accendo AUSTRALIA

DESKTOP ENVIRONMENTAL ASSESSMENT REPORT

LOT 9004 EATON DRIVE, EATON

DECEMBER 2018

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EXECUTIVE SUMMARY

Parkridge Group Pty Ltd (the proponent) is proposing to subdivide and develop Lot 9004 Eaton Drive, Eaton (herein referred to as the subject site). The subject site has a combined area of approximately 32 hectares (ha). It is located 2.5 km north of the Eaton town centre and 8 km east-north- east of Bunbury and is situated adjacent to the Collie River.

A Structure Plan (Calibre 2018a) has been prepared for the subject site to enable urban development with residential cells ranging from R25-40 and R40-60, also incorporating areas of Public and Regional Open Space.

This report provides a synthesis of a range of information regarding the environmental attributes and values of the subject site. Where environmental values have been identified, suitable management measures have been proposed. In consideration of these management measures, an assessment of the overall environmental impact of the proposed development has been provided.

The environmental attributes and values identified within the site have been outlined in **Section 4** and include:

- Surface elevations range from 10.50 m AHD in the south-eastern corner to 1.30 m AHD along the northern boundary within the Collie River floodplain.
- The subject site has been classified as having a 'moderate to low risk' of ASS occurring within three metres of the natural soil surface.
- The subject area sits within the Leschenault Estuary Catchment and as such is covered by the Leschenault Estuary WQIP.
- The majority of vegetation has been cleared as a result of the historical and current land use (livestock grazing).
- The subject site is mapped as containing a portion of a CC wetland. As identified within the *Wetland Buffer Determination* study (Bioscience 2012) for the subject site, this mapping appears to be incorrect as a site analysis revealed that the wetland function area associated with the CC wetland does not extend into the subject site. Furthermore, an examination of this specific area during the fauna assessment (Harewood 2018) revealed it to be comprised of only two native species (*Eucalyptus rudis* and *Melaleuca rhaphiophylla*) over introduced pasture grasses, which is not consistent with the definition of a CC wetland.
- As a result of the fauna assessment it was determined that the fauna habitat values at the subject site have been severely compromised by the removal of most of the original native vegetation and the degradation of the main remnant patches.
- There is no evidence of WRPs utilising vegetation with the subject site as habitat and overall, habitat quality in areas to be developed are low/very low.
- Some areas of vegetation represent black cockatoo habitat, but the degree of use appears to be low with no breeding or roosting activity detected and only a very limited amount of foraging habitat being present.
- There exist no major constraints relating to fauna, and in particular fauna of conservation significance with respect to the proposed development.

In consideration of the abovementioned key environmental features, the following management measures have been proposed to minimise potential impacts associated with the subdivision of the subject site:

- Prepare and implement an ASS and Dewatering Management Plan if necessary.
- Implement the approved LWMS during subdivision works.

Based on this assessment, Accendo considers that there are no fatal flaws or key environmental values that cannot be accommodated to enable development of the subject site for its intended purpose.

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1 INTRODUCTION

1.1 Background

Parkridge Group Pty Ltd (the proponent) is proposing to subdivide and develop Lot 9004 Eaton Drive, Eaton (herein referred to as the subject site). The subject site has an area of approximately 32 hectares (ha). It is located 2.5 km north of the Eaton town centre and 8 km east-north-east of Bunbury and is situated adjacent to the Collie River (refer to **Figure 1** and **2**).

A Structure Plan (Calibre 2018a) has been prepared for the subject site to enable urban development with residential cells ranging from R25-40 and R40-60, also incorporating areas of Public and Regional Open Space.

This Environment Assessment Report has been prepared to support the proposed subdivision of the subject site. It investigates the existing environment and the opportunities and constraints associated with the development of the site, including recommended management measures to mitigate impacts.

The subject site presents a unique opportunity for residential development within the locality in consideration of its proximity to existing town centres and transport routes.

1.2 Purpose and Scope

This report provides a synthesis of a range of information regarding the environmental attributes and values of the subject site. Where environmental values have been identified, suitable management measures have been proposed. In consideration of these management measures, an assessment of the overall environmental impact of the proposed development has been provided.

In addition to the above, this Environmental Assessment Report also addresses a submission received from the Department of Biodiversity, Conservation and Attractions (DBCA) regarding the Structure Plan.

1.3 Associated Reports

Previous reports produced for the subject site (and adjacent landholdings) include:

- Structure Plan – Parkridge Estate (Calibre 2018a);
- Lot 9004 Eaton Drive, Eaton - Local Water Management Strategy (Calibre 2018b);
- Fauna and Habitat Assessment – Lot 9004 Eaton Drive, Eaton (Harewood 2018);
- Desktop Environmental Assessment Report – Stage 3 - Lot 9004 Peninsula Lakes Drive, Eaton (Accendo 2017);
- Environmental Impact Assessment, Lot 9502 Peninsula Lakes Drive, Eaton (Bioscience 2012).

2 STRUCTURE PLAN

2.1 Description

The Structure Plan has been developed to guide the subdivision and development of 32 ha of undeveloped land within the remaining portion of Parkridge Estate. The Structure Plan for the site is provided in **Appendix A**.

The proposed development will yield in the order of 521 lots, split into 2 'main stages' being North Stage and South Stage as identified on the Structure Plan. A density range of between R25-R40 has been identified overall, with one area to be R60. This enables a range of lots sizes to be created at subdivision stage (Calibre 2018).

Public Open Space (POS) will be provided through the use of a central elongated strip that runs horizontally across Lot 9004. There is also a smaller second pocket identified north of the intersection of Peninsula Lakes Drive and Leicester Ramble. The POS has been located to provide a large central area of useable space and to incorporate an area of remnant vegetation located within the subject site The Structure Plan provides for 1.01 ha of Regional Open Space (ROS) and 3.19 ha of POS.

2.2 Environmental Features of the Structure Plan

The subject site does not have a high level of ecological value. This can be attributed to the historical and current land use which has resulted in clearing of native vegetation for agricultural purposes, e.g. livestock farming.

From an environmental perspective the key influences of the Structure Plan are:

- The Conservation Category (CC) wetland and its associated buffer;
- Water management; and
- Maintaining fauna habitat values within POS (e.g. retaining existing trees within POS areas).

3 LEGISLATION, POLICY AND GUIDELINES

The following legislation, policy and guidelines have been considered and will guide the required and expected management outcome from Federal, State and local government agencies.

3.1 Commonwealth Legislation

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation.

The EPBC Act aims to protect Matters of National Environmental Significance. Under the EPBC Act, the Commonwealth Department of the Environment and Energy (DotEE) lists Threatened species, Migratory species and Threatened Ecological Communities (TECs) in certain categories determined by criteria provided within the EPBC Act.

Under the EPBC Act, a significant impact is determined by the sensitivity, value and quality of the environment which is to be impacted and the intensity, duration, magnitude and geographic extent of the impacts (DEWHA 2008). If a proposed action is deemed to have a significant impact, this action should be referred to the Minister.

3.2 Western Australian Legislation

This desktop assessment has been undertaken in consideration of the relevant Western Australian state legislation which includes the following.

Wildlife Conservation Act 1950 (WC Act)

The Department of Biodiversity, Conservation and Attractions (DBCA) lists flora and fauna taxa under the provisions of the WC Act as protected according to their need for protection. Flora is given Declared Rare status when their populations are geographically restricted or are threatened by local processes. In addition, under the WC Act, by Notice in the Western Australian Government Gazette of 9 October 1987, all native flora and fauna is protected throughout the State.

Environmental Protection Act 1986 (EP Act)

This EP Act is administered by the Department of Water and Environmental Regulation (DWER) and the DBCA. The EP Act provides for conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with it. The Act establishes head powers to provide mechanisms for the development of Environmental Protection Policies (EPP), the referral and assessment of proposals (Environmental Impact Assessment), the control of pollution and enforcement. The Act also provides for an Environmental Protection Authority (EPA) that is a statutory authority and is the primary provider of independent environmental advice to Government. The EPA is assisted by the EPA Service Unit comprising the Environmental Impact Assessment and Policy Divisions of the DWER.

3.3 State Policy and Guidelines

Shire of Dardanup Biodiversity Policy

The objective of the *Biodiversity Policy* is to preserve significant areas of remnant vegetation, significant wetlands and waterways as well as key biodiversity corridors for future generations.

For the Eaton locality, the following is stated:

- Ensure buffers for ROS in new residential areas are based on ecological requirements of vegetation complexes and separation of wetlands from proposed residences (mosquito management zones). These should be achieved through the structure planning process.
- Ensure existing ROS is reserved for recreation and conservation where there are natural areas.
- Maximize protection of tree stands and understorey in POS, local schools and wider road reserves and road islands.
- Consider providing proponents with incentives to change road layouts to accommodate tree and understorey retention – e.g. Increased densities adjacent to protected natural areas.

Shire of Dardanup Town Planning Scheme No. 3

The general objectives of this Scheme as related to this report include:

- To zone the Scheme Area for the purposes in the Scheme described;
- To secure the amenity, health and convenience of the Scheme Area and the inhabitants;
- To make provisions as to the nature and location of buildings and the size of lots when used for certain purposes;
- The preservation of places of natural beauty, of historic buildings and objects of historical and scientific interest; and
- To make provision for other matters necessary or incidental to town planning and housing.

In relation to this report the Scheme provides for the zoning of 'Local Reserves' which restricts the use of and development on land zoned as a local reserve.

Wetland Management

The EPA administers the *Environmental Protection of Wetlands – Position Statement No. 4* (2004) to outline their principles for the protection of wetlands. The EPA's broad objectives are:

- To protect the environmental values and functions of wetlands in Western Australia.
- To protect, sustain and, where possible, restore the biological diversity of wetland habitats in Western Australia.
- To protect the environmental quality of the wetland ecosystems of Western Australia through sound management in accordance with the concept of 'wise use', as described in the Ramsar Convention, and ecologically sustainable development principles.
- To have as an aspirational goal, no net loss of wetland values and functions.

The identification and delineation of a wetland is described within the *Protocol for Proposing Modifications to the Geomorphic Wetlands Swan Coastal Plain Dataset* (DPaW 2007), whereby three key factors are considered:

- Hydrology – is dynamic and varies annually, seasonally and between wetlands. Long term groundwater data over differing seasons is required to accurately assess wetland hydrology.
- Hydric Soils – are soils formed in response to prevailing inundation or waterlogging, and are a long term wetland determining characteristic.
- Wetland Vegetation – reflects hydrology and hydric soils, in particular, obligate wetland species are considered reliable wetland indicators.

4 BIOPHYSICAL ENVIRONMENT

4.1 Land Use

Historically, the subject site has been used for broad acre agriculture. Accordingly, the subject site is largely devoid of remnant vegetation and consists of paddock grasses. There is a small area on the central western boundary of the site consisting of a stand of trees and a strip of vegetation which runs along the bank of the Collie River and joins into the densely vegetated area to the northwest of the subject site. Currently, the subject site is used for livestock grazing.

4.2 Topography, Soils and Geology

4.2.1 Topography

The subject site is comprised of undulating sand dunes and swampy low-lying areas that are consistent with the geomorphology of the Collie River. Surface elevations range from 10.50 m Australian Height Datum (AHD) in the south-eastern corner to 1.30 m AHD along the northern boundary within the Collie River floodplain.

4.2.2 Geology

The Bunbury-Burekup Sheet of the 1:50,000 Urban Geology Series maps published by the Geological Survey of Western Australia indicates that the subject site comprises two geological units. The Pleistocene Age Bassendean Sand (low rounded dunes) is mapped within the south-east corner of the subject site, while the remainder is underlain by Pleistocene Age Guildford Formation (primarily alluvial sandy clay).

4.2.3 Acid Sulfate Soils

Based on DWER's regional ASS risk mapping, the site has been identified as having a "moderate to low" risk of ASS occurring within 3 m of the natural soil surface (refer to **Figure 3**).

Golder Associates carried out a geotechnical and preliminary ASS investigation across the subject site in 2005. Based upon the results of this investigation it was concluded that the risk of encountering ASS above the action criteria (SCR 0.03%) is high within 3 m of the existing surface.

4.3 Groundwater

Groundwater was also found in 27 of the 35 test pits as part of the geotechnical investigation (Golder Associates, 2005). Groundwater depth ranged between 0.3 and 2.0 m below natural surface (BNS).

In addition, to determine the likely seasonal maximum groundwater levels across the subject site, onsite groundwater level monitoring was undertaken by Calibre between May 2009 and October 2010. The investigation included the installation of 23 monitoring bores across the site, to a depth of approximately 2.1m BNS. Results indicated that groundwater levels generally fall towards the low lying areas of the Collie River floodplain, from east to west with depth to groundwater ranging from above surface to 5.6 m BNS.

4.4 Surface Water

The Collie River is located approximately 330 m west of the subject site. The Collie River discharges south into the Leschenault Estuary and ultimately into the Indian Ocean. The subject site sits within the Leschenault Estuary Catchment and as such is covered by the Leschenault Estuary Water Quality Improvement Plan (WQIP). The Estuary and its tributaries are also a Management Area proclaimed under the *Waterways Conservation Act 1976* and a catchment included in the state government's Regional

Estuary initiative. The subject site discharges west towards the Collie River and ultimately the Leschenault Estuary (Calibre 2018b).

The subject site contains two manmade permanent freshwater dams which provide a water source for grazing stock.

4.5 Wetlands

Wetlands within Western Australia are classified on the basis of landform and water permanence pursuant to the Semeniuk (1995) classification system (refer to **Table 1**).

Table 1. Wetland classifications (Semeniuk 1995).

Water Longevity	Landform				
	Basin	Channel	Flat	Slope	Highland
Permanent Inundation	Lake	River	-	-	-
Seasonal Inundation	Sumpland	Creek	Floodplain	-	-
Intermittent Inundation	Playa	Wadi	Barlkarra	-	-
Seasonal Waterlogging	Dampland	Trough	Palusplain	Paluslope	Palusmont

Areas of wetlands have been mapped previously by Semenuik (1995) across the entire Swan Coastal Plain. This mapping has been converted into a digital dataset that is maintained by the DBCA and is referred to as the '*Geomorphic Wetland of the Swan Coastal Plain*' dataset. This dataset contains information on geomorphic wetland types and assigns management categories that guide the recommended management approach for each wetland area. The wetland management categories and management objectives are listed in **Table 2**.

Table 2. DBCA wetland management categories (Semeniuk 1995).

Category	Description	Management Objectives
Conservation	Wetlands support a high level of ecological attributes and functions.	Highest priority wetlands. Objective is to preserve and protect the existing conservation values of the wetlands through various mechanisms including: • Reservation in national parks, crown reserves and State owned land, • Protection under Environmental Protection Policies, and • Wetland covenanting by landowners. No development or clearing is considered appropriate. These are the most valuable wetlands and any activity that may lead to further loss or degradation is inappropriate.
Resource Enhancement	Wetlands which may have been partially modified but still support substantial ecological attributes and functions	Priority wetlands. Ultimate objective is to manage, restore and protect towards improving their conservation value. These wetlands have the potential to be restored to Conservation category. This can be achieved by restoring wetland function, structure and biodiversity.
Multiple Use	Wetlands with few remaining attributes and functions	Use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through landcare.

