterna dougallii	Roseate Tern	Schedule 5 - IA	Marine/ Migratory
Thalasseus bergii (Sterna bergii)	Crested Tern	Schedule 5 - IA	Marine/ Migratory
Tringa glareola	Wood Sandpiper	Schedule 5 - IA	Marine/ Migratory
Tringa nebularia	Common Greenshank	Schedule 5 - IA	Marine/ Migratory
Tringa stagnatilis	Marsh Sandpiper, Little Greenshank	Schedule 5 - IA	Marine/ Migratory
Phascogale tapoatafa wambenger	South-western Brush-tailed Phascogale, Wambenger	Schedule 6 - CD	
Falco peregrinus	Peregrine Falcon	Schedule 7 - OS	Marine/ Migratory
Ardea alba (Ardea modesta)	Great Egret, White Egret		Marine
Ardea ibis	Cattle Egret		Marine
Charadrius ruficapillus	Red-capped Plover		Marine

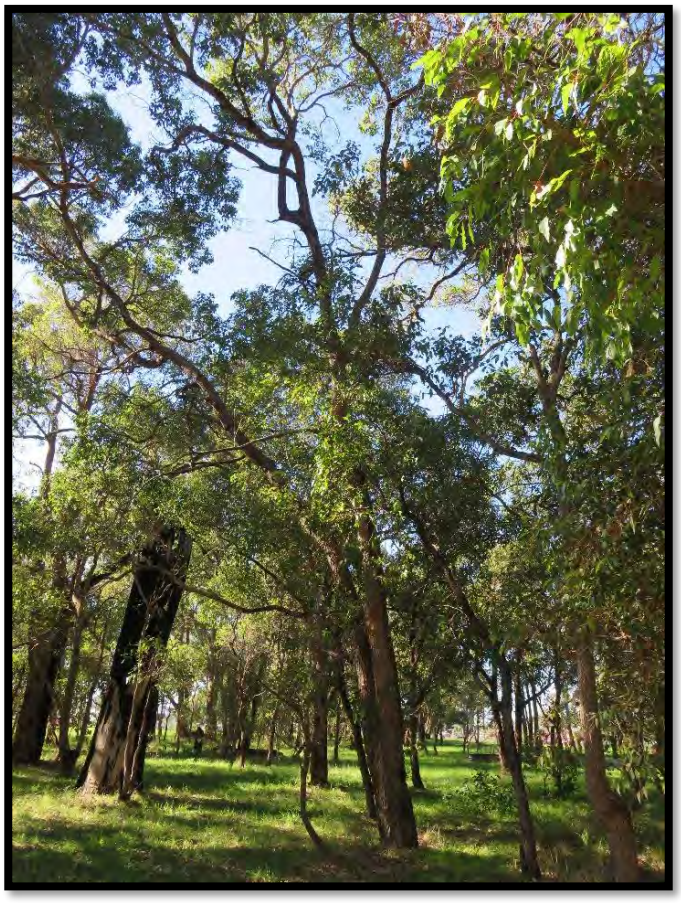
Scientific Name	Common Name	Conservation Status, WA	Status under EPBC Act
Haliaeetus leucogaster	White-bellied Sea-eagle		Marine
Himantopus himantopus	Black-winged Stilt		Marine
Merops ornatus	Rainbow Bee-eater		Marine
Recurvirostra novaehollandiae	Red-necked Avocet		Marine/ Migratory
Neelaps calonotos	Black-striped Snake	Priority 3	
Hydromys chrysogaster	Water-rat, Rakali	Priority 4	
Isoodon obesulus fusciventer	Southern Brown Bandicoot, Quenda	Priority 4	
Oxyura australis	Blue-billed Duck	Priority 4	
Thinornis rubricollis (Charadrius rubricollis)	Hooded Plover	Priority 4	Marine

Fauna are classified under five different Priority codes and rare and endangered fauna are classified under the *Wildlife Conservation (Specially Protected Fauna) Notice 2014* into five schedules of taxa.

2.9.2 Fauna Habitat

The fauna habitat was described on the site assessment visit undertaken on 6 July 2018. The fauna habitat on the site is described as an Open Woodland Habitat (Plate 4).

Plate 4: Open Woodland Habitat



Fauna habitat can be assessed using a number of factors including, the size of the habitat, the level of habitat connectivity, availability of specific resources (e.g. tree hollows) and overall vegetation quality.

The habitat was assessed according to the following categories:

> ***High quality fauna habitat*** *– These areas closely approximate the vegetation mix and quality that would have been in the area prior to any disturbance. The habitat has connectivity with other habitats and is likely to contain the most natural vertebrate fauna assemblage.*
>
> ***Very good fauna habitat*** *- These areas show minimal signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) and generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be minimally effected* [sic] *by disturbance.*
>
> ***Good fauna habitat*** *– These areas showed signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) but generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be affected by disturbance.*
>
> ***Disturbed fauna habitat*** *– These areas showed signs of significant disturbance. Many of the trees, shrubs and undergrowth are cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, contain weeds or have been damaged by vehicle or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas are likely to differ significantly from what might be expected in the area had the disturbance not occurred.*
>
> ***Highly degraded fauna habitat*** *– These areas often have a significant loss of vegetation, an abundance of weeds, and a large number of vehicle tracks or are completely cleared. Limited or no fauna habitat connectivity. Faunal assemblages in these areas are likely to be significantly different to what might have been in the area pre-disturbance.* (Coffey Environments, 2009).

The Open Woodland Habitat has limited habitat value, little connectivity and is Completely Degraded and therefore is considered to be Highly Degraded Fauna Habitat. The habitat provides some value for birds and bats. There was evidence of foraging by several species including Twenty Eights (Australian Ringneck) (*Barnardius zonarius*) (Plate 5).

Plate 5: Evidence of foraging by Twenty Eights

2.9.3 Conservation Significant Species

Outlined below in Table 5 is a short description of each of the species that were identified in the NatureMap Species Report search and the EPBC Protected Matters Search Tool in Table 4. The preferred habitat has been compared to the habitats on the site described above and the likelihood of each species to be present was determined.

Table 5: Likelihood of Conservation Significant Species being Present on the Site

Scientific Name	Common Name	Habitat*	Likelihood to occur on the site
Bettongia penicillata ogilbyi	Woylie, Brush-tailed Bettong	The Woylie habitat types ranged from forest to grassland, coastal and inland. During the day the Woylie shelters under patches of dense undergrowth, logs and rock-cavities and occasionally in burrows.	No – no understorey on the site
Pseudocheirus occidentalis	Western Ringtail Possum, Ngwayir	The Western Ringtail Possum is a medium sized nocturnal marsupial. This species occurs in and near coastal Peppermint Tree (*Agonis flexuosa*) forest and Tuart (*Eucalyptus gomphocephala*) dominated forest with a Peppermint Tree understorey.	No – no preferred habitat on the site
Botaurus poiciloptilus	Australasian bittern	The Australasian Bittern occurs mainly in densely vegetated freshwater wetlands and, rarely, in estuaries or tidal wetlands.	No – no wetlands on the site
Calyptorhynchus baudinii	Baudin's Black Cockatoo	Baudin's Black-Cockatoo mainly occurs in eucalypt forests, especially Jarrah (*E. marginata*), Marri (*Corymbia calophylla*), also Karri (*E. diversicolor*) forest, often feeding in the understorey on proteaceous trees and shrubs, especially banksias (SEWPaC, 2012).	Unlikely to visit – outside of the usual range
Calyptorhynchus latirostris	Carnaby's Black Cockatoo	Carnaby's Cockatoo is found in the south-west of Australia from Kalbarri through to Ravensthorpe. It has a preference for feeding on the seeds of Banksia, Dryandra, Hakea, Eucalyptus, Grevillea, Pinus and Allocasuarina spp. It is nomadic often moving toward the coast after breeding. It breeds in tree hollows that are 2.5 - 12m above the ground and have an entrance 23-30cm with a depth of 1-2.5m. Nesting mostly occurs in smooth-barked trees (e.g. Salmon Gum, Wandoo, Red Morrell) (SEWPaC, 2012)	Likely to visit the site intermittently
Rostratula australis (Rostratula benghalensis australis)	Australian Painted Snipe	The Australian Painted Snipe has been recorded at wetlands in all states of Australia but is most common in eastern Australia. It generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. It also uses inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include a cover of vegetation, including grasses.	No – no wetlands on the site

Scientific Name	Common Name	Habitat*	Likelihood to occur on the site
Calyptorhynchus banksii naso	Forest Red-tailed Black-Cockatoo	Forest Red-tailed Black Cockatoos frequent the humid to sub-humid south-west of Western Australia from Gingin in the north, to Albany in the south and west to Cape Leeuwin and Bunbury (SEWPaC, 2012). It nests in tree hollows with a depth of 1-5m, that are predominately Marri (Corymbia calophylla), Jarrah (Eucalyptus marginata) and Karri (E. diversicolor) and it feeds primarily on the seeds of Marri.	Likely to visit the site intermittently
Dasyurus geoffroii	Chuditch, Western Quoll	The Chuditch have been known to occupy a wide range of habitats including woodlands, dry sclerophyll forests, riparian vegetation, beaches and deserts. They are opportunistic feeders, and forage on the ground at night, feeding on invertebrates, small mammals, birds and reptiles.	Highly Unlikely – the site is too disturbed
Leipoa ocellata	Mallee Fowl	Mallee fowl have been found in mallee regions of southern Australia from approximately the 26th parallel of latitude southwards in mallee bushland.	No – no mallee habitat on the site
Westralunio carteri	Carter's Freshwater Mussel	Carter's Feshwater Mussel is South-West Western Australia's only freshwater mussel (Murdoch University & SERCUL, 2012). Carter's Freshwater Mussel occurs in freshwater streams, rivers, reservoirs and lakes (ICUN, 2015b) and is intolerant to dehydration for more than three days and salinity (Murdoch University & SERCUL, 2012).	No – no wetlands on the site
Calidris canutus piersmai	Red Knot (New Siberian Islands)	In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs.	No – not coastal habitat
Calidris ferruginea	Curlew Sandpiper	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms.	No – not coastal habitat
Numenius madagascariensis	Eastern Curlew	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets.	No – not coastal habitat

Scientific Name	Common Name	Habitat*	Likelihood to occur on the site
Actitis hypoleucos (Tringa hypoleucos)	Common Sandpiper	The Common Sandpiper is mostly found around muddy margins or rocky shores. Generally the species forages in shallow water and on bare soft mud at the edges of wetlands.	No – not coastal habitat
Apus pacificus	Fork-tailed Swift	The Fork-tailed Swift is almost exclusively aerial and is not known to breed in Australia. They are seen in inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. *Apus pacificus* subsp. *pacificus* is the only subspecies to migrate to Australia.	Highly Unlikely to land on the site
Calidris acuminata	Sharp-tailed Sandpiper	The Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	No – no wetland habitat on the site
Calidris melanotos	Pectoral Sandpiper	The Pectoral Sandpiper prefers shallow fresh to saline wetlands and is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	No – no wetland habitat on the site
Calidris ruficollis	Red-necked Stint	The Red-necked Stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores.	No – not coastal habitat
Calidris subminuta	Long-toed Stint	The Long-toed Stint prefers shallow freshwater or brackish wetlands including lakes, swamps, river floodplains, streams, lagoons and sewage ponds. The species is also fond of areas of muddy shoreline, growths of short grass, weeds, sedges, low or floating aquatic vegetation, reeds, rushes and occasionally stunted samphire.	No – no wetland habitat on the site
Charadrius dubius	Little Ringed Plover	The Little-ringed Plover prefers bare or sparsely vegetated sandy and pebbly shores of shallow standing freshwater pools, lakes or slow-flowing rivers (Birdlife Australia, 2014a).	No – no wetland habitat on the site
Limosa limosa	Black-tailed Godwit	The Black-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh.	No – not coastal habitat

Scientific Name	Common Name	Habitat*	Likelihood to occur on the site
Motacilla cinerea	Grey Wagtail	The Grey Wagtail is mostly recorded in coastal areas in Western Australia (ALA, 2015) however is widespread. There is non-breeding habitat only in Australia and the species has a strong association with water, particularly rocky substrates along water courses but also lakes and marshes.	No – not coastal habitat
Pandion cristatus (Pandion haliaetus)	Osprey	Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They feed on fish, especially mullet where available, and rarely take molluscs, crustaceans, insects, reptiles, birds and mammals.	No – no wetland habitat on the site
Philomachus pugnax	Ruff	The Ruff is found on generally fresh, brackish of saline wetlands with exposed mudflats at the edges and is found in terrestrial wetlands including lakes, swamps, pools, lagoons, tidal rivers, swampy fields and floodlands.	No – no wetland habitat on the site
Plegadis falcinellus	Glossy Ibis	The Glossy Ibis is the smallest ibis known in Australia. This species preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation but do not breed in South-west Western Australia..	No – no wetland habitat on the site
Sterna dougallii	Roseate Tern	The Roseate Tern is a migratory coastal seabird that feeds by plunge diving. This species breeds in sites surrounded by walls and rocks or in the shelter of vegetation (in temperate regions) (Birdlife International, 2014a).	No – not coastal habitat
Thalasseus bergii (Sterna bergii)	Crested Tern	The Crested Tern occurs in coastal Areas (Birdlife Australia, 2018).	No – not coastal habitat
Tringa glareola	Wood Sandpiper	The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially Melaleuca and River Red Gums Eucalyptus camaldulensis and often with fallen timber.	No – no wetland habitat on the site
Tringa nebularia	Common Greenshank	The Common Greenshank is a wader and does not breed in Australia. This species can be found in many types of wetlands and has the widest distribution of any shorebird in Australia. This species typically feeds on molluscs, crustaceans, insects, and occasionally fish and frogs.	No – no wetland habitat on the site

