CLEARING PERMIT APPLICATION – SUPPORTING DOCUMENTATION

Lot 4201 Jindong-Treeton Road, Kaloorup

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1 INTRODUCTION

1.1 Background

Lot 4201 Jindong – Treeton Road, Kaloorup is located within the municipality of the City of Busselton, approximately mid-way between Cowaramup and Busselton, being approximately 14 kilometres (km) from each and approximately 200 km south of Perth (refer to **Figure 1**).

The applicant (Leeuwin Civil Pty Ltd) is currently extracting gravel from within Lot 4201 in accordance with a Development Approval (DA16/0376), issued by the City of Busselton on the 17th November 2016. The applicant is seeking to extract gravel from an additional 11.2 hectare (ha) area to the north of the existing quarry (herein referred to as the subject site) (refer to **Figure 2**).

The proposed extraction activities within the subject site will require the clearing of approximately 7.44 ha of woodland/open forest consisting of Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) trees. The area contains limited midstorey vegetation and groundcover is dominated by introduced grasses (Harewood 2021).

1.2 Scope and Purpose

This document has been prepared to support an application for a Clearing Permit (Area Permit) pursuant to Section 51E of the *Environmental Protection Act 1986* (EP Act). This document provides information regarding the current environmental condition of the subject site, including the predicted impacts of clearing and proposed management actions to mitigate predicted impacts. It also provides an assessment against the ten clearing principles and other relevant legislation and policy.

1.3 Relevant Legislation and Policy

Western Australian legislation relevant to this Clearing Permit application includes:

- *Biodiversity Conservation Act 2016*;
- *Environmental Protection Act 1986*;
- *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*; and
- *Rights in Water and Irrigation Act 1914* (RiWI Act).

2 BIOPHYSICAL ENVIRONMENT

During the compilation of this supporting documentation, a range of specific environmental and heritage issues were explored in relation to the subject site. This involved a detailed desktop assessment supported by a site visit and black cockatoo habitat assessment.

2.1 Topography, Landform and Soils

The current topography of the subject site can be described as gently sloping downwards to the north and northeast. Online mapping from the Department of Primary Industries and Regional Development's (DPIRD's) *Natural Resource Information* (NRInfo) database indicated an elevation ranging between approximately 62 metres (m) Australian Height Datum (AHD) in the south to 52 m AHD to the north of the subject site.

A review of the mapping associated with the *Australian Soil Resource Information System* (ASRIS) indicates that the subject site is primarily located within the Whicher Scarp System, part of the Donnybrook Sunkland Zone. This system is comprised of a low scarp and raised platform on the northern edge of the Donnybrook Sunkland, with sandy gravel and pale deep sands, loamy gravel and non-saline wet soils.

Two soil types have been mapped within the subject site with the majority of the site being the Yelverton deep sandy flats Phase with a small area to the west of the subject site consisting of the Yelverton wet valleys Phase (refer to **Figure 3**). These Phases are described as:

- Yelverton deep sandy flats Phase: Level to gently undulating raised shelf, lying 10-40 m above the Swan Coastal Plain. The soils are mainly sands.
- Yelverton wet valleys Phase: Broad U-shaped minor valleys with swampy floors. Soils on the valley floors are non-saline wet soils.

2.2 Acid Sulfate Soils

Acid Sulfate Soils (ASS) is the common name given to naturally occurring soil and sediment containing iron sulfides. They have become a potential issue in land development projects on the Swan Coastal Plain when the naturally anaerobic conditions in which they are situated are disturbed and they are exposed to aerobic conditions and subsequently oxidise. When oxidised, ASS produce sulfuric acid, which can result in a range of impacts to the surrounding environment. ASS that has oxidised and resulted in the creation of acidic conditions are termed "Actual ASS" (AASS), and those that have acid generating potential but remain in their naturally anaerobic conditions are termed "Potential ASS" (PASS).

ASS risk mapping (DWER 2021) indicates that the majority of the subject site is not classified as having any risk of ASS occurring. The Yelverton wet valleys Phase soil type is classified as having '*Moderate to low risk of ASS occurring within 3 m of the natural soil surface but high to moderate risk of ASS beyond 3 m of natural soil surface*'.

The Department of Water and Environmental Regulation (DWER) guidelines *Identification and investigation of acid sulfate soils and acidic landscapes* (2015) indicate that sites should be investigated for ASS within areas mapped as having a 'moderate to low' risk of ASS when '*soil or sediment disturbance of 100 m^3 or more with excavation from below the natural watertable is proposed*'.

This proposal involves the excavation of material largely outside of the areas mapped as having a 'moderate to low' risk of ASS. Furthermore, no excavations below the watertable or dewatering will be undertaken during excavation works. Accordingly, the potential impacts associated with ASS are expected to be low and therefore no further investigations regarding ASS are considered necessary.

2.3 Hydrology

2.3.1 Groundwater

The subject site is located within the Dunsborough – Vasse sub-area of the proclaimed Busselton-Capel Groundwater Management Area (DoW 2009). Pursuant to the RiWi Act, in proclaimed areas it is an offence to take water without an appropriate licence. This subarea is fed by three aquifers including the Superficial, Leederville and Surficial (Leeuwin) aquifers. The Superficial aquifer forms an unconfined aquifer beneath the Swan Coastal Plain with a thin saturated thickness of <5 m and is fully recharged and saturated during the winter months resulting in areas of waterlogging. The depth of the superficial layer decreases towards the Whicher Scarp, where it becomes a thin layer (0–3 m) over the laterite, underlain by the Leederville aquifer. The Leederville aquifer is multi-layered and typically 150 m thick. It is recharged by direct infiltration and leakage from the above superficial aquifer. Finally, the Surficial Aquifer refers to shallow groundwater abstraction from the Leederville aquifer, which includes soaks and dams excavated below the watertable (Schafer, D. Johnson, S. Kern, A. 2008).

To protect the State's drinking water resources the DWER has defined certain Priority Classification Areas within Public Drinking Water Source Areas (PDWSA) providing three levels of groundwater quality protection. These are based on the principles of risk avoidance (Priority 1), risk minimisation (Priority 2) and pollution limiting (Priority 3). The subject site does not lie within any existing or potential PDWSAs.

2.3.2 Surface Water

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 Semeniuk (1995) across the entire southwest. This mapping has been converted into a digital dataset that is maintained by the Department of Biodiversity, Conservation and Attractions (DBCA) and is referred to as the '*Geomorphic Wetlands South West '* 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,

Category	Description	Management Objectives
		• 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 by 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 functions, 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 subject site does not contain any defined natural surface water channels or wetlands, however it is located adjacent to a Multiple Use (MU) wetland (UFI 15). The closest Resource Enhancement (RE) wetland is located greater than 250 m from the subject site (refer to **Figure 4**).

2.4 Vegetation and Flora

2.4.1 Vegetation Types

The subject site is within the South West Forests Biogeographic Region (Thackway and Cresswell 1995, and Paczkowska and Chapman 2000). This region wraps around the Swan Coastal Plain, extending from Mogumber to the north to Cape Naturaliste in the south and as far east as Mount Barker. Although much of the region has been historically cleared for urban and agricultural purposes, there remains a high level of species richness and endemism.

Broadscale pre-European vegetation mapping of the area undertaken by Mattiske and Havel (1998) identified the Whicher Scarp Yelverton Uplands vegetation complex mapped over the majority of the site with a small area mapped as containing the Yelverton wet valley phase soil type. These complexes are described as:

- Yelverton Uplands: woodland of Sheoaks (*Allocasuarina fraseriana*), Jarrah (*Eucalyptus marginata),* Western Woody Pear (*Xylomelum occidentale*) and Candlestick Banksia (*Banksia attenuata*) on sandy slopes in the humid zone.
- Yelverton Valleys: woodland of A*llocasuarina fraseriana, Nuytsia floribunda, Agonis flexuosa, Banksia attenuata* on slopes and open forest of *Corymbia calophylla*, *Eucalyptus patens, Eucalyptus marginata subsp. Marginata* on the lower slopes and woodland of *Eucalyptus rudis, Melaleuca rhaphiophylla* on valley floors in the humid zone.

Mapping of the area undertaken by Beard (1979) identified the pre-European vegetation as consisting of the Chapman complex containing *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri) and *Eucalyptus wandoo* (Wandoo).

The mapped vegetation associations can be used to determine vegetation extent and status within the South West Forests Biogeographic Region (refer to **Table 3**). The EPA recognises vegetation associations that are not well represented in reserves as being 'significant'.

Table 3. Extent of pre-European vegetation remaining within the South West Forest IBRA region.

System	Pre-European (ha)	Current Extent (ha)	Remaining Extent (%)	Extent in Managed Lands (%)
IBRA Bioregion: South West Forests				
Yelverton uplands (Yd)	2,439	1,358	56	15
Yelverton valleys (Yw)	3,589	1,065	30	12
Local Government				
City of Busselton	146,478	60,014	41	69
Beard Vegetation Association				
1181 - Chapman	15,821	6,754	43	23

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. In consideration of **Table 3**, all vegetation associations present within the subject site have greater than 30% of the pre-European extent remaining denoting that they are well represented.

The remnant vegetation within the subject site is classified as being in a 'Degraded' to 'Completely Degraded' condition. This can be attributed to historical and ongoing disturbances such as livestock grazing and firewood collecting/logging (Harewood 2021). Previous anthropogenic disturbances have resulted in very limited midstorey and the absence of native understorey. The understorey is currently comprised of introduced grasses (Harewood 2021).

2.4.2 Ecological Communities

Threatened Ecological Communities (TECs) are defined by the DBCA and listed under the *Biodiversity Conservation Act 2016* (BC Act) and are defined as "Critically Endangered", "Endangered" or "Vulnerable".

Selected TECs are also afforded statutory protection at a Federal level pursuant to the *Environment Protection and Biodiversity Conservation Act 1998* (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".

In addition to listing as a TEC, a community may be listed as a Priority Ecological Community (PEC). An ecological community that is under consideration for listing as a TEC, but does not yet meet the survey criteria or has not been adequately defined, is placed on the list of PECs in Categories 1 to 5.

A search of the Protected Matters Database indicated that three TECs are likely to occur within 5 km of the subject site. This includes the Banksia Dominated Woodlands of the Swan Coastal Plain ecological community (Endangered), Shrublands on the southern Swan Coastal Plain ironstones (Endangered) and the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community (Critically Endangered).

The Shrubland on the southern Swan Coastal Plain ironstones TEC is located on seasonal wetlands on ironstone and heavy clay soils on the Swan Coastal Plain near Busselton. The absence of these soil types and lack of seasonal inundation indicates that this TEC is not present within the subject site.

To be considered as part of the Banksia Woodlands TEC, a patch of Banksia woodlands needs to meet a number of criteria as follows:

- Occurrence on the Swan Coastal Plain and immediately adjacent areas of the Whicher Scarp, Ridge Hill Shelf and Dandaragan Plateau in well-drained, low nutrient soils on sandplain landforms;
- The structure is that of a low woodland to forest;
- The canopy is commonly dominated by or co-dominated by *Banksia attenuata* and/or *Banksia menziesii*;
- The patch must include at least one of *Banksia attenuata*, *Banksia menziesii*, *Banksia ilicifolia* or *Banksia prionotes*; and
- The canopy may include emergent trees of *Eucalyptus marginata* or *Corymbia calophylla*.

The condition of the patch is also important in determining the presence of the Banksia Woodlands TEC. A patch must meet the criteria for 'Good' condition or better according to the Keighery (1994) Condition Scale. If a patch is rated as being in 'Good' condition, then it must be at least 2 ha in size.

Given the 'Degraded' to 'Completely Degraded' nature of the vegetation within the subject site and the 'very occasional' occurrence of Banksia observed during the black cockatoo habitat assessment (Harewood 2021), the Banksia Woodlands TEC is not present within the subject site.

To be considered as part of the Tuart Woodlands and Forest TEC, a patch of Tuart woodland needs to meet the following criteria:

- Occurrence on the Swan Coastal Plain;
- Primarily occurs on the Spearwood and Quindalup dune systems, but can also occur on the Bassendean Dunes and Pinjarra Plain. It can occur on the banks of rivers and wetlands. It occurs below the Darling and Whicher escarpments where they define a plateau to the east of the Swan Coastal Plain;
- Most often occurs as a woodland but can occur in a variety of structural forms, including closed forest, open forest, woodland, open woodland, closed mallee forest, open mallee forest, mallee woodland and open mallee woodland; and
- The dominant tree canopy species is Tuart (*Eucalyptus gomphocephala*). While other tree species may be present in the canopy, they are less abundant than Tuart.

The condition of the patch is also important in determining the present of the Tuart Woodlands and Forest TEC. A patch must meet the criteria for 'Good' condition or better according to the Keighery (1994) Condition Scale. If a patch is rated as being in 'Good' condition it must also be at least 2 ha in size.

Given the 'Degraded' to 'Completely Degraded' nature of the vegetation within the subject site and the presence of Jarrah (*Eucalyptus marginata)* and Marri *(Corymbia calophylla)* as the dominant species identified, the Tuart Woodlands and Forest TEC is not present within the subject site.

2.4.3 Ecological Linkages

The DBCA recognises several Regional Ecological Linkages that have been identified from studies of regionally significant natural areas (Molloy *et al*. 1999). While there is no statutory basis for regional ecological linkages, they have been recognised as an environmental policy consideration in EPA and planning policy over the last decade (EPA, 2009 and references therein).

The South West Regional Ecological Linkages (SWREL) Technical Report (Molloy et al. 2009) identifies an ecological linkage running through the subject site (refer to **Figure 5**). Vegetation associated with this

linkage does not extend to the north of the subject site with a distance of approximately 800 m to the nearest vegetation.

2.4.4 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. Current declared ESAs are listed in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*.

An ESA has been identified over the entirety of the subject site which is associated with a TEC. As discussed within **Section 2.4.2**, three TEC's are mapped within proximity of the subject site. Notwithstanding, in consideration of the subject site's vegetation condition and the absence of key indicator species associated with the mapped TECs, it is very unlikely to contain any of the mapped TECs.

2.4.5 Flora

A search for known rare and Priority flora within or in proximity to the subject site was undertaken through review of the following databases:

- DBCA's NatureMap database; and
- EPBC Act Protected Matters database.

A total of 19 Priority flora and 14 Declared Rare Flora species have been recorded within 5 km of the subject site. The EPBC Act Protected Matters database search returned three results for listed "Critically Endangered" species, 11 results for "Endangered" species and four results for "Vulnerable" flora species of which two have potential to occur within the subject site (refer to **Appendix A**). A summary of these species and their likelihood of occurring within the subject site based on preferred soil types is provided within **Table 4**.

Table 4. Database search results for significant flora known to occur within a 5 km radius of the subject site.

Species	DBCA Status	EPBC Act Status	Likelihood of Occurrence
Acacia flagelliformis	P4	-	Unlikely. Prefers sandy soils and winter wet areas.
Acacia semitrullata	P4	-	Possible. White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.
Actinotus whicheranus	P2	-	Unlikely. White sand pockets over laterite.
Andersonia ferricola	P1	-	Unlikely. Prefers white sand soils or red-brown loam
Banksia nivea subsp. uliginosa	T	Endangered	Unlikely. Sandy clay, gravel.
Banksia squarrosa subsp. argillacea	T	Vulnerable	Unlikely. Prefers sandy or gravel soils and winter wet flats
Boronia capitata subsp. gracilis	P3	-	Unlikely. White/grey or black sand. Winter-wet swamps.
Brachyscias verecundus	-	Critically Endangered	Unlikely. In a moss sward. On a granite outcrop.
Caladenia busselliana	-	Endangered	Unlikely. Sandy loam. Winter-wet swamps.

Species	DBCA Status	EPBC Act Status	Likelihood of Occurrence
Caladenia hueglii	-	Endangered	Unlikely. Grey or brown sand, clay loam.
Caladenia procera	-	Critically Endangered	Unlikely. Rich clay loam. Alluvial loamy flats
Calothamnus lateralis var. crassus	P3	-	Unlikely
Calothamnus quadrifidus subsp. teretifolius	P4	-	Unlikely
Chordifex gracilior	P3	-	Unlikely. Peaty sand. Swamps.
Cyathochaeta teretifolia	P3	-	Unlikely. Grey sand, sandy clay. Swamps, creek edges.
Daviesia elongata	T	Vulnerable	Unlikely. Prefers sandy soils
Diuris micrantha	T	Vulnerable	Unlikely. Brown loamy clay. Winter-wet swamps.
Drakaea elastica	T	Endangered	Unlikely. winter-wet swamps.
Drakaea micrantha	T	Vulnerable	Unlikely. Prefers white-grey sandy soils
Eucalyptus x phylacis	T	Endangered	Unlikely. Laterite, loam over granite. Coastal areas.
Gastrolobium papilio	T	Endangered	Unlikely. Sandy clay over ironstone and laterite. Flat plains.
Grevillea brachystylis subsp. grandis	T	Critically Endangered	Unlikely. Brown lateritic clay loam soils.
Hakea oldfieldii	P3	-	Unlikely
Isopogon formosus subsp. dasylepis	P3	-	Unlikely. Prefers sand, sandy clay, gravelly sandy soils
Lambertia echinata subsp. occidentalis	T	Endangered	Unlikely. Red clay or sand over laterite. Seasonally wet flats.
Lasiopetalum laxiflorum	P3	-	Unlikely
Loxocarya magna	P3	-	Possible. Prefers Sand, loam, clay, ironstone
Petrophile latericola	T	Endangered	Unlikely. Red lateritic clay. Winter-wet flats.
Pimelea ciliata subsp. longituba	P3	-	Unlikely. Grey sand over clay, loam
Schoenus sp. Jindong	P1	-	Unlikely. Red loamy soils. Stream banks.
Stylidium leeuwinense	P4	-	Unlikely. Grey to black peaty sand. Winter-wet habitats.
Synaphea decumbens	P3	-	Unlikely. Sand over laterite.
Synaphea hians	P3	-	Unlikely. Sandy soils. Rises.
Synaphea petiolaris subsp. triloba	P3	-	Unlikely. Swampy areas, clay flats.
Verticordia densiflora var. pedunculata	T	Endangered	Unlikely. Grey/yellow sand, sandy loam. Winter-wet low-lying areas.
Verticordia plumosa var. ananeotes	T	Endangered	Unlikely. Sandy loam. Seasonally inundated plains.
Verticordia plumosa var. vassensis	T	Endangered	Unlikely. White/grey sand. Winter-wet flats.