The *Geomorphic Wetlands of the Swan Coastal Plain* dataset indicates that the majority of the subject site is mapped as a Multiple Use (MU) wetland. A CC wetland is mapped as marginally intersecting the north-western extent of the subject site (refer to **Figure 4**). However, a *Wetland Buffer Determination* study (Bioscience 2012) undertaken within the subject site determined that the CC wetland mapping is incorrect, as the function area associated with this wetland does not extend into the subject site. Notwithstanding, the area mapped as a CC wetland will be reserved as ROS and will be preserved for conservation purposes.

4.6 Vegetation and Flora

The balance of the subject site is completely cleared of native vegetation, with just a small number of scattered trees of various types. The small areas of remnant native vegetation are predominately comprised of a flooded gum/paperbark woodland in the north, and a grove of peppermint low woodland on higher ground in the south east of the subject site. All the vegetation present can be regarded as being in a 'Degraded' or 'Completely Degraded' condition.

4.6.1 Flora

A search on DBCA's *NatureMap* online indicated that one Declared Rare Flora (DRF) (*Diuris drummondii*) and two Priority Flora (PF) (*Lasiopetalum membranaceum* (Priority 3) and *Caladenia speciosa* (Priority 4)) exist within 2 km radius of the of the subject site. Previous site inspections have not resulted in the identification of any conservation significant flora (Bioscience 2012). Furthermore, given the highly disturbed nature of the subject site and the current land use (livestock grazing), the presence of flora of conservation significance is considered very unlikely.

4.6.2 Vegetation

Regional vegetation has been mapped by Heddle *et al*. (1980) at a scale of 1:250,000 based on major geomorphic units on the Swan Coastal Plain. The subject site traverses the Swan vegetation complex as defined by Heddle *et al*. (1980) which can be described as:

- Fringing woodland of *Eucalyptus rudis – Melaleuca rhaphiophylla* with localised occurrence of low open forest of *Casuarina obesa* and *Melaleuca cuticularis*.

The mapped Heddle *et al.* (1980) vegetation complex can be used to determine vegetation extent and status on the Swan Coastal Plain. The DBCA records show that approximately 13% of the pre- European extent remains across the Swan Coastal Plain. The national objectives and targets for biodiversity conservation in Australia have a target to prevent clearance of ecological communities with an extent below 30% of their pre- European extent remaining. However, the subject site is located within the 'constrained area' of the Perth Metropolitan Region (EPA 2006). Within this area the EPA (2006) provides for the reduction of vegetation complexes to a minimum of 10% of their pre – European extent remaining. The Swan vegetation complex has in excess of 10% of its pre-European extent remaining.

In addition, given that the vegetation structure and species diversity associated with Swan complex is largely absent, the vegetation within the subject site is not representative of this vegetation complex.

In consideration of the above, the vegetation within the subject site is not considered significant as a remnant.

Threatened Ecological Communities

Threatened Ecological Communities (TECs) are defined by the DBCA and are assigned to a category of Priority 1 to Priority 5. While they are not afforded direct statutory protection at a State level their

significance is acknowledged through other State environmental approval processes (i.e. the Environmental Impact Assessment pursuant to Part IV of the EP Act).

Selected TECs are also afforded statutory protection at a Federal level pursuant to the EPBC Act. The EPBC Act provides for the protection of TECs that are listed under section 181 of the Act, and are defined as "Critically Endangered", "Endangered" or "Vulnerable".

A search was undertaken of the DBCA's TEC database and the EPBC Act Protected Matters database and it was found that the *Banksia Woodlands of the Swan Coastal Plain ecological community*, listed under the EPBC Act as a TEC in the 'Endangered' category is 'likely to occur within the area'. The Banksia Woodlands of the Swan Coastal Plain ecological community is a woodland associated with the Swan Coastal Plain of south western, Western Australia. A key diagnostic feature of this TEC is a prominent tree layer of Banksia, with scattered eucalypts and other tree species often present among or emerging above the Banksia canopy. The understorey is a species rich mix of sclerophyllous shrubs, graminoids and forbs (Threatened Species Scientific Committee 2016). Although the ecological community is characterised by high endemism and considerable localised variation in species composition across its range, the absence of Banksia species and lack of vegetation structure, denotes that the TEC does not occur within the subject site.

4.6.3 Regional Ecological Linkages

Ecological linkages can be described as any area of remaining remnant vegetation that can provide a corridor or linkage between larger patches of vegetation, to allow movement of flora, fauna and their genetic material through the landscape.

A Strategy was developed for the EPA to identify regionally significant natural areas in its consideration of the Greater Bunbury Region Scheme. These areas were identified using the reports and studies listed below:

- System reports – System 1 and System 6 (DEC 1976 - 1983);
- Areas of threatened and poorly reserved plant communities: EPA (1994, derived from Gibson *et al*. 1994);
- Areas of threatened ecological communities: as defined by English and Blyth (1997); and
- The Kemerton Buffer Link (EPA 1999).

This resulted in the identification of 16 ecological linkages which are recognised in the Greater Bunbury Region Scheme. The subject site is not located within an ecological linkage which can be attributed to the lack of remnant vegetation.

4.6.4 Environmentally Sensitive Areas

Section 51B of the EP Act allows the Minister to declare an Environmentally Sensitive Area (ESA). Once declared, the exemptions to clear native vegetation under the regulations do not apply in these areas. TECs, areas within 50 m of any Declared Rare Flora and defined wetland areas constitute ESAs. However, a number of other areas of environmental significance are also listed. Current declared ESAs are listed in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*.

An ESA marginally intersects the north-western extent of the subject site, which is associated with the CC wetland (refer to **Figure 4**). Under the Structure Plan this area is reserved as ROS and will be preserved for conservation purposes.

4.7 Fauna

4.7.1 Fauna of Conservation Significance

A search of the DBCA Threatened Fauna database was undertaken to establish whether species declared as 'Rare or likely to become extinct' (Schedule 1), 'Birds protected under an international agreement' (Schedule 3) and 'Other Specially protected fauna' (Schedule 4) as listed under the WC Act have been recorded in proximity to the subject site. One species each listed as Schedule one, Priority one and Priority four were recorded within a 1km radius of the subject site. (refer to **Table 3**).

The EPBC Act Protected Matters Search Tool also identified several threatened and migratory species that could potentially occur within or in proximity to the subject site. This included three species classified as Critically Endangered, ten Endangered species, 18 Vulnerable species and 11 Migratory bird species (**Table 3)**.

Table 3. Significant fauna potentially occurring within the subject site as identified by State and Commonwealth database searches.

Species	DPaw Status	EPBC Act Status	Likelihood of Occurrence
Actitis hypoleucos (Common Sandpiper)		Migratory	Unlikely
Anous stolidus (Common Noddy)		Migratory	Unlikely
Anous tenuirostris metanops (Australian Lesser Noddy)		Vulnerable	Unlikely
Apus pacificus (Fork-tailed Swift)		Migratory	Unlikely
Ardenna carneipes (Flesh-footed Shearwater)		Migratory	Unlikely
Botaurus poiciloptilus (Australasian Bittern)		Endangered	Unlikely
Calidris acuminate (Sharp-tailed Sandpiper)		Migratory	Unlikely
Calidris ferruginea (Curlew Sandpiper)		Critically Endangered	Unlikely
Calidris melanotos (Pectoral Sandpiper)		Migratory	Unlikely
Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black-Cockatoo)		Vulnerable	Possible
Calyptorhynchus baudinii (Baudin's Cockatoo)		Endangered	Possible
Calyptorhynchus latirostris (Carnaby's Cockatoo)		Endangered	Possible
Caretta caretta (Loggerhead Turtle)		Endangered	Unlikely
Chelonia mydas (Green Turtle)		Vulnerable	Unlikely
Dasyurus geoffroii (Chuditch, Western Quoll)		Vulnerable	Unlikely
Dermochelys coriacea (Leatherback Turtle)		Endangered	Unlikely
Diomedea amsterdamensis (Amsterdam Albatross)		Endangered	Unlikely
Diomedea dabbenena (Tristan Albatross)		Endangered	Unlikely
Diomedea epomophora (Southern Royal Albatross)		Vulnerable	Unlikely
Diomedea exulans (Wandering Albatross)		Vulnerable	Unlikely
Diomedea sanfordi (Northern Royal Albatross)		Endangered	Unlikely
Geotria australis (Pouched Lampray)	P1		Unlikely
Hydromys chrysogaster (Water-rat)	P4		Unlikely

Species	DPaw Status	EPBC Act Status	Likelihood of Occurrence
Macronectes giganteus (Southern Giant-Petrel)		Endangered	Unlikely
Macronectes halli (Northern Giant Petrel)		Vulnerable	Unlikely
Manta alfredi (Reef Manta Ray)		Migratory	Unlikely
Manta birostris (Manta Ray)		Migratory	Unlikely
Motacilla cinera (Grey Wagtail)		Migratory	Unlikely
Nannatherina balstoni (Baltson's Pygmy Perch)		Vulnerable	Unlikely
Natator depressus (Flatback Turtle)		Vulnerable	Unlikely
Neophoca cinera (Australian Sea-Lion)		Vulnerable	Unlikely
Numenius madagascariensis (Eastern Curlew)		Critically Endangered	Unlikely
Pachyptila turtur subantarctica (Fairy Prion (southern))		Vulnerable	Unlikely
Pandion haliaetus i		Migratory	Unlikely
Pseudocheirus occidentalis (Western Ringtail Possum)	S1	Critically Endangered	Possible
Thalassarche cauta (Tasmanian Shy Albatross)		Vulnerable	Unlikely
Thalassarche cauta cauta (Shy Albatross)		Vulnerable	Unlikely
Thalassarche cauta steadi (White-capped Albatross)		Vulnerable	Unlikely
Thalassarche impavida (Campbell Albatross)		Vulnerable	Unlikely
Thalassarche melanophris (Black-browed Albatross)		Vulnerable	Unlikely
Thalassarche steadi (White-capped Albatross)		Vulnerable	Unlikely
Tringa nebularia (Common Greenshank)		Migratory	Unlikely
Westralunio carteri (Carter's Freshwater Mussel)		Vulnerable	Unlikely

In order to determine the ecological values of the subject site, Harewood undertook a targeted fauna and habitat assessment in September 2018 (refer to **Appendix B**).

Wetland Habitat

Of the abovementioned conservation significant species (excluding black cockatoos and Western Ringtail Possums), many have preferred habitat types associated with the Collie River and foreshore area. Accordingly, a Fauna Habitat Assessment (Harewood 2018) was undertaken to determine the quality and composition of wetland habitat within the subject site.

An examination of the CC wetland area mapped within the subject site revealed it to be comprised of a section of the open/low woodland of flooded gum (*Eucalyptus rudis*), paperback (*Melaleuca rhaphiophylla*) and grassland habitat unit which is 'Completely Degraded' and unlikely to fulfil the criteria of a CC wetland.

The vegetation present is comprised of only two native species (*Eucalyptus rudis* and *Melaleuca rhaphiophylla*) over introduced pasture grasses. The area is currently open to livestock grazing and there is unlikely to be any recruitment of new trees and it can therefore be expected that its quality will further deteriorate over time. The fauna habitat values of the mapped wetland area within the subject site can be considered to be very low. The subject site is not expected to support any wetland species of conservation significance (Harewood 2018).

Black Cockatoos

The black cockatoo (including Baudin's black cockatoo *Calyptorhynchus baudinii*, Carnaby's black cockatoo *Calyptorhynchus latirostris* and the forest red-tailed black cockatoo *Calyptorhynchus banksii naso*) breeding habitat assessment involved the identification of all suitable breeding tree species, including marri, jarrah, flooded gum and any other endemic Corymbia/Eucalyptus species within the subject site, that had a diameter at breast height (DBH) of equal to or over 50 cm (Harewood 2018). The number and size of any hollows present and their suitability for black cockatoos was then recorded. Peppermints, banksia, sheoak and melaleuca tree species were not assessed as they typically do not develop hollows that are used by black cockatoos.

The assessment identified 112 trees within the subject site with a DBH of equal to or over 50 cm. Hollows or possible hollows of some type were identified in 21 of these, with four being assessed as possibly suitable for black cockatoos to use for nesting. No actual evidence (e.g. chew marks) of any hollows being used by black cockatoos for nesting (currently or previously) was seen. Common brushtail possums were observed in close proximity to these trees during the nocturnal surveys and these animals may be occupying at least some of the potential hollows recorded.

Trees that are known to be or are potentially used as a direct food source (e.g. seeds, flowers, nectar, bark or grubs) by one or more of the species of black cockatoo were recorded within the subject site and include the following:

- Flooded Gum – *Eucalyptus rudis*;
- Marri – *Corymbia calophylla*;
- Jarrah – *Eucalyptus marginata*; and
- Peppermint - *Agonis flexuosa*.

Species such as flooded gum and peppermint while foraged upon on occasions are only likely to contribute a small proportion to any one bird's diet relative to more favoured species such as marri and therefore areas of these species are not generally regarded as representing quality foraging habitat. The only actual evidence of foraging left by black cockatoos was in the form of chewed marri fruits in the central section of the subject site. This evidence was attributed to either the Forest red-tailed black cockatoo or the Baudin's cockatoo. The extent of what would be regarded as quality black cockatoo foraging habitat within the subject site is very small, being comprised of approximately 0.2 ha of marri forest supported to a small degree by a limited number of scattered marri and jarrah trees. Therefore, black cockatoo species are very unlikely to rely on the subject site for its persistence and development within this area is not likely to be considered significant (Harewood 2018).

No evidence of black cockatoos roosting within trees located inside the subject site was observed during the fauna assessment (Harewood 2018).

Western Ringtail Possum (WRP) Assessment

During the fauna assessment, no evidence of WRP being present or utilising the subject site was found during the day or night surveys (Harewood 2018).

The vegetation in the northern portion of the subject site has been mapped by Shedley *et. al*. 2014, as being High Quality habitat suitability (Category Class B) for WRP. However, the low plant species diversity and lack of favoured foraging species present would indicate that the area provides very low quality habitat for WRPs, at best. While WRPs may occur occasionally as transients they would not permanently reside in this vegetation type (Harewood 2018).

The area of remnant vegetation consisting of low woodlands of peppermint adjacent to a small area of marri forest in the centre of the subject site has been mapped as being Medium and High Quality WRP habitat respectively and could possibly support WRP due to the presence of their favoured food source. In accordance with the Structure Plan, the majority of this vegetation will be retained within POS.

However, the value of this area as WRP habitat is greatly diminished its small size and isolated nature, with the closest other continuous vegetation being over 300 m away. The absence of WRP observations in these areas during the fauna assessment suggests that the species cannot persist in this remnant or that they have not been able to populate it from other areas due to the distance of separation (Harewood 2018).

5 POTENTIAL IMPACTS AND MANAGEMENT

During the process of undertaking this investigation, a range of specific environmental issues were explored in relation to the subject site and the proposed development. These issues arise from the proposed development, the existing environment of the subject site, its surrounds and the prevailing state and federal environment policy and legislation. The implications associated with the issues in the context of the intended development of the subject site are discussed in this Section.