Scientific Name	Common Name	Habitat*	Likelihood to occur on the site
Tringa stagnatilis	Marsh Sandpiper, Little Greenshank	The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks.	No – no wetland habitat on the site
Phascogale tapoatafa wambenger	South-western Brush-tailed Phascogale, Wambenger	Southern Brush-tailed Phascogales are arboreal marsupials which require tree hollows in suitable woodland or forest and rely on abundant invertebrate prey to sustain populations (Pescott, 2012).	No – no wetland habitat on the site the site has no understorey and is too disturbed
Falco peregrinus	Peregrine Falcon	The Peregrine Falcon is found in a variety of habitats but nests on high cliff ledges or artificial structures. It feeds primarily on small-medium sized birds, but occasionally taking insects, such as moths, cicadas and locusts (Birdlife Australia, 2012).	No – not the preferred habitat
Ardea alba (Ardea modesta)	Great Egret, White Egret	The Eastern Great Egret has been reported in a wide range of wetland habitats and usually frequents shallow waters. This species feeds on fish, insects, crustaceans, molluscs, frogs, lizards, snakes and small birds and mammals.	No – no wetland habitat on the site
Ardea ibis	Cattle Egret	The Cattle Egret occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands with breeding in Western Australia recorded in the far north in Wyndham in colonies in wooded swamps such as mangrove forest. This species forages away from water on low lying grasslands, improved pastures and croplands generally in areas that have livestock eating insects, frog, lizards and small mammals.	No – no wetland habitat on the site
Charadrius ruficapillus	Red-capped Plover	The Red-capped Plover is found in wetlands, especially in arid areas, and prefers saline and brackish waters (Birdlife Australia, 2014b).	No – no wetland habitat on the site
Haliaeetus leucogaster	White-bellied Sea-eagle	The White-bellied Sea-Eagle is found in coastal habitats with large areas of open water, especially those close to the sea-shore. This species feeds opportunistically on a variety of fish, birds, reptiles, mammals and crustaceans, and on carrion and offal.	No – not coastal habitat
Himantopus himantopus	Black-winged Stilt	The Black-winged Stilt is found near coastal lagoons and shallow freshwater or brackish pools with extensive areas of mudflats, salt meadows, saltpans, coastal marshes and swamps (Birdlife International, 2014b).	No – no suitable coastal or wetland habitat

Scientific Name	Common Name	Habitat*	Likelihood to occur on the site
Merops ornatus	Rainbow Bee-eater	Populations of the Rainbow Bee-eater that breed in northern Australia are considered to be resident, and in many northern localities the Rainbow Bee-eater is present throughout the year. The Rainbow Bee-eater nests in a burrow dug in the ground. It is found across the better-watered parts of WA including islands preferring lightly wooded, sandy country near water.	Species may occur intermittently on the site but highly unlikely to breed or rely on the site
Recurvirostra novaehollandiae	Red-necked Avocet	The Red-necked Avocet occurs in wetland areas including bogs, marshes, swamps and Permanent Saline, Brackish or Alkaline Lakes (Birdlife International, 2014c).	No – no wetland habitat on the site
Neelaps calonotos	Black-striped Snake	The Black-striped snake has a limited distribution, inhabiting areas with sandy soils that support heathlands and Banksia/Eucalypt Woodlands (Nevill, 2005) on the Swan Coastal Plain generally in the lower west coast from Lancelin to Mandurah (Storr et al, 1999).	Highly Unlikely due to clearing and disturbance on the site
Hydromys chrysogaster	Water-rat, Rakali	The Water Rat generally prefers wetland habitats characterised by dense, low-lying vegetation (0–30 cm from ground), low-density canopy cover and shallow, narrow water bodies (Speldewinde et al., 2013).	No – no wetland habitat on the site
Isoodon fusciventer	Southern Brown Bandicoot, Quenda	Southern Brown Bandicoots are small grey marsupials that prefer dense scrub (up to one metre high). Their diet includes invertebrates (including earthworms, adult beetles and their larvae), underground fungi, subterranean plant material, and very occasionally, small vertebrates (DEC, 2012).	Unlikely as the site has a cleared understorey and is highly disturbed
Oxyura australis	Blue-billed Duck	The Blue-billed Duck is found on terrestrial wetlands in temperate regions, that are freshwater to saline, and may be natural or artificial. It nests in rushes, sedges, Lignum Muehlenbeckia cunninghamii and paperbark *Melaleuca* (Birdlife International, 2015). The species is almost completely aquatic, and is seldom seen on land. Non-breeding flocks, often with several hundred individuals, congregate on large, deep open freshwater dams and lakes in autumn. The daylight hours are spent alone in small concealed bays within vegetation or communally in large exposed rafts far from the shore (Birds in Backyards, 2015).	No – no wetland habitat on the site

Scientific Name	Common Name	Habitat*	Likelihood to occur on the site
Thinornis rubricollis (Charadrius rubricollis)	Hooded Plover	The Hooded Plover primarily inhabits sandy, ocean beaches, with the highest densities on beaches with large amounts of beach-washed seaweed that are backed by extensive open dunes. In Western Australia the species also inhabits inland and coastal salt lakes (Birdlife International 2014d)	No – not coastal habitat

* Habitat descriptions from DoEE (2016) SPRAT Database unless

Species identified in the database searches as possibly present on the site were:

- Baudin's Black Cockatoo (*Calyptorhynchus baudinii*);
- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*); and
- Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*).

Listed Marine species under the EPBC Act that may intermittently visit the site are:

- Rainbow Bee-eater (*Merops ornatus*).

2.9.4 Pest Fauna

Rabbits (*Oryctolagus cuniculus*) and foxes (*Vulpes vulpes*) are likely to be present in surrounding areas and may visit the site. It is also likely that rats (*Rattus rattus*) and mice (*Mus musculus*) occur on the site.

2.9.5 Biodiversity Value

The EPA's (2002) *Terrestrial Biological Surveys as an Element of Biodiversity Protection Position Statement No. 3* indicated an ecological assessment of a site must consider its biodiversity value at the genetic, species and ecosystem levels; and its ecological functional value at the ecosystem level.

There is likely to be a paucity of native mammals and reptiles present as a result of disturbances on the site, introduced feral species such as foxes and rabbits and increased domestic predators such as cats. The biodiversity value on the site is very low.

2.10 Black Cockatoo Habitat Assessment

2.10.1 Black Cockatoo Species

Three Black Cockatoo species could potentially utilise the trees on the site.

Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) is found in the south-west of Australia from Kalbarri through to Ravensthorpe. It has a preference for feeding on the seeds of *Banksia, Hakea, Eucalyptus, Grevillea, Pinus* and *Allocasuarina* spp. It is nomadic, often moving toward the coast after breeding. It breeds in tree hollows that are 2.5 – 12m above the ground and have an entrance of 23-30cm with a depth of 1-2.5m. Nesting mostly occurs in smooth-barked trees (e.g. Salmon Gum, Wandoo, Red Morrell). Eggs are laid from July to October, with incubation lasting 29 days (DoE, 2014).

The site is within the modelled distribution and breeding range for Carnaby's Black Cockatoo (SEWPaC, 2012). The species has been recorded in the area as shown on the Naturemap Report (Appendix 4).

Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) is most common in the far south-west of Western Australia. It is known to breed from the southern forests north to Collie and east to near Kojonup. Baudin's Black Cockatoo is typically found in vagrant flocks and utilises the taller, more open Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) woodlands where it feeds mainly on Marri seeds and various Proteaceous species (Johnstone and Kirkby, 2011).

The site is on the boundary of the modelled distribution for Baudin's Black Cockatoos (SEWPaC, 2012). The species has not been recorded in the area as shown on the Naturemap Report (Appendix 4).

Forest Red-tailed Black Cockatoos (*Calyptorhynchus banksii naso*) are endemic to the humid to sub-humid south-west of Western Australia (SEWPaC, 2012). The range of Forest Red-tailed Black Cockatoos is bound by Gingin in the north to Mt Helena, Christmas Tree Well, West Dale, North Bannister, Mt Saddleback, Kojonup, Rocky Gully, upper King River and Green Range (east of Albany) (SEWPaC, 2012; DoE, 2014). It nests in tree hollows with a depth of 1-5m, that are predominately Marri, Jarrah and Karri (*E. diversicolor*) and it feeds primarily on the seeds of Marri and Jarrah (Johnstone and Kirkby, 2011).

The site is within the modelled distribution and breeding range for Forest Red-Tailed Black Cockatoos (SEWPaC, 2012). The species has been recorded in the area as shown on the Naturemap Report (Appendix 4) and by PGV Environmental during site reconnaissance visits.

2.10.2 Methodology

PGV Environmental undertook the Black Cockatoo Habitat Assessment in accordance with the *EPBC Act referral guidelines for three threatened Black Cockatoo species: Carnaby's cockatoo (endangered) Calyptorhynchus latirostris Baudin's cockatoo (vulnerable) Calyptorhynchus baudinii Forest red-tailed Black Cockatoo (vulnerable) Calyptorhynchus banksii naso* (SEWPaC, 2012) (Black Cockatoo Referral Guidelines) and the methodology that is outlined in the SPRAT Database for each of the Black Cockatoo species for Black Cockatoo Habitat Assessments.

A site visit was undertaken by PGV Environmental on 6 July 2018. The site was traversed on foot and information on Black Cockatoo foraging, roosting and breeding habitat was assessed.

The quality of the vegetation was determined in the context of foraging habitat for Black Cockatoos. During the site visit a search for feeding signs or feeding debris such as 'chewed' Marri, Banksia, Jarrah and Sheoak nuts was undertaken.

The site was also searched for evidence of roosting including areas of droppings, moulted feathers, feather down or clippings from branches under trees.

Breeding habitat is defined in the Black Cockatoo Referral Guidelines as trees of species known to support breeding within the range of the Black Cockatoo species which either have a suitable nest hollow OR have a diameter at breast height (DBH) greater than 500mm. The Marri and Jarrah trees on the site are potential breeding habitat.

2.10.3 Foraging

There are four native species recorded on the site that are recognised as foraging habitat for Carnaby's Black Cockatoos (Valentine and Stock, 2008; Groom, 2011). These are listed in Table 6. The site contains approximately 1.5ha of tree canopy that constitutes foraging habitat.

Table 6: Foraging Species for Carnaby's Black Cockatoos Recorded on the Site

Species	Common Name
Corymbia calophylla	Marri
Eucalyptus marginata	Jarrah
Allocasuarina fraseriana	Sheoak
Banksia menziesii	Firewood Banksia

There was evidence observed of Black Cockatoos foraging on the site during the site inspection (Plate 6) however this was limited to very small amounts of evidence (single Marri nuts) in two isolated areas. Discussion with the landowner confirm that Black Cockatoos regularly fly over the property but rarely land in the trees to forage.

Plate 6: Foraging evidence by Black Cockatoos on the site

2.10.4 Roosting

The site does not contain a known roosting site for Carnaby's Black Cockatoos and no evidence of the site being utilised as roosting habitat by Black Cockatoos was observed during the site visit. The nearest recorded roosting sites are greater than 5km away (DoP, 2011).

2.10.5 Breeding

Black Cockatoos are known to breed in hollows of large eucalypts. The site is not known as a breeding site for Carnaby's Black Cockatoos (DoP, 2011) and no breeding has been recorded within 5km of the site. No evidence of breeding by Black Cockatoos was observed on the site by PGV Environmental during the site visit. There were not trees with large hollows suitable for breeding by Black Cockatoos.

The Black Cockatoo Referral Guidelines define trees of certain species with a DBH of 500mm or greater as breeding habitat regardless of the presence or not of hollows. The theory behind this definition is the concept that while the trees may not currently contain hollows, they are mature enough that in the next 50 years or so a hollow might form and be of use to Black Cockatoos for the purposes of breeding.

PGV Environmental recorded a total of 69 trees on the site with a trunk diameter greater than 500mm at breast height (Appendix 1) that are species considered to be breeding habitat including 62 Marri, five Jarrah and two Standing Dead Trees. No trees contained hollows large enough for Black Cockatoos to use for breeding.

The details of the potential breeding habitat trees on the site are in Appendix 1 and are shown on Figure 3.

2.10.6 Regional Context

To assist in determining the significance of any impact on Black Cockatoo habitat on the site an assessment of Black Cockatoo habitat within the vicinity of the site was undertaken. Three Bush Forever sites (Table 7) occur within 5km of the site and contain more than 1,000ha of Black Cockatoo habitat (Figure 4).

Table 7: Bush Forever sites within 5km of the site

Bush Forever Site	Area (ha)	Significant Vegetation Complexes within Bush Forever Sites	Potential Foraging and/or Breeding Habitat
Lake Cooloongup, Lake Walyungup and Adjacent Bushland, Hillman to Port Kennedy BF Site 356	Upland 120ha	*Banksia attenuata* and *B. menziesii* Low Woodland; *Eucalyptus gomphocephala*, *E. marginata* and *Banksia attenuata* Open Forest; *Grevillea ves*tita Closed Heath; *Hibbertia hypericoides* Open Low Heath	Foraging and Breeding
Leda and Adjacent Bushland, Leda BF Site 349	850ha of Upland vegetation	*Eucalyptus marginata, E. gomphocephala* and *Allocasuarina fraseriana* Woodland; *Banksia menziesii*, *Eucalyptus marginata* and *Allocasuarina fraseriana* Low Woodland; *Banksia attenuata* and *B. grandis* Low Woodland; *Banksia attenuata* and *B. menziesii* Low Woodland with scattered emergent *Eucalyptus gomphocephala*; *Eucalyptus gomphocephala* Open Forest; *Acacia saligna* Low Open Forest; *Eucalyptus calophylla* Open Forest	Foraging and Breeding
Doghill Road Bushland, Baldivis BF Site 369	58.8ha	*Banksia attenuata, B. menziesii* and *Allocasuarina fraseriana* Low Woodland; Scattered *Eucalyptus marginata* and/or *E. gomphocephala* over *Banksia* species Low Woodland	Foraging and Breeding

The site is also near the Baldivis Tramway Reserve which is 95ha and contains a significant amount of Black Cockatoo Habitat.

2.10.7 Significance of Impact

This significant impact assessment assumes all of the foraging and potential breeding trees on the site would be cleared which may not necessarily occur. Using the worst-case scenario, the clearing would result in 1.5ha of foraging habitat and 69 potential breeding trees being cleared, although 19 may potentially be retained.