Two species of conservation significance, *Loxocarya magna* and *Acacia semitrullata*, have the potential to occur within the subject site based on preferential soil types. These species are either shrubs or herbs. In consideration of the previous land use (intensive livestock grazing) which has resulted in the absence of under and mid storey native vegetation, it is considered unlikely that the subject site contains flora species of conservation significance.

2.5 Fauna

A search of the DBCA NatureMap database was undertaken to establish whether species declared as 'Rare or likely to become extinct' (Threatened), 'Birds protected under an international agreement' (International Agreement (IA)) and 'Other specially protected fauna' (S) as listed under the BC Act have been recorded in proximity to the subject site. Four fauna species listed as 'Critically Endangered', four species listed as 'Endangered' and five species listed as 'Vulnerable' have been recorded within a 5km radius of the subject site. Additionally, the DBCA Priority fauna database identified two Priority 4 and one other specially protected fauna within this zone (refer to **Table 5**).

Table 5. Significant fauna potentially occurring within the subject site as identified by State and Commonwealth database searches.

Species	DBCA Status	EPBC Act Status	Likelihood of Occurrence
Botaurus poiciloptilus (Australasian Bittern)	T	Endangered	Unlikely, no potential habitat
Calidris canutus (Red Knot)	T	Endangered	Unlikely, no potential habitat
Calidris ferruginea (Curlew Sandpiper)	T	Critically Endangered	Unlikely, no potential habitat
Calyptorhynchus banksii naso (Forest Red Tailed Black Cockatoo)	T	Vulnerable	Possible, presence of preferred habitat
Calyptorhynchus baudinii (Baudin's Cockatoo)	T	Endangered	Possible, presence of preferred habitat
Calyptorhynchus latirostris (Carnaby's Cockatoo)	T	Endangered	Possible, presence of preferred habitat
Dasyurus geoffroii (Chuditch)	T	Vulnerable	Unlikely, no potential habitat
Engaewa pseudoreducta (Margaret River Burrowing Crayfish)	T	-	Unlikely, no potential habitat
Engaewa reducta (Dunsborough Burrowing Crayfish)	T	Critically Endangered	Unlikely, no potential habitat
Falco hypoleucos (Grey Falcon)	T	Vulnerable	Unlikely, no potential habitat
Hydromys chrysogaster (Water-rat)	P4	-	Unlikely, no potential habitat
Isodon fusciventer (Quenda)	P4	-	Unlikely, no potential habitat
Numenius madagascariensis (Eastern Curlew)	T	Critically Endangered	Unlikely, no potential habitat
Phascogale tapoatafa subsp. Wambenger (South-western Brush-tailed Phascogale)	S	-	Possible, presence of habitat
Pseudocheirus occidentalis (Western Ringtail Possum)	T	Critically Endangered	Possible, known to occur in the area

Species	DBCA Status	EPBC Act Status	Likelihood of Occurrence
Sternula nereis nereis (Australian Fairy Tern)	T	Vulnerable	Unlikely, no potential habitat
Westralunio carteri (Carter's Freshwater Mussel)	T	Vulnerable	Unlikely, no potential habitat

Migratory bird species have been omitted from this assessment as while they may infrequently visit the subject site, they are unlikely to rely on it for their survival.

Of the abovementioned conservation significant species, based on known occurrences and preferred habitat types, five species have the potential to occur within the subject site. A further assessment to determine the likelihood of these species occurring within the subject site is provided below.

Black Cockatoos (Forest Red-tailed, Carnaby's and Baudin's)

A black cockatoo habitat survey was conducted within Lot 4201 in February 2021 (refer to **Appendix B**). The results are presented below.

Breeding Habitat

Trees considered potentially suitable for black cockatoos to use as nesting habitat (subject to a suitable hollow being present and other factors) which were found within the subject site are comprised of the following species (Harewood 2021):

- Marri - *Corymbia calophylla*; and
- Jarrah - *Eucalyptus marginata*.

A summary of the potential black cockatoo breeding trees (using DAWE criteria i.e. any suitable tree species with a DBH ≥ 50 cm (Commonwealth of Australia 2012)) observed within the subject site is provided below and their location shown in **Figure 2**.

Table 6. Summary of potential black cockatoo breeding habitat trees (DBH ≥50cm) (Harewood 2021).

Area	Total Number of Habitat Trees	Number of Trees with No Hollows Observed	Number of Trees with Hollows Considered Unsuitable for Nesting	Number of Trees with Hollows Considered Possibly Suitable for Nesting
Subject site	377	353	24	0
Outside of subject site	538	498	33	7
Total	915	851	57	7

The assessment identified a total of 377 trees with a DBH of >50 cm within the subject site (refer to **Figure 2).** Most trees (353, ~94%) were not observed to contain hollows of any size. Twenty four trees (~6%) contained one or more possible hollows considered not to be suitable for black cockatoos to use for nesting purposes (Harewood 2021). The subject site has been specifically located to avoid any trees containing hollows considered possibly suitable for black cockatoo nesting.

Foraging Habitat

The following flora species 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 and were recorded within the area surveyed within Lot 4201:

- Marri – *Corymbia calophylla*;
- Jarrah – *Eucalyptus marginata*;
- Bull Banksia – *Banksia grandis* (occur on a very occasional basis within the subject site);
- Sheoak – *Allocasuarina fraseriana* (occur on a very occasional basis within the subject site); and
- Peppermint – *Agonis flexuousa* (occur on a very occasional basis within the subject site).

Evidence of all three species of black cockatoos foraging within the subject site in the form of chewed fruits from Marri trees was observed at a number of locations.

Roosting

No evidence of black cockatoos roosting within within the subject site was observed during the survey. The closest documented roost site, recorded during the 2019 great Cocky Count, is located approximately 6 km northeast of the subject site (Harewood 2021).

Pseudocheirus occidentalis (Western Ringtail Possum)

The Western Ringtail Possum (WRP) is endemic to the south- west of Western Australia. It was formerly patchily distributed through the near-coastal southwest from approximately 120 km southeast of Geraldton to the southern edge of the Nullabor Plain and its range has now substantially contracted (How *et al.*, 1978; de Tores *et al.*, 2005; Jones, 2004). Extant populations now occur mostly on the coastal strip from Yalgorup (100km south of Perth) to Waychinicup National Park (just east of Albany), with isolated inland populations in the lower Collie River valley, Harvey River valley and at Perup (Manjimup) (de Tores *et al.,* 2005; Jones, 2004; Jones, 2007).

With the exception of the few isolated inland populations in Eucalypt forests, the WRP generally occurs in coastal Peppermint (*Agonis flexuosa*) woodlands, Peppermint/Tuart (*Eucalyptus gomphocephala*) woodlands, and Peppermint/Eucalypt woodlands associations, with the highest density populations occurring within the Busselton to Dunsborough coastal strip (de Tores *et al.,* 2005; Jones *et al.,* 2007). WRPs preferred native vegetation type is likely to be peppermint dominated forest, mixed tuart forest with peppermint, and shrublands with preferred foraging species, particularly fringing vegetation around wetlands with dense melaleucas, kunzeas and acacias (Shedley and Williams 2014). Mapping of suitable WRP habitat undertaken by Shedley and Williams (2014) indicates the subject site has 'Medium' suitability for WRP.

The subject site has been described as containing very occasional Peppermint trees, with the majority of the vegetation consisting of regrowth Jarrah and Marri trees. With limited midstorey and the absence of native understorey, the subject site does not provide preferential habitat for WRPs. Although a few Peppermint trees were identified within the subject site during the black cockatoo habitat assessment, they are limited in number and are unlikely to support WRPs. Accordingly, while WRPs could visit the subject site it is unlikely they are dependent on it for their survival.

South-western Brush-tailed Phascogale (*Phascogale tapoatafa* subsp. *wambenger*)

The south-western brush-tailed phascogale (brush-tailed phascogale) is listed as a 'specially protected' species pursuant to the BC Act. The species has been observed in dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover. Brush-tailed phascogales are

nocturnal arboreal carnivores that forage for food under the bark of trees (van Dyck and Strahan 2008). This feeding mode and the use of tree hollows for shelter results in a preference for large trees, particularly Jarrah and Marri with over 95 cm DBH (Rhind 1996).

During the black cockatoo habitat assessment, no evidence of brush- tailed phascogales was recorded as being observed in any of the hollows inspected (Harewood 2021). However, the subject site may contain trees with hollows that could be suitable for the south-western Brush-tailed Phascogales. Therefore, based on the habitat present there is the potential that this species could occur within the subject site.

2.6 Aboriginal Heritage

All Aboriginal sites in Western Australia are provided protection under the *Aboriginal Heritage Act 1972* in which it is an offence for anyone to excavate, damage, destroy, conceal or in any way alter an Aboriginal site without the Minister's permission.

An online search for relevant Aboriginal heritage information was undertaken using the Department of Planning, Lands and Heritage (DPLH) *Aboriginal Heritage Inquiry System* (AHIS) that incorporates both the heritage site register and the heritage survey database. The Aboriginal Heritage Site Register is maintained pursuant to Section 38 of the *Aboriginal Heritage Act 1972* and contains information on over 22,000 listed Aboriginal sites throughout Western Australia.

Results of the database search revealed that no Aboriginal heritage sites are present within the subject site or within 5 km of the subject site.

3 CLEARING ASSESSMENT

3.1 Avoidance and Mitigation Measures

To avoid potential impacts to black cockatoos, the applicant has considered alternative locations for the proposed action within Lot 4201. However, the remaining gravel resource is restricted to the vegetated portions of Lot 4201, denoting that vegetation clearing is unavoidable. The black cockatoo habitat assessment was undertaken to identify the quality of habitat within the vegetated areas. Accordingly, the clearing footprint within the subject site has been specifically designed to avoid any trees with hollows possibly suitable for black cockatoo breeding. This has required a reduction in the original clearing footprint by approximately 1.5 ha. Furthermore, the best quality habitat (in terms of potential breeding tree density and foraging habitat quality) has been retained and will be protected in perpetuity.

Given that the clearing area has historically been subject to livestock grazing (resulting in a reduced mid and understorey), the key environmental attributes are the mature habitat trees. These are interspersed throughout the clearing footprint and therefore areas of increased environmental value could not be reasonably isolated. Accordingly, it is considered that no other feasible avoidance measures can be implemented within the clearing footprint.

In order to reduce the impacts from the proposed action, the following management measures will be implemented as described below.

Fauna Management

The proposed management actions to mitigate potential impacts to fauna include:

- Peg/flag areas to be cleared to avoid any unnecessary disturbance to adjacent vegetation;
- Plan clearing such that it does not result in the creation of isolated remnants of native vegetation that have no ecological corridors to allow fauna movement to adjacent areas;
- Restrict all vehicle use to designated roads and access tracks;
- Enforce compliance with onsite speed limits at all times;
- During clearing, a qualified fauna expert will be present to direct clearing operators, particularly when clearing trees that are occupied by fauna, to ensure that these are cleared in a way that allows the animals to safely mobilise to adjacent areas. In addition, they will supervise any animal handling and the rescue of injured animals should this be required; and
- No stockpiling of topsoil or other material is to occur outside of the clearing boundary.

Weed and Pathogen Management

The proposed management actions to mitigate potential impacts associated with weeds and pathogens include:

- All earthmoving and ground engaging equipment will be inspected and cleaned of vegetation, mud and soil prior to entry and exit of the clearing area.

In addition to the proposed management measures, the subject site will be cleared progressively over approximately five years. Subsequently, it is not proposed that the entire 7.44 ha will be cleared as a single exercise but rather at an approximate rate of two hectares per annum. Clearing will commence in a west to east direction, which will enable fauna to naturally disperse into the adjoining vegetation.

3.2 Offsets

It is proposed to conserve in perpetuity 11.3 ha of non-secure remnant native vegetation within Lot 4201 Jindong-Treeton Road, Kaloorup. This vegetation is located approximately 100 m west of the subject site. Vegetation within this area is comprised of the same predominant vegetation type as the subject site, described as: Yelverton Uplands: woodland of Sheoaks (*Allocasuarina fraseriana*), Jarrah (*Eucalyptus marginata*), Western Woody Pear (*Xylomelum occidentale*) and Candlestick Banksia (*Banksia attenuata*) on sandy slopes in the humid zone.

The black cockatoo habitat assessment (Harewood 2021) included this area. The assessment identified 425 trees within this area with a DBH of >50cm. Twenty seven (27) trees contained apparent or obvious hollows, all of which were assessed as being unlikely to be suitable for black cockatoos to currently use for nesting purposes. Six (6) trees were assessed as containing one or more hollows potentially suitable for black cockatoos to use for nesting purposes as they appeared to be of a suitable size and with a favourable orientation. None of the hollows showed any conclusive evidence of actual use by black cockatoos.

3.3 Assessment Against the Ten Clearing Principles

Any clearing of native vegetation requires a permit in accordance with Part V of the EP Act, except where an exception applies under Schedule 6 of the EP Act or is prescribed by regulation in the *Environmental Protection (Clearing Native Vegetation) Regulations 2004*.

The clearing of 7.44 ha of native vegetation will require an approved clearing permit. Clearing applications are assessed against the Ten Clearing Principles outlined in Schedule 5 of the EP Act. These principles aim to ensure that all potential impacts resulting from the removal of native vegetation can be assessed in an integrated manner.

An examination of the Ten Clearing Principles applied against a desktop investigation, review of previous assessments and results from a recent site visit is provided below.

a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

The remnant vegetation within the subject site is classified as 'Degraded' to 'Completely Degraded' as it has been subject to considerable historical and ongoing disturbances such as livestock grazing and firewood collecting/logging (Harewood 2021).

Mapping (Mattiske and Havel 1998) indicates the original vegetation complexes within the subject site would have include vegetation of the Whicher Scarp Yelverton Uplands and valley systems vegetation complexes which are described as a 'woodland of Sheoaks (*Allocasuarina fraseriana*), Jarrah (*Eucalyptus marginata),* Western woody pear (*Xylomelum occidentale*) and Candlestick banksia (*Banksia attenuata*) on sandy slopes in the humid zone' and 'woodland of A*llocasuarina fraseriana, Nuytsia floribunda, Agonis flexuosa, Banksia attenuata* on slopes and open forest of *Corymbia calophylla*, *Eucalyptus patens, Eucalyptus marginata subsp. marginata* on the lower slopes and woodland of *Eucalyptus rudis, Melaleuca rhaphiophylla* on valley floors in the humid zone' respectively. Based on aerial photography and results from the black cockatoo habitat assessment (Harewood 2021), the majority of the subject site is almost completely covered with a Jarrah (*Eucalyptus marginata*) – Marri (*Corymbia calophylla*) woodland/open forest and contains very limited midstorey vegetation. Native ground cover vegetation is absent with introduced grasses dominating.

A search of the Protected Matters Database indicated three TECs are likely to occur within 5 km of the subject site. As discussed within Principle (d), the vegetation condition and absence of key indicator

species denotes that it is very unlikely that any vegetation communities of conservation significance occur within the subject site.

As discussed under Principle (b), the subject site does contain foraging and potential breeding habitat for black cockatoo species. The proposal will entail the clearing of 324 potential habitat trees with no hollows and 24 potential habitat trees with hollows that are unlikely to be suitable for breeding. The subject site has been designed to avoid any trees with hollows possibly suitable for black cockatoo breeding. Overall, the fauna habitats present are highly degraded given most areas appear to have been subject to considerable historical and ongoing disturbances such as livestock grazing and firewood collecting/logging. Much of the vegetation appears to be regrowth from historical clearing. The total fauna assemblage within the subject site is likely to be extremely depauperate as a consequence (Harewood 2021).

On a local and regional scale, the subject site may contain suitable habitat for black cockatoos and the South-western Brush-tailed Phascogale. No other species of conservation significance are expected to regularly utilise habitat within the subject site.

While it is noted that a Regional Ecological Linkage is mapped through the subject site, the nearest vegetation to the north along the axis line is over 780 m away. It is therefore unlikely that this linkage is utilised by nonarboreal fauna to traverse the landscape. Furthermore, in association with the identified linkage, 11.3 ha of native vegetation will be retained within Lot 4201. Accordingly, while the proposed clearing will result in a marginal reduction of vegetation in association with the linkage, it is unlikely to compromise its existing values as an ecological linkage for avian fauna, especially in consideration of its highly degraded condition.