5.1 Acid Sulfate Soils

The ASS objectives as prescribed by the EPA are to:

- Maintain the integrity, ecological function and environmental values of the soil and landform.
- Ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.
- Ensure that rehabilitation achieves an acceptable standard compatible with the intended land use, and consistent with appropriate criteria.

The DWER has published a number of guidelines relating to the identification, reporting and management of contaminated sites and ASS in WA, including the Contaminated Site Management Series report and *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes* (DWER 2015).

5.1.1 Potential Impacts

According to existing DWER mapping, the risk of ASS occurring within 3 m of the surface is moderate to low.

In an undisturbed state below the water table, these soils remain benign and non-acidic. However, if these soils are exposed to the atmosphere through drainage, excavation or dewatering, the sulfides may react with oxygen and form sulfuric acid.

While identification of possible ASS hotspots is important, the occurrence of ASS is rarely a 'fatal flaw' issue and in most circumstances can be appropriately addressed at the subdivision/development stages through design or management mechanisms. As a result, if required, detailed ASS investigations would not be necessary until detailed engineering design drawings have been prepared for the subject site.

5.1.2 Environmental Management and Mitigation

It is expected that any deep excavations within the subject site requiring dewatering, such as installing deep sewerage, may trigger the need for a detailed ASS investigation and management plan. Any such investigation is best done after the location and depths of deep excavations are determined, in order to reduce the field work required. This is not expected to be a constraint to the proposed development of the subject site, but may result in a slightly extended approval programme for site works and a relatively minor increase in investigation and reporting fees.

A DWER guideline compliant ASS and Dewatering Management Plan will, if required, then be developed and implemented to manage:

- All proposed dewatering proposed in association with residential development (in accordance with subdivision and servicing layout); and
- Any excavation in actual or potential ASS areas.

The excavation of ASS and dewatering for the project will be managed in accordance with DWER guidelines to result in no adverse impacts to the environment.

5.2 Water Management

The EPA water management objectives include:

- Maintain the quantity of water (surface and ground) so that existing and potential environmental values are protected.
- Ensure that the quality of water emissions (surface and ground) do not adversely affect environmental values or the health, welfare and amenity of people and land uses, and meets statutory requirements and acceptable standards.

5.2.1 Potential Impacts

Development of the subject site is associated with the following potential impacts:

- Groundwater and surface water at the subject site flows west towards the Collie River, which is an environmentally sensitive receptor. Impacts to groundwater and/or surface water quality on site may also impact sensitive receptors downstream.
- The use of subsoil drainage to control pre-development groundwater levels may impact the CC wetland adjacent to the subject site.

5.2.2 Environmental Management and Mitigation

A LWMS has been prepared to support the Structure Plan associated with the subject site. The LWMS details the best management practices approach to water management that will be undertaken for this development, in accordance with *Better Urban Water Management* (WAPC 2008). The LWMS will achieve integrated water management through the following design objectives:

- Effectively manage the risk to human life, property damage and environmental degradation from water contamination, flooding and waterlogging.
- Maintain and if possible, improve water quality (surface and groundwater) within the development in relation to pre-development water quality.
- Reduce potable water consumption within both public and private spaces using practical and cost-effective measures.
- Promote infiltration of surface water on site to minimise the risk of further water quality degradation in the Leschenault Estuary Catchment.
- Implement best management practices in regard to stormwater management, including structural and non-structural controls.
- Incorporate where possible, low maintenance, cost-effective landscaping and stormwater treatment systems.

It is expected that development of the subject site will have a positive impact on groundwater quality through Best Management Practices and the treatment of stormwater prior to infiltration as discussed below:

- The stormwater structural controls will improve infiltrating stormwater water quality through reducing water velocities, biological uptake and increasing infiltration areas.
- Water quality will be improved through minimising and controlling the levels of fertilisers and pesticides applied to the site through appropriate plant selection and operation and maintenance.
- The management of stormwater and nutrients will be in accordance with the Leschenault Estuary WQIP and Better Urban Water Management practices.

Based on the investigations undertaken and the management measures proposed, it is not expected that any changes to groundwater flows, levels or quality will have an adverse impact on the function and environmental values of the subject site.

5.3 Wetlands

The EPA wetland objective is to maintain and where possible enhance the integrity, ecological function and environmental values of wetlands.

5.3.1 Potential Impacts

A portion of the subject site is mapped as containing a MU wetland. MU wetlands have few remaining functions, values and typically their attributes have been considerably degraded such that they provide limited ecological value. On this basis, MU wetlands do not usually preclude development. The impacts to the MU wetlands within the subject site are minimal as these wetlands are in a "Completely Degraded" condition and are considered suitable for development.

A site-specific study (Bioscience 2012) has determined that the CC wetland located adjacent to the subject site does not extend into the subject site. Nonetheless, the area (incorrectly) mapped as a CC wetland within the subject site along with a 50 m buffer, will be excluded from development and retained within ROS. Accordingly, there will be no direct impacts to the CC wetland as result of the proposed development. Indirect potential impacts as a result of the proposed development may include:

- ASS impacts resulting from earthworks or dewatering.
- Changes to hydrology through changes in surface water flows and subsoil drains.

5.3.2 Environmental Management and Mitigation

It is envisaged that by maintaining pre-development surface and groundwater flows to the buffer area, the vegetation will be provided with similar water needs after development, whilst experiencing improved water quality through the use of constructed vegetated bioretention areas (swales) and other suitably designed and best practice water sensitive urban design techniques.

It is important to acknowledge the current surface water flow through the CC wetland, which includes the nutrient run-off from the surrounding paddocks, is not treated. The proposed water management strategy seeks to improve significantly this outcome through incorporating best stormwater quality management practice consistent with Better Urban Water Management principles.

It is anticipated that the above management mechanisms will improve the current condition of the wetland as well as providing suitable waterbird habitat.

5.4 Vegetation and Flora

The EPA flora and vegetation objective is to maintain the abundance, diversity, geographic distribution and productivity of flora at the species and ecosystem levels through the avoidance or management of adverse impacts and through improvement in knowledge.

5.4.1 Potential Impacts

As a result of historical and current anthropogenic disturbances, the vegetation within the subject site is in a 'Degraded' to 'Completely Degraded' condition. It is very unlikely to contain any flora or vegetation of conservation significance and it does not provide any ecological connectivity to surrounding environmental features (i.e. the Collie River).

A small pocket of vegetation that may provide some (albeit limited) ecological value will be retained within POS (refer to **Appendix A**) and therefore will not be impacted.

Consequently, it is anticipated that the proposed development will have very little impact on native vegetation.

5.4.2 Environmental Management and Mitigation

Within the development footprint, there are no vegetation or flora values within the subject site that preclude development or require protection. Accordingly, no specific management measures pertaining to remnant vegetation are deemed necessary.

Any potential impacts will be reduced through the following:

- Retention and replanting of areas of POS and ROS in accordance with the Shire of Dardanup's objectives for this area.
- Areas of POS and road reserves will be landscaped, which will involve planting species native to the local area.

5.5 Fauna

The EPA fauna objective is to maintain the abundance, diversity, geographic distribution and productivity of native fauna at the species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

5.5.1 Potential Impacts

No evidence of WRPs being present or utilising the subject site has been identified (Harewood 2018). This is likely to be attributed to the composition of the majority of vegetation onsite (flooded gum and paperbark), which represents low quality habitat for WRPs. While WRPs may occur occasionally as transients they would not permanently reside in this vegetation type given the low plant species diversity and a complete lack of some of their favoured foraging species (e.g. peppermint, sheoak).

The value of the peppermint and marri dominated vegetation (located within the proposed POS) to WRPs is greatly diminished by the fact that it is a relatively small area (<2 ha) and is isolated, being over 300 metres from the closest other continuous area of vegetation. The lack of WRP observations in this area also suggests that the species cannot persist in this remnant or that they have not been able to populate it from other areas due to the distance of separation (Harewood 2018). Accordingly, there are not expected to be any impacts to WRPs as a result of the proposed development.

The peppermint and marri dominated vegetation unit represents black cockatoo habitat, but the degree of use appears to be low with no breeding or roosting activity detected and only a very limited amount (<2ha) of foraging habitat being present. As mentioned above, this habitat unit will be retained within POS.

Based on the results of the assessment and the scale of the proposed development, likely impacts on WRPs and black cockatoos and/or their preferred habitat are negligible (Harewood 2018). Accordingly, no further approval requirements are considered necessary in accordance with the EPBC Act or the EP Act.

In consideration of their 'Completely Degraded' condition, the fauna habitat values of the CC wetland and MU wetland mapped within the subject site are very low. Accordingly, there are not expected to be any impacts to wetland fauna of conservation significance as a result of the proposed development

5.5.2 Environmental Management and Mitigation

The following management measures have been developed and incorporated to reduce the likelihood of impacts to native fauna:

- Fauna corridors will be created through the revegetation of the ROS and POS.
- The majority of the peppermint and marri dominated vegetation unit will retained within POS.

6 CONSULTATION

The proposed Structure Plan was advertised in accordance with the *Planning and Development (Local Planning Schemes) Regulations 2015*. In response to the advertising, 12 submissions (including five public submissions) were received. In the context of environmental issues, the DBCA provided a set of comments which are addressed below in **Table 4**.

Table 4. Response to DBCA's Comments

DBCA	Shire	Accendo Response
The northern portion of Lot 9004 contains native vegetation associated with the adjacent Conservation Category Wetlands (CCW) on the Collie River floodplain.	Noted.	An examination of this specific area during the fauna survey (Harewood 2018) revealed it to be comprised of only two native species (*Eucalyptus rudis* and *Melaleuca rhaphiophylla*) over introduced pasture grasses. It is considered highly degraded and unlikely to fulfil the criteria of a CC wetland. The area is currently open to livestock grazing and there is unlikely to be any recruitment of new trees and it can therefore be expected that its quality will further deteriorate over time. The fauna habitat values of this area can be considered to be very low. It should be noted that other sections of this same vegetation unit located within the subject site, is in identical condition and has been mapped as a MU wetland which is consistent with its highly degraded condition (Harewood 2018). Based on the site-specific survey results (Harewood 2018 and Bioscience 2012), it is considered that the CC wetland does not actually occur within the subject site.
Shelley et at, 2014 mapped the northern Lot 9004 vegetation as being High Quality habitat suitability (Category Class B) for western ringtail possums (WRP) High Quality habitat suitability is important in maintaining the integrity of WRP habitat, which is required to increase the reproductive output of the species and to counter declining populations and losses due to habitat loss and predation.	Noted.	The open woodland of flooded gum and paperback present in the north of the subject site has been mapped by Shelley *et al.* (2014) as being within the "high" habitat suitability class for WRPs. Observations made during the field survey (Harewood 2018) suggest that this area should in fact be rated as having a "very low" habitat suitability (i.e. able to support <0.5 WRPs per ha) at best. Apart from the absence of any WRP observations in this area, this conclusion is justified by the fact the vegetation is comprised of only flooded gum and paperbark, a combination which represents low quality habitat for WRPs. While WRPs may occur occasionally as transients they would not permanently reside in this vegetation type given the low plant species diversity and a complete lack of some of their favoured foraging species (e.g. peppermint, sheoak) (Harewood 2018).

WRP (Schedule 1) is listed as critically endangered species under the Commonwealth of Australia's Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and Western Australia's Wildlife Conservation Act 1950.	Noted.	Noted. A targeted survey for WRPs was undertaken within the subject site. This included a daytime survey and two-night time survey. No WRPs were identified and no evidence of WRPs utilising the subject site was identified. An assessment of the fauna habitat types within the subject site identified that the habitat quality for WRPs within the development footprint ranged from low to very low. In consideration of the above, there are not anticipated to be any impacts to WRP as a result of the proposed development.
It appears that 2 to 3ha of this high quality WRP habitat will be cleared if the current structure plan is implemented. These areas are also very close, if not overlapping, the environmentally sensitive area associated with the CCW.	The map contained in (Appendix ORD:12.2C) identifies the Conservation Category Wetland (CCW) referred to which is outside of the PESP area and not impacted by the proposal. The vegetated area in the northern part of the site that will be subject to clearing is estimated by staff to be approximately 1.7ha.	Based on the targeted WRP survey, vegetation subject to clearing represents low to very low-quality habitat for WRPs. Furthermore, no evidence of WRPs utilising any of the vegetation within the subject site was identified. In the expert opinion of a highly qualified zoologist, there will be negligible impacts to WRP as a result of the proposed development (Harewood 2018).
The central portion of the structure plan shows that about 1ha of mapped medium quality WRP habitat is to be cleared and the rest retained in Public Open Space (POS).	Noted	The value of the peppermint and marri dominated vegetation (the majority of which will be retained within POS) to WRPs is greatly diminished by the fact that it encompasses a small area (<2 ha) and is isolated, being over 300m from the closest other continuous area of vegetation. The absence of WRPs in this area also suggests that the species cannot persist in this remnant or that they have not been able to populate it from other areas due to the distance of separation (Harewood 2018). As discussed above, the impacts to WRPs as a result of the proposed development are considered negligible (Harewood 2018).

While the application provided some vegetation classification information, it did not include any flora or fauna survey information.	The structure plan report (Page 10) states that the PESP area has previously been assessed by the EPA during the preparation of the Greater Bunbury Region Scheme, and subsequent amendments to the Local Planning Scheme when the land was re-zoned to 'Development' zone (Amendment 187). It also states that the site has previously been subject to an approved subdivision design that proposed to clear the remnant vegetation, however officers are unclear as to what this is referring to as the most recent subdivision was refused. Notwithstanding, it is recommended that Council requests a modification to the Structure Plan to include the following notation: "At subdivision the applicant/ landowner shall be required to undertake a flora and fauna study to identify the presence of threatened flora and fauna within the site being regarded as being of biodiversity and conservation value."	A Fauna and Habitat Assessment of the subject site was undertaken by a qualified zoologist in September 2018 (Harewood 2018). Based on the results of the assessment it was concluded that there exist no major constraints relating to fauna, and in particular fauna of conservation significance with respect to the proposed development. The Fauna and Habitat Assessment identified the vegetation types within the subject site. Given the historical and current land use (livestock grazing), all the vegetation present can be regarded as being in a Degraded or Completely Degraded condition. Most of the vegetation present is comprised of only two native species (*Eucalyptus rudis* and *Melaleuca rhaphiophylla*) over introduced pasture grasses. Accordingly, it is very unlikely that any flora or vegetation of conservation significance would occur within the subject site. Therefore, undertaking a flora and vegetation survey will provide no further environmental value.