The following assessments are for the Carnaby's Black Cockatoo which is listed as Endangered and the Forest Red-tailed Black Cockatoo which is listed as Vulnerable.

Carnaby's Black Cockatoo

The impact on Carnaby's Black Cockatoos from clearing the Black Cockatoo habitat on the site has been assessed against the criteria set out in the Significant Impact Guidelines 1.1 for the impact on an Endangered species and is shown below:

• *Lead to a long-term decrease in the size of a population*

There was no evidence that the site supports breeding or roosting of Carnaby's Black Cockatoos. There are large areas (greater than 1,000ha) of Bush Forever sites within 5km consisting of larger areas of foraging and potential breeding habitat. The site is rarely foraged by Black Cockatoos. Therefore, clearing of the site will not result in this outcome.

• *Reduce the area of occupancy of the species*

Clearing of the site will not result in a reduction of any known breeding and roosting habitat although it will result in a reduction of 1.5ha of foraging habitat. Within 5km of the site, however, there is greater than 1,000ha of foraging habitat located in Bush Forever sites and therefore clearing of the site will not result in this outcome.

• *Fragment an existing population into two or more populations*

Clearing of the site is unlikely to fragment the population of Carnaby's Black Cockatoos in the area into sub-populations due to the Bush Forever sites in the area providing linkages consisting of large areas of Black Cockatoo habitat. Carnaby's Black Cockatoos and Baudin's Black Cockatoos can fly large distances between foraging areas. Clearing of the site will therefore not result in this outcome.

• *Adversely affect habitat critical to the survival of a species*

There was no evidence of breeding or roosting by Carnaby's Black Cockatoos or Baudin's Black Cockatoos on the site. There were no trees that contained potentially suitable hollows/spouts and the approximately 1.5ha of foraging habitat is not considered to be critical to the survival of the species due to the large amount of foraging and potential breeding habitat within 5km of the site, therefore clearing of the site would not result in this outcome.

• *Disrupt the breeding cycle of a population*

The site contained no evidence of breeding and there were no trees that contained potentially suitable hollows/spouts therefore clearing of the site would not result in this outcome.

• *Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

Clearing of the site will not result in this outcome due to the large extent of Black Cockatoo habitat reserved in Bush Forever sites within 5km of the site.

• *Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat*

Clearing of the site will not result in the establishment of an invasive species harmful to Carnaby's Black Cockatoos or Baudin's Black Cockatoos.

• *Introduce disease that may cause the species to decline*

Clearing of the site will not cause disease to be introduced therefore will not result in this outcome.

• *Interfere with the recovery of the species*

The Carnaby's Black Cockatoos that very occasionally utilise the site for foraging have access to greater than 1,000ha of Black Cockatoo habitat within 5km reserved in Bush Forever sites. Therefore, any clearing of habitat on the site would not interfere substantially with the recovery of the species.

The conclusion of this assessment in accordance with the criteria set out in the Significant Impact Guidelines 1.1 is that development on Lot 1 Baldivis Road will not have a significant impact on Carnaby's Black Cockatoos.

Forest Red-tailed Black Cockatoo

The impact on Forest Red-tailed Black Cockatoos from clearing the small area of habitat suitable for this species has been assessed against the criteria set out in the Significant Impact Guidelines 1.1 for the impact on a Vulnerable species and is shown below:

• *Lead to a long-term decrease in the size of an important population of a species*

In the Significant Impact Guidelines 1.1 an important population is defined as "a population that is necessary for a species' long-term survival and recovery" and may be "key source populations either for breeding or dispersal, populations that are necessary for maintaining genetic diversity, and/or populations that are near the limit of the species' range".

There was no evidence of breeding occurring on the site and very little foraging habitat. The surrounding area contains eight larger Bush Forever sites providing large areas of foraging and breeding habitat for Cockatoos that utilise the site. Development of the site would therefore not result in this outcome.

• *Reduce the area of occupancy of an important population*

There was no evidence found of Forest Red-tailed Black Cockatoos breeding or roosting on the site. Clearing of the site will reduce the area of foraging available by a small area of foraging habitat, however foraging on the site is minimal and there is greater than 1,000ha of potential foraging habitat within 5km of the site in Bush Forever sites. Therefore, clearing of the site would not result in this outcome.

• *Fragment an existing important population into two or more populations*

There are large areas of Bush Forever sites within 5km of the site that provide foraging and potential breeding habitat. Forest Red-tailed Black Cockatoos can fly large distances between foraging areas. Therefore, clearing of the site would not result in this outcome.

• *Adversely affect habitat critical to the survival of a species*

There was no evidence that Forest Red-tailed Black Cockatoos breed on the site and there are large areas of foraging habitat within 5km of the site, as Bush Forever sites, therefore the site is not considered critical to the survival of the species.

• *Disrupt the breeding cycle of an important population*

There was no evidence that Forest Red-tailed Black Cockatoos breed on the site and only limited evidence of foraging. There were no trees on the site that contained potentially suitable hollows/spouts, therefore clearing of the site would not result in this outcome.

• *Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*

The large areas of foraging and breeding habitat located in the Bush Forever sites within 5km of the site would prevent the population from declining as a result of clearing of the site.

• *Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*

Clearing the site will not result in invasive species being introduced, therefore would not result in this outcome.

• *Introduce disease that may cause the species to decline*

Clearing the site will not result in disease being introduced, therefore would not result in this outcome.

• *Interfere substantially with the recovery of the species*

The Forest Red-tailed Black Cockatoos that would occasionally utilise the site have access to greater than 1,000ha of Black Cockatoo habitat within 5km reserved in Bush Forever sites. Therefore, clearing the small area of foraging habitat on the site would not interfere substantially with the recovery of the species.

In accordance with the criteria set out in the Significant Impact Guidelines 1.1 the conclusion of this assessment is that development of Lot 1 Baldivis Road, would not have a significant impact on Forest Red-tailed Black Cockatoos.

2.11 Heritage

2.11.1 Aboriginal Heritage

There are no listed Aboriginal Heritage Sites within Lot 1 Baldivis Road and no mapped Heritage Places (Appendix 6)

2.11.2 European Heritage

Heritage sites can be listed under the following lists/registers:

- World Heritage Sites;
- National Heritage Sites;
- Commonwealth Heritage Sites;
- Sites on the register of the National Estate;
- Sites on the Western Australian Heritage Council Register; and
- Sites listed in the City of Rockingham Municipal Heritage Inventory List.

There are no listed Heritage Sites or Interim Heritage Sites on the site (National Map, 2018; Heritage Council of Western Australia, 2018; DoEE, 2018).

3 ENVIRONMENTAL ASSESSMENT

3.1 Proposed Development

The proposed development on the site retains the existing house and main sheds with will be cells of urban development in the remaining area of the lot. The proposed Intersection Design is shown on Figure 3.

3.2 Land Use

The site has been significantly cleared for decades and used for grazing although a large number of native trees remain. The site is not listed as a Contaminated Site. Previous land use is not an impediment to development.

3.3 Surrounding Land Use

The surrounding land use to the West, North and east of the site do not impact on the proposed development. The assessed odour buffer to the Layer and Hatchery facility to the south impacts on the southern part of the site, therefore precluding development of this area for residential purposes while the hatchery is in production. The odour buffer area should remain undeveloped for sensitive land uses until such time as the facility is closed.

3.4 Geology and Soils

The Spearwood Dune geological unit is not constrained for residential development and the soil types are not a constraint to development.

The WAPC *Acid Sulphate Soils Planning Guidelines* (WAPC, 2009) indicate that "*acid sulphate soils are technically manageable in the majority of cases*". ASS Investigation and Management Plans will be required once the detailed design of the road and the areas and depth of disturbance is known in accordance with the *Acid Sulphate Soils Guideline Series: Identification and Investigation of Acid Sulphate Soils and Acidic Landscapes* (DEC, 2009) and *Treatment and Management of Soils and Water in Acid Sulphate Soil Landscapes* (DEC, 2011). As the impact of disturbing ASS is manageable this is not an impediment to the development of the Lot.

An Acid Sulphate Soils Management Plan may be required at subdivision stage if dewatering and excavation have the potential to disturb Acid Sulphate Soils

3.5 Hydrology

Groundwater is generally greater than 5m from the surface and is not an impediment to development.

Stormwater management will be required to be addressed in accordance with *Better Urban Water Management* (WAPC, 2008). A Local Water Management Strategy (LWMS) is required at Local Structure Plan stage and an Urban Water Management Plan (UWMP) will be required at the subdivision stage. There are no surface water features on the site and stormwater should be managed by on-site infiltration.

3.6 Flora and Vegetation

The Flora and Vegetation assessment found the following:

- No Threatened (Declared Rare) or Priority Flora species are likely to occur on the site;
- The vegetation is mapped as being part of the Karrakatta – Central and South vegetation complex, which has 8% reservation however is Completely Degraded and not representative of this complex.;
- The vegetation is described as Open Woodland of *Corymbia calophylla* (Marri) and *Eucalyptus marginata* (Jarrah) over weeds;
- The vegetation is Completely Degraded; and
- The vegetation is not a TEC or PEC.

There are no conservation values of the flora and vegetation that would impact on the development of the site.

3.7 Significant Trees

The significant tree survey undertaken in accordance with AS4970 recorded 82 trees on the site (plus 2 standing dead trees). The total included 29 trees in Good condition, 43 in Fair condition and 10 in Poor or Very Poor condition.

The Tree Retention Plan (Appendix 2) shows 55 significant trees (>500mm DBH) (plus the 2 dead trees) that will be cleared for subdivision and 27 that potentially could be retained in the development.

In addition, the Tree Retention Plan includes 18 trees with a DBH 100-500mm of which 11 will be cleared and seven could potentially be retained (Appendix 2).

Tree retention is subject to engineering works for the lots and roads. Indicative cut and fill levels are shown in Appendix 3 and are likely to lead to less trees being retained than shown as potentially retained in Appendix 2.

The tree retention plan and earthworks plan included in this report are preliminary only for the purpose of informing the Structure Plan. At later stages of planning (ie. subdivision and/or local development plan approval) an updated earthworks plan and tree retention plan are required to be submitted. The updated earthworks plan will include existing and surface contours in the context of the significant tree survey and Tree Retention Plan.

Assessment by an arboriculturist is recommended prior to subdivision design to ensure any trees designated to be retained are not a future liability, given that termite activity was observed on the site and several large trees were leaning. The trees are not prominent in the landscape and therefore are not considered to have a high level of amenity.

3.8 Fauna

The fauna assessment found the following:

- The habitat on the site is an Open Woodland habitat;
- The habitat is considered to be Highly Disturbed Fauna Habitat due to disturbance and lack of connectivity;

- Listed species that have the potential to utilise the site are:
  - Baudin's Black Cockatoo (*Calyptorhynchus baudinii*);
  - Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*); and
  - Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*).
- Listed Marine species under the EPBC Act that may intermittently visit the site the Rainbow Bee-eater (*Merops ornatus*);
- Pest fauna likely to occur on the site are rats and mice with potentially intermittent visits from rabbits and foxes.

The proposed development of Lot 1 Baldivis Road will impact on 4ha of highly disturbed fauna habitat.

3.9 Black Cockatoos

The Black Cockatoo Habitat Assessment found the following:

- The site contains approximately 1.5ha of foraging habitat for Carnaby's and Forest Red-tailed Black Cockatoos;
- There has been no roosting recorded on the site;
- There is no recorded breeding or evidence of breeding on the site;
- There are 69 potential breeding habitat trees (Marri and Jarrah) recorded on the site;
- The Tree Retention Plan shows 50 potential breeding trees being cleared and 19 potential breeding trees potentially retained; and
- There are significant reserves containing more than 1000ha of foraging and potential breeding habitat within 5km of the site in conservation reserves.

According to the EPBC Act Significant Impact Guidelines 1.1 the impact of development is unlikely to be significant due to the small area of foraging habitat to be cleared and the loss of up to 69 potential breeding trees that do not have any hollows. There is abundant Black Cockatoo habitat that will be retained in nearby reserves around the site.

Consideration has been given to incorporating trees in future development of the site to mitigate the clearing of any Black Cockatoo habitat.

3.10 Heritage

There are no listed Heritage Sites on the site and the proposed development of the site is not constrained by heritage.

3.11 Future Management Plans

The site is completely degraded so no further environmental studies should be required to be undertaken on the site.

A Fauna Relocation Management Plan may be required at subdivision stage. If required, the plan would identify fauna species likely to occur on the site and the methodology for their management and potential relocation during clearing.

A tree protection management plan may also be required as a condition of subdivision.

An Acid Sulphate Soils Management Plan may be required at subdivision stage if dewatering and excavation have the potential to disturb Acid Sulphate Soils

4 SUMMARY AND CONCLUSION

4.1 Summary

The Environmental Assessment of Lot 1 Baldivis Road, Baldivis found the following:

- The historical land use is not an impediment to the development on the site;
- Surrounding land use impacts on the southern boundary of the site due to odour effects of the layer and hatching facility on the adjacent property;
- The geology and soils are not a constraint to development with potential Acid Sulphate Soils able to be managed during the development phase. An Acid Sulphate Soils Management Plan may be required at subdivision stage if dewatering and excavation have the potential to disturb Acid Sulphate Soils;
- The hydrology of the site is not an impediment to development with the implementation of appropriate stormwater controls;
- There is no Declared Rare or Priority flora likely to occur on the site and therefore flora is not an impediment to development;
- The vegetation is too degraded to assign a Floristic Community and therefore cannot be a TEC or PEC;
- The site contains 82 trees deemed as significant in accordance with AS4970. The tree retention plan prepared for the preliminary development plan indicates that 55 of the trees will be cleared for lots and roads. There is potential to retain 27 of the significant trees but will require an arboriculture assessment to ensure their suitability;
- There were an additional 18 trees between 100 and 500mm DBH identified in a features survey, seven of which could be retained and 11 that will be cleared;
- An Updated Earthworks Plan and Tree Retention Plan will need to be submitted with the subdivision application;
- A tree retention management plan may be required as a condition of subdivision;
- The site contains 1.5ha of foraging habitat and 69 potential breeding trees for Carnaby's and Forest Red-tailed Black Cockatoos. Most of the foraging habitat and 50 of the potential breeding habitat trees are likely to be cleared in the development. The level of impact is assessed as not significant according to the EPBC Act Significant Impact Guidelines 1.1;
- A Fauna Relocation Management Plan may be required as a condition of subdivision; and
- There are no known heritage sites on the lot and therefore heritage does not impact on the proposed development.