The clearing will result in the removal of approximately 7.44 ha of degraded vegetation consisting mainly of Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) with limited midstorey and no native understorey. The removal of this vegetation along with the retention of 11.3 ha of native vegetation within Lot 4201 is unlikely to significantly impact on the biological diversity of the area.

b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

As discussed in **Section 2.5**, a black cockatoo habitat assessment (Harewood 2021) was undertaken over the remnant vegetation within Lot 4201. Evidence of all three species of black cockatoos foraging within the subject site was observed. Seven trees with suitable hollows for black cockatoos were identified, none of which are within the subject site. The assessment identified a total of 324 trees with a DBH of >50 cm within the subject site (refer to **Figure 2**). Most (353, ~94%) were not observed to contain hollows of any size. Twenty four trees (~6%) contained one or more possible hollows considered not to be suitable for black cockatoos to use for nesting purposes (Harewood 2021).

Approximately 11.3 ha of native vegetation within Lot 4201, including six trees with possibly suitable hollows for black cockatoos will be retained. Furthermore, available mapping indicates that there is approximately 11,800 ha of remnant native vegetation within a 12 km radius of the subject site, the majority of which is described as Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) woodland, associated with black cockatoo breeding and foraging habitat. On this basis, the removal of 7.44 ha of highly degraded vegetation will constitute a 0.06% reduction of foraging and potential breeding habitat within a 12 km radius of the subject site. Accordingly, the proposed clearing will not have a significant impact on the availability of breeding and foraging habitat for black cockatoos on a local or regional scale.

A search of the DBCA's NatureMap and EPBC Act Protected Matters database indicates that along with the three species of black cockatoo, both WRP and South-western Brush-tailed Phascogales have the potential to occur within the subject site.

During the black cockatoo habitat assessment (Harewood 2021), Peppermint trees were identified on a very occasional basis, and it was noted the subject site does not support midstorey or understorey vegetation. Given the absence of suitable habitat for the species, it is considered unlikely that WRP occur within the subject site.

Brush-tailed phascogales have been observed in dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover. Brush-tailed phascogales are nocturnal arboreal carnivores that forage for food under the bark of trees (van Dyck and Strahan 2008). This feeding mode and the use of tree hollows for shelter results in a preference for large trees, particularly Jarrah and Marri with over 95 cm DBH (Rhind 1996).

During the black cockatoo habitat assessment, no evidence of brush- tailed phascogales was recorded in any of the hollows inspected. However, the subject site may contain trees with hollows that could be suitable for the species. Therefore, based on the habitat present there is the potential that this species could occur within the subject site.

The proposal will result in a marginal reduction of foraging habitat within the local area (reduction of 0.06%) and therefore is considered to be at variance to this Principle.

c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

A search for known rare and Priority flora within or in proximity to the subject site was undertaken through a review of the relevant databases (refer to **Section 2.4.5**). Two species of conservation significance have the possibility of occurring within the subject site based on preferential soil type and population location. These species are either shrubs or herbs. In consideration of the previous land use (intensive livestock grazing) which has resulted in very limited mid storey and no native understorey vegetation, it is considered unlikely that the subject site contains flora species of conservation significance.

Therefore, the proposal is not considered to be at variance to this Principle.

d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threated ecological community.

A search of the DBCAs TEC database and the EPBC Act Protected Matters database within a 5 km proximity to the subject site, revealed the possible presence of three TECs. This includes the Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region ecological community (Endangered), Shrublands on southern Swan Coastal Plain ironstones (Endangered) and the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community (Critically Endangered).

The subject site does not contain the floristic composition or structure consistent with the identified TECs, as the vegetation is in a highly degraded condition and homogenous in terms of species diversity. On this basis, the subject site is not likely to comprise or be necessary for the maintenance of a TEC. Therefore, the proposal is not considered to be at variance to this Principle.

e) Native vegetation should not be cleared if it is a remnant of native vegetation in an area that has been extensively cleared.

Mapping (Mattiske and Havel 1998) indicates the original vegetation complexes within the subject site included vegetation of the Whicher Scarp Yelverton Uplands and Valley systems vegetation complexes which are described as a 'woodland of Sheoaks (*Allocasuarina fraseriana*), Jarrah (*Eucalyptus marginata),* Western Woody Pear (*Xylomelum occidentale*) and Candlestick banksia (*Banksia attenuata*) on sandy slopes in the humid zone' and 'woodland of *Allocasuarina fraseriana, Nuytsia floribunda, Agonis flexuosa, Banksia attenuata* on slopes and open forest of *Corymbia calophylla*, *Eucalyptus patens, Eucalyptus marginata subsp. marginata* on the lower slopes and woodland of *Eucalyptus rudis, Melaleuca rhaphiophylla* on valley floors in the humid zone' respectively. Based on an assessment of aerial photography and the black cockatoo habitat assessment (Harewood 2021), the subject site is comprised of a Jarrah (*Eucalyptus marginata*) – Marri (*Corymbia calophylla*) woodland/open forest and contains little midstorey vegetation. Native ground cover vegetation is absent with introduced grasses dominating.

The EPA has a target to retain all remaining areas of each complex where less than 30% remains (EPA 2003a). Both the Yelverton Upland and Valley vegetation complexes have greater than 30% representation and therefore they are deemed to be well represented.

In addition, the vegetation to be cleared does not contain the floristic composition or structure consistent with either vegetation complex. Accordingly, the clearing will not impact the extent of either the Yelverton Uplands or Valley complexes.

Furthermore, as the subject site does not comprise high biological diversity, it is not likely to impact upon significant habitat for fauna indigenous to Western Australia, priority or threatened flora and is not likely to comprise a PEC or TEC. On this basis the subject site is not considered to be a significant remnant within an extensively cleared landscape and this proposal is not considered to be at variance to this Principle.

f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

The subject site does not contain any defined natural surface water channels or wetlands, however it is located adjacent to a MU wetland (UFI 15). MU wetlands are assessed as possessing few remaining ecological attributes and functions. While such wetlands can still contribute to regional or landscape ecosystem management, including hydrological function, they are considered to have low intrinsic ecological value. Typically, they have minimal or no native vegetation remaining (less than 10%). Accordingly, there is no legislative requirement to protect or retain them and as such MU wetlands do not usually preclude development.

The management objective for MU wetlands is to preserve the hydrological functions in the context of the proposed development (EPA 2008). The proposal has been strategically located and designed to avoid any direct impacts to the mapped MU wetland whilst also maintaining existing hydrological functions, thereby complying with the management objectives associated with MU wetlands.

The proposal will not involve clearing of any riparian native vegetation or clearing of vegetation in proximity to a watercourse.

The proposed clearing is unlikely to cause any impact to the MU wetland and therefore, the proposal is not considered to be at variance to this Principle.

g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

The subject site is located within the following land phases:

- Yelverton deep sandy flats Phase: Level to gently undulating raised shelf, lying 10-40 m above the Swan Coastal Plain. The soils are mainly sands.
- Yelverton wet valleys Phase: Broad U-shaped minor valleys with swampy floors. Soils on the valley floors are non-saline wet soils.

The Yelverton deep sandy flats Phase is mapped as having 0% of the Phase as a high to extreme water erosion risk with 13% of the Yelverton wet valley Phase having a high to extreme water erosion risk. The risk (albeit low) will be mitigated by the retention of all stormwater within the excavated pits at any time and the use of retention and infiltration basins during excavation works.

The Yelverton deep sandy flats Phase is mapped as having 86% of the Phase as a high to extreme wind erosion risk with 24% of the Yelverton wet valley Phase having a high to extreme wind erosion risk. Although a high portion of wind erosion risk has been identified, this will be mitigated by limiting the size of the cells (2 ha open at any time) and the progressive rehabilitation. A Dust and Water Management Plan will be developed to support the Extractive Industry Licence application prior to works commencing. Accordingly, the proposed clearing is not at variance to this Principle.

h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

The subject site is located on privately owned land which has previously been cleared for agricultural activities. Land use abutting the boundaries of the subject site is rural based, including a range of grazing and pastoral land uses.

The subject site does not provide a continuous vegetative link to any nearby or adjacent conservation areas, with the closest conservation area located approximately 2 km south (Bushland Protection Area 100019898). Based on this, the proposed clearing is not at variance to this Principle.

i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface of underground water.

The subject site is within the proclaimed Busselton – Capel Groundwater Area. The subject site does not contain any defined natural surface water channels and is not located within a 'Public Drinking Water Source' area.

The current water cycle within the subject site consists of inputs from rainwater being largely infiltrated on site. The development will maintain this process, with all surface water being retained within the excavated areas to enable infiltration through stormwater pits to ensure water quality is maintained.

Furthermore, no interactions with groundwater are expected with a minimum of 1 m separation to groundwater to be maintained post excavation.

It is therefore unlikely that the proposed clearing will reduce the quality of surface or groundwater and therefore the proposal is not at variance to this Principle.

j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

Given the topography, soil type and proposed excavation design, it is considered unlikely that the proposed clearing will increase the incidence of flooding and therefore the proposal is not at variance to this Principle.

4 ENVIRONMENTAL MANAGEMENT MEASURES

In order to mitigate potential impacts associated with the proposed clearing activities, the following site specific management activities will be implemented.

4.1 Vegetation and Flora Management

4.1.1 Background

Vegetation clearing will be required only for the area marked in the Clearing Plan (refer to **Figure 2**). Vegetation will be cleared with mechanical equipment such as an excavator.

4.1.2 Management Plan

In order to ensure that the potential impacts associated with vegetation clearing is minimised as far as practicable, the following management measures are proposed.

Table 7. Vegetation clearing and construction management plan.

Vegetation Clearing and Construction	
Responsibility • Project Manager. • Contractors.	
Objectives • Prevent clearing outside of the designated clearing boundaries. • Minimise soil erosion and sedimentation.	
Potential Impacts • Clearing native vegetation. • Inadvertent additional clearing of vegetation. • Impacts on fauna species. • Weed and disease invasion.	
Management Strategies	**Timing**
• All site personnel will be inducted on the clearing controls for this project.	• Prior to clearing.
• Vegetation required to be removed will be marked with white flagging tape to avoid any unnecessary disturbance to adjacent vegetation.	• Prior to clearing.
• The flagging tape which demarcates the trees to be cleared will be checked on a daily basis to ensure that the clearing requirements remain clearly visible.	• During clearing.
• No movement of vehicles or personnel within the vegetation retention areas will be allowed.	• During clearing.
• No stockpiling of topsoil or other material is to occur outside of the clearing boundary.	• During clearing.
• The location and area of vegetation cleared will be checked on a daily basis.	• During clearing.
Performance Indicators • No unauthorised clearing is undertaken.	

- No fauna is directly impacted during clearing.

Monitoring

- Daily checks to ensure that clearing is consistent with the approved clearing boundaries.
- Daily checks to ensure that no fauna have been impacted.

Reporting

- The DWER will be notified immediately if clearing beyond the approved clearing boundaries occurs, or if any fauna is directly impacted. Work may be stopped and the site inspected by DWER or LGA and a remedy determined before work restarts.
- A review of the performance indicators will be undertaken upon completion of clearing to determine the success of the vegetation clearing management measures. Where non-compliances are identified the DWER will be notified accordingly.

4.2 Fauna Management

4.2.1 Background

As discussed in **Section 2.5**, there is potential for species of conservation significance including black cockatoos and brush-tailed phascogales, to occur within the subject site. On this basis, the implementation of appropriate management measures is required during clearing works.

4.2.2 Management Plan

A series of management and mitigation measures have been developed as documented below which will further support the protection of the above species of conservation significance within the subject site.

Table 8. Fauna management plan.

Species of conservation significance	
Responsibility • Project Manager. • Contractors.	
Objectives • Minimise direct and indirect impacts to species of conservation significance during clearing. • Long term preservation of species of conservation significance within the local area.	
Potential Impacts • Direct impacts to species of conservation significance during clearing works.	

Management Strategies
• Clearing will be undertaken as per **Section 4.1.2.**
• The following clearing protocols will be implemented to avoid impacts to species of conservation significance:
  ○ Immediately prior to any clearing commencing a qualified expert will undertake a pre-clearing inspection of the clearing zone and nearby areas to confirm the location of tree hollows currently or likely to be occupied by South-western Brush-tailed phascogale or black cockatoos and mark these trees as necessary.
  ○ The suitably qualified expert will be onsite when clearing is being undertaken. The qualified expert should also have a current authorisation to take or disturb threatened species from the
	Timing
	• During clearing.
	• Prior to and during clearing.

Minister for Environment or delegate under section 40 of the BC Act. ○ Prior to clearing commencing, the clearing operators will be briefed by the same qualified expert who will explain to operators which areas of the subject site are more sensitive in relation to the presence of species of conservation significance and the techniques and approaches that will need to be employed during the clearing operations. An agreed means of communication between the operators and the qualified expert will be established prior to clearing commencing to ensure the safety of the species of conservation significance. Operators will be required to abide by this agreed means of communication at all times. ○ The qualified expert will be present on the subject site to direct clearing operators, particularly when clearing trees are occupied by species of conservation significance to ensure that these are cleared in a way that allows the animals to safely mobilise to adjacent areas. In addition, they will supervise any animal handling and the rescue of injured animals should this be required. ○ In the event that a species of conservation significance is observed in a tree that is about to be cleared and there is a tree/area marked for retention near the tree which is to be cleared then the tree will be gently lowered to the ground to enable the animal to safely evacuate. The animal/s will be encouraged to move towards and occupy the trees to be retained. ○ If operators encounter injured species of conservation significance during clearing then the qualified expert will make arrangements for the care and welfare of the injured animals.	
• In relation to the qualified expert, the following requirements need to be met: ○ They need to have appropriate equipment to administer emergency care to any injured or displaced animals. ○ They need to have a suitable care facility of their own or have made prior arrangements with an appropriate carer who can rehabilitate any injured animals. ○ They need to be able to recognise suitable habitat for species of conservation significance adjacent to the clearing. ○ They need to have demonstrated capture and animal handling experience.	• Prior to clearing.
Performance Indicators • Environmental induction and species of conservation significance clearing protocols implemented. • No fauna deaths occur during clearing works. • Disturbance on site is limited to the approved trees.	
Reporting • The DWER will be notified immediately if clearing beyond the approved clearing boundaries occurs, or if any individuals are directly impacted.	

- A report prepared by the qualified expert will be provided to DWER to advise on implementation of this plan and report on species of conservation significance and or handled.

4.3 Weed and Pathogen Management

4.3.1 Background

Phytophthora dieback is a soil-borne pathogen recognised as a major threat to Australian vegetation, and in particular, the vegetation and dependent biota within the southwest botanical province. *Phytophthora* dieback is known to reduce the health and species diversity of native vegetation and the disease is listed as a key threatening process under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

While there has been no formal mapping of the extent of weed incursion or dieback disease caused by the pathogen *Phytophthora cinnamomi* within the subject site, weed and pathogen management measures are recommended to minimise the spread and potential infestation. The key objective associated with weed and pathogen management is to prevent the introduction and/or spread of weeds or disease throughout the subject site.

4.3.2 Management Plan

The following controls will be implemented within the subject site to assist in the control of weed and pathogen movement.

Table 9. Weed and pathogen management plan.

***Phytophthora* dieback and weed management**	
Responsibility • Project Manager. • Contractors.	
Objectives • To prevent the introduction and spread of *Phytophthora* dieback and weeds within the subject site.	
Potential Impacts • Introduction and spread of disease (*Phytophthora* spp.) and weeds.	
Management Strategies	**Timing**
• Training will be provided to all personnel during the safety and environment induction course. This will include an explanation of the specific requirements relating to *Phytophthora* dieback management.	• Prior to clearing.
• All earthmoving and ground engaging equipment will be inspected and cleaned of vegetation and soil prior to entry and exit of the subject site.	• Prior to clearing.
• Access to the subject site during clearing will be restricted to the proposed roads and driveways. No other access points should be established. The access location and vehicle inspection point should be clearly sign posted.	• Prior to and during clearing.
• As far as practicable, onsite drainage shall be designed to contain runoff from roads within disturbed areas.	• Prior to and during clearing.

• Reduce vehicle and plant movement into and within the site as much as possible, particularly during wet conditions. • All material will be transported such that soil shall not fall from the vehicle onto road verges.	• During clearing. • During and post clearing.
Performance Indicators • Hygiene procedures are adopted during clearing.	
Monitoring • Project Manager will ensure disease hygiene and control measures are implemented during clearing works.	
Reporting • Contractors to confirm that *Phytophthora* dieback and weed management measures have been implemented.	

4.4 Dust Management

4.4.1 Background

Dust is the generic term used to describe solid airborne particles generated and dispersed into the air by processes such as vegetation clearing and construction works.

The closest sensitive receptor is a residential dwelling located approximately 615 m north-east of the subject site.

4.4.2 Environmental Management

The Table below specifies appropriate avoidance and mitigation measures to be implemented prior to, during and after clearing works to minimise potential impacts associated with dust emissions.

Table 10: Dust management plan

Dust management	
Responsibility • Project Manager. • Contractors.	
Objectives • Minimise dust lift during clearing activities. • No adverse impacts to sensitive receptors or agricultural crops.	
Potential Impacts • Amenity and nuisance impacts on nearby sensitive receptors. • Loss of visibility onsite. • Depositing on adjacent agricultural crops. • Adverse effects on human health.	
Management Strategies	**Timing**
• Notice to be erected at the site, providing contact details of the person to be contacted regarding the works. • Areas of land cleared and the period of time they remain cleared are to be kept to a minimum.	• Prior to clearing. • All times

• Water trucks are to water down unsealed roads during operation to reduce dust lift.	• As required
• Transport of dust-prone material will be via covered trucks or dampened prior to transport to prevent dust lift during transport.	• During soil transport
• Water trucks are to be available at all times during construction activities to water the site on observation of dust lift.	• As required
• Vehicle speeds will be restricted to no more than 10km/hr on the site to minimize dust lift off.	• At all times
• All complaints regarding dust and erosion are to be recorded within a Complaints Register immediately.	• As required
• All complaints regarding dust are to be addressed within 24 hours if severe, or within one week for minor complaints.	• As required
Performance Indicators	
• No dust lift or signs of dust deposition near property boundary.	
Monitoring	
• Project Manager will ensure dust control measures are implemented during clearing and excavation works.	
Reporting	
• Contractors to confirm that dust management measures have been implemented.	