DBCA advises that the proposed clearing should be referred to the Department of Water and Environmental Regulation specifically for consideration under the Environmental Protection Act, Native, Vegetation Clearing regulations.	Council's consideration of the proposal does not remove the responsibility of the landowner to comply with the Environment Protection Act 1986 regarding the clearing of vegetation. The Structure Plan was referred to DWER for comment as required.	A clearing exemption pursuant Schedule 6 of the *Environmental Protection Act 1986* applies to the application area associated with a WAPC subdivision approval.
The proposed structure plan depicts an area of Local Open Space which retains some bushland and a small strip of Regional Open Space (ROS) along the northern and western Lot 9004 boundary. However, it would be desirable to also retain the northern Lot 9004 treed vegetation, to retain the High Quality WRP habitat within Public Open Space. Amongst these areas, the highest priority for protection would be the lines of mature trees immediately inside the northern structure plan boundary, just outside the proposed ROS, associated with the GBRS floodway and flood fringe boundary. This will also retain valuable established trees for the CCW buffer.	It is recommended that Council requests a modification to the Structure Plan to include the following note: "At subdivision the applicant/ landowner shall be required to undertake a flora and fauna study to identify the presence of threatened flora and fauna within the site being regarded as being of biodiversity and conservation value."	This area has been assessed and was determined to be in a Completely Degraded condition. It is predominately comprised of only two native species (*Eucalyptus rudis* and *Melaleuca rhaphiophylla*) over introduced pasture grasses. The area is currently open to livestock grazing and there is unlikely to be any recruitment of new trees and it can therefore be expected that its quality will further deteriorate over time. The fauna habitat values of this area of the CC wetland can be considered to be very low. It should be noted that other sections of this same vegetation unit located within the subject site, is in identical condition and has been mapped as a MU wetland which is consistent with its highly degraded condition (Harewood 2018).
The proponent should consider referral requirements to the Federal Department of the Environment and Energy under the EPBC Act in terms of significant impacts on WRP habitat.	Council's consideration of the proposal does not remove the responsibility of the landowner to comply with the EPBC Act regarding the clearing of vegetation.	Based on a targeted WRP assessment, it was determined that impacts to WRP from the proposed development will be negligible (Harewood 2018). The subject site does not appear to support any WRPs and provides low to very low habitat quality for the species. Accordingly, referral to the DotEE pursuant to the EPBC Act is not considered necessary.

DBCA supports the use of a fauna spotter during clearing and recommends that the fauna spotter is used during all clearing works associated with the development footprint. A wildlife protection management plan could be prepared and implemented to manage threatened species during approved clearing works.	Noted. The flora and fauna study will identify the presence of any native animals within the areas identified for clearing. If determined appropriate DWER may place conditions regarding the requirement for a fauna spotter and/or a wildlife protection management plan on the clearing permit.	Noted.

7 SUMMARY

Accendo was engaged by the proponent to prepare an environmental assessment to support the preparation of a Structure Plan for the subject site. This has included a site-specific fauna assessment to identify and assess the environmental attributes and values within the subject site. The environmental attributes and values identified within the site have been outlined in **Section 4** and include:

- Surface elevations range from 10.50 m AHD in the south-eastern corner to 1.30 m AHD along the northern boundary within the Collie River floodplain.
- The subject site has been classified as having a 'moderate to low risk' of ASS occurring within three metres of the natural soil surface.
- The subject area sits within the Leschenault Estuary Catchment and as such is covered by the Leschenault Estuary WQIP.
- The majority of vegetation has been cleared as a result of the historical and current land use (livestock grazing).
- The subject site is mapped as containing a portion of a CC wetland. As identified within the *Wetland Buffer Determination* study (Bioscience 2012) for the subject site, this mapping appears to be incorrect as a site analysis revealed that the wetland function area associated with the CC wetland does not extend into the subject site. Furthermore, an examination of this specific area during the fauna assessment (Harewood 2018) revealed it to be comprised of only two native species (*Eucalyptus rudis* and *Melaleuca rhaphiophylla*) over introduced pasture grasses, which is not consistent with the definition of a CC wetland.
- As a result of the fauna assessment it was determined that the fauna habitat values at the subject site have been severely compromised by the removal of most of the original native vegetation and the degradation of the main remnant patches.
- There is no evidence of WRPs utilising vegetation with the subject site as habitat and overall, habitat quality in areas to be developed are low/very low.
- Some areas of vegetation represent black cockatoo habitat, but the degree of use appears to be low with no breeding or roosting activity detected and only a very limited amount of foraging habitat being present.
- There exist no major constraints relating to fauna, and in particular fauna of conservation significance with respect to the proposed development.

In consideration of the abovementioned key environmental features, the following management measures have been proposed to minimise potential impacts associated with the subdivision of the subject site:

- Prepare and implement an ASS and Dewatering Management Plan if necessary.
- Implement the approved LWMS during subdivision works.

Based on this assessment, Accendo considers that there are no fatal flaws or key environmental values that cannot be accommodated to enable development of the subject site for its intended purpose.

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FIGURES

PROJECT **Lots 9004 Eaton Drive, Eaton (Parkridge Estate)**

DRAWING TITLE FIGURE **1** -**Site Locality**

CLIENT **Parkridge Group Pty Ltd**

accendo AUSTRALIA

PO Box 5178
West Busselton
Western Australia 6280
Mobile 0418 950 852

Project Number	Drawing Number	Revision
	FIG **1**	A

Designed	KMT	Checked	Date 19.11.2018
Drawn	PN	Approved	Sheet 1 of 1
Local Authority		Shire of Dardanup	

PROJECT **Lots 9004 Eaton Drive, Eaton (Parkridge Estate)**

DRAWING TITLE FIGURE **2** -**Extent of Site**

CLIENT **Parkridge Group Pty Ltd**

accendo AUSTRALIA

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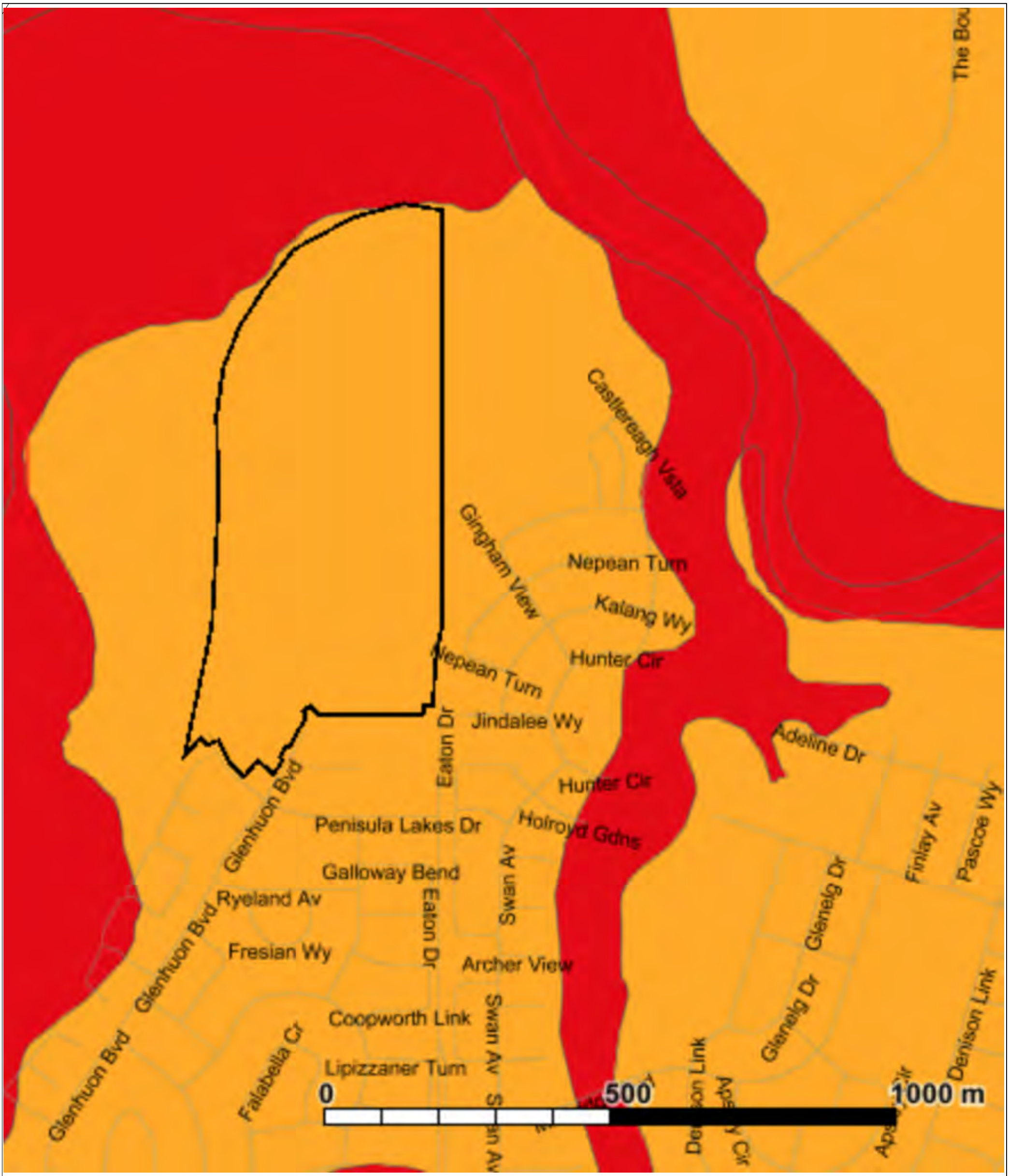
West Busselton
Western Australia 6280
Mobile 0418 950 852

Project Number	Drawing Number	Revision
	FIG **2**	A

Designed	KMT	Checked	Date 19.11.2018
Drawn	PN	Approved	Sheet 1 of 1
Local Authority		Shire of Dardanup	



Legend

- High to moderate risk of ASS occurring within 3m of natural soil surface. (or deeper)
- Moderate to low risk of ASS occurring within 3m of natural soil surface.

PROJECT Lot **9004 Eaton Drive, Eaton (Parkridge Estate)**

DRAWING TITLE FIGURE **3 - Acid Sulphate Soil Mapping**

CLIENT **Parkridge Group Pty Ltd**

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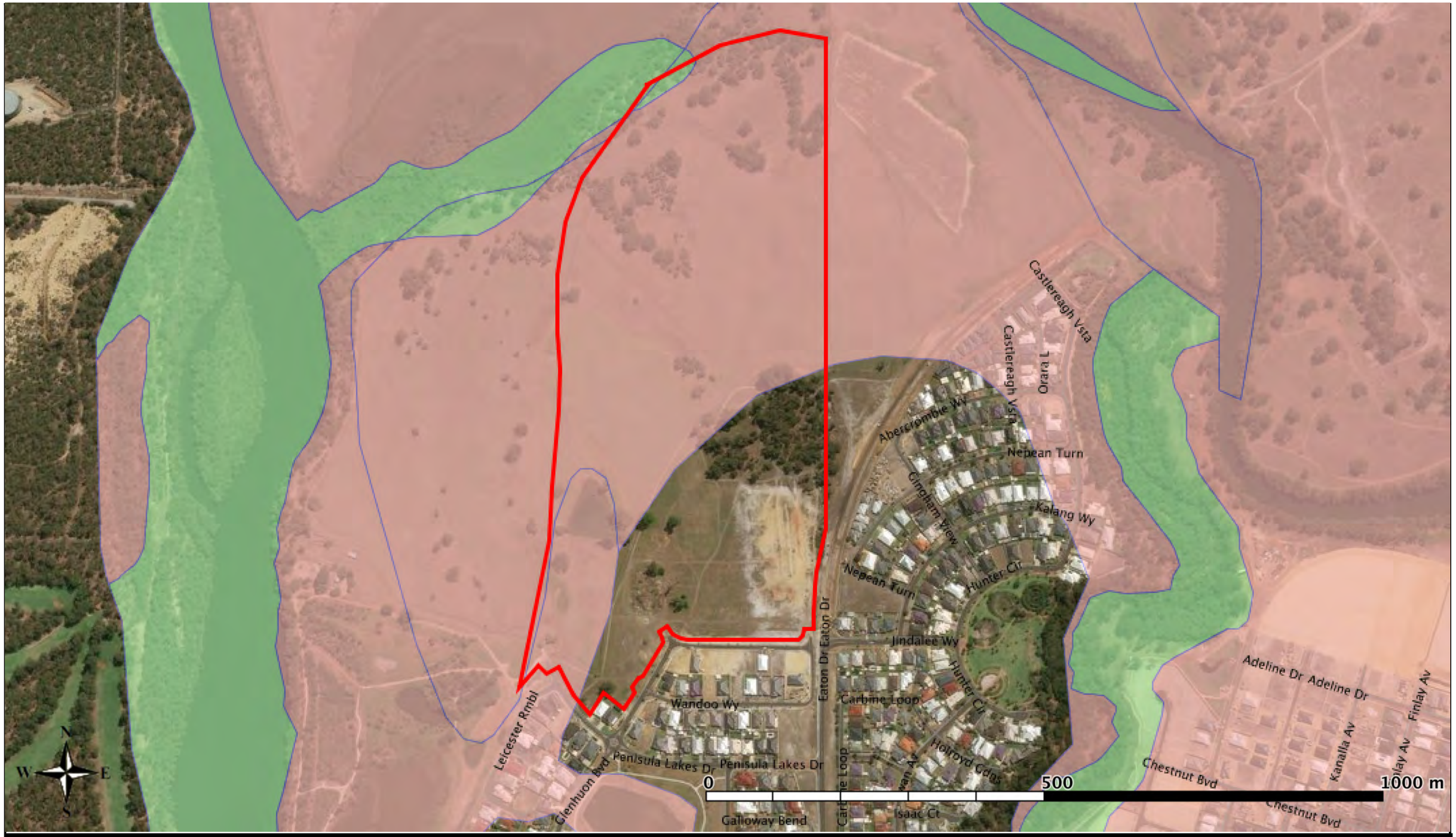
Project Number	Drawing Number	Revision
	FIG **3**	**A**

Designed	KMT	Checked	Date 19.11.18
Drawn	PN	Approved	Sheet 1 of 1

Local Authority Shire of Dardanup



Legend

- Lot Boundary
- Conservation Category Wetland
- Multiple Use Wetland

PROJECT	Lot **9004 Eaton Drive, Eaton (Parkridge Estate)**
DRAWING TITLE	FIGURE **4 -Mapped Wetlands**
CLIENT	**Parkridge Group Pty Ltd**