4.2 Conclusion

The proposed development on Lot 1 Baldivis Road, Baldivis is not highly constrained by environmental factors. The clearing of trees for development and is unlikely to have a significant impact on Black Cockatoos according to the EPBC Act Significant Impact Guidelines 1.1.

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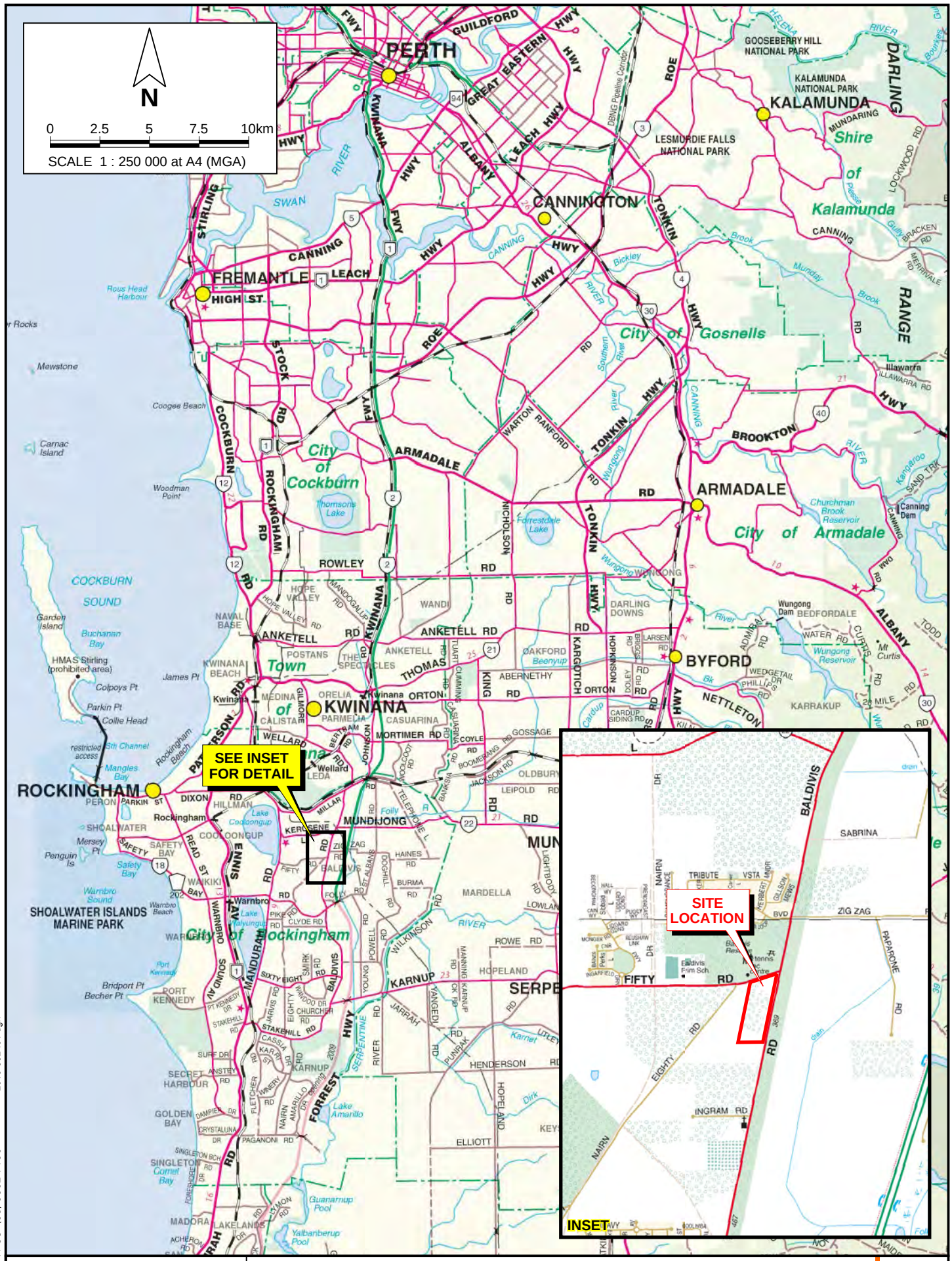
FIGURES



PINPOINT CARTOGRAPHICS (08) 9562 7136 2018-382-f01.dgn

pgv ENVIRONMENTAL

Baldivis Homes Pty Ltd
ENVIRONMENTAL ASSESSMENT REPORT
LOT 1 BALDIVIS ROAD, BALDIVIS

Drawn: J. Cabot	Date: 12 Dec 2018
Job: 10324 Rpt: 2018-382	Revision: A

SITE LOCATION

Figure 1

PINPOINT CARTOGRAPHICS (08) 9562 7136 2018-382-f02.dgn

N

0 10 20 30 40 50m

SCALE 1 : 1 000 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Topographic Contour
- Odour Buffer

389 000mE
389 100mE
6 424 800mN
6 424 700mN
6 424 600mN
6 424 500mN
FIFTY ROAD
EIGHTY ROAD
BALDIVIS ROAD
1376
R 23952
1283
Lot 1
1
2
3
6
7
8
9

CONTOUR SOURCE: DWER, July 2018.
CADASTRAL SOURCE: Landgate, July 2018.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown June 2018.

pgv ENVIRONMENTAL

Baldivis Homes Pty Ltd
ENVIRONMENTAL ASSESSMENT REPORT
LOT 1 BALDIVIS ROAD, BALDIVIS

Drawn: J. Cabot | Date: 12 Dec 2018

Job: 10324 Rpt: 2018-382 | Revision: A

SITE BOUNDARY AND TOPOGRAPHY

Figure 2

PINPOINT CARTOGRAPHICS (08) 9562 7136 2018-382-f03.dgn

N

0 10 20 30 40 50m

SCALE 1 : 1 000 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Proposed Subdivision Boundary
- Proposed Road
- Odour Buffer

Significant Trees

- Marri (*Corymbia calophylla*)
- Jarrah (*Eucalyptus marginata*)
- Christmas Tree (*Nuytsia floribunda*)
- Planted Tuart (*Eucalyptus gomphocephala*)
- Sheoak (*Allocasuarina fraseriana*)
- Standing Dead Tree
- **20** Tree Number

389 000mE
389 100mE
6 424 700mN
6 424 600mN
6 424 500mN
1376
R 23952
FIFTY ROAD
BALDIVIS ROAD
Lot 1
1283
2
3

CADASTRAL SOURCE: Landgate, July 2018.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown June 2018.
SUBDIVISION SOURCE: Development Engineering Consultants, Dwg No. BDVTER8-K04, Rev B, 15-03-19.

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Job: 10324 Rpt: 2018-382 | Revision: A

Baldivis Homes Pty Ltd
ENVIRONMENTAL ASSESSMENT REPORT
LOT 1 BALDIVIS ROAD, BALDIVIS

SIGNIFICANT TREES

Figure 3

N

0 0.5 1 1.5 2km

SCALE 1 : 40 000 at A3 (MGA)

Legend

- Site Boundary
- Bush Forever Site

5km

349 356 360 368 369 372 418 419 495

BUSH FOREVER SOURCE: Department of Planning, 2007.
ROOSTING SITES SOURCE:Department of Planning, January 2011.

PINPOINT CARTOGRAPHICS (08) 9562 7136 2018-382-f04.dgn

pgv ENVIRONMENTAL

Baldivis Homes Pty Ltd
ENVIRONMENTAL ASSESSMENT REPORT
LOT 1 BALDIVIS ROAD, BALDIVIS

Drawn: J. Cabot	Date: 26 Jul 2018
Job: 10324 Rpt: 2018-382	Revision: A

CONTEXT PLAN

Figure 4

APPENDIX 1

Significant Trees

Lot 1 Baldivis Road, Baldivis Tree Data

Tree Number	Species	Easting MGA zn50	Northing MGA zn50	Height (m)	Diameter (mm)						Notes (hollows, bees etc.)	Black Cockatoo Potential
					DBH1	DBH2	DBH3	DBH4	DBH5	Calculated DBH		
1	Marri *(Corymbia calophylla)*	389001	6424635	14	960					960	Fair Condition, no hollows, no foraging evidence	Yes
2	Marri *(Corymbia calophylla)*	389011	6424653	12	570					570	Good Condition, no hollows, no foraging evidence	Yes
3	Marri *(Corymbia calophylla)*	389016	6424656	14	660					660	Good Condition, no hollows, no foraging evidence	Yes
4	Marri *(Corymbia calophylla)*	389019	6424654	14	760					760	Fair Condition, no hollows, no foraging evidence	Yes
5	Jarrah *(Eucalyptus marginata)*	389064	6424656	8	330	250	410			583	Fair Condition, no hollows, no foraging evidence	No
6	Jarrah *(Eucalyptus marginata)*	389066	6424672	10	370	380	320	290		684	Fair Condition, no hollows, no foraging evidence	No
7	Jarrah *(Eucalyptus marginata)*	389082	6424689	12	830					830	Good Condition, no hollows, no foraging evidence	Yes
8	Marri *(Corymbia calophylla)*	388982	6424665	11	520					520	Fair Condition, no hollows, no foraging evidence	Yes
9	Marri *(Corymbia calophylla)*	388978	6424657	14	550					550	Fair Condition, no hollows, no foraging evidence	Yes
10	Marri *(Corymbia calophylla)*	388996	6424645	14	760					760	Good Condition, no hollows, no foraging evidence	Yes
11	Marri *(Corymbia calophylla)*	388988	6424704	15	540	410				678	Good Condition, no hollows, no foraging evidence	Yes
12	Marri *(Corymbia calophylla)*	388986	6424712	14	540	280				608	Good Condition, no hollows, no foraging evidence	Yes
13	Marri *(Corymbia calophylla)*	389008	6424721	15	700					700	Fair Condition, no hollows, no foraging evidence	Yes
14	Marri *(Corymbia calophylla)*	389025	6424706	14	830					830	Fair Condition, leaning, no hollows, no foraging evidence	Yes
15	Marri *(Corymbia calophylla)*	389018	6424734	15	860					860	Poor Condition,hollow at base, no hollows, no foraging evidence	Yes
16	Marri *(Corymbia calophylla)*	389020	6424728	14	540					540	Fair Condition, no hollows, no foraging evidence	Yes
17	Marri *(Corymbia calophylla)*	389007	6424730	15	610					610	Fair Condition, no hollows, no foraging evidence	Yes
18	Jarrah *(Eucalyptus marginata)*	388992	6424741	11	340	280	330	240	420	733	Fair Condition, coppiced, no hollows, no foraging evidence	No
19	Marri *(Corymbia calophylla)*	389014	6424754	16	570	690	610	430		1165	Fair Condition, no hollows, no foraging evidence	Yes

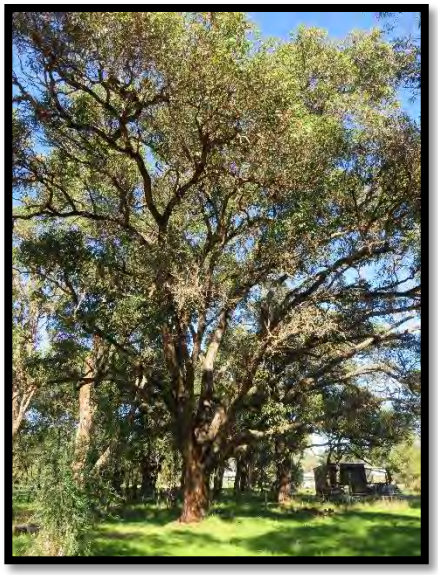
Tree Number	Species	Easting MGA zn50	Northing MGA zn50	Height (m)	Diameter (mm)						Notes (hollows, bees etc.)	Black Cockatoo Potential
					DBH1	DBH2	DBH3	DBH4	DBH5	Calculated DBH		
20	Marri *(Corymbia calophylla)*	389006	6424760	15	530					530	Fair Condition, no hollows, no foraging evidence	Yes
21	Marri *(Corymbia calophylla)*	389014	6424766	14	640					640	Fair Condition, leaning, no hollows, foraging evidence	Yes
22	Jarrah *(Eucalyptus marginata)*	389004	6424772	11	1020					1020	Fair Condition, no hollows, no foraging evidence	Yes
23	Marri *(Corymbia calophylla)*	389011	6424775	15	800					800	Fair Condition, no hollows, no foraging evidence	Yes
24	Marri *(Corymbia calophylla)*	389025	6424777	15	560	670				873	Poor Condition, damage at base, no hollows, no foraging evidence	Yes
25	Marri *(Corymbia calophylla)*	389036	6424788	15	730					730	Poor Condition, damage at base, no hollows, no foraging evidence	Yes
26	Marri *(Corymbia calophylla)*	389024	6424798	14	590					590	Poor Condition, no hollows, no foraging evidence	Yes
27	Marri *(Corymbia calophylla)*	389006	6424779	12	540	620				822	Fair Condition, damage to trunk, no hollows, no foraging evidence	Yes
28	Jarrah *(Eucalyptus marginata)*	388996	6424778	9	260	540	200			632	Fair Condition, coppiced, no hollows, no foraging evidence	Yes
29	Marri *(Corymbia calophylla)*	389004	6424814	14	500					500	Good Condition, no hollows, no foraging evidence	Yes
30	Marri *(Corymbia calophylla)*	389013	6424824	14	570					570	Fair Condition, leaning, no hollows, no foraging evidence	Yes
31	Marri *(Corymbia calophylla)*	389009	6424826	16	520					520	Fair Condition, no hollows, no foraging evidence	Yes
32	Marri *(Corymbia calophylla)*	389006	6424826	15	790					790	Fair Condition, leaning, no hollows, no foraging evidence	Yes
33	Marri *(Corymbia calophylla)*	389026	6424825	15	510	360				624	Good Condition, no hollows, no foraging evidence	Yes
34	Marri *(Corymbia calophylla)*	389025	6424833	16	590					590	Fair Condition, no hollows, no foraging evidence	Yes
35	Marri *(Corymbia calophylla)*	389039	6424825	15	870					870	Fair Condition, no hollows, no foraging evidence	Yes
36	Marri *(Corymbia calophylla)*	389034	6424818	15	750					750	Good Condition, no hollows, no foraging evidence	Yes
37	Marri *(Corymbia calophylla)*	389040	6424814	14	710					710	Good Condition, no hollows, no foraging evidence	Yes
38	Marri *(Corymbia calophylla)*	389030	6424806	16	620					620	Fair Condition, no hollows, no foraging evidence	Yes
39	Marri *(Corymbia calophylla)*	389062	6424829	14	300	300	240	570	390	845	Fair Condition, no hollows, no foraging evidence	Yes
40	Marri *(Corymbia calophylla)*	389053	6424831	15	550					550	Poor Condition, no hollows, no foraging evidence	Yes