4.5 Water Management

4.5.1 Surface Water

The subject site does not contain any defined natural surface water channels or wetlands with the nearest RE wetland located greater than 250 m to the north of the subject site. It is, however, located adjacent to an MU wetland. The current water cycle within the subject site consists of inputs from rainwater being largely infiltrated on site. The clearing and subsequent excavation will maintain this process, with all surface water being retained within the excavated areas to enable infiltration through stormwater pits to ensure water quality to the drains is maintained.

4.5.2 Groundwater

Groundwater will not be extracted or dewatered during the operation of the quarry and therefore, no impacts to groundwater levels are proposed.

Maximum excavation levels will be determined to ensure a 1 m separation from the maximum groundwater level will be maintained at all times.

The extraction and processing of sand and gravel is a chemically free operation with the liquids used being lubricants for machinery and refuelling. There will be no storage of chemicals or fuel on site.

4.6 Hydrocarbons and Dangerous Goods Management

4.6.1 Background

Hydrocarbons are the only dangerous goods that will be utilised within the proposed clearing area. However, storage of hydrocarbons on the subject site will not occur.

Servicing of machinery and equipment will not occur onsite further reducing the possibility of contamination.

4.6.2 Management Plan

There is the minor possibility for soil and water contamination as a result of an incidental hydrocarbon leakages or spills during the operation of machinery. In such instances the management measures specified below will be implemented.

Table 11. Hydrocarbon and dangerous goods management measures.

Timing	Management Measure
During quarry operations	Mobile refuelling of equipment and vehicles will be undertaken following set procedures to acceptably minimise the risk of spills and to ensure adequate containment and bunding is in place to contain any spills that may occur.
	Spill kits containing appropriate equipment for control, containment and cleanup of hydrocarbon and chemical spills will be available in appropriate locations onsite and maintained.
	No vehicles or machinery are to be serviced or cleaned within the extraction area.

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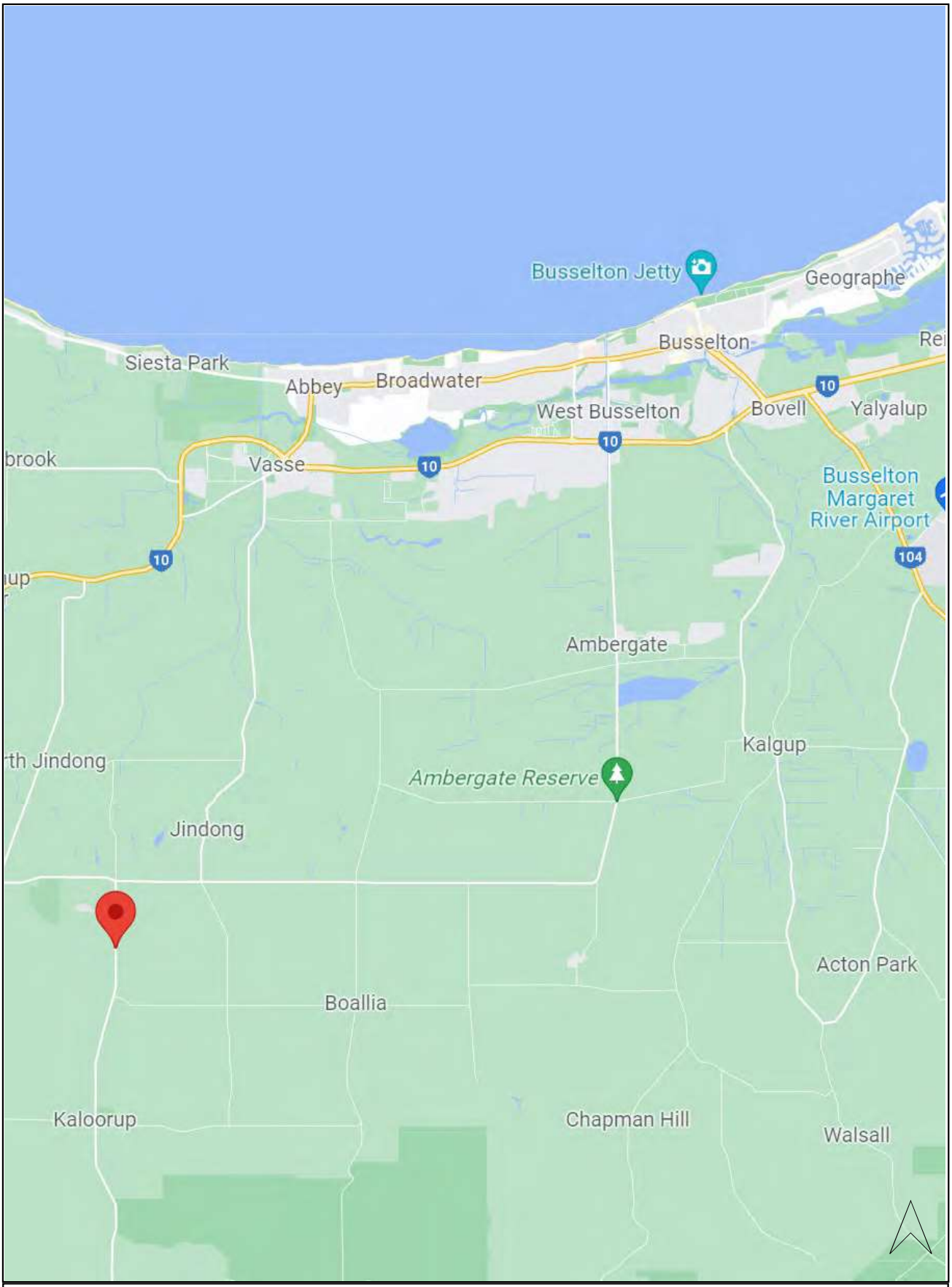
FIGURES



PROJECT	Lot 4201 Jindong– Treeton Road, Kaloorup	Project Number	Drawing Number	Revision
DRAWING TITLE	Figure 1 – Site Locality	2154	Figure 1	A
CLIENT	Leeuwin Civil Pty Ltd	Designed PN Drawn PN	Checked Approved	
		Date Local Authority Sheet 1 of 1	6/10/2021 City of Busselton	

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PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 2 - Clearing plan
CLIENT	Leeuwin Civil Pty Ltd

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Project Number	2172	Designed	HB
Drawing Number	Figure 2	Drawn	HB
Revision	A	Checked	
Date	29/10/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton

PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 3 - Soil Landscape Mapping
CLIENT	Leeuwin Civil Pty Ltd

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Project Number	2172	Designed	PN
Drawing Number	Figure 3	Drawn	PN
Revision	A	Checked	
Date	3/11/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton

PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 4 - Wetland mapping
CLIENT	Leeuwin Civil Pty Ltd

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Project Number	2172	Designed	HB
Drawing Number	Figure 4	Drawn	HB
Revision	A	Checked	
Date	29/10/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton

PROJECT	Lot 4201 Jindong – Treeton Road, Kaloorup
DRAWING TITLE	Figure 5 - Ecological Linkage Mapping
CLIENT	Leeuwin Civil Pty Ltd

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Project Number	2154	Designed	HB
Drawing Number	Figure 5	Drawn	HB
Revision	A	Checked	
Date	29/09/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton

APPENDIX A – EPBC PROTECTED MATTERS SEARCH REPORT

Table 1. Database search results for significant flora known to occur within a 5 km radius of the subject site.

Species	DBCA Status	EPBC Act Status	Likelihood of Occurrence
Banksia nivea subsp. uliginosa	T	Endangered	Unlikely. Sandy clay, gravel.
Banksia squarrosa subsp. argillacea	T	Vulnerable	Unlikely. Prefers sandy or gravel soils and winter wet flats
Brachyscias verecundus	-	Critically Endangered	Unlikely. In a moss sward. On a granite outcrop.
Caladenia busselliana	-	Endangered	Unlikely. Sandy loam. Winter-wet swamps.
Caladenia hueglii	-	Endangered	Unlikely. Grey or brown sand, clay loam.
Caladenia procera	-	Critically Endangered	Unlikely. Rich clay loam. Alluvial loamy flats
Daviesia elongata	T	Vulnerable	Unlikely. Prefers sandy soils
Diuris micrantha	T	Vulnerable	Unlikely. Brown loamy clay. Winter-wet swamps.
Drakaea elastica	T	Endangered	Unlikely. winter-wet swamps.
Drakaea micrantha	T	Vulnerable	Unlikely. Prefers white-grey sandy soils
Eucalyptus x phylacis	T	Endangered	Unlikely. Laterite, loam over granite. Coastal areas.
Gastrolobium papilio	T	Endangered	Unlikely. Sandy clay over ironstone and laterite. Flat plains.
Grevillea brachystylis subsp. grandis	T	Critically Endangered	Unlikely. Brown lateritic clay loam soils.
Lambertia echinata subsp. occidentalis	T	Endangered	Unlikely. Red clay or sand over laterite. Seasonally wet flats.
Petrophile latericola	T	Endangered	Unlikely. Red lateritic clay. Winter-wet flats.
Verticordia densiflora var. pedunculata	T	Endangered	Unlikely. Grey/yellow sand, sandy loam. Winter-wet low-lying areas.
Verticordia plumosa var. ananeotes	T	Endangered	Unlikely. Sandy loam. Seasonally inundated plains.
Verticordia plumosa var. vassensis	T	Endangered	Unlikely. White/grey sand. Winter-wet flats.

Table 2. Significant fauna potentially occurring within the subject site as identified by State and Commonwealth database searches.

Species	DBCA Status	EPBC Act Status	Likelihood of Occurrence
Botaurus poiciloptilus (Australasian Bittern)	T	Endangered	Unlikely, no potential habitat
Calidris canutus (Red Knot)	T	Endangered	Unlikely, no potential habitat
Calidris ferruginea (Curlew Sandpiper)	T	Critically Endangered	Unlikely, no potential habitat
Calyptorhynchus banksii naso (Forest Red Tailed Black Cockatoo)	T	Vulnerable	Possible, presence of foraging habitat
Calyptorhynchus baudinii (Baudin's Cockatoo)	T	Endangered	Possible, presence of foraging habitat
Calyptorhynchus latirostris (Carnaby's Cockatoo)	T	Endangered	Possible, presence of foraging habitat
Dasyurus geoffroii (Chuditch)	T	Vulnerable	Unlikely, no potential habitat
Engaewa pseudoreducta (Margaret River Burrowing Crayfish)	T	-	Unlikely, no potential habitat
Engaewa reducta (Dunsborough Burrowing Crayfish)	T	Critically Endangered	Unlikely, no potential habitat
Falco hypoleucos (Grey Falcon)	T	Vulnerable	Unlikely, no potential habitat
Numenius madagascariensis (Eastern Curlew)	T	Critically Endangered	Unlikely, no potential habitat
Pseudocheirus occidentalis (Western Ringtail Possum)	T	Critically Endangered	Unlikely, unsuitable habitat
Sternula nereis nereis (Australian Fairy Tern)	T	Vulnerable	Unlikely, no potential habitat
Westralunio carteri (Carter's Freshwater Mussel)	T	Vulnerable	Unlikely, no potential habitat

Migratory bird species have been omitted from this assessment as while they may infrequently visit the subject site, they are unlikely to rely on it for their survival given its degraded condition.

APPENDIX B – BLACK COCKATOO HABITAT ASSESSMENT

Habitat Requirements

Black cockatoos are known to utilise a range of habitats and plant taxa (both native and non-native) for foraging. Marri (*Corymbia calophylla*) and Jarrah (*Eucalyptus marginata*) woodlands are particularly important to Baudin's cockatoo and Forest Red-tailed black cockatoo and proteaceous heaths (i.e. shrublands dominated by vegetation of Banksia spp., Hakea spp. and Grevillea spp.) is also preferential habitat for Carnaby's Cockatoo (DSEWPaC 2012). This type of preferential habitat for Carnaby's cockatoo is absent from the subject site, with vegetation restricted to marri / jarrah woodland with understorey virtually absent.

Available mapping indicates that there is approximately 12,000 ha of remnant native vegetation within a 12 km radius of the subject site, the majority of which is described as jarrah (*Eucalyptus marginata*) and marri (*Corymbia calophylla*) woodland, associated with black cockatoo breeding and foraging habitat. On this basis, the removal of 7.44 ha of highly degraded vegetation will constitute a 0.06% reduction of foraging and potential breeding habitat within a 12 km radius of the subject site.

Survey Results

A black cockatoo habitat survey was conducted within Lot 4201 in February 2021 (Harewood 2021). The results are presented below.

Trees considered potentially suitable for black cockatoos (Carnaby's cockatoo (*Calyptorhynchus latirostris*), Baudin's cockatoo (*C. baudinii*) and Forest Red-tailed cockatoo (*C. banksii naso*) to use as nesting habitat (subject to a suitable hollow being present and other factors) which were found within the subject site are comprised of the following species (Harewood 2021):

- Marri - *Corymbia calophylla*; and
- Jarrah - *Eucalyptus marginata*.

A summary of the potential black cockatoo breeding trees (using DAWE criteria i.e. any suitable tree species with a DBH ≥ 50 cm (Commonwealth of Australia 2012)) observed within the subject site is provided below and their location shown in **Figure 1**.

Table 1. Summary of potential black cockatoo breeding habitat trees (DBH ≥50cm) (Harewood 2021).

Area	Total Number of Habitat Trees	Number of Trees with No Hollows Observed	Number of Trees with Hollows Considered Unsuitable for Nesting	Number of Trees with Hollows Considered Possibly Suitable for Nesting
Subject site	377	353	24	0
Outside of subject site	538	498	33	7
Total	915	851	57	7

The assessment identified a total of 377 trees with a DBH of >50 cm within the subject site (refer to **Figure 2).** Most (353, ~94%) were not observed to contain hollows of any size. Twenty four trees (~6%) contained one or more possible hollows considered not to be suitable for black cockatoos to use for nesting purposes

(Harewood 2021). The subject site has been strategically located to avoid any trees containing hollows considered possibly suitable for black cockatoo nesting.

Foraging Habitat

The following flora species 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 and were recorded within the area surveyed within Lot 4201:

- Marri – *Corymbia calophylla*;
- Jarrah – *Eucalyptus marginata*;
- Bull Banksia – *Banksia grandis;*
- Sheoak – *Allocasuarina fraseriana*; and
- Peppermint – *Agonis flexuousa.*

Evidence of all three species of black cockatoos foraging within the subject site in the form of chewed fruits from Marri trees was observed at a number of locations. It is worth noting that Bull Banksia – *Banksia grandis;* Sheoak – *Allocasuarina fraseriana* and Peppermint – *Agonis flexuousa* were only recorded within the subject site on a very occasional basis (i.e. very few individuals).

Roosting

No evidence of black cockatoos roosting within trees located within the subject site was observed during the survey. The closest documented roost site, recorded during the 2019 great Cocky Count, is located approximately 6 km northeast of the subject site (Harewood 2021).

Direct Impacts

Clearing of Habitat

The Proposal will require the clearing of up to 7.44 ha of black cockatoo foraging habitat, representing <0.06% of the modelled 12,000 ha of locally available foraging habitat. In this context, and considering the condition of vegetation subject to clearing, the impact of the Proposal on black cockatoo foraging habitat is not considered to be significant.

The Proposal will not result in the clearing of any trees containing hollows possibly suitable for black cockatoo breeding. Accordingly, there will be no immediate loss of breeding habitat for black cockatoos as a result of the Proposal. A total of 24 habitat trees with no hollows suitable for breeding will be removed, however within the property, a total of 33 habitat trees with no suitable hollows, and seven trees with hollows suitable for breeding, will be retained.

According to the DBCA's *Carnabys Cockatoo Confirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA Regions*, the closest known breeding site is located 34 km north of the subject site, in Busselton. According to the database, the next closest known breeding site is located approximately 105 km north of the subject site, in the Peel region. Accordingly, the subject site and its locality is not associated within any known black cockatoo breeding sites.

In consideration of the above, in relation to breeding, there will be no immediate loss of habitat. Furthermore, the removal of 24 habitat trees with no hollows suitable for breeding is not anticipated to result in a long term impact to the species given the availability of breeding habitat within the property and the locality.

Loss of Individuals

No direct loss of black cockatoo individuals is expected as a result of the Proposal. This is in consideration of the following:

- No clearing of trees containing hollows possibly suitable for black cockatoo breeding will be undertaken;
- Prior to any clearing taking place, vegetation to be removed will be inspected by a suitably qualified "fauna specialist" for the presence of fauna so that the appropriate management measures can be employed.

Indirect Impacts

Decline in Habitat Quality

The subject site is located with an agricultural landscape. This land use has resulted in the reduction in habitat patch sizes due to the clearing of native vegetation, in addition to the exposure of 'edge effects' such as the introduction or spread of introduced flora taxa (weeds) or *Phytophthora* dieback. Within the subject site, this in addition to historical and current grazing of livestock, has resulted in a decline in the quality of habitat for black cockatoos through changes in the composition and structure of vegetation communities, with the subject site being in a Degraded to Completely Degraded condition.

The clearing of native vegetation for the Proposal is unlikely to result in increased / changed edges to the remnant habitat patches, given the Degraded condition of vegetation, and ongoing landuse (livestock grazing).