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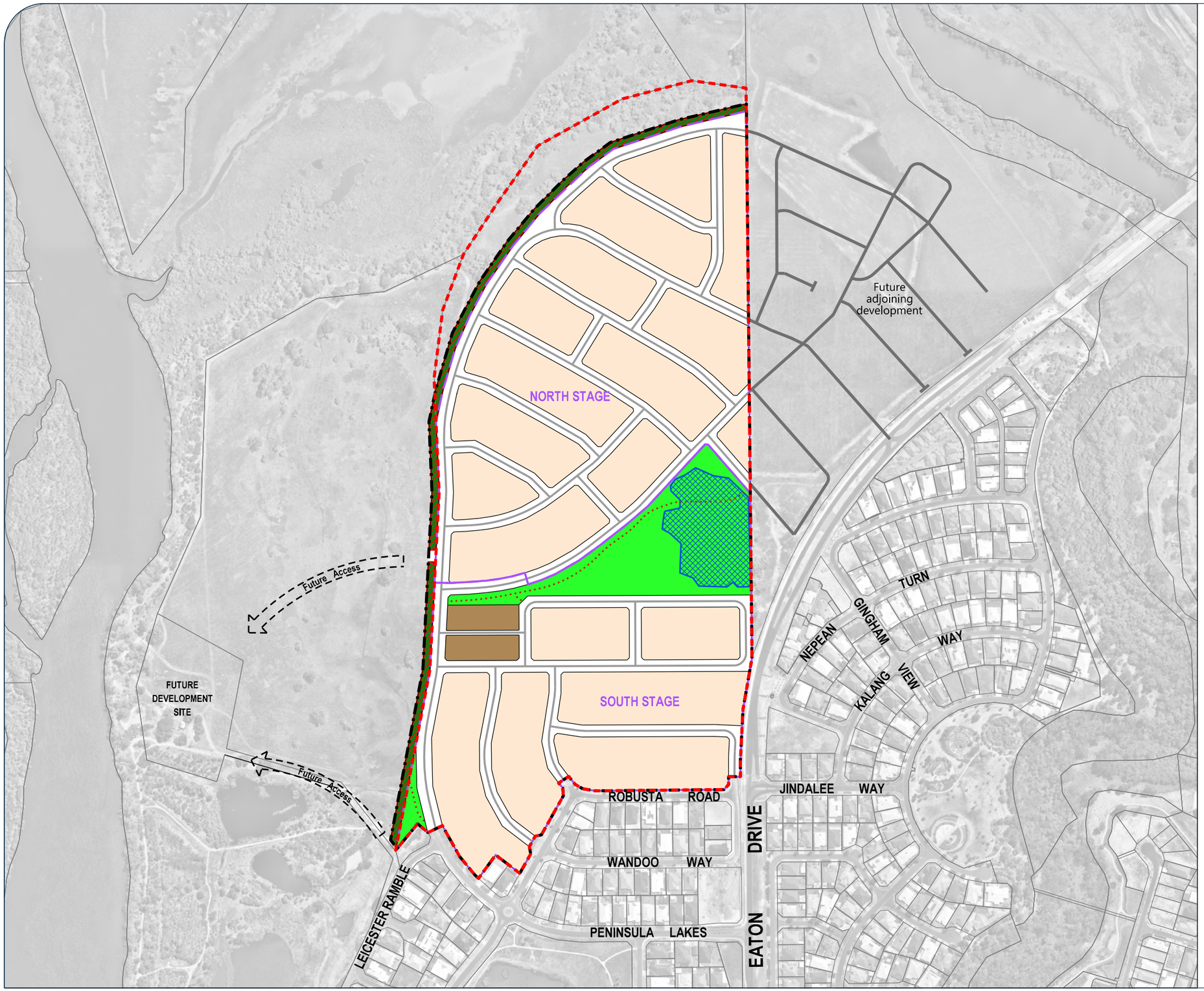
Project Number	Drawing Number	Revision
	FIG **4**	A

Designed	KMT	Checked	Date 19.11.2018
Drawn	PN	Approved	Sheet 1 of 1
Local Authority		Shire of Dardanup	

APPENDIX A. STRUCTURE PLAN



LEGEND

- EXISTING CADASTRE
- LOT BOUNDARY
- STRUCTURE PLAN BOUNDARY
- PROPOSED CADASTRE
- STAGE BOUNDARY
- RESIDENTIAL: R25 - R40
- RESIDENTIAL: R60
- PUBLIC OPEN SPACE 3.192ha
- REGIONAL OPEN SPACE
- LOCAL ROADS
- PATHWAY - SHARED PATHS
- PROPOSED PLAYING FIELD
- PROPOSED MANAGED LOW FUEL ZONE
- VEGETATION TO BE RETAINED

INDICATIVE LOT YIELD

NORTH STAGE
RESIDENTIAL R25 - R40 : .....296 LOTS

SOUTH STAGE
RESIDENTIAL R25 - R40 : .....187 LOTS
RESIDENTIAL R60 : ..... 38 LOTS

250m
0m

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STRUCTURE PLAN

Parkridge, Eaton

Plan No: 17-002497P-SP-01F

Date:	09.04.2018
Rev:	E
Scale:	A1 @1:2500, A3 @ 1:5000
Co-ords:	MGA
Aerial:	Nearmap

Figure 1 - Local Structure Plan

This plan has been prepared for planning purposes. Areas, contours and dimensions shown are subject to survey.

APPENDIX B. FAUNA ASSESSMENT (HAREWOOD 2018)

Fauna and Habitat Assessment

Lot 9004 and Lot 9503
Eaton Drive
Eaton

November 2018
V2

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APPENDICES

SUMMARY

This report details the results of a targeted fauna and habitat assessment over Lot 9004 and Lot 9503 Eaton Drive, Eaton (subject site). Lot 9004 and Lot 9503 have a combined area of about 34 hectares, most of which is cleared farmland used for or previously used for livestock grazing (Figure 1 and 2)

The scope of works was to carry out a habitat assessment including that of a Conservation Category Wetland, part of which extends into the subject site. A targeted survey for western ringtail possums and black cockatoo habitat was also completed.

The small areas (<4.4 ha) of remnant native vegetation onsite are mainly comprised of a flooded gum/paperbark woodland in the low lying arears in the north of the property and a grove of peppermint low woodland on higher ground in the south east (Figure 3). The balance of the site is totally cleared with just a small number of scattered trees of various types (mainly flooded gum and paperbark). All the vegetation present can be regarded as being in a degraded or highly degraded condition.

Overall fauna habitat values at the subject site have been severely compromised by the removal of most of the original native vegetation and the degradation of the main remnant patches. Most areas lack any natural attributes and are now only utilised by generally common and widespread fauna species with non-specific requirements which allow them to persist in disturbed/highly disturbed habitats. As a consequence, the fauna biodiversity of the subject site is well below levels present prior to historical and ongoing disturbances taking place.

The assessment of part of a Conservation Category Wetland (Figure 4) which extends into the subject site suggests that it should be considered for re-classification as a Multiple Use Wetland given it is highly degraded and of an identical character to adjoining areas that are mapped as such.

No evidence of western ringtail possum being present or utilising the subject site was found during the day or night surveys. Given the relatively small extent of the remnant vegetation remaining on site (~4.4 ha excluding scattered trees) and the fact that it was relatively easy to survey for evidence of the species, it is the Authors opinion that at the time of the surveys western ringtail possums were not present within the subject site. The lack of use of the area by this species can be attributed to the low quality habitat present in some areas and the small extent and isolation of other remnant patches.

The habitat tree assessment identified 112 trees within the subject site with a DBH of ≥50cm. Twenty one of these trees were observed to contain hollows or possible hollows of some type with four being assessed at the time to possibly have hollows suitable for black cockatoos to use for nesting (i.e. large enough entrance into a suitably sized and orientated branch/truck). No actual evidence (e.g. chew marks) of any hollows being used by black cockatoos for nesting (currently or previously) was seen. Common brushtail possums were

observed in close proximity to some of these hollow trees during the nocturnal surveys and these animals may be occupying at least some of the potential hollows recorded.

The extent of what would be regarded as quality black cockatoo foraging habitat within the subject site is very small, being comprised of about 0.2 ha of marri forest supported to a small degree by a limited number of scattered marri and jarrah trees.

No existing roosting trees (trees used at night by black cockatoos to rest) were positively identified during the survey.

The results of the assessment suggest that if the proposed development were to be referred to the Department of the Environment and Energy (DotEE) for review under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) that it would be regarded as "not a controlled action" given impacts on listed species or their habitat are not likely to be significant.

It is therefore concluded that there exists no major constraints relating to fauna, and in particular fauna of conservation significance with respect to the proposed development.

It is recommended that a fauna relocation program be implemented prior to and during clearing works to ensure direct impact on fauna (e.g. common brushtail possums) most likely to be encountered, are minimised.

1. INTRODUCTION

This report details the results of a targeted fauna and habitat assessment over Lot 9004 and Lot 9503 Eaton Drive, Eaton (subject site). The subject site is situated about nine kilometres east of Bunbury in the south west of Western Australia and is centred at approximately 33.296748°S and 115.727755°E. Lot 9004 and Lot 9503 have a combined area of about 34 hectares, most of which is cleared farmland used for or previously used for livestock grazing (Figure 1 and 2).

2. SCOPE OF WORKS

The scope of works, as defined by Accendo Australia, was to

- Carry out a wetland habitat assessment of the native vegetation associated with a nearby Conservation Category Wetland;
- Carry out a preliminary survey of western ringtail possums (WRP)(*Pseudocheirus occidentalis*) with the aim of obtaining an estimate of the distribution, abundance and habitat extent of the species within the subject site;
- Carry out a black cockatoo habitat assessment with the aim of determining the status, extent and quality of habitat within the subject site; and
- Prepare a report summarising all results.

Note: For the purposes of this report the term black cockatoo is in reference to Baudin's black cockatoo *Calyptorhynchus baudinii*, Carnaby's black cockatoo *Calyptorhynchus latirostris* and the forest red-tailed black cockatoo *Calyptorhynchus banksii naso*.

3. METHODS

Daytime field survey work at the site was carried out on the 9 and 10 September 2018. The nocturnal WRP surveys were carried out on the 29 and 31 September 2018. All survey work and reporting has been completed by Greg Harewood (Zoologist).

3.1 HABITAT ASSESSMENT

3.1.1 Fauna Habitat Assessment

The vegetation communities, soils and landforms identified during the site reconnaissance survey have been used as the basis for a classification of areas into broad fauna habitat types.

3.1.2 Wetland Habitat Assessment

The northern portion of Lot 9004 contains native vegetation mapped as part of a Conservation Category Wetland (CCW) which extends westwards outside of the subject site. The onsite wetland vegetation making up part of this habitat was examined to determine its quality and composition in relation to the overall CCW classification.

3.2 WESTERN RINGTAIL POSSUM ASSESSMENT

To determine if western ringtail possums were utilising the subject site the following was carried out:

- Daytime survey of the site along closed spaced traverses searching for dreys, obvious tree hollows (and other potential daytime refuge habitat), scats and individual WRPs. The day time survey was carried out using a GPS equipped PDA for guidance and as a data recorder;

- Two night time surveys were undertaken to provide information on the approximate distribution and abundance of WRPs. The nocturnal counts involved the systematic searching of potential WRP habitats within the subject site along close spaced transects, on foot using a head torch. The nocturnal counts were carried out using a GPS equipped PDA for guidance and as a data recorder; and

- An estimation of the amount and quality of WRP habitat present within the subject site based on field observations and available air photography has also been made. This information has been compared to mapping and classifications of habitat suitability provided by Shelley *et al*. (2014).

3.3 BLACK COCKATOO HABITAT ASSESSMENT

The following methods were employed to comply with the defined scope of works and are based on guidelines published by the federal DotEE (Commonwealth of Australia 2012) which states that surveys for Carnaby's, Baudin's and forest red-tailed black cockatoo habitat should:

- be done by a suitably qualified person with experience in vegetation or cockatoo surveys, depending on the type of survey being undertaken;

- maximise the chance of detecting the species' habitat and/or signs of use;

- determine the context of the site within the broader landscape—for example, the amount and quality of habitat nearby and in the local region (for example, within 10 km);

- account for uncertainty and error (false presence and absences); and

- include collation of existing data on known locations of breeding and feeding birds and night roost locations.

Habitat used by black cockatoos have been placed into three categories by the DotE (Commonwealth of Australia 2012) these being:

- Breeding Habitat;
- Foraging Habitat; and
- Night Roosting Habitat.

So as to comply with the requested scope of works and in line with the published guidelines the following was carried out.

3.3.1 Black Cockatoo Breeding Habitat

The black cockatoo breeding habitat assessment involved the identification of all suitable breeding tree species within the subject site that had a diametre at breast height (DBH) of equal to or over 50cm. The DBH of each tree was estimated using a pre-made 50 cm "caliper".

The location of each tree identified as being over the threshold DBH was recorded with a GPS and details on tree species, number and size of hollows (if any) noted. Trees observed to contain hollows (of any size/type) were marked with "H" using spray paint for easy future reference.

Target tree species included marri, jarrah and flooded gum or any other endemic *Corymbia/Eucalyptus* species of a suitable size that was present. Peppermints, *banksia*, sheoak and *melaleuca* tree species (for example) were not assessed as they typically do not develop hollows that are used by black cockatoos.

For the purposes of this study a tree containing a potential cockatoo nest hollow was defined as:

Generally, any tree which is alive or dead that contains one or more visible hollows (cavities within the trunk or branches) or possible hollows considered potentially suitable for occupation by black cockatoos for the purpose of nesting/breeding. Hollows or possible hollows that had an entrance greater than about 10cm in diameter and would allow the entry of a black cockatoo into a suitably orientated and sized branch/trunk, were recorded as "potential nest hollows".

Identified hollows were examined using binoculars for evidence of actual use by black cockatoos (e.g. chewing around hollow entrance, scarring and scratch marks on trunks and branches).

A review of available literature was carried out to determine the location/extent of any known/likely black cockatoo breeding habitat areas in the vicinity of the subject site.

3.3.2 Black Cockatoo Foraging Habitat

The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around the base of trees) observed during the field survey was recorded. The nature and extent of potential foraging habitat present was also documented irrespective of the presence of any actual foraging evidence.

A review of available literature was also carried out to determine the location/extent of any known/likely black cockatoo foraging habitat areas in the vicinity of the subject site.

3.3.3 Black Cockatoo Roosting Habitat

Direct and indirect evidence of black cockatoos roosting within trees was with the subject site was noted if observed (e.g. branch clippings, droppings or moulted feathers). Two dusk surveys were also carried out immediately prior to the nocturnal WRP surveys

A review of available literature was also carried out to determine the location/extent of any known/likely black cockatoo roosting habitat areas in the vicinity of the subject site.

3.4 OPPORTUNISTIC FAUNA OBSERVATIONS

Opportunistic observations of fauna species were made during all field survey work which primarily involved a series of transects across the subject site during the day while searching microhabitats such as logs, rocks, leaf litter and observations of bird species with binoculars. Secondary evidence of a species presence such as tracks, scats, skeletal remains, foraging evidence or calls were also noted if observed/heard.

4. SURVEY CONSTRAINTS

No seasonal sampling has been carried out as part of this fauna assessment. The conclusions presented are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the subject site at the time of the field assessments. It should also be recognised that site conditions can change with time.

During the black cockatoo habitat survey a search for trees containing hollows was completed. It should be noted that identifying hollows suitable for fauna species from ground level has limitations. Generally the full characteristics of any hollow seen are not fully evident (e.g. internal dimensions). It is also difficult to locate all hollows within all trees as some are not observable from ground level.

The location of observations was recorded using a handheld GPS. The accuracy of the GPS cannot be guaranteed above a level of about 5 to 10 metres, though it should be noted that in some circumstance the accuracy can increase or decrease beyond this range.

5. RESULTS

5.1 HABITAT ASSESSMENT

5.1.1 Fauna Habitat Assessment

The subject site is situated on the western margin of the Swan Coastal Plain and mainly overlaps a low-lying section of the Guildford Formation which is characterised by alluvial sandy clays. The higher ground in the south east section of the subject site represents a subdued section of the Bassendean Dune System which consists of a relatively thin layer of leached, grey sands. The general area has largely been cleared of vegetation in the past, primarily for livestock grazing and more recently for residential developments.

The small areas of remnant native vegetation onsite are mainly comprised of a flooded gum/paperbark woodland in the low lying arears in the north of the property and a grove of peppermint low woodland on higher ground in the south east. The balance of the site is totally cleared with just a small number of scattered trees of various types (mainly flooded gum and paperbark). All the vegetation present can be regarded as being in a degraded or highly degraded condition.