Tree Number	Species	Easting MGA zn50	Northing MGA zn50	Height (m)	Diameter (mm)						Notes (hollows, bees etc.)	Black Cockatoo Potential
					DBH1	DBH2	DBH3	DBH4	DBH5	Calculated DBH		
41	Marri *(Corymbia calophylla)*	389053	6424837	12	340	600				690	Very Poor Condition, no hollows, no foraging evidence	Yes
42	Marri *(Corymbia calophylla)*	389054	6424791	14	850					850	Fair Condition, no hollows, no foraging evidence	Yes
43	Marri *(Corymbia calophylla)*	389041	6424787	16	670					670	Fair Condition, branch recently split off, no hollows, no foraging evidence	Yes
44	Marri *(Corymbia calophylla)*	389054	6424772	18	810					810	Fair Condition, no hollows, no foraging evidence	Yes
45	Marri *(Corymbia calophylla)*	389058	6424770	16	780					780	Fair Condition, no hollows, no foraging evidence	Yes
46	Marri *(Corymbia calophylla)*	389058	6424773	14	480	400				625	Fair Condition, no hollows, no foraging evidence	No
47	Marri *(Corymbia calophylla)*	389080	6424779	17	980					980	Good Condition, no hollows, no foraging evidence	Yes
48	Marri *(Corymbia calophylla)*	389087	6424764	14	830					830	Fair Condition, no hollows, no foraging evidence	Yes
49	Marri *(Corymbia calophylla)*	389092	6424764	14	850					850	Fair Condition, leaning, no hollows, no foraging evidence	Yes
50	Christmas Tree *(Nuytsia floribunda)*	389103	6424748	8	640	420				766	Poor Condition, surrounded by wire, no hollows, no foraging evidence	No
51	Marri *(Corymbia calophylla)*	389090	6424770	14	1040					1040	Fair Condition, no hollows, no foraging evidence	Yes
52	Marri *(Corymbia calophylla)*	389072	6424731	14	730					730	Very Poor Condition, no hollows, foraging evidence nearby	Yes
53	Marri *(Corymbia calophylla)*	389066	6424724	14	580	590				827	Almost dead - small sprouting at base, no hollows, no foraging evidence	Yes
54	Marri *(Corymbia calophylla)*	389072	6424720	11	430	320	210			576	Fair Condition, no hollows, no foraging evidence	No
55	Planted Tuart *(Eucalyptus gomphocephala)*	389088	6424710	8	330	470				574	Good Condition, no hollows, no foraging evidence	No
56	Marri *(Corymbia calophylla)*	388981	6424627	12	610					610	Good Condition, no hollows, no foraging evidence	Yes
57	Marri *(Corymbia calophylla)*	388978	6424609	12	520	470				701	Good Condition, no hollows, no foraging evidence	Yes
58	Marri *(Corymbia calophylla)*	388986	6424613	12	1300					1300	Fair Condition, no hollow, missing main branch, no foraging evidence	Yes
59	Marri *(Corymbia calophylla)*	388994	6424612	12	890					890	Fair Condition, leaning, no hollows, no foraging evidence	Yes
60	Marri *(Corymbia calophylla)*	389012	6424617	11	750					750	Fair Condition, leaning, no hollows, no foraging evidence	Yes
61	Marri *(Corymbia calophylla)*	389013	6424627	10	460	430				630	Fair Condition, leaning, no foraging evidence	No

Tree Number	Species	Easting MGA zn50	Northing MGA zn50	Height (m)	Diameter (mm)						Notes (hollows, bees etc.)	Black Cockatoo Potential
					DBH1	DBH2	DBH3	DBH4	DBH5	Calculated DBH		
62	Marri *(Corymbia calophylla)*	389027	6424637	11	670					670	Poor Condition, Leaning, no hollows, no foraging evidence	Yes
63	Marri *(Corymbia calophylla)*	389050	6424625	12	1230					1230	Good Condition, no hollows, no foraging evidence	Yes
64	Standing Dead Tree	389022	6424612	12	540					540	Good Condition, no hollows, no foraging evidence	Yes
65	Marri *(Corymbia calophylla)*	389017	6424616	14	560					560	Good Condition, slight lean, no hollows, no foraging evidence	Yes
66	Marri *(Corymbia calophylla)*	389000	6424610	12	460	270				533	Good Condition, no hollows, no foraging evidence	No
67	Marri *(Corymbia calophylla)*	389010	6424584	12	530	330				624	Good Condition, no hollows, foraging evidence	Yes
68	Jarrah *(Eucalyptus marginata)*	388964	6424594	11	580	400				705	Good Condition, no hollows, no foraging evidence	Yes
69	Marri *(Corymbia calophylla)*	388973	6424612	12	540	470				716	Fair Condition, no hollows, no foraging evidence	Yes
70	Jarrah *(Eucalyptus marginata)*	388969	6424602	11	320	280	240	290		568	Good Condition, no hollows, no foraging evidence	No
71	Sheoak *(Allocasuarina fraseriana)*	388983	6424565	8	610	500				789	Fair Condition, no foraging evidence	No
72	Jarrah *(Eucalyptus marginata)*	388966	6424544	11	570	310	260	240	310	801	Good Condition, no hollows, no foraging evidence	Yes
73	Standing Dead Tree	388979	6424540	10	840					840	Dead, small hollows	Yes
74	Jarrah *(Eucalyptus marginata)*	388966	6424538	10	350	240	310	150	90	554	Fair Condition, no foraging evidence	No
75	Jarrah *(Eucalyptus marginata)*	389005	6424533	8	380	370				530	Good Condition, no foraging evidence	No
76	Marri *(Corymbia calophylla)*	389051	6424532	10	400	330	220	150	120	595	Good Condition, foraging evidence	No
77	Marri *(Corymbia calophylla)*	389068	6424547	12	530					530	Good Condition, no hollows, no foraging evidence	Yes
78	Marri *(Corymbia calophylla)*	389067	6424547	12	480	200				520	Good Condition, no hollows, no foraging evidence	No
79	Marri *(Corymbia calophylla)*	389069	6424554	10	560	230				605	Very Poor Condition, no hollows, no Foraging evidence	Yes
80	Marri *(Corymbia calophylla)*	389068	6424561	10	600					600	Good Condition, no hollows, no foraging evidence	Yes
81	Marri *(Corymbia calophylla)*	389047	6424581	12	520	200				557	Good Condition, no hollows, no foraging evidence	Yes
82	Marri *(Corymbia calophylla)*	389051	6424581	12	520	310				605	Fair Condition, some leaning, no hollows, no foraging evidence	Yes
83	Marri *(Corymbia calophylla)*	389048	6424582	11	590					590	Fair Condition, leaning over, no hollows, no foraging evidence	Yes
84	Marri *(Corymbia calophylla)*	389040	6424592	11	530	380				652	Good Condition, no hollows, no foraging evidence	Yes

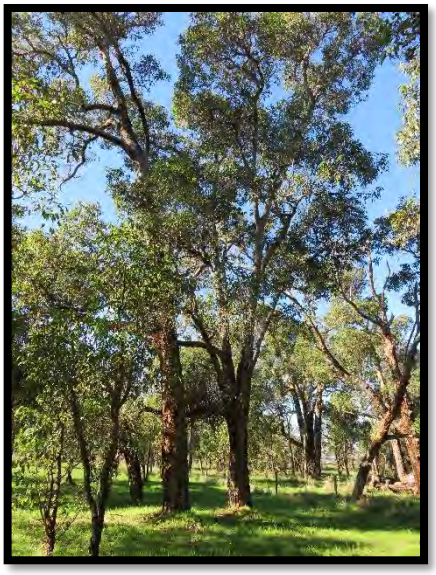
Lot 1 Baldivis Road, Baldivis

Tree 1



Tree 2

Tree 3 (L) and Tree 4 (R)



Tree 5

Tree 6

Tree 7

Tree 8

Tree 9

Tree 10

Lot 1 Baldivis Road, Baldivis

Tree 11

Tree 12

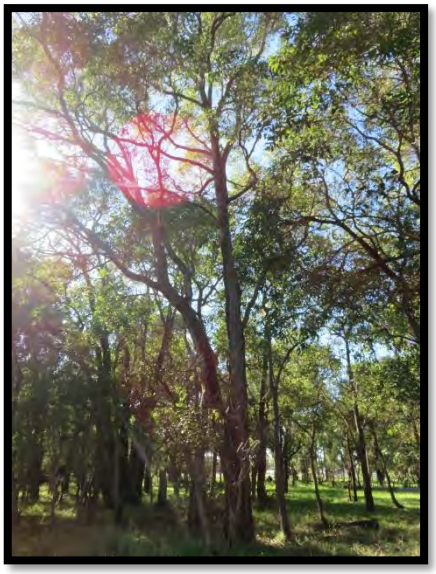
Tree 13

Tree 14

Tree 15

Tree 16

Tree 17



Tree 18

Tree 19

Lot 1 Baldivis Road, Baldivis

Tree 20

Tree 21

Tree 22

Tree 23

Tree 24

Tree 25

Tree 26

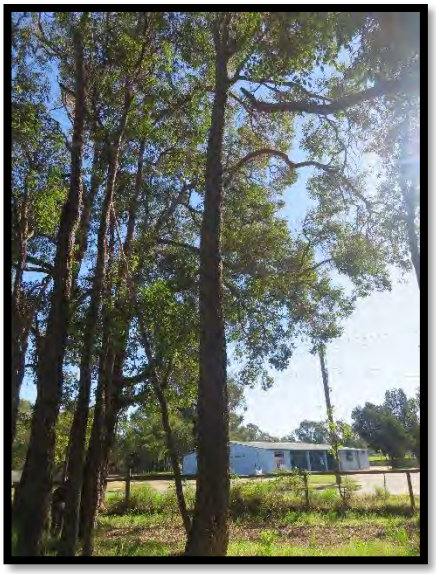
Tree 27

Tree 28

Lot 1 Baldivis Road, Baldivis

Tree 29

Tree 30



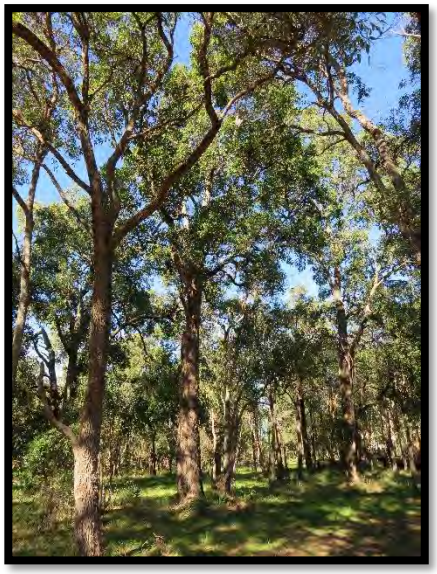
Tree 31 (L) and Tree 32 (R)

Tree 33

Tree 34

Tree 35

Tree 36



Tree 37

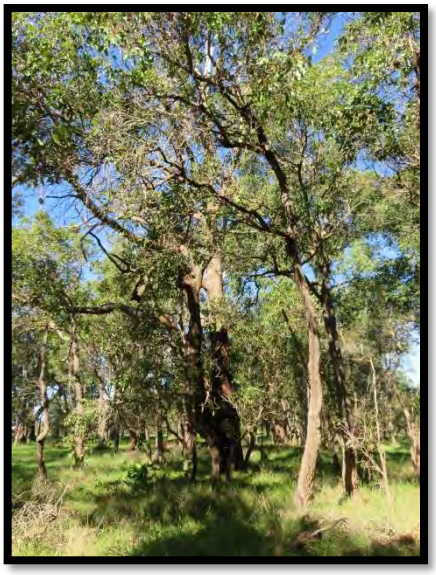
Tree 38

Lot 1 Baldivis Road, Baldivis

Tree 39

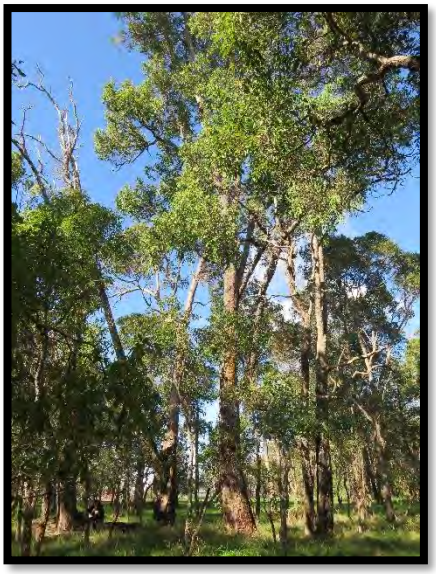
Tree 40 (L) and Tree 41 (R)

Tree 42



Tree 43

Tree 44(R) and Tree 45 (L)