The Proposal is therefore not expected to exacerbate the impact of the current edge effects (introduced flora, *Phytophthora* dieback), nor introduce any new types of edge effects which could result in a further degradation of habitat quality for black cockatoos.

Displacement of Individuals

Black cockatoo foraging evidence was recorded within the subject site. Nonetheless, no breeding or roosting sites were recorded.

Approximately 11.3 ha of native vegetation within Lot 4201, including seven trees with possibly suitable hollows for black cockatoos will be retained. The vegetation will be protected in perpetuity in accordance with a conservation covenant. Accordingly, with the retention of black cockatoo habitat within Lot 4201, the clearing will not result in the displacement of individuals.

Assessment Against EPBC Act Criteria

In order to determine the significance of the impact from the proposed action on black cockatoos, an assessment of Carnaby's Black-Cockatoo against the EPBC Act significant impact criteria provided in the E*PBC Act significant impact guidelines* (DotE 2013) was conducted (refer to **Table 2**).

Table 2. Impact assessment against EPBC significant impact criteria.

EPBC Act Criteria (DotE 2013)	Likelihood and Rationale
Lead to a long-term decrease in the size of a population (or an important population)	**Unlikely**. Any disturbance to black cockatoo habitat is highly likely to be, at most, at the scale of the localised displacement of limited foraging activity by a small number of birds (i.e. not a population). In order to determine whether the loss of 24 habitat trees with hollows, unsuitable for breeding, will have a significant impact on black cockatoo populations within the local area, the area of potentially suitable breeding habitat in secure tenure was calculated within a 12 km radius of the clearing footprint. This resulted in approximately 12,000

EPBC Act Criteria (DotE 2013)	Likelihood and Rationale
	ha of vegetation within the locality. These areas contain jarrah-marri forest, predominately in a better condition that the clearing footprint (due to restricted anthropogenic disturbances) and largely in secure tenure. Accordingly, in comparison to the area of potentially suitable breeding habitat within a 12 km radius and in secure tenure, the clearing of 7.44 ha would result in the reduction <0.06% of foraging habitat in the local area. This reduction is unlikely to result in a long-term decrease in the size of a population.
Reduce the area of occupancy of the species (or an important population)	**Unlikely**. As discussed above, the overall reduction in habitat available for black cockatoos within the locality will be insignificant (<0.06% of habitat available locally). Furthermore, approximately 11.3 ha of native vegetation within Lot 4201, including seven trees with possibly suitable hollows for black cockatoos will be retained. The vegetation will be protected in perpetuity in accordance with a conservation covenant. The proposed action is unlikely to impact the area of occupancy of the species.
Fragment an existing population (or important population) into two or more populations.	**Unlikely**. The clearing footprint does not constitute a corridor between habitat areas and is not situated between two vegetated areas. The proposed action is an expansion of the existing footprint as such it is unlikely to substantially fragment habitat or impose a physical barrier to the movement of black cockatoos between surrounding habitat areas. Large, contiguous areas of native vegetation surround the clearing footprint which currently provide important habitat linkages to surrounding areas. The proposed clearing is unlikely to significantly fragment the habitat available in the local area and/or regional area. Based on the mobility of the species and the availability of suitable habitat surrounding the clearing footprint, fragmentation of populations is considered very unlikely.
Adversely affect habitat critical to the survival of a species.	**Unlikely**. The Proposal will require the clearing of up to 7.44 ha of black cockatoo foraging habitat, representing <0.06% of the modelled 12,000 ha of locally available foraging habitat. In this context, and considering the condition of vegetation subject to clearing, the impact of the Proposal on black cockatoo foraging habitat is not considered to be significant. The Proposal will not result in the clearing of any trees containing hollows possibly suitable for black cockatoo breeding. Accordingly, there will be no immediate loss of breeding habitat for black cockatoos as a result of the Proposal. A total of 24 habitat trees with no hollows suitable will be removed, however within the property, a total of 33 habitat trees with no suitable hollows, and seven trees with hollows suitable for breeding will be retained. According to the DBCA's *Carnabys Cockatoo Confirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA Regions*, the closest known breeding site is located 34 km north of the subject site, in Busselton. According to the database, the next closest known breeding site is located approximately 105 km north of the subject site, in the Peel region. Accordingly, the subject site and its locality is not associated within any known black cockatoo breeding sites. In consideration of the above, in relation to breeding, there will be no immediate loss of habitat. Furthermore, the removal of 24 habitat trees with no hollows suitable for breeding is not anticipated to result in a long term impact to the species given the availability of breeding habitat within the property and the locality.
Disrupt the breeding cycle of a population (or important population).	**Unlikely**. The Proposal will not result in the clearing of any trees containing hollows possibly suitable for black cockatoo breeding. Accordingly, there will be no immediate loss of breeding habitat for black cockatoos as a result of the Proposal. A total of 24 habitat trees with no hollows suitable will be removed,

EPBC Act Criteria (DotE 2013)	Likelihood and Rationale
	however within the property, a total of 33 habitat trees with no suitable hollows, and seven trees with hollows suitable for breeding will be retained. According to the DBCA's *Carnabys Cockatoo Confirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA Regions*, the closest known breeding site is located 34 km north of the subject site, in Busselton. According to the database, the next closest known breeding site is located approximately 105 km north of the subject site, in the Peel region. Accordingly, the subject site and its locality is not associated within any known black cockatoo breeding sites. In consideration of the above, in relation to breeding, there will be no immediate loss of habitat. Furthermore, the removal of 24 habitat trees with no hollows suitable for breeding is not anticipated to result in a long term impact to the species given the availability of breeding habitat within the property and the locality.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Unlikely**. It is unlikely that this degree of clearing would lead to a decline in the species because the area of habitat that would be lost equates to only 0.06% of black cockatoo habitat within the local area. No impact on habitat extent or quality outside of the clearing footprint is expected given the historical and current landuse. The proposed action is an expansion of an existing landuse that has been in operation for over 20 years. In addition, the proponent will implement appropriate mitigation measures to minimise/prevent impact on habitat outside the clearing footprint.
Result in invasive species that are harmful to a threatened species becoming established in the threatened species' habitat.	**Unlikely**. The subject site is located with an agricultural landscape. This land use has resulted in the reduction in habitat patch sizes due to the clearing of native vegetation, in addition to the exposure of 'edge effects' such as the introduction or spread of introduced flora taxa (weeds) or *Phytophthora* dieback. Within the subject site, this in addition to historical and current grazing of livestock, has resulted in a decline in the quality of habitat for black cockatoos through changes in the composition and structure of vegetation communities, with the subject site being in a Degraded to Completely Degraded condition. The clearing of native vegetation for the Proposal is unlikely to result in increased / changed edges to the remnant habitat patches, given the Degraded condition of vegetation, and ongoing landuse (livestock grazing). The Proposal is therefore not expected to exacerbate the impact of the current edge effects (introduced flora, *Phytophthora* dieback), nor introduce any new types of edge effects which could result in a further degradation of habitat quality for black cockatoos.
Introduce disease that may cause the species to decline.	**Unlikely.** As above.
Interfere with the recovery of the species	**Unlikely**. The proposed action is unlikely to interfere significantly with the recovery of Carnaby's Black Cockatoo as it is unlikely to interfere with the recovery actions outlined in the *Carnaby's cockatoo (Calyptorhynchus latirostris) Recovery Plan* (DPAW 2013). Actions in the Recovery Plan include: • protect and manage important habitat: this assessment determined that the clearing footprint is unlikely to contain habitat critical to the survival of the species. The vegetation has been exposed to prolonged threatening processes (i.e. livestock grazing and clearing). • conduct research to inform management: the proposed action will not interfere with research programs. • undertake regular monitoring: the proposed action will not interfere with regular monitoring.

EPBC Act Criteria (DotE 2013)	Likelihood and Rationale
	• manage other impacts: suitable management plans will be implemented to avoid other impacts (i.e. disease introduction, collision with vehicles) • undertake information and communication activities: inductions for all site personnel will be undertaken during construction works which will include information pertaining to black cockatoos and their conservation significance. • engage with the broader community – as above. The proposed action is unlikely to interfere substantially with the recovery of the Baudin's Black Cockatoo and the Forest Redtailed Black Cockatoo as it is unlikely to interfere with the recovery actions outlined in the *Forest Black Cockatoo (Baudin's Cockatoo Calyptorhynchus baudinii and Forest Redtailed Black Cockatoo Calyptorhynchus banksii naso) Recovery Plan* (DEC 2008). Actions in the Recovery Plan include: • seek the funding required to implement future recovery actions: the proposed clearing will not interfere with this action. • determine and promote non-lethal means of mitigating fruit damage by Baudin's Black Cockatoo in orchards: the proposed clearing will not interfere with this action. • eliminate illegal shooting: the proposed clearing will not interfere with this action. • develop and implement strategies to allow for the use of noise emitting devices in orchards: the proposed clearing will not interfere with this action. • determine and implement ways to remove feral Honeybees from nesting hollows: feral Honeybees were not recorded within the subject site. • identify factors affecting the number of breeding attempts and breeding success and manage nest hollows to increase recruitment: the proposed clearing will not interfere with this action. • determine and implement ways to minimise the effects of mining and urban development on habitat loss: the proposed clearing will not interfere with this action. • determine and implement ways to manage forests for the conservation of Forest Black Cockatoos: the proposed clearing will not interfere with this action. • identify and manage important sites and protect from threatening processes: the clearing footprint has been designed to avoid trees containing potentially suitable hollows for breeding. • map feeding and breeding habitat critical to survival and important populations, and prepare management guidelines for these habitats: the proposed clearing will not interfere with this action. • monitor populations numbers and distribution: the proposed clearing will not interfere with this action. • determine the patterns and significance of movement: the proposed clearing will not interfere with this action • maintain the Cockatoo care program and use other opportunities to promote the recovery of Forest Black Cockatoos – the proposed clearing will not interfere with this action.

In consideration of the potential direct and indirect impacts, and based on the outcomes of the assessment against the EPBC Act significant impact criteria, the proposal is unlikely to result in a significant impact to black cockatoos.

Avoidance Measures

To avoid potential impacts to black cockatoos, the applicant has considered alternative locations for the proposed action within Lot 4201. However, the remaining gravel resource is restricted to the vegetated portions of Lot 4201, denoting that vegetation clearing is unavoidable. The black cockatoo habitat assessment was undertaken to identify the quality of habitat within the vegetated areas. Accordingly, the clearing footprint within the subject site has been specifically designed to avoid any trees with hollows possibly suitable for black cockatoo breeding. This has required a reduction in the original clearing footprint by approximately 1.5 ha. Furthermore, the best quality habitat (in terms of potential breeding tree density and foraging habitat quality) has been retained and will be protected in perpetuity.

Given that the clearing area has historically been subject to livestock grazing (resulting in a reduced mid and understorey), the key environmental attributes are the mature habitat trees. These are interspersed throughout the clearing footprint and therefore areas of increased environmental value could not be reasonably isolated. Accordingly, it is considered that no other feasible avoidance measures can be implemented within the clearing footprint.

Mitigation Measures

In order to reduce the impacts from the proposed action, the following management measures will be implemented as described below.

Fauna Management

The proposed management actions to mitigate potential impacts to fauna include:

- Peg/flag areas to be cleared to avoid any unnecessary disturbance to adjacent vegetation;
- Plan clearing such that it does not result in the creation of isolated remnants of native vegetation that have no ecological corridors to allow fauna movement to adjacent areas;
- Restrict all vehicle use to designated roads and access tracks;
- Enforce compliance with onsite speed limits at all times;
- During clearing, a qualified fauna expert will be present to direct clearing operators, particularly when clearing trees that are occupied by fauna, to ensure that these are cleared in a way that allows the animals to safely mobilise to adjacent areas. In addition, they will supervise any animal handling and the rescue of injured animals should this be required; and
- No stockpiling of topsoil or other material is to occur outside of the clearing boundary.

Weed and Pathogen Management

The proposed management actions to mitigate potential impacts associated with weeds and pathogens include:

- All earthmoving and ground engaging equipment will be inspected and cleaned of vegetation, mud and soil prior to entry and exit of the clearing area.

In addition to the proposed management measures, the subject site will be cleared progressively over approximately five years. Subsequently, it is not proposed that the entire 7.44 ha will be cleared as a single exercise but rather at an approximate rate of two hectares per annum. Clearing will commence in a west to east direction, which will enable fauna to naturally disperse into the adjoining vegetation.

FIGURES

PROJECT	Lot 4201 Jindong - Treeton Road, Kaloorup
DRAWING TITLE	Figure 2 - Clearing plan
CLIENT	Leeuwin Civil Pty Ltd

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West Busselton
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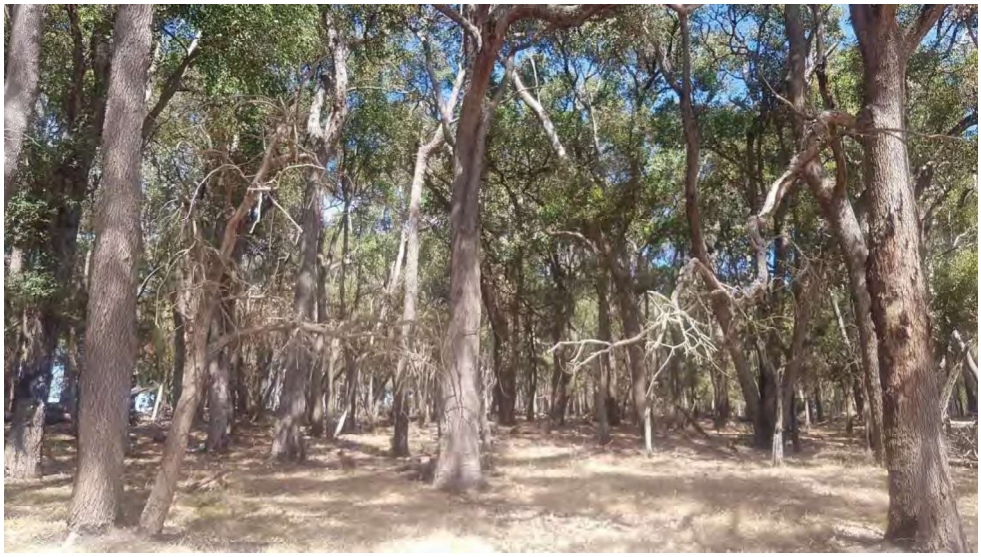
Project Number	2172	Designed	HB
Drawing Number	Figure 2	Drawn	HB
Revision	A	Checked	
Date	29/10/2021	Approved	
Sheet 1 of 1		Local Authority	City of Busselton

Black Cockatoo Habitat Assessment



Lot 4201 Jindong-Treeton Road

Kaloorup

February 2021
V1

On behalf of:
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SUMMARY

This report details the results of a black cockatoo habitat assessment over a section of Lot 4201 (the survey area) (Figure 1 and Figure 2).

It is understood that Leeuwin Civil (with permission of the landowners) are investigating the viability of expanding an extractive industry at the site, which to proceed will require the clearing of up to 20 hectares (ha) of remnant native vegetation.

To facilitate the clearing Leeuwin Civil will soon be applying for a clearing permit from the Department of Water and Environmental Regulation (DWER). The habitat survey reported on here has been carried out to support the application.

The field component of the assessment was carried out on the 24, 25 and 26 February 2021 by Greg Harewood (Zoologist).

Key Findings

The survey area has a total extent of about 20 hectares and is almost completely covered with a Jarrah (*Eucalyptus marginata*) – Marri (*Corymbia calophylla*) woodland/open forest on a subtle topographical high composed of a sandy gravel substrate. The remnant contains little midstorey vegetation with only occasional/very occasional sheoak (*Allocasuarina fraseriana*), bull banksia (*Banksia grandis*), peppermint (*Agonis flexuosa*) and Kingia (*Kingia australis*). Native ground cover vegetation is absent with introduced grasses dominating

With respect to fauna in general most of the survey area has low habitat values which has resulted as a consequence of historical and ongoing disturbances such livestock grazing and firewood collecting/logging. The survey area is almost completely covered with a Jarrah (*Eucalyptus marginata*) – Marri (*Corymbia calophylla*) woodland/open forest on a subtle topographical high composed of a sandy gravel substrate, however the remnant contains little midstorey vegetation. Native ground cover vegetation is absent with introduced grasses dominating.

The habitat tree assessment identified 915 trees within the survey area with a DBH of ≥50cm. The vast majority of these trees (851) appeared to not contain hollows of any size. Fifty seven (57) trees contained apparent or obvious hollows, all of which were assessed as being unlikely to be suitable for black cockatoos to currently use for nesting purposes, due to the hollows apparent small size, unsuitable orientation and/or height above ground level.

Seven (7) trees were assessed as containing one or more hollows potentially suitable for black cockatoos to use for nesting purposes as they appeared to be of a suitable size, with a favourable orientation. None of the hollows showed any conclusive evidence of actual use by black cockatoos for nesting purposes.

Evidence of all three species of black cockatoos foraging with the survey area was observed at a number of locations. The evidence was in all cases in the form of chewed fruits from marri trees. The foraging activity was attributed to the forest red-tailed black cockatoo, Carnaby's or Baudin's black cockatoos depending on the nature of the chew marks left on the fruits. Given

the dominance of jarrah and marri within the survey area the entire remnant (~20 ha) can be regarded as representing quality foraging habitat for black cockatoos.

No roost sites were identified within the survey area with the closest documented roost site being located about six kilometres north east of the survey area.