Descriptions and examples images of the main fauna habitats/dominant vegetation present within the subject site are provided in Table 1. The location and extent of the identified habitat units is shown in Figure 3.

Table 1: Main Fauna Habitats within the Subject Site

Unit	Fauna Habitat Description	Example Image
1	Cleared paddocks comprised of grassland introduced pasture species with occasional sedges and widely scattered remnant trees (flooded gum (*Eucalyptus rudis),* peppermint *(Agonis flexuosa),* jarrah *(Eucalyptus marginata), marri (*Corymbia calophylla*)* and paperback (*Melaleuca rhaphiophylla*). Area = ~ 29.1 ha (~86%)	

Unit	Fauna Habitat Description	Example Image
2	Open woodland of flooded gum (*Eucalyptus rudis*) over low woodland of paperback (*Melaleuca rhaphiophylla*) over a grassland of introduced pasture species. Area = ~ 2.7 ha (~8%)	
3	Low woodland/low open woodland of peppermint (*Agonis flexuosa*) with emergent jarrah (*Eucalyptus marginata*) and marri (*Corymbia calophylla*) over a grassland of introduced pasture species. Area = ~ 1.5 ha (~4%)	
4	Tall open forest of marri (*Corymbia calophylla*) over grassland of introduced pasture species. Area = ~ 0.2 ha (~1%)	

Unit	Fauna Habitat Description	Example Image
5	Manmade permanent freshwater dam with occasional fringing sedges, flooded gum (*Eucalyptus rudis*) and paperback (*Melaleuca rhaphiophylla*). Area = ~ 0.5 ha (~1%)	

Overall fauna habitat values at the subject site have been severely compromised by the removal of most of the original native vegetation and the degradation of the main remnant patches. Most areas lack any natural attributes and are now only utilised by generally common and widespread fauna species with non-specific requirements which allow them to persist in disturbed/highly disturbed habitats. As a consequence the fauna biodiversity of the subject site is well below levels present prior to historical and ongoing disturbances taking place.

5.1.2 Wetland Habitat Assessment

Figure 4 shows the relative extent of mapped wetland classification units within the subject site. As can be seen in Figure 4 a small section (~2,000 m^2) of a Conservation Category Wetland is mapped as extending into the subject site. An examination of this specific area during the field survey revealed it to be comprised of a section of the open/low woodland of flooded gum (*Eucalyptus rudis*), paperback (*Melaleuca rhaphiophylla*) and grassland habitat unit which is clearly highly degraded and unlikely to fulfil the criteria of a Conservation Category Wetland. An example image is provided in Plate 1 below.

Plate 1: Example image of the Conservation Category Wetland within the Subject Site

The vegetation present is comprised of only two native species (*Eucalyptus rudis* and *Melaleuca rhaphiophylla*) over introduce pasture grasses. The area is currently open to livestock grazing and there is unlikely to be any recruitment of new trees and it can therefore be expected that its quality will further deteriorate over time. The fauna habitat values of this area of the CCW can be considered to be very low. It should be noted that other sections of this same vegetation unit located within the subject site, is in identical condition and has been mapped as a Multiple Use Wetland which is consistent with its highly degraded condition.

That section of the CCW that occurs outside of the subject site to the west is significantly different in its character and is in a much higher level of condition. An example image is provided below.

Plate 2: Example image of the Conservation Category Wetland outside of the Subject Site

This area of the CCW is likely to have relatively good fauna habitat values given most of the original vegetation structure and composition still persists.

5.2 WESTERN RINGTAIL POSSUM ASSESSMENT

The locations of various possum observations made during the site surveys are shown in Figure 5.

No evidence of western ringtail possum being present or utilising the subject site was found during the day or night surveys. Given the relatively small extent of the remnant vegetation remaining on site (~4.4 ha excluding scattered trees) and the fact that it was relatively easy to survey for evidence of the species it is the Author's opinion that at the time of the surveys WRP were not present within the subject site.

Eight common brushtail possums (*Trichosurus vulpecula*) were observed on the first night survey and seven on the second night. This distribution of observations suggest that nine individual possums were involved.

The open woodland of flooded gum and paperback present in the north of the subject site has been mapped by Shelley *et al*. (2014) as being within the "high" habitat suitability class for WRPs (i.e. able to support 5-10 WRPs per ha). Observations made during the field survey suggest that in reality this area should in fact be rated as having a "very low" habitat suitability (i.e. able to support <0.5 WRPs per ha) at best. Apart from the lack of WRP observations in this area, this conclusion is justified by the fact the vegetation is comprised of only flooded gum and paperbark, a combination which represents low quality habitat for WRPs. While WRPs may occur occasionally as transients they would not permanently reside in this vegetation type given the low plant species diversity and a complete lack of some of their favoured foraging species (e.g. peppermint, sheoak).

The other main area of vegetation within the subject site is dominated by a low open woodland of peppermint. This area has been mapped by Shelley *et al.* (2014) as being within the "medium" habitat suitability class for WRPs (i.e. able to support 2-5 WRPs per ha). This classification is probably justified given the dominance of peppermint, a food source often favoured by WRPs. The small area of marri forest which adjoins the peppermint has been mapped as being within the "high" habitat suitability class for WRPs (i.e. able to support 5-10 WRPs per ha). This vegetation unit is however unlikely to have the capacity to support this density of WRPs and should in fact be mapped as having the same or slightly less value as the adjoining peppermint woodland given a lack of midstorey species (including peppermint) which WRPs generally favour.

The value of the peppermint and marri dominated vegetation to WRPs is however greatly diminished by the fact that they cover a relatively small area (<2 ha) and are isolated, being over 300 metres from the closest other continuous area of vegetation. The lack of WRP observations in these areas also suggests that the species cannot persist in this remnant or that they have not been able to populate it from other areas due to the distance of separation.

5.3 BLACK COCKATOO HABITAT ASSESSMENT

5.3.1 Black Cockatoo Breeding Habitat

Trees considered potentially suitable for black cockatoos to use as nesting habitat (using DotEE criteria – Commonwealth of Australia 2012, but ultimately subject to a suitable hollow being present or developing and a range of other factors) which were found within the subject site comprised the following species:

- Flooded Gum – *Eucalyptus rudis*
- Marri – *Corymbia calophylla;*

- Jarrah - *Eucalyptus marginata*; and
- Dead unidentified species.

It should be noted that the likelihood of particular tree species developing hollows suitable for black cockatoos to use for breeding varies considerably. On the Swan Coastal Plain tuart is most commonly used by Carnaby's black cockatoos for breeding (Johnstone & Kirkby 2011). Available data also suggests that jarrah (*Eucalyptus marginata*) rarely produces suitable hollows. Kirkby (2009) reports that from a database of 109 confirmed black cockatoo nest trees throughout an area of jarrah forest only six were located in jarrah trees.

A summary of the potential black cockatoo habitat trees observed within the subject site is provided in Table 2 below and their location shown in Figure 6.

The assessment identified 112 trees within the subject site with a DBH of ≥50cm. Twenty one of these trees were observed to contain hollows or possible hollows of some type with four being assessed at the time to possibly have hollows suitable for black cockatoos to use for nesting (i.e. large enough entrance into a suitably sized and orientated branch/truck).

No actual evidence (e.g. chew marks) of any hollows being used by black cockatoos for nesting (currently or previously) was seen. Common brushtail possums were observed in close proximity to some of these hollow trees during the nocturnal surveys and these animals may be occupying at least some of the potential hollows recorded.

Table 2: Summary of Potential Black Cockatoo Habitat Trees (DBH ≥50cm) within the Subject Site

Tree species	Total Number of Habitat Trees Recorded	Number of Trees with No Hollows Observed	Number of Trees with Hollows Considered Unsuitable for Nesting Black Cockatoos	Number of Trees with Hollows Considered Possibly Suitable for Nesting Black Cockatoos
Flooded Gum	73	65	8	0
Marri	22	22	0	0
Jarrah	8	4	4	0
Dead Unidentified Eucalyptus	9	0	5	4
Total	**117**	**91**	**17**	**4**

Additional details on each habitat tree observed can be found in Appendix D.

A review of publicly available data showed no previous black cockatoo breeding records in or near the subject site (DoP 2011). The closest breeding records shown in the DoP document are located 20 km south east of the subject site in Dalyellup.

Based on available mapping there is about 5,300 ha of remnant native vegetation within 10 kilometres of the subject site. Some of this vegetation is also likely to contain "potential" breeding habitat as defined by DotEE.

5.3.2 Black Cockatoo Foraging Habitat

Following is a list of the main flora species recorded within the subject site survey that are known to be or are potentially used as a direct food source (e.g. seeds, flowers, nectar, bark or grubs) by one or more species of black cockatoo:

- Flooded Gum – *Eucalyptus rudis*
- Marri – *Corymbia calophylla;*
- Jarrah - *Eucalyptus marginata*; and
- Peppermint – *Agonis flexuosa*.

It should be noted that some of the above-mentioned species (e.g., flooded gum and peppermint) while foraged upon on occasions are only likely to contribute a small proportion to any one birds diet relative to more favoured plant species such as marri. Areas of flooded gum and peppermint are therefore not generally regarded as representing quality foraging habitat. In addition, some tree species are also only represented by a small number of specimens (i.e. jarrah) and therefore do not contribute to the overall foraging resource to a significant degree.

The only actual evidence of foraging left by black cockatoos was in the form of chewed marri fruits at a few locations in the area of marri located in the central section of the subject site. This evidence was attributed to the forest red-tailed black-cockatoo or Baudin's black-cockatoo depending on the nature of the marks left on the fruit debris in each instance, examples of which is provided in Table 3.

The extent of what would be regarded as quality black cockatoo foraging habitat within the subject site is very small being comprised of about 0.2 ha of marri forest supported to a small degree by a limited number of scattered marri and jarrah trees.

Table 3: Foraging Evidence Examples

Foraging Evidence Description	Example Image
Marri Fruits – foraging activity attributed to the forest red-tailed black-cockatoo.	
Marri fruits – foraging activity attributed to Baudin's black cockatoo.	

Based on available mapping there is about 5,300 ha of remnant native vegetation within 10 kilometres of the subject site. Much of this is likely to also represent black cockatoo foraging habitat of some type.

5.3.3 Black Cockatoo Roosting Habitat

No evidence of black cockatoos roosting within trees located inside the subject site was observed during the survey period.

A review of the 2017 Great Cocky Count database shows no documented roost sites within the subject site, the closest active roost (2017) being about 3 km south. This site was in use by 20 white-tailed black cockatoos during the 2017 Great Cocky Count. Another nine documented roost sites (but not necessarily in current use) occur within 10 km of the subject site.

5.4 OPPORTUNISTIC FAUNA OBSERVATIONS

Opportunistic fauna observations are listed in Appendix B. A total of 37 native fauna species were observed (or positively identified from foraging evidence, scats, tracks,

skeletons or calls) within the subject site during the course of site visits. Five introduced species were also confirmed as being present. Most of the fauna species recorded are common, widespread bird species.

Evidence of two listed threatened black cockatoo species was observed (forest red-tailed black cockatoo and Baudin's black cockatoo – foraging evidence (chewed marri fruits) (see section 5.2.4.2). No evidence of any listed migratory or DBCA priority fauna species using the area was found.

6. CONCLUSION

The fauna assessment within the subject site was undertaken for the purposes of delineating and characterising the fauna and wetland habitats present and to identify potential impacts of the proposed development. Targeted searches for western ringtail possums and black cockatoo individuals and their habitat were also carried out.

An assessment of part of a Conservation Category Wetland which extends into the subject site suggests that it should be considered for re-classification as a Multiple Use Wetland given it is highly degraded and of an identical character to adjoining areas that are mapped as such.

Based on the results of the assessment and the scale of the proposed development, likely impacts on western ringtail possums and black cockatoos and/or their preferred habitat are considered to be non-existent/negligible.

Western ringtail possums appear not to be utilising vegetation with the subject site as habitat and overall, habitat quality in areas to be developed are low/very low.

Some areas of vegetation represent black cockatoo habitat, but the degree of use appears to be low with no breeding or roosting activity detected and only a very limited amount of quality foraging habitat being present.

The results of the assessment suggest that if the proposed development were to be referred to the DotEE for review under the *EPBC Act* that it would be regarded as "not a controlled action" given impacts on listed species or their habitat are not likely to be significant.

It is therefore concluded that there exists no major constraints relating to fauna, and in particular fauna of conservation significance with respect to the proposed development.

It is recommended that a fauna relocation program be implemented prior to and during clearing works to ensure direct impact on fauna (e.g. common brushtail possums) most likely to be encountered, are minimised.

7. REFERENCES

Commonwealth of Australia (2012). *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*.

Department of Planning (DoP) (2011). 'Greater Bunbury Region Scheme (GBRS) - potential habitat for the Carnaby's Black Cockatoo which may require further assessment". Department of Planning: Mapping and GeoSpatial Branch January 2011.

Johnstone, R. E. & Kirkby, T. (2011). Carnaby's Cockatoo (*Calyptorhynchus latirostris*), Baudin's Cockatoo (*Calyptorhynchus baudinii*) and the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) on the Swan Coastal Plain (Lancelin–Dunsborough), Western Australia. Studies on distribution, status, breeding, food, movements and historical changes. Report for the Department of Planning, Western Australia.

Kirkby, T. (2009). Results of Black Cockatoo Survey at Lot 2 Dawesville. Unpublished report for WA Limestone.

Shedley E. and Williams K. (2014). An assessment of habitat for western ringtail possum (*Pseudocheirus occidentalis*) on the southern Swan Coastal Plain. Unpublished report for the Department of Parks and Wildlife, Bunbury, Western Australia.