Tree 46

Tree 47

Tree 48

Tree 49

Lot 1 Baldivis Road, Baldivis

Tree 50

Tree 51

Tree 52 (R) and Tree 53 (L)

Tree 54

Tree 55

Tree 56

Tree 57

Tree 58

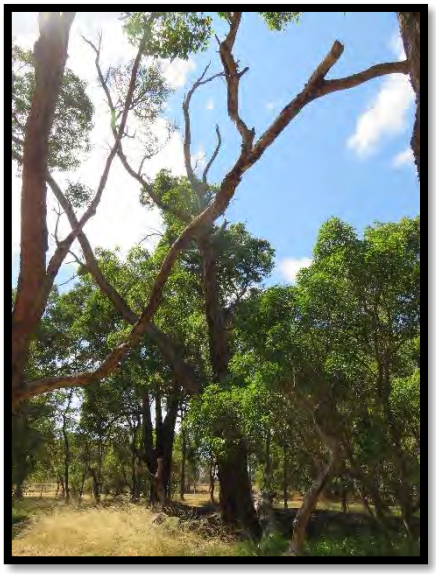
Tree 59

Lot 1 Baldivis Road, Baldivis

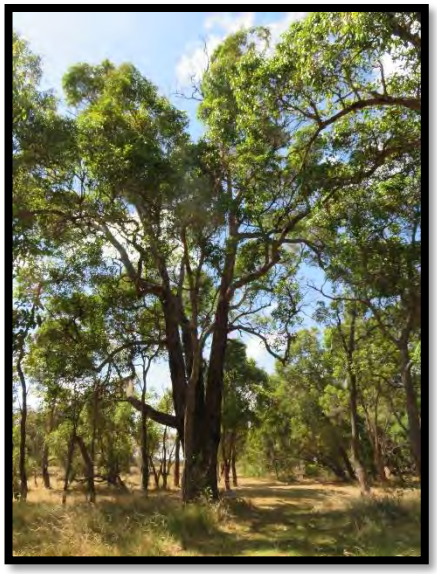
Tree 60

Tree 61

Tree 62



Tree 63



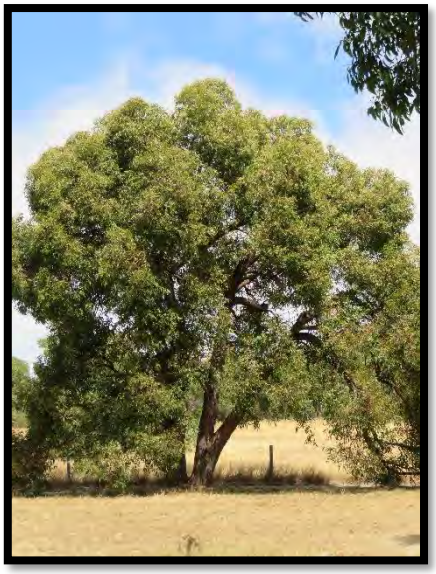
Tree 64

Tree 65

Tree 66

Tree 67

Tree 68



Lot 1 Baldivis Road, Baldivis

Tree 69

Tree 70

Tree 71

Tree 72

Tree 73

Tree 74

Tree 75

Tree 76

Tree 77 (R) and Tree 78 (L)

Lot 1 Baldivis Road, Baldivis

Tree 79

Tree 80

Tree 81 (L), 82 (M) and 83 (R)

Tree 84

APPENDIX 2

Tree Retention Plan (Preliminary)

Tree Retention Plan

Lot 1 Fifty Road, Baldivis

Date: 20 Nov 2019 Scale: 1:1000 @ A3 File: **19-339 ST-5 A** Staff: JP GW Checked: GW

0 10 20m

element.

Level 18, 191 St Georges Terrace, Perth Western Australia 6000.
PO Box 7375 Cloisters Square, Perth Western Australia 6850.
T. +61 8 9289 8300 | **E.** hello@elementwa.com.au **elementwa.com.au**

APPENDIX 3

Earthworks Plan (Preliminary)

EARTHWORKS NOTES:

1. GENERAL
   - 1.1. LEVELS ARE REDUCED FROM A.H.D
   - 1.2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATION
   - 1.3. DESIGN LEVELS SHOWN ON THIS DRAWING ARE THE FINISHED SURFACE LEVELS INCLUDING 100mm TOPSOIL IN LOTS
   - 1.4. WORKS ARE TO BE COMPLETED WITHIN THE DESIGNATED BOUNDARY ONLY AND BATTERED TO E.S.L. REFER SECTION A
2. TOPSOIL
   - 2.1. THE CONTRACTOR SHALL RETAIN ALL TREES WHERE POSSIBLE OR AS DIRECTED BY THE SUPERINTENDENT. CLEAR VEGETATION FROM THE EARTHWORKS AREA AND REMOVE TOPSOIL (100mm MIN.) TO A STOCKPILE
   - 2.2. FOLLOWING THE COMPLETION OF EARTHWORKS THE CONTRACTOR SHALL RESPREAD TOPSOIL OVER THE WORKS AREA
   - 2.3. EXCESS TOPSOIL SHALL BE REMOVED FROM SITE
3. EARTHWORKS
   - 3.1. THE CONTRACTOR SHALL LIMIT THE MOVEMENT OF EQUIPMENT AND MANPOWER TO THE MINIMUM AREA NECESSARY AND PROTECT ALL VEGETATION
   - 3.2. THE CONTRACTOR SHALL CUT AND FILL THE SITE AS SPECIFIED
   - 3.3. FOR DESIGN DETAILS OF EARTHWORKS WITHIN THE ROAD RESERVES REFER TO THE LONGITUDINAL AND CROSS SECTION DRAWINGS
   - 3.4. THE CONTRACTOR SHALL GRADE EVENLY BETWEEN THE DESIGN CONTOURS AND SPOT LEVELS SHOWN
   - 3.5. EXISTING ROAD VERGES ARE TO BE TRIMMED AT 2% FROM TOP OF KERB
4. DUST CONTROL
   - 4.1. THE CONTRACTOR SHALL ALLOW FOR DUST CONTROL MEASURES AS SPECIFIED
5. STABILISATION
   - 5.1. THE COMPLETED LOTS SHALL BE STABILISED WITH SEEDED HYDROMULCH AS SPECIFIED

LEGEND

- EXTENT OF EARTHWORKS
- 4.0 — FINISHED SURFACE CONTOURS (0.25m INTERVALS)
- 6.0 — EXISTING SURFACE CONTOUR (0.2m INTERVALS)
- •27.89 — EXISTING SURFACE SPOT LEVEL
- 24.0 — PROPOSED LOT LEVEL (FLAT LOT)
- (23.80) — PROPOSED AVERAGE LOT LEVEL (SLOPING LOT)
- W — EXISTING WATER
- W — PROPOSED WATER
- T — EXISTING TELSTRA
- B — PROPOSED NBN
- OF — EXISTING OPTIC FIBRE
- OF — PROPOSED OPTIC FIBRE
- G — EXISTING GAS
- G — PROPOSED GAS
- U — EXISTING UNDERGROUND POWER
- U — PROPOSED UNDERGROUND POWER
- S — EXISTING SEWER
- S — PROPOSED SEWER
- IRRIGATION DUCT Ø225mm (U.O.N) (Ø100mm DUCTS INTO LOTS)
- PROPOSED DRAINAGE PIPE
- PROPOSED SUB-SOIL DRAINAGE PIPE
- D — EXISTING DRAINAGE PIPE
- D — FUTURE DRAINAGE PIPE
- (SEP) SIDE ENTRY PIT
- U/S 00.00 — UPSTREAM INVERT LEVEL
- 300/2/200 — PIPE DIA/ CLASS*/ GRADE
- D- 00.0 — PIPE LENGTH
- D/S 00.00 — DOWNSTREAM INVERT LEVEL
- SS INDICATES SUBSOIL DRAINAGE
- * INDICATES BEDDING TO BE TYPE 1 (TYP.)

BALDIVIS ROAD
FIFTY ROAD
22m wide Road Widening
15m wide Road Reserve
12.5m wide Road Reserve
COMMERCIAL
PUBLIC OPEN SPACE
1:500 (A1)

PERTH ONE CALL SYSTEM DIAL 1100 DIAL BEFORE YOU DIG

No.	DATE	BY	REVISION	
B	27/11/19	JEG	UPDATE3D DESIGN	SRA
A	11/12/18	JEG	INITIAL ISSUE	SRA

CLIENT: BALDIVIS HOMES PTY LTD

DEVELOPMENT ENGINEERING CONSULTANTS
SUITE 3, 123A COLIN ST, WEST PERTH, 6005 WESTERN AUSTRALIA
Ph: (08) 9481 1900
Fax: (08) 9481 1700