If the Department of Water and Environmental Regulation approve a clearing permit based on the information provided it is recommended that immediately prior to any clearing taking place, vegetation to be removed be inspected by a suitably qualified “fauna specialist” for the presence of fauna so that the appropriate management measures can be employed. In particular, while the use of the area by black cockatoo for breeding has not been confirmed, the seven trees identified as containing large hollows should be closely monitored prior to works commencing.

1. INTRODUCTION

This report details the results of a black cockatoo habitat assessment over a section of Lot 4201 (the survey area) (Figure 1 and Figure 2).

It is understood that Leeuwin Civil (with permission of the landowners) are investigating the viability of expanding an extractive industry at the site, which to proceed will require the clearing of up to 20 hectares (ha) of remnant native vegetation. To facilitate the clearing Leeuwin Civil will soon be applying for a clearing permit from the Department of Water and Environmental Regulation (DWER). The habitat survey reported on here has been carried out to support the application.

Information obtained as part of this fauna assessment report will be used in conjunction with other environmental investigations to guide project planning and will also be used in the formulation of management plans, both of which will aim to minimise potential environmental impacts. The information presented may also be used by regulatory authorities to assess the potential impact of the proposal on fauna and fauna habitats at the site during the project evaluation and approval process if required.

2. SCOPE OF WORKS

The following scope of works is proposed to fill anticipated information gaps that will be required by regulatory authorities:

- A black cockatoo habitat survey (habitat trees, foraging and roosting habitat);
- A report detailing methods and results.

Note: For the purposes of this proposal 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

3.1 FIELD SURVEYS

The field component of the assessment was carried out on the 24, 25 and 26 February 2021 by Greg Harewood (Zoologist) as described in the sections below.

3.1.1 GENERAL HABITAT ASSESSMENT

Vegetation units, landforms and soils observed during the site reconnaissance survey have been used to define broad fauna habitat types across the survey area.

3.1.2 BLACK COCKATOO HABITAT ASSESSMENT

The following methods were employed to comply with the defined scope of works and are based on Commonwealth of Australia (2012) guidelines which state 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.

The Commonwealth of Australia (2012) places habitats used by Black Cockatoos into the following three categories:

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

3.1.2.1 Breeding Habitat Assessment

The black cockatoo breeding habitat assessment identified all suitable breeding tree species within the survey area that have a diameter at breast height (DBH) equal to or greater than 50cm. The DBH of each tree was estimated using a pre-made "caliper".

Target tree species included marri, jarrah, tuart and flooded gum and any other *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 used by black cockatoos.

The location of each tree identified over the threshold DBH was recorded with a GPS and the following additional details recorded: approximate tree height, number, approximate entrance size of any hollow/possible hollow, evidence of hollow use and likelihood of representing an actual black cockatoo nest hollow. Trees observed to contain hollows (of any size/type) were marked with "H" using spray paint.

Hollow/potential hollows were placed into one of four categories, based on the size of the apparent hollow entrance, these being:

- Small = ~<5cm diameter (i.e. entrance too small for a black cockatoo);

- Medium = ~5cm-10cm diameter (i.e. entrance too small for a black cockatoo);
- Large = ~>10cm diameter (entrance large enough for a black cockatoo but hollow appears unsuitable for nesting i.e. wrong orientation, appears too small, too low or too shallow); or
- Large (cockatoo) = ~>10cm diameter (entrance appears big enough for a black cockatoo to use for nesting).

Based on this assessment, trees present within the survey area were placed into one of four categories:

- Tree <50cm DBH or an unsuitable species (these were not assessed/recorded);
- Tree ≥50cm DBH, no hollows seen;
- Tree ≥50cm DBH, one or more hollows seen, none of which were considered suitable for black cockatoos to use for nesting; or
- Tree ≥50cm DBH, one or more hollows seen, with at least one considered suitable for black cockatoos to use for nesting.

For the purposes of this assessment, a tree containing a potential black 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 suitable for occupation by black cockatoo for the purpose of nesting/breeding. 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 a "potential nest hollow".

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

Where the assessment was inconclusive, and if possible, trees identified as having potential black cockatoo nest hollows were subsequently examined and photographed using a drone (DJI Mavic Air/Mini).

Potential nest hollows were initially placed into one of three categories based on the type of hollow entry:

- Chimney: the hollow entry faces directly upwards in the end of the trunk;
- Spout: hollow entry which is at the end of a broken branch; or
- Side: the entry is directly into the side of the trunk or a branch with no protrusions.

After inspection with the drone suspected hollows have then been placed into one of five categories based on the observable characteristics of each hollow. The categories used were:

- Confirmed Hollow: Black cockatoos observed utilising the hollow for breeding purposes;
- Chewed Hollow: The hollow shows signs of chewing ("chipping" around or near entrance and/or internally) attributed to black cockatoo activity (in most cases indicating nesting activity, but in some cases possibly marks left by black cockatoos investigating ("prospecting") hollows);
- Unused Hollow: The hollow appears to be of a suitable size for black cockatoos to use for nesting, but no conclusive evidence of this activity seen. It should be noted that chew marks/chipping are not always evident or present on some hollows that have been used for nesting. Hollows classified as "unused" may therefore have been used for nesting but cannot be specifically classified as such. Alternatively, some "unused" hollows may not be suitable for black cockatoos as a range of characteristics, not all of which can be seen or measured, ultimately determined if a hollow will ever actually be used;
- Unsuitable Hollow: The hollow has been assessed, based on information obtained, as being unlikely to be suitable for black cockatoos (generally because of the entrance appearing to be too small or because the actual hollow or accommodating branch/tree trunk appears to be too small or as having an unfavourable orientation);
- No Hollow: A possible hollow was found upon closer inspection to not be present.

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 survey area.

3.1.2.2 Foraging Habitat Assessment

The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around 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. Foraging habitat is represented by plant species that are known to provide a food source for black cockatoos. This can be in the form of seeds, flowers and also boring grubs that are extracted from some plant species.

A review of available literature was carried out to determine the location/extent of any known/likely Black Cockatoo foraging habitat areas in the vicinity.

3.1.2.3 Night Roosting Habitat Assessment

Direct and indirect evidence of black cockatoos roosting within trees on site was noted where observed (e.g. branch clippings, droppings or moulted feathers).

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

4. SURVEY LIMITATIONS

No seasonal sampling was 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 site at the time of the field assessments. It should be recognised that site conditions can change with time.

Lack of observational data on some species should also not necessarily be taken as an indication that a species is absent from the site or does not utilise it for some purpose at times.

During the survey, habitat trees with hollows were searched for. 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 FIELD SURVEYS

5.1.1 GENERAL HABITAT ASSESSMENT

The survey area has a total extent of about 20 ha and is almost completely covered with a Jarrah (*Eucalyptus marginata*) – Marri (*Corymbia calophylla*) woodland/open forest on a subtle topographical high composed of a sandy gravel substrate. The remnant contains little midstorey vegetation with only occasional/very occasional sheoak (*Allocasuarina fraseriana*), bull banksia (*Banksia grandis*), peppermint (*Agonis flexuosa*) and Kingia (*Kingia australis*). Native ground cover vegetation is absent with introduced grasses dominating

Example images of the fauna habitats present are provided in Table 1.

Table 1: Example Images of the Fauna Habitats within the Survey area

Fauna Habitat Description	Example Images
Jarrah (*Eucalyptus marginata*) – Marri (*Corymbia calophylla*) Woodland/Open Forest over occasional/very occasional sheoak (*Allocasuarina fraseriana*), bull banksia (*Banksia grandis*), peppermint (*Agonis flexuosa*) and Kingia (*Kingia australis*)	 

Overall, the fauna habitats present are highly degraded given most areas appear to have been subject to considerable historical and ongoing disturbances such as livestock grazing and firewood collecting/logging. Much of the vegetation appears to be regrowth from historical clearing. The total fauna assemblage within the survey area itself is likely to be extremely depauperate as a consequence.

5.1.2 BLACK COCKATOO HABITAT ASSESSMENT

5.1.2.1 Breeding Habitat Assessment

Trees considered potentially suitable for black cockatoos to use as nesting habitat (subject to a suitable hollow being present and other factors) found within the survey area comprised the following species:

- Marri – *Corymbia calophylla;*
- Jarrah – *Eucalyptus marginata*; and
- Dead Unidentified - *Eucalyptus* spp.

A summary of the habitat trees observed is provided in Table 2. The locations of habitat trees are shown in Figure 3. Additional details on each tree can be found in Appendix A.

Table 2: Summary of Potential Habitat Trees (DBH ≥50cm) within the Survey area

Total Number of Habitat Trees (DBH > 50cm)	Number of Habitat Trees with No Hollows Observed	Number of Habitat Trees with Possible Hollows considered Unsuitable for Black Cockatoos	Number of Habitat Trees with Possible Hollows considered Potentially suitable for Black Cockatoos	Tree Species		
				Jarrah	Marri	Dead Unidentified
915	851	57	7	499	407	9

The assessment identified 915 trees within the survey area with a DBH of ≥50cm. The vast majority of these trees (851) appeared to not contain hollows of any size. Fifty seven (57) trees contained apparent or obvious hollows, all of which were assessed as being unlikely to be suitable for black cockatoos to currently use for nesting purposes, due to the hollows apparent small size, unsuitable orientation and/or height above ground level.

Initially, 23 trees were assessed as containing possible large hollows. These were subsequently examined in better detail using a drone. Sixteen of the original 23 trees suspected of having possible large hollows were upon closer inspection found to be unsuitable for black cockatoos. This conclusion was based on the hollows actually being non-existent or too shallow/open.

Seven (7) trees were assessed as containing one or more hollows potentially suitable for black cockatoos to use for nesting purposes as they appeared to be of a suitable size and with a favourable orientation. None of the hollows showed any conclusive evidence of actual use by black cockatoos for nesting purposes.

A summary of observations made on the 23 original trees suspected of having possible large hollows is provided in the table below. More details on these trees (including photographs) are provided in Appendix B.

Table 3: Summary of Drone Inspection Results

Tree ID	Number of Hollows (including small hollows)	Status (BC Hollow)	Justification
64	2+	Unused Hollow	Jarrah with an upward facing spout type hollow. The hollow has a large entrance. Small number of minor chew/chip marks that cannot be conclusively attributed to black cockatoo activity. Must be considered potentially suitable for black cockatoos to use for nesting purposes.
71	2+	Unsuitable Hollow/No Hollow	Jarrah with a possible side entry/spout type hollow and a possible large side entry hollow. Neither hollow appeared to have any depth when examined with a drone.

Tree ID	Number of Hollows (including small hollows)	Status (BC Hollow)	Justification
211	2+	No Hollow	Dead tree with a possible upward facing spout type hollow. The hollow was found to have no depth when examined with a drone.
223	0	No Hollow	Dead tree with a possible upward facing chimney type hollow. The hollow was found to have no depth when examined with a drone.
320	2+	No Hollow	Jarrah with possible side entry/spout type hollow. The hollow was found to have no depth when examined with a drone.
385	2+	Unsuitable Hollow/No Hollow	Dead Jarrah with possible spout type hollow and large side entry hollow. The spout type hollow was found to have no depth when examined with a drone. The side entry hollow also has no depth and is open on several sides – appears unsuitable.
394	1	Unsuitable Hollow/No Hollow	Dead Jarrah with three upward facing spout type hollows. Two hollows were found to have no depth at all while the third was too shallow and small internally to be suitable for black cockatoos.
403	2+	Unsuitable Hollow	Marri with an angled spout type hollow. The hollow is horizontal and has little depth. It therefore appears unsuitable for black cockatoos to use for nesting purposes.
505	0	No Hollow	Marri with a possible chimney type hollow. The hollow was found to have no depth when examined with a drone.
525	0	No Hollow	Jarrah with a possible chimney type hollow. The hollow was found to have no depth when examined with a drone.
600	2+	Unused Hollows	Marri with a large spout type hollow and a spout type hollow. Both hollows appear of a size and orientation to be considered potentially suitable for black cockatoos to use for nesting purposes, though neither shows evidence of use for this purpose.
605	1	Unused Hollow	Marri with a chimney type hollow. The hollow is shrouded in branches and could not be examined closely with a drone. The hollow does however appear to have a large entrance and some depth and therefore it must be considered potentially suitable for black cockatoos to use for nesting purposes.
616	1	Unsuitable Hollow	Marri with a possible chimney type hollow. The hollow was found to have little depth when examined with a drone and would not be suitable for black cockatoo to use for nesting purposes.
619	0	No Hollow	Jarrah with two possible side entry hollows. Both hollows were found to have little or no depth when examined with the drone.
625	1	Unsuitable Hollow	Marri with a chimney type hollow. The hollow appears to be very shallow/open and is therefore considered unsuitable for black cockatoos to use for nesting purposes.
668	2+	No Hollow	Dead tree with possible upwards facing spout/side entry type hollows. Both hollows were found to have no depth when examined with a drone.
677	1	Unused Hollow	Dead tree with possible upwards facing spout/side entry type hollows. Both hollows were found to have no depth when examined with a drone. Several much smaller possible spout type hollows in dead branches.

Tree ID	Number of Hollows (including small hollows)	Status (BC Hollow)	Justification
747	1	Unused Hollow	Marri with a chimney type hollow. The hollow is shrouded in branches and could not be examined closely with a drone. The hollow does however appear to have a large entrance and some depth and therefore it must be considered potentially suitable for black cockatoos to use for nesting purposes.
755	2+	Unused Hollow	Marri with a possible chimney type hollow. The hollow was difficult to examine but appears to be suitable (size and orientation) to be classified as potentially suitable for black cockatoos to use for nesting purposes.
757	2+	Unsuitable Hollows	Marri with possible chimney type hollow and a side entry hollow. Side entry hollow was found to have small internal dimensions. Chimney style hollow is obstructed with branches and also appears to be very shallow.
798	2+	Unused Hollow	Near dead Marri with a possible upward facing spout type hollow and a side entry hollow. The side entry hollow was found to have no depth. The upward facing spout type hollow had depth and was found to be occupied by a common brushtail possum. The hollow appears to be of a size potentially suitable for black cockatoos to use for nesting purposes but showed no evidence of previous use for this purpose
813	0	No Hollows	Jarrah with a possible chimney type hollow and a spout type hollow. Neither potential hollow has any depth when examined with drone.
886	0	No Hollow	Jarrah with a chimney type hollow. The hollow was found to have no depth when examined with a drone.

Based on available mapping, there is approximately 11,800 ha of remnant native vegetation within 12 km of the survey area (DPIRD 2020). Much of this is likely to contain "potential" breeding habitat as defined by DAWE/DWER (i.e. suitable tree species with a DBH ≥50cm).

5.1.2.2 Foraging Habitat Assessment

The following flora species 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 and were recorded within the survey area:

- Marri – *Corymbia calophylla*;
- Jarrah – *Eucalyptus marginata*;
- Bull Banksia - *Banksia grandis*;
- Sheoak – *Allocasuarina fraseriana;* and
- Peppermint – *Agonis flexuosa.*

It should be noted that some of the above-mentioned species (e.g. bull banksia, sheoak and peppermint) while foraged upon on occasions would make up only a small proportion

of any one bird's diet relative to more favoured plant species such as marri. Some tree species are also only represented by a small number of specimens (e.g. bull banksia, sheoak) and therefore do not contribute to the overall foraging resource to a significant degree.

Evidence of all three species of black cockatoos foraging with the survey area was observed at a number of locations. The evidence was all in the form of chewed fruits from marri trees. The foraging activity was attributed to the forest red-tailed black cockatoo, Carnaby's or Baudin's black cockatoos depending on the nature of the chew marks left on the fruits. Examples of the foraging debris observed are provided in the table below.

Table 4: 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 the Carnaby's Black Cockatoo.	
Marri fruits – foraging activity attributed to the Baudin's Black Cockatoo.	

Given the dominance of jarrah and marri within the survey area the entire remnant (~20 ha) can be regarded as representing quality foraging habitat for black cockatoos.

Based on available mapping there is about 11,800 ha of remnant native vegetation within 12 km of the survey area (DPIRD 2020). Much of this is likely to represent black cockatoo foraging habitat of some type.

5.1.2.3 Night Roosting Habitat Assessment

No evidence of Black Cockatoos roosting within trees located within the survey area was observed during the survey period. It is difficult to determine if trees or groves of trees within the survey area represent potential roosting habitat as a range of factors, not all of which can be observed, determine suitability. Some of the larger trees may be suitable for roosting but as indicated no actual evidence of use was seen.

A review of the 2019 Great Cocky Count database shows no documented roost sites within the survey area. The 2019 Great Cocky Count recorded the closest active roost, approximately six kilometres north east of the survey area (Site ID: BUSJINR001). This roost was being used by 10 "White-tailed Black Cockatoos" during the April 2019 survey (Peck *et al.* 2019). Another seven documented roost sites (but not necessarily in current use) occur within 12 km of the survey area.

6. CONCLUSION

The assessment within the survey area was primarily undertaken to document black cockatoo habitat.

With respect to fauna in general most of the survey area has low habitat values which has resulted as a consequence of historical and ongoing disturbances such livestock grazing and firewood collecting/logging. The survey area is almost completely covered with a Jarrah (*Eucalyptus marginata*) – Marri (*Corymbia calophylla*) woodland/open forest on a subtle topographical high composed of a sandy gravel substrate, however the remnant contains little midstorey vegetation. Native ground cover vegetation is absent with introduced grasses dominating.

The habitat tree assessment identified 915 trees within the survey area with a DBH of ≥50cm. The vast majority of these trees (851) appeared to not contain hollows of any size. Fifty seven (57) trees contained apparent or obvious hollows, all of which were assessed as being unlikely to be suitable for black cockatoos to currently use for nesting purposes, due to the hollows apparent small size, unsuitable orientation and/or height above ground level.