FIGURES

Legend

Subject Site

0 1 2 3 4 5

Kilometres

Fauna Assessment

Lot 9004 and Lot 9503
Eaton Drive - Eaton

Subject Site & Surrounds

Drawn: G Harewood
Date: Oct 2018
Scale: 1:50,000
Projection/Coordinate System: UTM/MGA Zone 50

Figure: 1

Legend

Subject Site

0 50 100 150 200

Metres

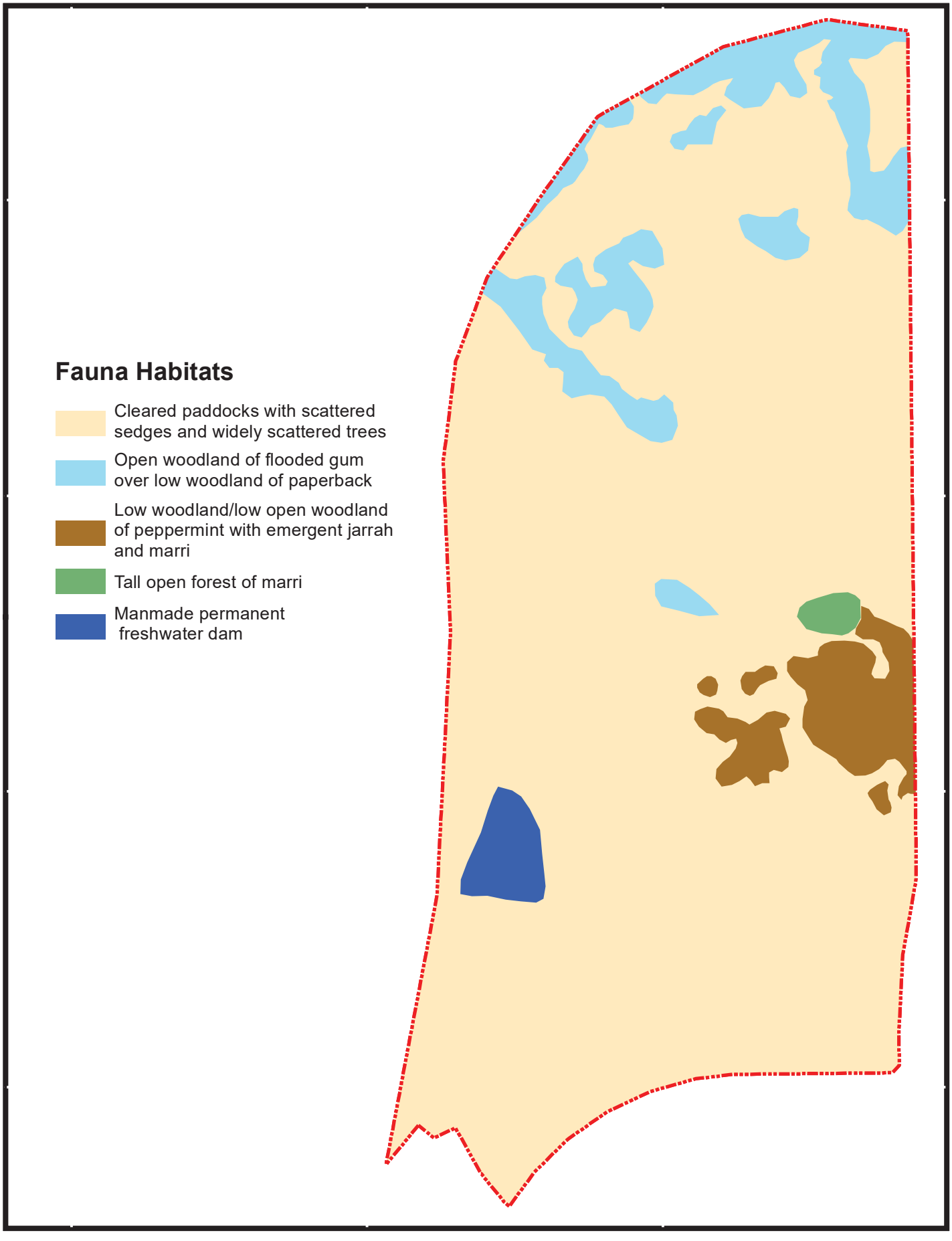
Fauna Assessment

Lot 9004 and Lot 9503
Eaton Drive - Eaton

Air Photo

Drawn: G. Harewood
Date: Nov 2018
Scale: 1:4,275
Projection/Coordinate System: UTM/MGA Zone 50

Figure: 2



Legend

Subject Site

N

0 50 100 150 200

Metres

Drawn: G. Harewood

Date: Nov 2018

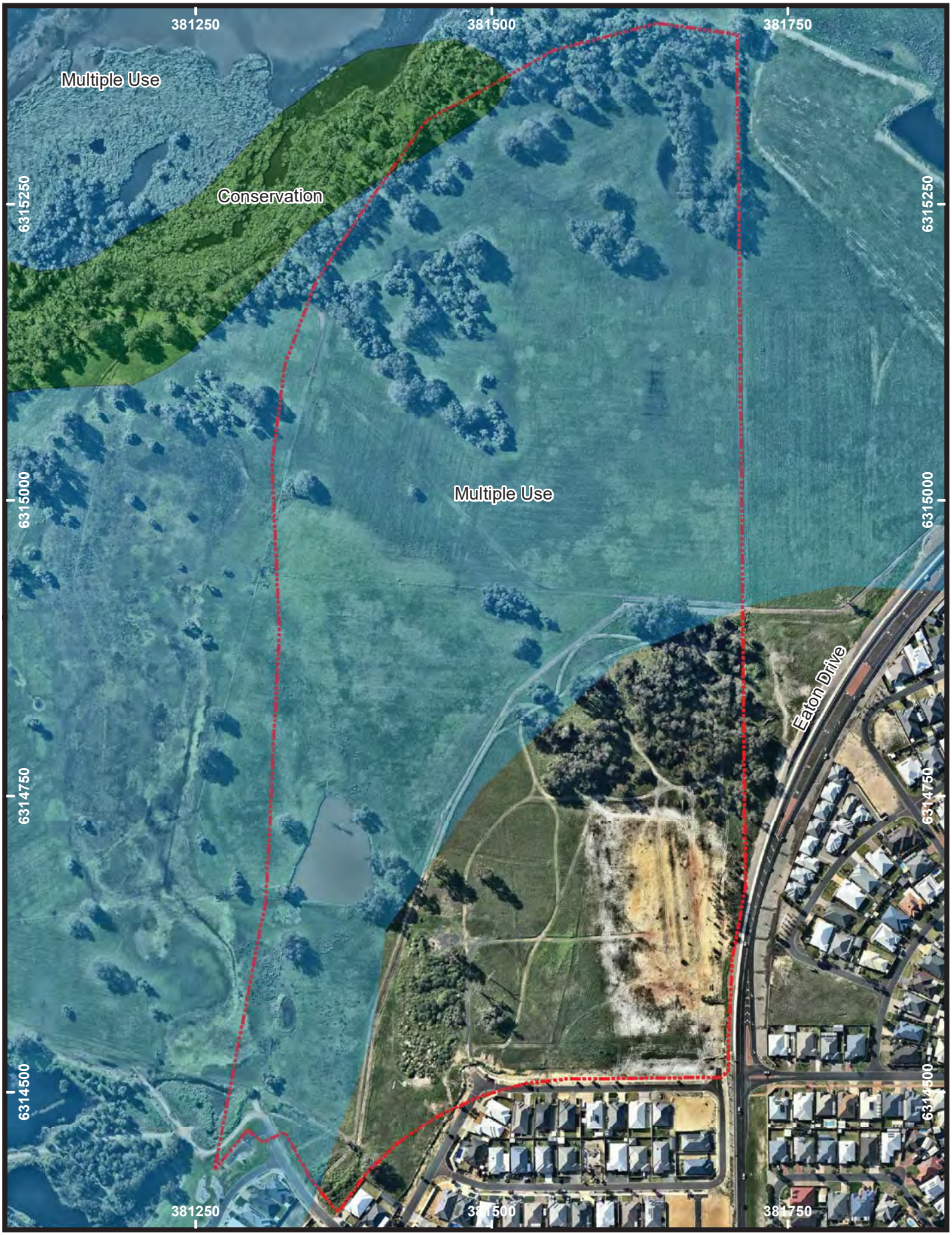
Scale: 1:4,275

Projection/Coordinate System: UTM/MGA Zone 50

Lot 9004 and Lot 9503
Eaton Drive - Eaton

Fauna Habitats

Figure: 3



Legend

Subject Site

0 50 100 150 200

Metres

Fauna Assessment

Drawn: G. Harewood

Date: Nov 2018

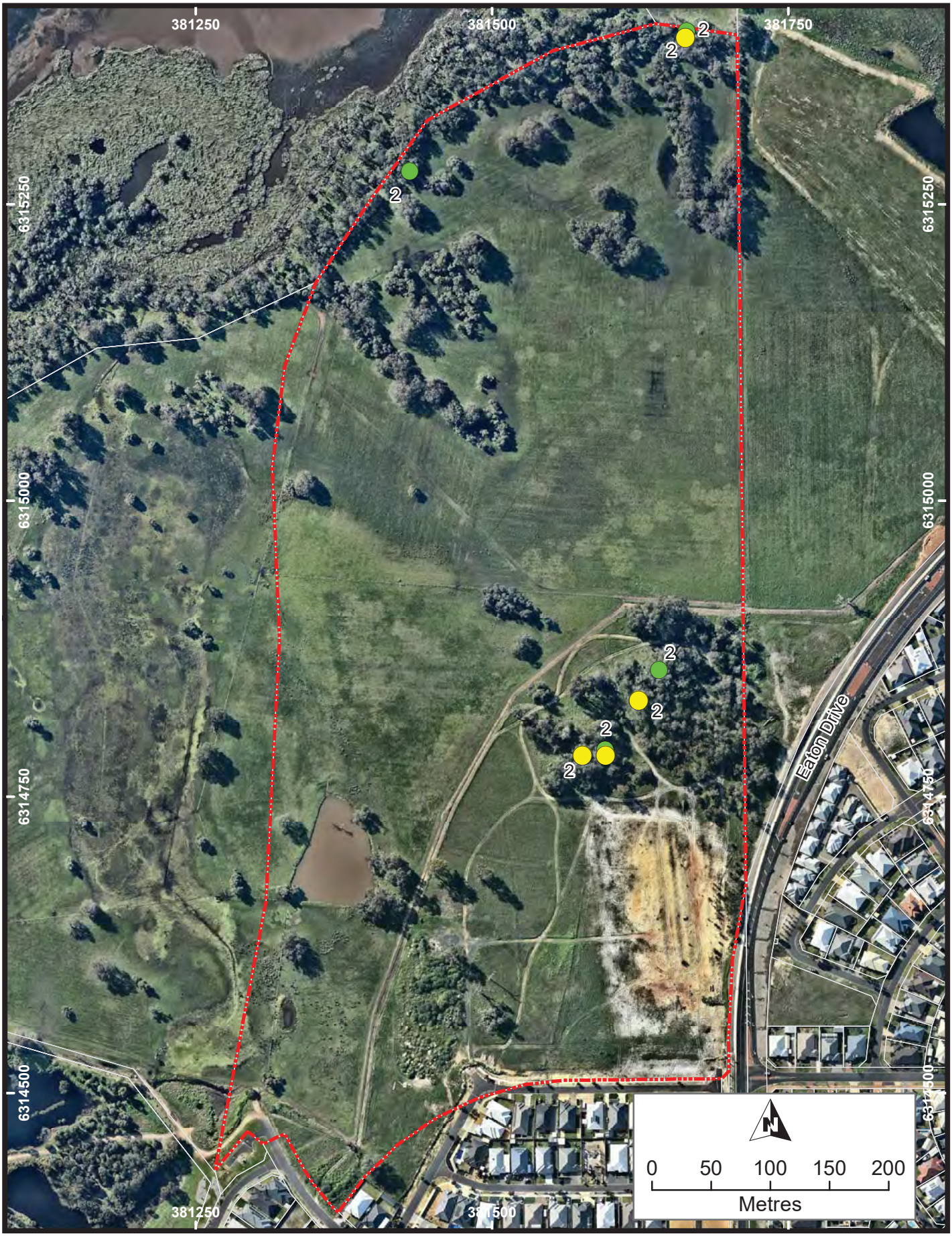
Scale: 1:4,275

Projection/Coordinate System: UTM/MGA Zone 50

Lot 9004 and Lot 9503
Eaton Drive - Eaton

Wetland Classifications

Figure: 4



Legend

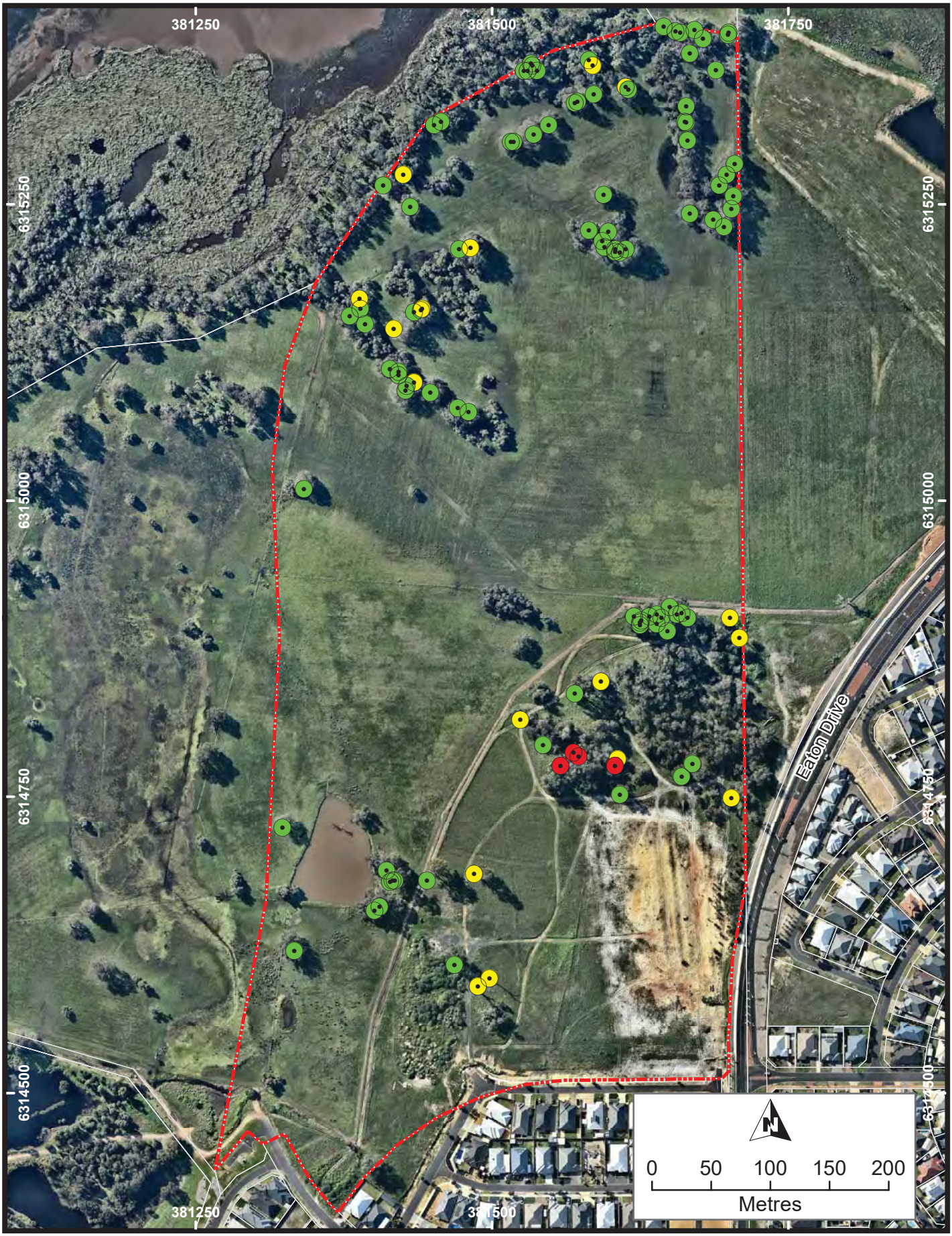
- Subject Site
- Night 1 - Common Brushtail Possum (8)
- Night 2 - Common Brushtail Possum (7)

Drawn: G. Harewood
Date: Nov 2018
Scale: 1:4,275
Projection/Coordinate System: UTM/MGA Zone 50

Lot 9004 and Lot 9503
Eaton Drive - Eaton

Possum Observations

Figure: 5



Legend

Subject Site

Habitat Tree - One or more hollows possibly suitable for black cockatoos

Habitat Tree - One or more hollows unsuitable for black cockatoos

Habitat Tree - No hollows seen

Fauna Assessment

Drawn: G. Harewood

Date: Nov 2018

Scale: 1:4,275

Projection/Coordinate System: UTM/MGA Zone 50

Lot 9004 and Lot 9503
Eaton Drive - Eaton

Habitat Trees (DBH >50cm)