PROJECT: LOT 1 BALDIVIS ROAD BALDIVIS
W.A.P.C. No. -

DRAWING: EARTHWORKS PLAN
CAD DRAWING DO NOT MANUALLY ALTER

SCALE	DRAWN	CHECK	REV No.
1:500	JEG	SRA	B
DATE	DESIGNED	APPROVED	
DEC' 18	JEG	SRA	

PROJECT NUMBER / DRAWING NUMBER: BDVTER80 K02
S:\TER\BDVTER80\Drawings\BDVTER80 K02.dwg 27/11/2019

APPENDIX 4

Naturemap Report

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 11/07/2018

Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Circle'
Centre	115° 49' 18" E,32° 18' 30" S
Buffer	5km
Group By	Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	407	4807
Other specially protected fauna	2	3
Priority 3	1	2
Priority 4	6	83
Protected under international agreement	10	91
Rare or likely to become extinct	6	153
TOTAL	**432**	**5139**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Rare or likely to become extinct					
1.	24784	*Calidris ferruginea (Curlew Sandpiper)*		T	
2.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black Cockatoo)*		T	
3.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
4.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
5.	24798	*Numenius madagascariensis (Eastern Curlew)*		T	
6.	34113	*Westralunio carteri (Carter's Freshwater Mussel)*		T	
Protected under international agreement					
7.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
8.	25554	*Apus pacificus (Fork-tailed Swift, Pacific Swift)*		IA	
9.	24779	*Calidris acuminata (Sharp-tailed Sandpiper)*		IA	
10.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
11.	24789	*Calidris subminuta (Long-toed Stint)*		IA	
12.	24843	*Plegadis falcinellus (Glossy Ibis)*		IA	
13.	48597	*Thalasseus bergii (Crested Tern)*		IA	
14.	24806	*Tringa glareola (Wood Sandpiper)*		IA	
15.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
16.	24809	*Tringa stagnatilis (Marsh Sandpiper, little greenshank)*		IA	
Other specially protected fauna					
17.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
18.	48070	*Phascogale tapoatafa subsp. wambenger (South-western Brush-tailed Phascogale, Wambenger)*		S	
Priority 3					
19.	25249	*Neelaps calonotos (Black-striped Snake, black-striped burrowing snake)*		P3	
Priority 4					
20.	4763	*Dodonaea hackettiana (Hackett's Hopbush)*		P4	
21.	24215	*Hydromys chrysogaster (Water-rat, Rakali)*		P4	
22.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
23.	48022	*Notamacropus irma (Western Brush Wallaby)*		P4	
24.	24328	*Oxyura australis (Blue-billed Duck)*		P4	
25.	48135	*Thinornis rubricollis (Hooded Plover, Hooded Dotterel)*		P4	
Non-conservation taxon					
26.	15482	*Acacia pulchella var. goadbyi*			
27.	3525	*Acacia rostellifera (Summer-scented Wattle)*			
28.	3527	*Acacia saligna (Orange Wattle, Kudjong)*			
29.	30032	*Acacia saligna subsp. saligna*			
30.	3557	*Acacia stenoptera (Narrow Winged Wattle)*			
31.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
32.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
33.	24262	*Acanthiza inornata (Western Thornbill)*			
34.	1208	*Acanthocarpus preissii*			
35.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
36.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
37.	24281	*Accipiter cirrocephalus subsp. cirrocephalus (Collared Sparrowhawk)*			
38.	25536	*Accipiter fasciatus (Brown Goshawk)*			
39.	24282	*Accipiter fasciatus subsp. fasciatus (Brown Goshawk)*			
40.	42368	*Acritoscincus trilineatus (Western Three-lined Skink)*			
41.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
42.	4582	*Adriana quadripartita (Bitter Bush)*			
43.	184	*Aira caryophyllea (Silvery Hairgrass)*	Y		
44.	1728	*Allocasuarina fraseriana (Sheoak, Kondil)*			
45.		*Allotrochosina karri*			
46.		*Aname mainae*			
47.		*Aname tepperi*			
48.	24312	*Anas gracilis (Grey Teal)*			
49.	24315	*Anas rhynchotis (Australasian Shoveler)*			
50.	24316	*Anas superciliosa (Pacific Black Duck)*			
51.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
52.	44629	*Anilios australis*			
53.		*Anser anser*			
54.	24561	*Anthochaera carunculata (Red Wattlebird)*			
55.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
56.	6211	*Apium prostratum (Sea Celery)*			
57.	12040	*Apium prostratum var. prostratum (Sea Celery)*			
58.	24285	*Aquila audax (Wedge-tailed Eagle)*			
59.	24337	*Ardea garzetta subsp. nigripes (Little Egret)*			
60.	25558	*Ardea ibis (Cattle Egret)*			
61.	41324	*Ardea modesta (great egret, white egret)*			
62.	24340	*Ardea novaehollandiae (White-faced Heron)*			
63.	24341	*Ardea pacifica (White-necked Heron)*			
64.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
65.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
66.	226	*Arundo donax (Giant Reed)*	Y		
67.	7851	*Asteridea pulverulenta (Common Bristle Daisy)*			
68.	17234	*Austrostipa compressa*			
69.	17240	*Austrostipa flavescens*			
70.	231	*Avellinia michelii*	Y		
71.	234	*Avena fatua (Wild Oat)*	Y		
72.	24318	*Aythya australis (Hardhead)*			
73.	1800	*Banksia attenuata (Slender Banksia, Piara)*			
74.	1819	*Banksia grandis (Bull Banksia, Pulgarla)*			
75.	1830	*Banksia littoralis (Swamp Banksia, Pungura)*			
76.	1834	*Banksia menziesii (Firewood Banksia)*			
77.	32077	*Banksia sessilis var. cygnorum*			
78.	32080	*Banksia sessilis var. sessilis*			
79.		*Barnardius zonarius*			
80.	15037	*Bartsia trixago*	Y		
81.	740	*Baumea arthrophylla*			
82.	743	*Baumea juncea (Bare Twigrush)*			
83.	24319	*Biziura lobata (Musk Duck)*			
84.	749	*Bolboschoenus caldwellii (Marsh Club-rush)*			
85.	3710	*Bossiaea eriocarpa (Common Brown Pea)*			
86.	42381	*Brachyurophis semifasciatus (Southern Shovel-nosed Snake)*			
87.	244	*Briza maxima (Blowfly Grass)*	Y		
88.	245	*Briza minor (Shivery Grass)*	Y		
89.	249	*Bromus diandrus (Great Brome)*	Y		
90.	250	*Bromus hordeaceus (Soft Brome)*	Y		
91.	24359	*Burhinus grallarius (Bush Stone-curlew)*			
92.	25715	*Cacatua roseicapilla (Galah)*			
93.	25716	*Cacatua sanguinea (Little Corella)*			
94.	24729	*Cacatua tenuirostris (Eastern Long-billed Corella)*	Y		
95.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
96.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
97.	1276	*Caesia micrantha (Pale Grass Lily)*			
98.	2846	*Calandrinia calyptrata (Pink Purslane)*			
99.	2854	*Calandrinia granulifera (Pygmy Purslane)*			
100.	2856	*Calandrinia liniflora (Parakeelya)*			
101.	96	*Callitris preissii (Rottnest Island Pine, Maro)*			
102.		*Calocera guepinioides*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
103.	5415	*Calothamnus lateralis*			
104.	35816	*Calothamnus quadrifidus subsp. quadrifidus*			
105.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
106.	2957	*Cassytha racemosa (Dodder Laurel)*			
107.	6539	*Centaurium erythraea (Common Centaury)*	Y		
108.	6542	*Centaurium tenuiflorum*	Y		
109.	6214	*Centella asiatica*			
110.	1125	*Centrolepis drummondiana*			
111.	2889	*Cerastium glomeratum (Mouse Ear Chickweed)*	Y		
112.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
113.	1280	*Chamaescilla corymbosa (Blue Squill)*			
114.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
115.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
116.	47909	*Cheramoeca leucosterna (White-backed Swallow)*			
117.	24980	*Christinus marmoratus (Marbled Gecko)*			
118.		*Chroicocephalus novaehollandiae*			
119.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			
120.	24288	*Circus approximans (Swamp Harrier)*			
121.	7937	*Cirsium vulgare (Spear Thistle, Scotch Thistle)*	Y		
122.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
123.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
124.	24399	*Columba livia (Domestic Pigeon)*	Y		
125.	4552	*Comesperma confertum*			
126.	4555	*Comesperma integerrimum*			
127.	6217	*Conium maculatum (Hemlock)*	Y		
128.	6348	*Conostephium pendulum (Pearl Flower)*			
129.	1418	*Conostylis aculeata (Prickly Conostylis)*			
130.	11438	*Conostylis candicans subsp. candicans*			
131.	1436	*Conostylis juncea*			
132.	20074	*Conyza sumatrensis*	Y		
133.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
134.	25592	*Corvus coronoides (Australian Raven)*			
135.	24671	*Coturnix pectoralis (Stubble Quail)*			
136.	25595	*Cracticus tibicen (Australian Magpie)*			
137.	24422	*Cracticus tibicen subsp. dorsalis (White-backed Magpie)*			
138.	25596	*Cracticus torquatus (Grey Butcherbird)*			
139.	3137	*Crassula colorata (Dense Stonecrop)*			
140.	3140	*Crassula glomerata*	Y		
141.	25400	*Crinia insignifera (Squelching Froglet)*			
142.	30893	*Cryptoblepharus buchananii*			
143.	25020	*Cryptoblepharus plagiocephalus*			
144.	25027	*Ctenotus australis*			
145.	25039	*Ctenotus fallens*			
146.	6663	*Cuscuta epithymum (Lesser Dodder, Greater Dodder)*	Y		
147.	24322	*Cygnus atratus (Black Swan)*			
148.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
149.	7454	*Dampiera linearis (Common Dampiera)*			
150.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
151.	1218	*Dasypogon bromeliifolius (Pineapple Bush)*			
152.	3845	*Daviesia triflora*			
153.	1259	*Dianella revoluta (Blueberry Lily)*			
154.	11636	*Dianella revoluta var. divaricata*			
155.	1287	*Dichopogon capillipes*			
156.		*Dingosa serrata*			
157.	7054	*Dischisma arenarium*	Y		
158.	12939	*Diuris magnifica*			
159.	11156	*Drakaea livida*			
160.	3095	*Drosera erythrorhiza (Red Ink Sundew)*			
161.	3106	*Drosera macrantha (Bridal Rainbow)*			
162.	13216	*Drosera menziesii subsp. penicillaris*			
163.	3131	*Drosera stolonifera (Leafy Sundew)*			
164.		*Egretta garzetta*			
165.		*Egretta novaehollandiae*			
166.	347	*Ehrharta calycina (Perennial Veldt Grass)*	Y		
167.	349	*Ehrharta longiflora (Annual Veldt Grass)*	Y		
168.		*Elanus axillaris*			
169.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
170.		*Eolophus roseicapillus*			
171.	24567	*Epthianura albifrons (White-fronted Chat)*			
172.	17175	*Eremophila glabra subsp. albicans*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
173.	15446	*Eryngium pinnatifidum subsp. pinnatifidum*			
174.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
175.	5649	*Eucalyptus foecunda (Narrow-leaved Red Mallee)*			
176.	5659	*Eucalyptus gomphocephala (Tuart, Duart)*			
177.	5708	*Eucalyptus marginata (Jarrah, Djara)*			
178.	5763	*Eucalyptus rudis (Flooded Gum, Kulurda)*			
179.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
180.	24472	*Falco cenchroides subsp. cenchroides (Australian Kestrel, Nankeen Kestrel)*			
181.	25623	*Falco longipennis (Australian Hobby)*			
182.	24041	*Felis catus (Cat)*	Y		
183.		*Fomitopsis lilacinogilva*			
184.	25727	*Fulica atra (Eurasian Coot)*			
185.	24761	*Fulica atra subsp. australis (Eurasian Coot)*			
186.	907	*Gahnia trifida (Coast Saw-sedge)*			
187.	7323	*Galium murale (Small Goosegrass)*	Y		
188.	25729	*Gallinula tenebrosa (Dusky Moorhen)*			
189.	24763	*Gallinula tenebrosa subsp. tenebrosa (Dusky Moorhen)*			
190.	4339	*Geranium molle (Dove's Foot Cranesbill)*	Y		
191.	25530	*Gerygone fusca (Western Gerygone)*			
192.	1520	*Gladiolus caryophyllaceus (Wild Gladiolus)*	Y		
193.	6587	*Gomphocarpus fruticosus (Narrowleaf Cottonbush)*	Y		
194.	3957	*Gompholobium tomentosum (Hairy Yellow Pea)*			
195.	24443	*Grallina cyanoleuca (Magpie-lark)*			
196.	2119	*Grevillea vestita*			
197.	12824	*Grevillea vestita subsp. vestita*			
198.	2175	*Hakea lissocarpha (Honey Bush)*			
199.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*			
200.	24295	*Haliastur sphenurus (Whistling Kite)*			
201.	3961	*Hardenbergia comptoniana (Native Wisteria)*			
202.	25410	*Heleioporus eyrei (Moaning Frog)*			
203.	3016	*Heliophila pusilla*	Y		
204.	6839	*Hemiandra pungens (Snakebush)*			
205.	25119	*Hemiergis quadrilineata*			
206.	5135	*Hibbertia hypericoides (Yellow Buttercups)*			
207.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			
208.	47965	*Hieraaetus morphnoides (Little Eagle)*			
209.	25734	*Himantopus himantopus (Black-winged Stilt)*			
210.	24491	*Hirundo neoxena (Welcome Swallow)*			
211.		*Holconia westralia*			
212.	6222	*Homalosciadium homalocarpum*			
213.	12859	*Hovea trisperma var. trisperma*			
214.	5216	*Hybanthus calycinus (Wild Violet)*			
215.	5218	*Hybanthus debilissimus*			
216.	6224	*Hydrocotyle blepharocarpa*			
217.	43384	*Hydrophis platurus (Yellow-bellied Seasnake)*			
218.	5825	*Hypocalymma robustum (Swan River Myrtle)*			
219.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
220.		*Idiommata blackwalli*			
221.	910	*Isolepis cernua (Nodding Club-rush)*			
222.	20199	*Isolepis cernua var. cernua*			
223.	917	*Isolepis marginata (Coarse Club-rush)*			
224.	7396	*Isotoma hypocrateriformis (Woodbridge Poison)*			
225.	3992	*Isotropis cuneifolia (Granny Bonnets)*			
226.	8092	*Ixiolaena viscosa (Sticky Ixiolaena)*			
227.	20454	*Juncus acutus subsp. acutus*	Y		
228.	1178	*Juncus bufonius (Toad Rush)*	Y		
229.	1185	*Juncus kraussii (Sea Rush)*			
230.	1189	*Juncus pauciflorus (Loose Flower Rush)*			
231.	4044	*Kennedia prostrata (Scarlet Runner)*			
232.	5832	*Kunzea ericifolia (Spearwood, Pondil)*			
233.	1370	*Lachenalia reflexa*	Y		
234.	467	*Lagurus ovatus (Hare's Tail Grass)*	Y		
235.		*Lampona cylindrata*			
236.	28342	*Landoltia punctata (Thin Duckweed)*			
237.	24511	*Larus novaehollandiae subsp. novaehollandiae (Silver Gull)*			
238.	45082	*Lasiopetalum glutinosum subsp. latifolium*			
239.	1309	*Laxmannia squarrosa*			
240.	925	*Lepidosperma angustatum*			
241.	937	*Lepidosperma longitudinale (Pithy Sword-sedge)*			
242.	944	*Lepidosperma scabrum*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
243.		*Lepidosperma sp.*			
244.	46375	*Leptocarpus decipiens*			
245.	25133	*Lerista elegans*			
246.	6374	*Leucopogon conostephioides*			
247.	6427	*Leucopogon parviflorus (Coast Beard-heath)*			
248.	6436	*Leucopogon propinquus*			
249.	7677	*Levenhookia stipitata (Common Stylewort)*			
250.	25005	*Lialis burtonis*			
251.	25661	*Lichmera indistincta (Brown Honeyeater)*			
252.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
253.	4362	*Linum marginale (Wild Flax)*			
254.	25378	*Litoria adelaidensis (Slender Tree Frog)*			
255.	25388	*Litoria moorei (Motorbike Frog)*			
256.	9289	*Lobelia anceps (Angled Lobelia)*			
257.	7408	*Lobelia tenuior (Slender Lobelia)*			
258.	6515	*Logania vaginalis (White Spray)*			
259.	1223	*Lomandra caespitosa (Tufted Mat Rush)*			
260.	1231	*Lomandra maritima*			
261.	1232	*Lomandra micrantha (Small-flower Mat-rush)*			
262.	1234	*Lomandra nigricans*			
263.	1239	*Lomandra preissii*			
264.	1243	*Lomandra sericea (Silky Mat Rush)*			
265.	1246	*Lomandra suaveolens*			
266.	1198	*Luzula meridionalis (Field Woodrush)*			
267.	1097	*Lyginia barbata*			
268.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
269.	85	*Macrozamia riedlei (Zamia, Djiridji)*			
270.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
271.	25654	*Malurus splendens (Splendid Fairy-wren)*			
272.	24583	*Manorina flavigula (Yellow-throated Miner)*			
273.	25758	*Megalurus gramineus (Little Grassbird)*			
274.	13271	*Melaleuca huegelii subsp. huegelii*			
275.	5952	*Melaleuca preissiana (Moonah)*			
276.	5959	*Melaleuca rhaphiophylla (Swamp Paperbark)*			
277.	5978	*Melaleuca teretifolia (Banbar)*			
278.	5980	*Melaleuca thymoides*			
279.	4084	*Melilotus albus*	Y		
280.	25184	*Menetia greyii*			
281.	24598	*Merops ornatus (Rainbow Bee-eater)*			
282.	955	*Mesomelaena pseudostygia*			
283.		*Microcarbo melanoleucos*			
284.	485	*Microlaena stipoides (Weeping Grass)*			
285.	7085	*Misopates orontium (Lesser Snapdragon)*	Y		
286.		*Missulena granulosa*			
287.	4662	*Monotaxis grandiflora (Diamond of the Desert)*			
288.	4666	*Monotaxis occidentalis*			
289.	25191	*Morethia lineoocellata*			
290.	25192	*Morethia obscura*			
291.	48008	*Morus serrator (Australasian Gannet)*			
292.	2412	*Muehlenbeckia adpressa (Climbing Lignum)*			
293.	24223	*Mus musculus (House Mouse)*	Y		
294.	7289	*Myoporum caprarioides (Slender Myoporum)*			
295.	24738	*Neophema elegans (Elegant Parrot)*			
296.	25252	*Notechis scutatus (Tiger Snake)*			
297.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
298.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
299.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
300.	14292	*Oenothera stricta subsp. stricta*	Y		
301.	7348	*Opercularia hispidula (Hispid Stinkweed)*			
302.	18255	*Opercularia vaginata (Dog Weed)*			
303.	1372	*Ornithogalum arabicum (Lesser Cape Lily)*	Y		
304.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
305.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
306.	516	*Parapholis incurva (Coast Barbgrass)*	Y		
307.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
308.	25682	*Pardalotus striatus (Striated Pardalote)*			
309.	7090	*Parentucellia viscosa (Sticky Bartsia)*	Y		
310.	528	*Paspalum distichum (Water Couch)*	Y		
311.	1550	*Patersonia occidentalis (Purple Flag, Koma)*			
312.	4346	*Pelargonium littorale*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
313.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
314.	2273	*Persoonia saccata (Snottygobble)*			
315.	48061	*Petrochelidon nigricans (Tree Martin)*			
316.	48066	*Petroica boodang (Scarlet Robin)*			
317.	24659	*Petroica goodenovii (Red-capped Robin)*			
318.	2299	*Petrophile linearis (Pixie Mops)*			
319.	25697	*Phalacrocorax carbo (Great Cormorant)*			
320.	25698	*Phalacrocorax melanoleucos (Little Pied Cormorant)*			
321.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
322.	25699	*Phalacrocorax varius (Pied Cormorant)*			
323.	551	*Phalaris minor (Lesser Canary Grass)*	Y		
324.	552	*Phalaris paradoxa (Paradoxa Grass)*	Y		
325.	24409	*Phaps chalcoptera (Common Bronzewing)*			
326.		*Phlebia subceracea*			
327.	1478	*Phlebocarya ciliata*			
328.	6734	*Phyla nodiflora var. nodiflora*	Y		
329.	48071	*Phylidonyris niger (White-cheeked Honeyeater)*			
330.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
331.	4675	*Phyllanthus calycinus (False Boronia)*			
332.	6983	*Physalis peruviana (Cape Gooseberry)*	Y		
333.		*Phytophthora cinnamomi*			
334.	5254	*Pimelea leucantha*			
335.	18117	*Pimelea rosea subsp. rosea*			
336.	7303	*Plantago lanceolata (Ribwort Plantain)*	Y		
337.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
338.	24842	*Platalea regia (Royal Spoonbill)*			
339.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
340.	24750	*Platycercus zonarius subsp. semitorquatus (Twenty-eight Parrot)*			
341.		*Pluteus atromarginatus*			
342.	577	*Poa poiformis (Coastal Poa)*			
343.	578	*Poa porphyroclados*			
344.	25704	*Podiceps cristatus (Great Crested Grebe)*			
345.	8175	*Podolepis gracilis (Slender Podolepis)*			
346.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
347.	25722	*Polytelis anthopeplus (Regent Parrot)*			
348.	4691	*Poranthera microphylla (Small Poranthera)*			
349.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
350.	24767	*Porphyrio porphyrio subsp. bellus (Purple Swamphen)*			
351.	24769	*Porzana fluminea (Australian Spotted Crake)*			
352.	25732	*Porzana pusilla (Baillon's Crake)*			
353.	24771	*Porzana tabuensis (Spotless Crake)*			
354.	25511	*Pseudonaja affinis (Dugite)*			
355.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
356.	2751	*Ptilotus polystachyus (Prince of Wales Feather)*			
357.		*Purpureicephalus spurius*			
358.	24245	*Rattus rattus (Black Rat)*	Y		
359.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
360.	48434	*Reticularia lobata*			Y
361.	11341	*Rhagodia baccata subsp. baccata*			
362.	48096	*Rhipidura albiscapa (Grey Fantail)*			
363.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
364.	1556	*Romulea rosea (Guildford Grass)*	Y		
365.	6483	*Samolus junceus*			
366.	6484	*Samolus repens (Creeping Brookweed)*			
367.	7603	*Scaevola canescens (Grey Scaevola)*			
368.	13182	*Scaevola repens var. repens*			
369.	982	*Schoenus clandestinus*			
370.	1004	*Schoenus nitens (Shiny Bog-rush)*			
371.	25878	*Senecio condylus*			
372.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
373.	2909	*Silene gallica (French Catchfly)*	Y		
374.	8225	*Siloxerus humifusus (Procumbent Siloxerus)*			
375.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
376.	30948	*Smicrornis brevirostris (Weebill)*			
377.	7022	*Solanum nigrum (Black Berry Nightshade)*	Y		
378.	9367	*Sonchus hydrophilus (Native Sowthistle)*			
379.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
380.	1312	*Sowerbaea laxiflora (Purple Tassels)*			
381.	635	*Sporobolus virginicus (Marine Couch)*			
382.	4828	*Spyridium globulosum (Basket Bush)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
383.	2918	*Stellaria media (Chickweed)*	Y		
384.	25643	*Sterna hybrida (Whiskered Tern)*			
385.	2316	*Stirlingia latifolia (Blueboy)*			
386.	25597	*Strepera versicolor (Grey Currawong)*			
387.	25589	*Streptopelia chinensis (Spotted Turtle-Dove)*	Y		
388.	30951	*Streptopelia chinensis subsp. tigrina (Spotted Turtle-Dove)*	Y		
389.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
390.	7693	*Stylidium brunonianum (Pink Fountain Triggerplant)*			
391.	7774	*Stylidium piliferum (Common Butterfly Triggerplant)*			
392.	2326	*Synaphea polymorpha (Albany Synaphea, Pinda)*			
393.	2329	*Synaphea spinulosa*			
394.	15532	*Synaphea spinulosa subsp. spinulosa*			
395.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
396.	24682	*Tachybaptus novaehollandiae subsp. novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
397.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
398.	15741	*Tamarix aphylla (Athel Tree)*	Y		
399.		*Tetragnatha demissa*			
400.	5077	*Thomasia cognata*			
401.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
402.	1319	*Thysanotus arenarius*			
403.	1338	*Thysanotus manglesianus (Fringed Lily)*			
404.	1339	*Thysanotus multiflorus (Many-flowered Fringe Lily)*			
405.	25203	*Tiliqua occipitalis (Western Bluetongue)*			
406.	25519	*Tiliqua rugosa*			
407.	25207	*Tiliqua rugosa subsp. rugosa*			
408.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
409.	6266	*Trachymene coerulea (Blue Lace Flower)*			
410.	6280	*Trachymene pilosa (Native Parsnip)*			
411.	4383	*Tribulus terrestris (Caltrop)*	Y		
412.	39097	*Trichia decipiens*			
413.	25723	*Trichoglossus haematodus (Rainbow Lorikeet)*			
414.	25521	*Trichosurus vulpecula (Common Brushtail Possum)*			
415.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
416.	1361	*Tricoryne elatior (Yellow Autumn Lily)*			
417.	4292	*Trifolium campestre (Hop Clover)*	Y		
418.	151	*Triglochin striata*			
419.	99	*Typha orientalis (Bulrush, Cumbungi)*			
420.	24852	*Tyto alba subsp. delicatula (Barn Owl)*			
421.	8255	*Ursinia anthemoides (Ursinia)*	Y		
422.	38388	*Ursinia anthemoides subsp. anthemoides*	Y		
423.	24386	*Vanellus tricolor (Banded Lapwing)*			
424.	24206	*Vespadelus regulus (Southern Forest Bat)*			
425.	722	*Vulpia bromoides (Squirrel Tail Fescue)*	Y		
426.	724	*Vulpia myuros (Rat's Tail Fescue)*	Y		
427.	6658	*Wilsonia backhousei (Narrow-leaf Wilsonia)*			
428.	1256	*Xanthorrhoea preissii (Grass tree, Palga)*			
429.	6289	*Xanthosia huegelii*			
430.	2331	*Xylomelum occidentale (Woody Pear, Djandin)*			
431.	1049	*Zantedeschia aethiopica (Arum Lily)*	Y		
432.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			