Seven (7) trees were assessed as containing one or more hollows potentially suitable for black cockatoos to use for nesting purposes as they appeared to be of a suitable size, with a favourable orientation. None of the hollows showed any conclusive evidence of actual use by black cockatoos for nesting purposes.

Evidence of all three species of black cockatoos foraging with the survey area was observed at a number of locations. The evidence was in all cases in the form of chewed fruits from marri trees. The foraging activity was attributed to the forest red-tailed black cockatoo, Carnaby's or Baudin's black cockatoos depending on the nature of the chew marks left on the fruits. Given the dominance of jarrah and marri within the survey area the entire remnant (~20 ha) can be regarded as representing quality foraging habitat for black cockatoos.

No roost sites were identified within the survey area with the closest documented roost site being located about six kilometres north east of the survey area.

If DWER approve a clearing permit based on the information provided it is recommended that immediately prior to any clearing taking place, vegetation to be removed be inspected by a suitably qualified "fauna specialist" for the presence of fauna so that the appropriate management measures can be employed. In particular, while the use of the area by black cockatoo for breeding has not been confirmed, the seven trees identified as containing large hollows should be closely monitored prior to works commencing.

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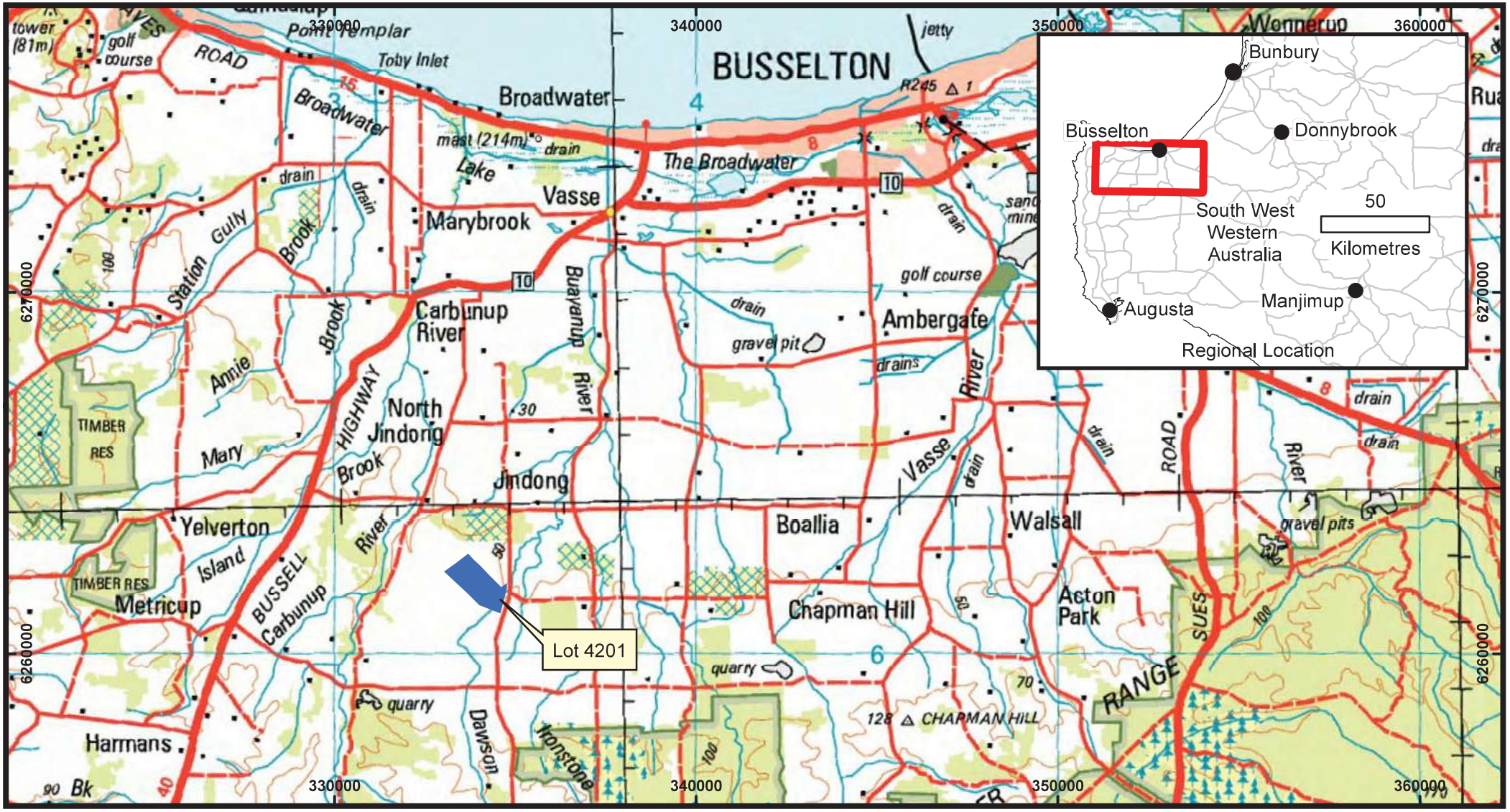
7. REFERENCES

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 Primary Industries and Regional Development (DPIRD) Geographic Information Services (2020). Native Vegetation Extent (DPIRD-005) (Western Australia) Shapefile - https://catalogue.data.wa.gov.au/dataset/native-vegetation-extent.

Peck, A., Barrett, G. & Williams, M. (2019). The 2019 Great Cocky Count: a community-based survey for Carnaby's Black-Cockatoo *(Calyptorhynchus latirostris),* Baudin's Black-Cockatoo *(Calyptorhynchus baudinii)* and Forest Red-tailed Black-Cockatoo *(Calyptorhynchus banksii naso)*. BirdLife Australia, Floreat, Western Australia.

FIGURES



Legend

Lot 4201 Jindong Treeton Road

0 2 4 6 8 10

Kilometres

Fauna Survey

Lot 4201 Jindong-Treeton Rd Kaloorup

Survey Area and Surrounds

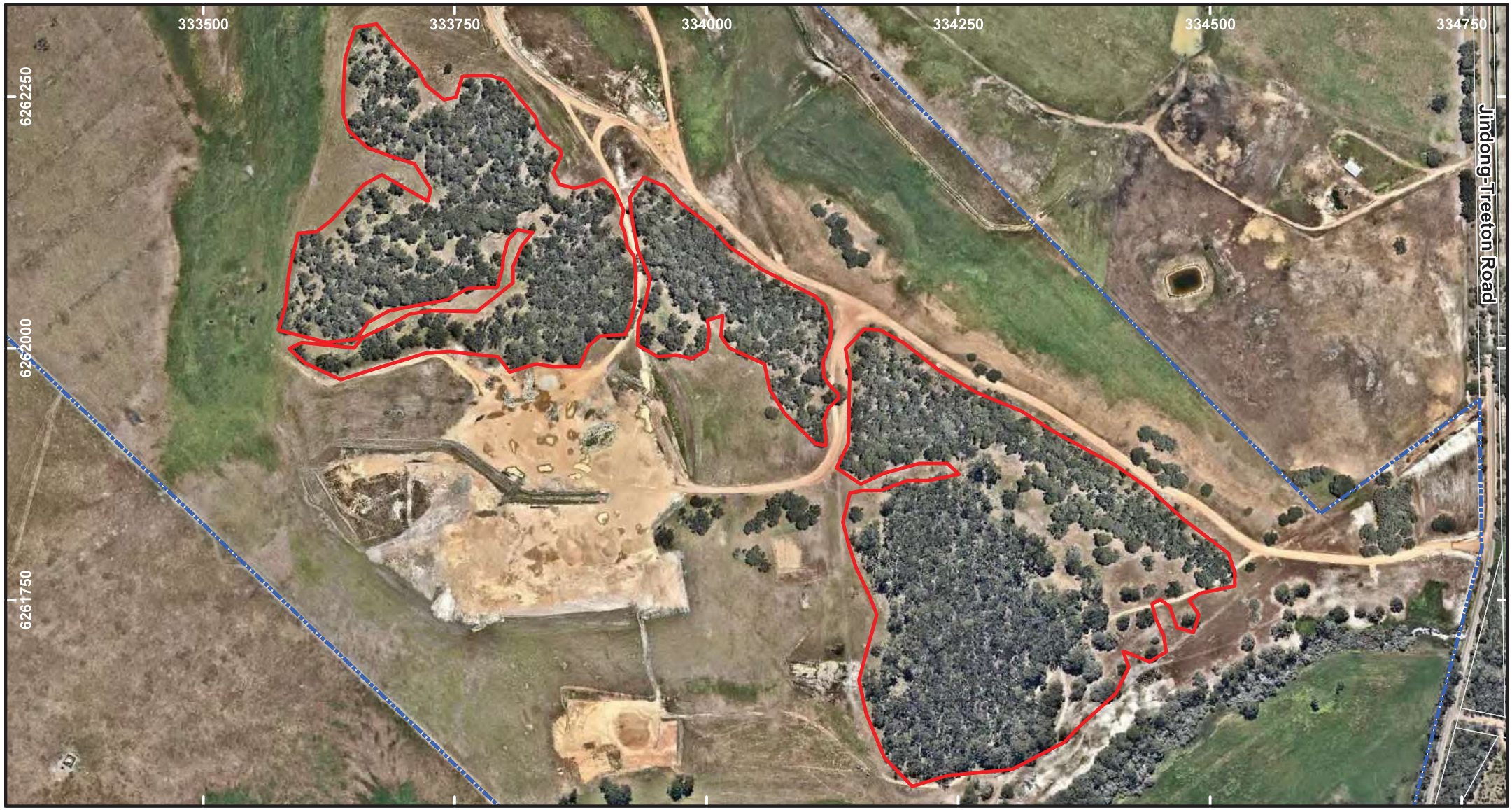
Drawn: G Harewood

Date: Feb 2021

Scale: 1: 250,000

Projection/Coordinate System: UTM/MGA Zone 50

Figure: 1



Legend

- Lot 4201 Boundary
- Survey Area

N

0 110 220 330 440

Metres

Fauna Survey

Lot 4201 Jindong-Treeton Rd Kaloorup

Survey Area Aerial Photograph

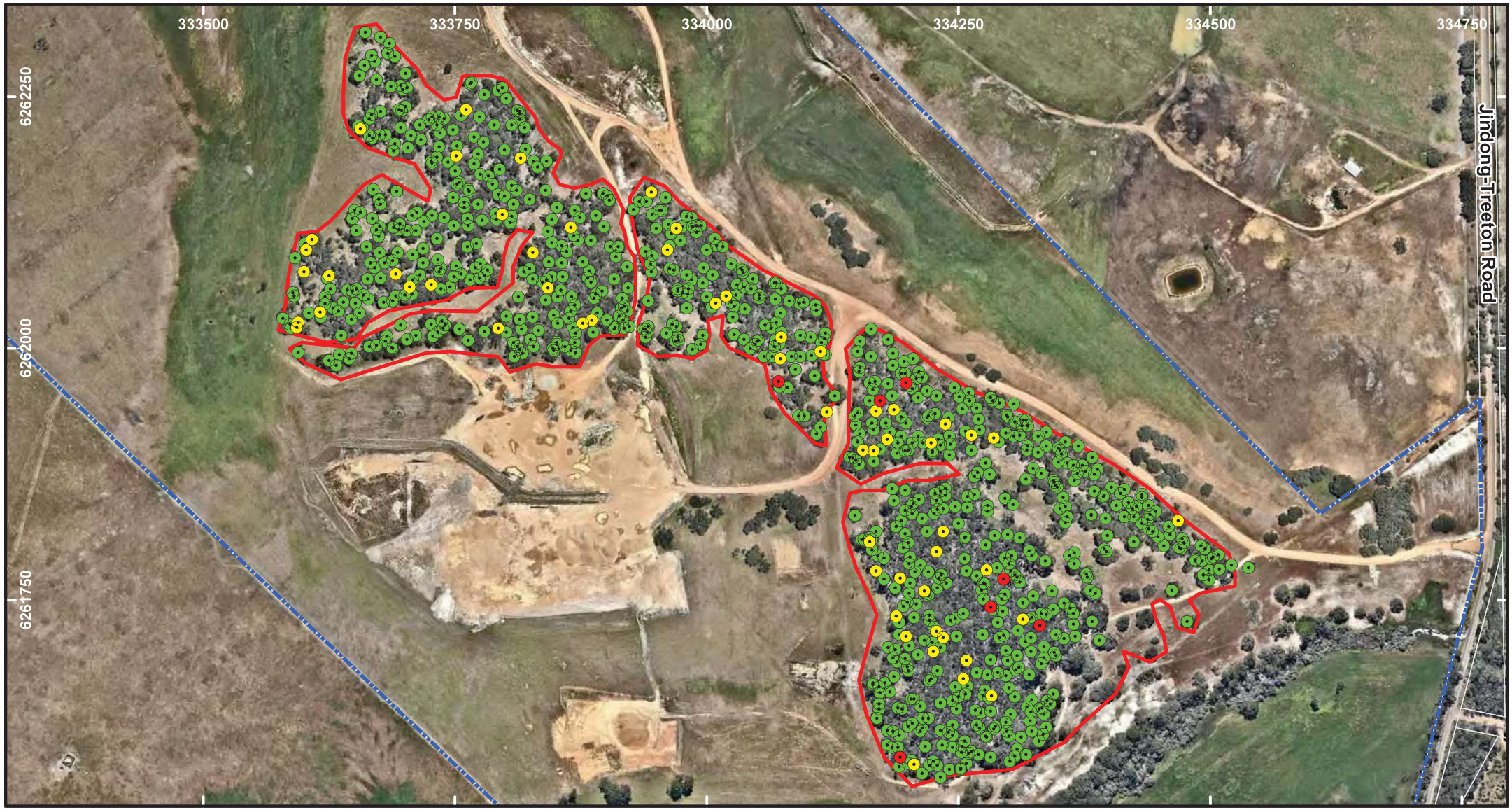
Drawn: G Harewood

Date: Feb 2021

Scale: 1:5,250

Projection/Coordinate System: UTM/MGA Zone 50

Figure: 2



Legend

- Lot 4201 Boundary
- Survey Area
- (7) Habitat Tree - One or more hollows possibly suitable for Black Cockatoos
- (57) Habitat Tree - One or more possible hollows, none suitable for Black Cockatoos
- (851) Habitat Tree - No hollows seen

0 100 200 300 400 500
Metres

Fauna Survey

Drawn: G Harewood
Date: Feb 2021
Scale: 1:5,250
Projection/Coordinate System: UTM/MGA Zone 50