Figure: 6

APPENDIX A

BLACK COCKATOO HABITAT TREE DETAILS

Habitat Trees
DBH >50cm
Datum - GDA94
Entrance Size Ranges - Small = >5cm, Medium = 5 to 10cm, Large = >10cm

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Estimated Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt001	50H	381709	6314884	Dead Unknown	15-20	>50	2+	Small & Medium	No signs	No signs	No	Internal dimensions of hollows unknown
wpt002	50H	381701	6314901	Dead Unknown	15-20	>50	2+	Small	No signs	No signs	No	Internal dimensions of hollows unknown
wpt003	50H	381665	6314901	Marri	15-20	>50	0					
wpt004	50H	381660	6314905	Marri	20+	>50	0					
wpt005	50H	381656	6314904	Marri	20+	>50	0					
wpt006	50H	381650	6314910	Marri	20+	>50	0					
wpt007	50H	381643	6314901	Marri	20+	>50	0					
wpt008	50H	381639	6314904	Marri	20+	>50	0					
wpt009	50H	381620	6314902	Marri	15-20	>50	0					
wpt010	50H	381626	6314899	Marri	20+	>50	0					
wpt011	50H	381625	6314897	Marri	20+	>50	0					
wpt012	50H	381625	6314895	Marri	20+	>50	0					
wpt013	50H	381639	6314896	Marri	20+	>50	0					
wpt014	50H	381633	6314902	Marri	15-20	>50	0					
wpt015	50H	381648	6314890	Marri	20+	>50	0					
wpt016	50H	381592	6314847	Jarrah	15-20	>50	2+	Small, Medium & Large	No signs	No signs	No	Internal dimensions of hollows unknown
wpt017	50H	381570	6314837	Marri	20+	>50	0					
wpt018	50H	381524	6314815	Jarrah	20+	>50	2+	Small	No signs	No signs	No	Internal dimensions of hollows unknown
wpt019	50H	381543	6314794	Marri	15-20	>50	0					
wpt020	50H	381558	6314776	Dead Unknown	10-15	>50	2+	Medium & Large (Cockatoo)	No signs	No signs	Yes	Internal dimensions of hollows unknown
wpt021	50H	381573	6314784	Dead Unknown	10-15	>50	2+	Medium & Large (Cockatoo)	No signs	No signs	Yes	Internal dimensions of hollows unknown
wpt022	50H	381569	6314787	Dead Unknown	15-20	>50	2+	Medium & Large (Cockatoo)	No signs	No signs	Yes	Internal dimensions of hollows unknown
wpt023	50H	381604	6314776	Dead Unknown	10-15	>50	2+	Medium & Large (Cockatoo)	No signs	No signs	Yes	Internal dimensions of hollows unknown
wpt024	50H	381606	6314782	Dead Unknown	5-10	>50	2+	Medium & Large	No signs	No signs	No	Internal dimensions of hollows unknown
wpt025	50H	381608	6314752	Jarrah	10-15	>50	0					
wpt026	50H	381660	6314767	Jarrah	10-15	>50	0					
wpt027	50H	381669	6314778	Jarrah	15-20	>50	0					
wpt028	50H	381702	6314749	Dead Unknown	10-15	>50	2+	Small & Medium	No signs	No signs	No	Internal dimensions of hollows unknown
wpt029	50H	381488	6314590	Dead Jarrah	15-20	>50	2+	Small, Medium & Large	No signs	No signs	No	Tree Martins nesting
wpt030	50H	381498	6314597	Dead Unknown	15-20	>50	2+	Small, Medium & Large	No signs	No signs	No	Kestrel nesting ?
wpt031	50H	381468	6314608	Marri	15-20	>50	0					
wpt032	50H	381485	6314685	Jarrah	15-20	>50	2+	Small, Medium & Large	No signs	No signs	No	Internal dimensions of hollows unknown
wpt033	50H	381445	6314679	Jarrah	20+	>50	0					
wpt034	50H	381414	6314678	Marri	15-20	>50	0					
wpt035	50H	381418	6314679	Marri	15-20	>50	0					
wpt036	50H	381416	6314679	Marri	15-20	>50	0					
wpt037	50H	381411	6314688	Marri	15-20	>50	0					
wpt038	50H	381401	6314654	Flooded Gum	15-20	>50	0					

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Estimated Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt039	50H	381405	6314657	Flooded Gum	15-20	>50	0					
wpt040	50H	381333	6314620	Flooded Gum	15-20	>50	0					
wpt041	50H	381323	6314724	Marri	15-20	>50	0					
wpt042	50H	381341	6315010	Flooded Gum	15-20	>50	0					
wpt043	50H	381480	6315075	Flooded Gum	15-20	>50	0					
wpt044	50H	381471	6315078	Flooded Gum	15-20	>50	0					
wpt045	50H	381448	6315091	Flooded Gum	15-20	>50	0					
wpt046	50H	381434	6315100	Flooded Gum	15-20	>50	2+	Small & Medium	No signs	No signs	No	Internal dimensions of hollows unknown
wpt047	50H	381427	6315093	Flooded Gum	15-20	>50	0					
wpt048	50H	381428	6315097	Flooded Gum	15-20	>50	0					
wpt049	50H	381421	6315106	Flooded Gum	15-20	>50	0					
wpt050	50H	381421	6315109	Flooded Gum	15-20	>50	0					
wpt051	50H	381414	6315111	Flooded Gum	15-20	>50	0					
wpt052	50H	381393	6315149	Flooded Gum	15-20	>50	0					
wpt053	50H	381380	6315156	Flooded Gum	15-20	>50	0					
wpt054	50H	381389	6315162	Flooded Gum	15-20	>50	0					
wpt055	50H	381388	6315170	Flooded Gum	15-20	>50	2+	Small	No signs	No signs	No	Internal dimensions of hollows unknown
wpt056	50H	381417	6315145	Flooded Gum	15-20	>50	2+	Small	No signs	No signs	No	Internal dimensions of hollows unknown
wpt057	50H	381434	6315159	Flooded Gum	15-20	>50	0					
wpt058	50H	381440	6315161	Flooded Gum	15-20	>50	0					
wpt059	50H	381441	6315162	Flooded Gum	15-20	>50	2+	Small	No signs	No signs	No	Internal dimensions of hollows unknown
wpt060	50H	381472	6315212	Flooded Gum	15-20	>50	0					
wpt061	50H	381482	6315213	Flooded Gum	15-20	>50	2+	Small & Medium	No signs	No signs	No	Internal dimensions of hollows unknown
wpt062	50H	381431	6315248	Flooded Gum	15-20	>50	0					
wpt063	50H	381408	6315266	Flooded Gum	15-20	>50	0					
wpt064	50H	381425	6315275	Flooded Gum	15-20	>50	2+	Small, Medium & Large	No signs	No signs	No	Large hollows too low - Internal dimensions of hollows unknown
wpt065	50H	381451	6315317	Flooded Gum	15-20	>50	0					
wpt066	50H	381457	6315320	Flooded Gum	15-20	>50	0					
wpt067	50H	381516	6315303	Flooded Gum	15-20	>50	0					
wpt068	50H	381518	6315303	Flooded Gum	15-20	>50	0					
wpt069	50H	381535	6315309	Flooded Gum	15-20	>50	0					
wpt070	50H	381548	6315317	Flooded Gum	15-20	>50	0					
wpt071	50H	381572	6315337	Flooded Gum	15-20	>50	0					
wpt072	50H	381570	6315336	Flooded Gum	15-20	>50	0					
wpt073	50H	381586	6315343	Flooded Gum	15-20	>50	0					
wpt074	50H	381527	6315363	Flooded Gum	15-20	>50	0					
wpt075	50H	381530	6315363	Flooded Gum	15-20	>50	0					
wpt076	50H	381534	6315367	Flooded Gum	15-20	>50	0					
wpt077	50H	381533	6315369	Flooded Gum	15-20	>50	0					
wpt078	50H	381538	6315363	Flooded Gum	15-20	>50	0					
wpt079	50H	381582	6315372	Flooded Gum	15-20	>50	0					
wpt080	50H	381585	6315367	Flooded Gum	15-20	>50	1	Small	No signs	No signs	No	Internal dimensions of hollows unknown

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	DBH (cm)	Number of Hollows	Estimated Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt081	50H	381613	6315349	Flooded Gum	15-20	>50	2+	Small	No signs	No signs	No	Internal dimensions of hollows unknown
wpt082	50H	381615	6315347	Flooded Gum	15-20	>50	0					
wpt083	50H	381645	6315400	Flooded Gum	15-20	>50	0					
wpt084	50H	381655	6315396	Flooded Gum	15-20	>50	0					
wpt085	50H	381659	6315395	Flooded Gum	15-20	>50	0					
wpt086	50H	381671	6315397	Flooded Gum	15-20	>50	0					
wpt087	50H	381678	6315390	Flooded Gum	15-20	>50	0					
wpt088	50H	381699	6315393	Flooded Gum	15-20	>50	0					
wpt089	50H	381700	6315395	Marri	15-20	>50	0					
wpt090	50H	381689	6315363	Flooded Gum	15-20	>50	0					
wpt091	50H	381667	6315377	Flooded Gum	15-20	>50	0					
wpt092	50H	381664	6315333	Flooded Gum	15-20	>50	0					
wpt093	50H	381663	6315320	Flooded Gum	15-20	>50	0					
wpt094	50H	381664	6315319	Flooded Gum	15-20	>50	0					
wpt095	50H	381665	6315304	Flooded Gum	15-20	>50	0					
wpt096	50H	381705	6315284	Flooded Gum	15-20	>50	0					
wpt097	50H	381698	6315275	Flooded Gum	15-20	>50	0					
wpt098	50H	381692	6315266	Flooded Gum	15-20	>50	0					
wpt099	50H	381704	6315257	Flooded Gum	15-20	>50	0					
wpt100	50H	381702	6315246	Flooded Gum	15-20	>50	0					
wpt101	50H	381696	6315231	Flooded Gum	15-20	>50	0					
wpt102	50H	381687	6315237	Flooded Gum	15-20	>50	0					
wpt103	50H	381667	6315242	Flooded Gum	15-20	>50	0					
wpt104	50H	381594	6315258	Flooded Gum	15-20	>50	0					
wpt105	50H	381582	6315228	Flooded Gum	15-20	>50	0					
wpt106	50H	381598	6315227	Flooded Gum	15-20	>50	0					
wpt107	50H	381593	6315219	Flooded Gum	15-20	>50	0					
wpt108	50H	381595	6315214	Flooded Gum	15-20	>50	0					
wpt109	50H	381604	6315210	Flooded Gum	15-20	>50	0					
wpt110	50H	381604	6315212	Flooded Gum	15-20	>50	0					
wpt111	50H	381608	6315209	Flooded Gum	15-20	>50	0					
wpt112	50H	381613	6315212	Flooded Gum	15-20	>50	0					

APPENDIX B

LIST OF FAUNA OBSERVED

List of Fauna Observed

LOT 9004 9503 EATON DRIVE - EATON

Compiled by Greg Harewood - Nov 2018

Class **Family** *Species*	Common Name	Conservation Status
Reptilia		
Scincidae Skinks		
Cryptoblepharus buchananii	Fence Skink	
Tiliqua rugosa	Bobtail	
Aves		
Anatidae Geese, Swans, Ducks		
Anas gracilis	Grey Teal	LC
Anas superciliosa	Pacific Black Duck	LC
Aythya australis	Hardhead	Bh LC
Chenonetta jubata	Australian Wood Duck	LC
Tadorna tadornoides	Australian Shelduck	LC
Podicipedidae Grebes		
Tachybaptus novaehollandiae	Australasian Grebe	LC
Ardeidae Herons, Egrets, Bitterns		
Ardea ibis	Cattle Egret	CA JA
Ardea novaehollandiae	White-faced Heron	LC
Threskiornithidae Iibises, Spoonbills		
Threskiornis molucca	Australian White Ibis	LC
Threskiornis spinicollis	Straw-necked Ibis	LC

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status
Accipitridae Kites, Goshawks, Eagles, Harriers		
Haliastur sphenurus	Whistling Kite	Bp LC
Falconidae Falcons		
Falco cenchroides	Australian Kestrel	LC
Rallidae Rails, Crakes, Swamphens, Coots		
Fulica atra	Eurasian Coot	LC
Columbidae Pigeons, Doves		
Ocyphaps lophotes	Crested Pigeon	LC
Streptopelia senegalensis	Laughing Turtle-Dove	Introduced
Psittacidae Parrots		
Cacatua roseicapilla	Galah	LC
Cacatua sanguinea	Little Corella	Introduced
Calyptorhynchus banksii naso	Forest Red-tailed Black-Cockatoo	S3 VU Bp LC
Calyptorhynchus baudinii	Baudin's Black Cockatoo	S2 EN Bp EN A3cde
Platycercus spurius	Red-capped Parrot	LC
Platycercus zonarius	Australian Ringneck	LC
Halcyonidae Tree Kingfishers		
Dacelo novaeguineae	Laughing Kookaburra	Introduced
Acanthizidae Thornbills, Geryones, Fieldwrens & Whitefaces		
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	Bh LC
Gerygone fusca	Western Gerygone	LC
Smicrornis brevirostris	Weebill	Bh LC

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status
Pardalotidae Pardalotes		
Pardalotus striatus	Striated Pardalote	LC
Meliphagidae Honeyeaters, Chats		
Anthochaera carunculata	Red Wattlebird	LC
Dicruridae Monarchs, Magpie Lark, Flycatchers, Fantails, Drongo		
Grallina cyanoleuca	Magpie-lark	LC
Rhipidura fuliginosa	Grey Fantail	LC
Rhipidura leucophrys	Willie Wagtail	LC
Campephagidae Cuckoo-shrikes, Trillers		
Coracina novaehollandiae	Black-faced Cuckoo-shrike	LC
Cracticidae Currawongs, Magpies & Butcherbirds		
Cracticus tibicen	Australian Magpie	LC
Cracticus torquatus	Grey Butcherbird	LC
Corvidae Ravens, Crows		
Corvus coronoides	Australian Raven	LC
Hirundinidae Swallows, Martins		
Hirundo nigricans	Tree Martin	LC
Mammalia		
Phalangeridae Brushtail Possums, Cuscuses		
Trichosurus vulpecula vulpecula	Common Brushtail Possum	LC
Macropodidae Kangaroos, Wallabies		
Macropus fuliginosus	Western Grey Kangaroo	LC

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Class **Family** *Species*	Common Name	Conservation Status
Canidae Dogs, Foxes		
Vulpes vulpes	Red Fox	Introduced
Bovidae Horned Ruminants		
Bos taurus	European Cattle	Introduced
Leporidae Rabbits, Hares		
Oryctolagus cuniculus	Rabbit	Introduced

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

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The conclusions are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of preparing the report. Also it should be recognised that site conditions, can change with time.

Within the limitations imposed by the scope of services, the field assessment and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

In preparing the report, the Author has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise stated in the report, the Author has not verified the accuracy of completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. The Author will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to the Author.

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