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 wholely 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 5

Protected Matters Search Tool Report

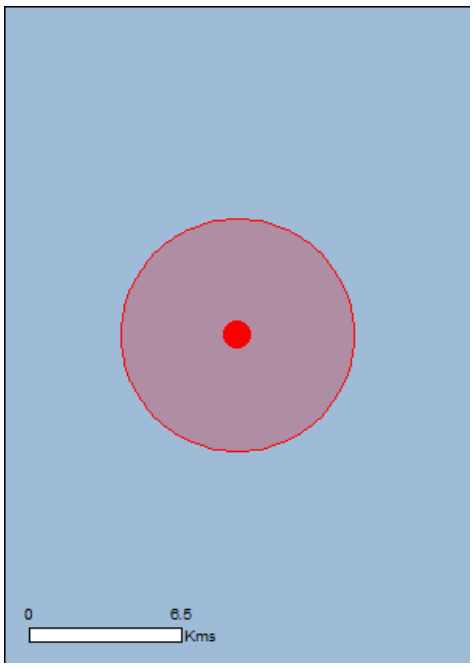
EPBC Act Protected Matters Report

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: 16/07/18 15:16:56



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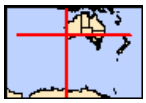

Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	24
Listed Migratory Species:	18

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	27
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	36
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Becher point wetlands	Within 10km of Ramsar
Peel-yalgorup system	20 - 30km upstream

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
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
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		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Species or species habitat likely to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Mammals		

Name	Status	Type of Presence
Bettongia penicillata ogilbyi		
Woylie [66844]	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
Pseudocheirus occidentalis		
Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat likely to occur within area
Other		
Westralunio carteri		
Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area
Plants		
Andersonia gracilis		
Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
Caladenia huegelii		
King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
Diuris micrantha		
Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area
Diuris purdiei		
Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area
Drakaea elastica		
Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat likely to occur within area
Drakaea micrantha		
Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus x balanites		
Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat likely to occur within area
Lepidosperma rostratum		
Beaked Lepidosperma [14152]	Endangered	Species or species habitat likely to occur within area
Synaphea sp. Fairbridge Farm (D. Papenfus 696)		
Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area
Synaphea sp. Serpentine (G.R. Brand 103)		
[86879]	Critically Endangered	Species or species habitat may occur within area
Synaphea stenoloba		
Dwellingup Synaphea [66311]	Endangered	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

Name	Threatened	Type of Presence
Sterna dougallii		
Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis		
Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris subminuta		
Long-toed Stint [861]		Species or species habitat known to occur within area
Charadrius dubius		
Little Ringed Plover [896]		Species or species habitat known to occur within area
Limosa limosa		
Black-tailed Godwit [845]		Species or species habitat known to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat likely to occur within area
Philomachus pugnax		
Ruff (Reeve) [850]		Species or species habitat known to occur within area
Tringa glareola		
Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to 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]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Species or species habitat known to occur within area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area
Charadrius dubius Little Ringed Plover [896]		Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Species or species habitat known to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Himantopus himantopus Black-winged Stilt [870]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Limosa limosa Black-tailed Godwit [845]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Species or species habitat known 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 dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat known to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Species or species habitat known to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Leda	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
Turdus merula Common Blackbird, Eurasian Blackbird [596]		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 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

Name	Status	Type of Presence
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 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
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species 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

Name	Status	Type of Presence
		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

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-32.31116 115.81946

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact Us page.

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APPENDIX 6

Aboriginal Heritage Inquiry System Reports

Aboriginal Heritage Inquiry System

List of Registered Aboriginal Sites

Search Criteria

No Registered Aboriginal Sites in Custom search area - Polygon - 115.820570917172°E, 32.3075931402567°S (GDA94) : 115.822899074596°E, 32.3070127917875°S (GDA94) : 115.822105140728°E, 32.3109935448672°S (GDA94) : 115.819830627484°E, 32.3109572745581°S (GDA94) : 115.820570917172°E, 32.3075931402567°S (GDA94)

Disclaimer

The *Aboriginal Heritage Act 1972* preserves all Aboriginal sites in Western Australia whether or not they are registered. Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you email the details to the Department at heritageenquiries@dplh.wa.gov.au and we will make every effort to rectify it as soon as possible.

South West Settlement ILUA Disclaimer

Your heritage enquiry is on land **within or adjacent to** the following Indigenous Land Use Agreement(s): Gnaala Karla Booja People ILUA.

On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boojarah #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).

The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will 'impact' (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site. The Aboriginal Heritage Due Diligence Guidelines, which are referenced by the NSHA, provide guidance on how to assess the potential risk to Aboriginal heritage.

Likewise, from 8 June 2015 the Department of Mines, Industry Regulation and Safety (DMIRS) in granting Mineral, Petroleum and related Access Authority tenures within the South West Settlement ILUA areas, will place a condition on these tenures requiring a heritage agreement or a NSHA before any rights can be exercised.

If you are a State Government Department, Agency or Instrumentality, or have a heritage condition placed on your mineral or petroleum title by DMIRS, you should seek advice as to the requirement to use the NSHA for your proposed activity. The full ILUA documents, maps of the ILUA areas and the NSHA template can be found at https://www.dpc.wa.gov.au/swnts/South-West-Native-Title-Settlement/Pages/default.aspx.

Further advice can also be sought from the Department of Planning, Lands and Heritage at heritageenquiries@dplh.wa.gov.au.

Copyright

Coordinate Accuracy

Coordinates (Easting/Northing metres) are based on the GDA 94 Datum. Accuracy is shown as a code in brackets following the coordinates.

Department of Planning, Lands and Heritage

GOVERNMENT OF WESTERN AUSTRALIA

Aboriginal Heritage Inquiry System

Map of Registered Aboriginal Sites

For further important information on using this information please see the Department of Planning, Lands and Heritage's Terms of Use statement at http://www.daa.wa.gov.au/Terms-Of-Use/

Legend

- Registered Aboriginal Site
- Search Area
- Town
- Road
- River
- Local Government Authority

0.23 kilometres

Map Scale 1 : 6,920

MGA Zone 50 (GDA94)

Aboriginal Heritage Inquiry System

List of Other Heritage Places

Search Criteria

No Other Heritage Places in Custom search area - Polygon - 115.820570917172°E, 32.3075931402567°S (GDA94) : 115.822899074596°E, 32.3070127917875°S (GDA94) : 115.822105140728°E, 32.3109935448672°S (GDA94) : 115.819830627484°E, 32.3109572745581°S (GDA94) : 115.820570917172°E, 32.3075931402567°S (GDA94)

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Department of Planning, Lands and Heritage

GOVERNMENT OF WESTERN AUSTRALIA

Aboriginal Heritage Inquiry System

Map of Other Heritage Places

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Legend

- Other Heritage Place
- Search Area
- Town
- Road
- River
- Local Government Authority

0.23 kilometres

Map Scale 1 : 6,920

MGA Zone 50 (GDA94)