Lot 4201 Jindong-Treeton Rd
Kaloorup

Survey Area Aerial Photograph

Figure: 3

APPENDIX A

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	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt001	50H	333994	6262122	Marri	>50	15-20	0					
wpt002	50H	333990	6262122	Marri	>50	15-20	0					
wpt003	50H	333985	6262130	Marri	>50	15-20	0					
wpt004	50H	333980	6262131	Marri	>50	15-20	0					
wpt005	50H	333955	6262137	Marri	>50	15-20	0					
wpt006	50H	333953	6262137	Marri	>50	15-20	0					
wpt007	50H	333959	6262150	Marri	>50	15-20	0					
wpt008	50H	333945	6262155	Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	
wpt009	50H	333940	6262146	Marri	>50	15-20	0					
wpt010	50H	333933	6262146	Marri	>50	15-20	0					
wpt011	50H	333927	6262138	Marri	>50	15-20	0					
wpt012	50H	333946	6262133	Marri	>50	15-20	0					
wpt013	50H	333950	6262119	Marri	>50	15-20	0					
wpt014	50H	333962	6262123	Marri	>50	15-20	0					
wpt015	50H	333965	6262114	Jarrah	>50	15-20	0					
wpt016	50H	333963	6262102	Jarrah	>50	15-20	0					
wpt017	50H	333961	6262098	Marri	>50	20+	2+	Small & Medium	No Signs	No Signs	No	
wpt018	50H	333946	6262092	Marri	>50	15-20	0					
wpt019	50H	333939	6262096	Marri	>50	15-20	0					
wpt020	50H	333944	6262084	Marri	>50	15-20	0					
wpt021	50H	333945	6262076	Marri	>50	15-20	0					
wpt022	50H	333942	6262047	Marri	>50	15-20	0					
wpt023	50H	333942	6262022	Marri	>50	15-20	0					
wpt024	50H	333939	6262019	Marri	>50	15-20	0					
wpt025	50H	333937	6262019	Marri	>50	15-20	0					
wpt026	50H	333941	6262016	Marri	>50	15-20	0					
wpt027	50H	333939	6262011	Marri	>50	15-20	0					
wpt028	50H	333960	6262015	Marri	>50	15-20	0					
wpt029	50H	333969	6262007	Marri	>50	15-20	0					
wpt030	50H	333971	6262011	Marri	>50	15-20	0					
wpt031	50H	333972	6262008	Marri	>50	15-20	0					
wpt032	50H	333966	6262024	Marri	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt033	50H	333970	6262022	Marri	>50	15-20	0					
wpt034	50H	333986	6261999	Marri	>50	15-20	0					
wpt035	50H	333994	6262004	Marri	>50	15-20	0					
wpt036	50H	333996	6262013	Marri	>50	15-20	0					
wpt037	50H	333963	6262079	Marri	>50	15-20	0					
wpt038	50H	333967	6262078	Marri	>50	15-20	0					
wpt039	50H	333980	6262073	Marri	>50	15-20	0					
wpt040	50H	333985	6262068	Marri	>50	15-20	0					
wpt041	50H	333971	6262059	Marri	>50	15-20	0					
wpt042	50H	333971	6262057	Marri	>50	15-20	0					
wpt043	50H	333976	6262055	Marri	>50	15-20	0					
wpt044	50H	333982	6262059	Marri	>50	15-20	0					
wpt045	50H	333981	6262054	Marri	>50	15-20	0					
wpt046	50H	333980	6262040	Marri	>50	15-20	0					
wpt047	50H	334000	6262051	Jarrah	>50	15-20	0					
wpt048	50H	334009	6262045	Marri	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	
wpt049	50H	334005	6262041	Jarrah	>50	15-20	0					
wpt050	50H	334019	6262052	Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	
wpt051	50H	334024	6262046	Jarrah	>50	15-20	0					
wpt052	50H	334027	6262042	Jarrah	>50	15-20	0					
wpt053	50H	334026	6262031	Marri	>50	15-20	0					
wpt054	50H	334027	6262014	Marri	>50	15-20	0					
wpt055	50H	334037	6262009	Marri	>50	15-20	0					
wpt056	50H	334043	6262000	Jarrah	>50	15-20	0					
wpt057	50H	334048	6262004	Jarrah	>50	15-20	0					
wpt058	50H	334050	6262007	Jarrah	>50	15-20	0					
wpt059	50H	334051	6262008	Jarrah	>50	15-20	0					
wpt060	50H	334067	6262002	Jarrah	>50	15-20	0					
wpt061	50H	334057	6261992	Jarrah	>50	15-20	0					
wpt062	50H	334065	6261992	Jarrah	>50	15-20	0					
wpt063	50H	334073	6261990	Marri	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	
wpt064	50H	334071	6261967	Jarrah	>50	15-20	2+	Small, Medium & Large (Cockatoo)	No Signs	No Signs	Yes	Examined with drone
wpt065	50H	334072	6261962	Jarrah	>50	10-15	0					
wpt066	50H	334080	6261961	Marri	>50	15-20	0					
wpt067	50H	334091	6261933	Jarrah	>50	15-20	0					
wpt068	50H	334097	6261933	Dead Jarrah	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt069	50H	334109	6261915	Marri	>50	15-20	0					
wpt070	50H	334113	6261922	Jarrah	>50	15-20	0					
wpt071	50H	334119	6261937	Jarrah	>50	20+	2+	Small & Medium	No Signs	No Signs	No	Examined with drone
wpt072	50H	334107	6261973	Marri	>50	20+	0					
wpt073	50H	334127	6261953	Marri	>50	15-20	0					
wpt074	50H	334118	6261994	Marri	>50	15-20	0					
wpt075	50H	334116	6261994	Marri	>50	15-20	0					
wpt076	50H	334113	6261997	Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	
wpt077	50H	334114	6262006	Dead Jarrah	>50	15-20	0					
wpt078	50H	334117	6262010	Dead Jarrah	>50	15-20	0					
wpt079	50H	334118	6262015	Marri	>50	15-20	0					
wpt080	50H	334109	6262038	Jarrah	>50	15-20	0					
wpt081	50H	334108	6262043	Marri	>50	15-20	0					
wpt082	50H	334096	6262046	Marri	>50	20+	0					
wpt083	50H	334092	6262045	Jarrah	>50	15-20	0					
wpt084	50H	334082	6262047	Jarrah	>50	15-20	0					
wpt085	50H	334074	6262059	Jarrah	>50	15-20	0					
wpt086	50H	334069	6262065	Jarrah	>50	15-20	0					
wpt087	50H	334067	6262065	Marri	>50	15-20	0					
wpt088	50H	334046	6262069	Jarrah	>50	15-20	0					
wpt089	50H	334036	6262075	Marri	>50	20+	0					
wpt090	50H	334035	6262078	Jarrah	>50	15-20	0					
wpt091	50H	334034	6262079	Marri	>50	15-20	0					
wpt092	50H	334024	6262084	Jarrah	>50	15-20	0					
wpt093	50H	334016	6262101	Marri	>50	10-15	0					
wpt094	50H	334010	6262102	Marri	>50	15-20	0					
wpt095	50H	334008	6262109	Marri	>50	15-20	0					
wpt096	50H	333990	6262115	Jarrah	>50	15-20	0					
wpt097	50H	333986	6262121	Marri	>50	15-20	0					
wpt098	50H	333976	6262121	Jarrah	>50	15-20	0					
wpt099	50H	333970	6262119	Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	
wpt100	50H	333974	6262107	Jarrah	>50	15-20	0					
wpt101	50H	334000	6262098	Jarrah	>50	15-20	0					
wpt102	50H	333997	6262080	Jarrah	>50	15-20	0					
wpt103	50H	334006	6262073	Jarrah	>50	15-20	0					
wpt104	50H	333996	6262065	Marri	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt105	50H	334030	6262063	Jarrah	>50	15-20	0					
wpt106	50H	334037	6262061	Jarrah	>50	15-20	0					
wpt107	50H	334029	6262053	Dead Jarrah	>50	15-20	0					
wpt108	50H	334038	6262039	Jarrah	>50	15-20	0					
wpt109	50H	334058	6262023	Jarrah	>50	15-20	0					
wpt110	50H	334064	6262020	Jarrah	>50	15-20	0					
wpt111	50H	334068	6262008	Jarrah	>50	15-20	0					
wpt112	50H	334074	6262016	Jarrah	>50	15-20	0					
wpt113	50H	334074	6262011	Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	
wpt114	50H	334072	6262005	Jarrah	>50	15-20	0					
wpt115	50H	334084	6261992	Jarrah	>50	15-20	0					
wpt116	50H	334088	6261979	Marri	>50	20+	0					
wpt117	50H	334093	6261992	Dead Jarrah	>50	15-20	0					
wpt118	50H	334104	6261993	Jarrah	>50	15-20	0					
wpt119	50H	334103	6262011	Marri	>50	15-20	0					
wpt120	50H	334093	6262013	Marri	>50	15-20	0					
wpt121	50H	334069	6262026	Jarrah	>50	15-20	0					
wpt122	50H	334073	6262035	Marri	>50	15-20	0					
wpt123	50H	334068	6262049	Jarrah	>50	15-20	0					
wpt124	50H	334052	6262050	Marri	>50	20+	0					
wpt125	50H	334052	6262053	Jarrah	>50	15-20	0					
wpt126	50H	334044	6262059	Jarrah	>50	15-20	0					
wpt127	50H	333922	6262060	Marri	>50	15-20	0					
wpt128	50H	333921	6262081	Marri	>50	15-20	0					
wpt129	50H	333910	6262091	Jarrah	>50	15-20	0					
wpt130	50H	333912	6262101	Marri	>50	15-20	0					
wpt131	50H	333904	6262101	Jarrah	>50	15-20	0					
wpt132	50H	333898	6262121	Marri	>50	15-20	0					
wpt133	50H	333890	6262132	Marri	>50	15-20	0					
wpt134	50H	333903	6262147	Marri	>50	15-20	0					
wpt135	50H	333901	6262151	Jarrah	>50	10-15	0					
wpt136	50H	333897	6262154	Jarrah	>50	15-20	0					
wpt137	50H	333880	6262154	Jarrah	>50	15-20	0					
wpt138	50H	333869	6262137	Jarrah	>50	15-20	0					
wpt139	50H	333851	6262140	Jarrah	>50	15-20	0					
wpt140	50H	333846	6262128	Jarrah	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt141	50H	333842	6262116	Dead Jarrah	>50	15-20	0					
wpt142	50H	333846	6262105	Jarrah	>50	15-20	0					
wpt143	50H	333827	6262095	Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	
wpt144	50H	333824	6262079	Dead Unknown	>50	0-5	0					
wpt145	50H	333818	6262076	Marri	>50	15-20	0					
wpt146	50H	333827	6262069	Jarrah	>50	15-20	0					
wpt147	50H	333813	6262051	Marri	>50	15-20	0					
wpt148	50H	333801	6262032	Jarrah	>50	15-20	0					
wpt149	50H	333793	6262020	Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	
wpt150	50H	333779	6262017	Jarrah	>50	15-20	0					
wpt151	50H	333754	6262019	Jarrah	>50	20+	0					
wpt152	50H	333737	6262027	Marri	>50	15-20	0					
wpt153	50H	333740	6262023	Marri	>50	15-20	0					
wpt154	50H	333738	6262020	Marri	>50	15-20	0					
wpt155	50H	333733	6262016	Marri	>50	15-20	0					
wpt156	50H	333728	6262012	Marri	>50	15-20	0					
wpt157	50H	333726	6262024	Marri	>50	15-20	0					
wpt158	50H	333696	6262023	Jarrah	>50	10-15	0					
wpt159	50H	333682	6262012	Marri	>50	15-20	0					
wpt160	50H	333681	6262007	Marri	>50	15-20	0					
wpt161	50H	333672	6262003	Marri	>50	15-20	0					
wpt162	50H	333665	6262002	Marri	>50	15-20	0					
wpt163	50H	333647	6261995	Marri	>50	15-20	0					
wpt164	50H	333635	6261994	Marri	>50	15-20	0					
wpt165	50H	333625	6261988	Marri	>50	20+	0					
wpt166	50H	333594	6261996	Marri	>50	15-20	0					
wpt167	50H	333632	6261983	Marri	>50	15-20	0					
wpt168	50H	333645	6261990	Marri	>50	15-20	0					
wpt169	50H	333687	6262001	Marri	>50	15-20	0					
wpt170	50H	333688	6262000	Marri	>50	15-20	0					
wpt171	50H	333702	6262009	Marri	>50	15-20	0					
wpt172	50H	333711	6262013	Marri	>50	15-20	0					
wpt173	50H	333763	6262008	Jarrah	>50	15-20	0					
wpt174	50H	333809	6261992	Marri	>50	15-20	0					
wpt175	50H	333814	6261999	Marri	>50	20+	0					
wpt176	50H	333817	6261995	Marri	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt177	50H	333828	6262002	Marri	>50	15-20	0					
wpt178	50H	333825	6262009	Marri	>50	20+	0					
wpt179	50H	333847	6262000	Marri	>50	15-20	0					
wpt180	50H	333848	6261998	Marri	>50	15-20	0					
wpt181	50H	333851	6262004	Jarrah	>50	15-20	0					
wpt182	50H	333851	6262006	Jarrah	>50	15-20	0					
wpt183	50H	333859	6262002	Jarrah	>50	15-20	0					
wpt184	50H	333865	6261998	Marri	>50	15-20	0					
wpt185	50H	333870	6261996	Marri	>50	20+	0					
wpt186	50H	333869	6262006	Marri	>50	15-20	0					
wpt187	50H	333887	6262016	Jarrah	>50	20+	0					
wpt188	50H	333908	6262019	Marri	>50	15-20	0					
wpt189	50H	333909	6262021	Jarrah	>50	15-20	0					
wpt190	50H	333918	6262020	Marri	>50	15-20	0					
wpt191	50H	333923	6262022	Marri	>50	15-20	0					
wpt192	50H	333917	6262028	Marri	>50	15-20	0					
wpt193	50H	333913	6262032	Marri	>50	15-20	0					
wpt194	50H	333915	6262040	Jarrah	>50	15-20	0					
wpt195	50H	333918	6262042	Jarrah	>50	15-20	0					
wpt196	50H	333921	6262037	Jarrah	>50	15-20	0					
wpt197	50H	333896	6262057	Jarrah	>50	15-20	0					
wpt198	50H	333908	6262069	Jarrah	>50	15-20	0					
wpt199	50H	333885	6262107	Jarrah	>50	15-20	0					
wpt200	50H	333874	6262130	Jarrah	>50	15-20	0					
wpt201	50H	333865	6262120	Marri	>50	20+	2+	Small, Medium & Large (Cockatoo)	Bees	No Signs	No	
wpt202	50H	333868	6262112	Jarrah	>50	10-15	0					
wpt203	50H	333872	6262107	Jarrah	>50	10-15	0					
wpt204	50H	333861	6262096	Marri	>50	15-20	0					
wpt205	50H	333856	6262102	Jarrah	>50	15-20	0					
wpt206	50H	333856	6262085	Marri	>50	15-20	0					
wpt207	50H	333843	6262086	Jarrah	>50	15-20	0					
wpt208	50H	333846	6262071	Jarrah	>50	15-20	0					
wpt209	50H	333841	6262068	Jarrah	>50	15-20	0					
wpt210	50H	333837	6262066	Jarrah	>50	15-20	0					
wpt211	50H	333842	6262060	Dead Unknown	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	Examined with drone
wpt212	50H	333840	6262048	Jarrah	>50	20+	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt213	50H	333852	6262051	Jarrah	>50	15-20	0					
wpt214	50H	333827	6262031	Jarrah	>50	15-20	0					
wpt215	50H	333814	6262029	Jarrah	>50	15-20	0					
wpt216	50H	333816	6262019	Jarrah	>50	15-20	0					
wpt217	50H	333801	6262016	Jarrah	>50	15-20	0					
wpt218	50H	333808	6262006	Marri	>50	15-20	0					
wpt219	50H	333812	6262002	Jarrah	>50	15-20	0					
wpt220	50H	333833	6262018	Marri	>50	20+	0					
wpt221	50H	333852	6262025	Jarrah	>50	15-20	0					
wpt222	50H	333863	6262030	Marri	>50	15-20	0					
wpt223	50H	333867	6262021	Dead Unknown	>50	5-10	0					Examined with drone
wpt224	50H	333870	6262015	Marri	>50	15-20	0					
wpt225	50H	334454	6261804	Marri	>50	15-20	0					
wpt226	50H	333877	6262025	Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	
wpt227	50H	333886	6262028	Marri	>50	20+	2+	Small & Medium	Bees	No Signs	No	
wpt228	50H	333891	6262035	Jarrah	>50	15-20	0					
wpt229	50H	333901	6262028	Marri	>50	15-20	0					
wpt230	50H	333888	6262050	Jarrah	>50	15-20	0					
wpt231	50H	333890	6262054	Jarrah	>50	15-20	0					
wpt232	50H	333885	6262066	Marri	>50	15-20	0					
wpt233	50H	333882	6262070	Marri	>50	15-20	0					
wpt234	50H	333883	6262077	Jarrah	>50	15-20	0					
wpt235	50H	333877	6262086	Jarrah	>50	15-20	0					
wpt236	50H	333857	6262071	Jarrah	>50	15-20	0					
wpt237	50H	333855	6262058	Jarrah	>50	15-20	0					
wpt238	50H	333866	6262051	Jarrah	>50	15-20	0					
wpt239	50H	333869	6262043	Jarrah	>50	15-20	0					
wpt240	50H	333865	6262037	Jarrah	>50	15-20	0					
wpt241	50H	333848	6262033	Jarrah	>50	15-20	0					
wpt242	50H	333916	6262050	Jarrah	>50	15-20	0					
wpt243	50H	333702	6262259	Marri	>50	15-20	0					
wpt244	50H	333698	6262257	Jarrah	>50	15-20	0					
wpt245	50H	333696	6262261	Jarrah	>50	15-20	0					
wpt246	50H	333701	6262273	Marri	>50	15-20	0					
wpt247	50H	333690	6262290	Marri	>50	15-20	0					
wpt248	50H	333685	6262303	Marri	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt249	50H	333683	6262293	Marri	>50	0-5	0					
wpt250	50H	333676	6262309	Jarrah	>50	15-20	0					
wpt251	50H	333661	6262314	Marri	>50	15-20	0					
wpt252	50H	333667	6262291	Dead Jarrah	>50	5-10	0					
wpt253	50H	333670	6262285	Marri	>50	15-20	0					
wpt254	50H	333660	6262281	Dead Jarrah	>50	0-5	0					
wpt255	50H	333655	6262271	Jarrah	>50	15-20	0					
wpt256	50H	333667	6262232	Jarrah	>50	15-20	0					
wpt257	50H	333665	6262228	Jarrah	>50	15-20	0					
wpt258	50H	333654	6262221	Marri	>50	20+	0					
wpt259	50H	333656	6262218	Marri	>50	10-15	2+	Small & Medium	No Signs	No Signs	No	
wpt260	50H	333658	6262219	Jarrah	>50	15-20	0					
wpt261	50H	333665	6262211	Jarrah	>50	15-20	0					
wpt262	50H	333668	6262209	Jarrah	>50	15-20	0					
wpt263	50H	333675	6262212	Jarrah	>50	15-20	0					
wpt264	50H	333681	6262212	Jarrah	>50	15-20	0					
wpt265	50H	333696	6262219	Marri	>50	20+	0					
wpt266	50H	333697	6262236	Jarrah	>50	15-20	0					
wpt267	50H	333701	6262240	Jarrah	>50	15-20	0					
wpt268	50H	333694	6262237	Jarrah	>50	15-20	0					
wpt269	50H	333686	6262260	Jarrah	>50	15-20	0					
wpt270	50H	333672	6262267	Jarrah	>50	15-20	0					
wpt271	50H	333676	6262235	Jarrah	>50	15-20	0					
wpt272	50H	333690	6262203	Marri	>50	10-15	0					
wpt273	50H	333689	6262196	Marri	>50	20+	0					
wpt274	50H	333703	6262199	Jarrah	>50	15-20	0					
wpt275	50H	333706	6262211	Jarrah	>50	15-20	0					
wpt276	50H	333716	6262207	Jarrah	>50	15-20	0					
wpt277	50H	333715	6262222	Jarrah	>50	15-20	0					
wpt278	50H	333735	6262214	Jarrah	>50	15-20	0					
wpt279	50H	333734	6262200	Jarrah	>50	15-20	0					
wpt280	50H	333732	6262190	Jarrah	>50	15-20	0					
wpt281	50H	333726	6262186	Jarrah	>50	15-20	0					
wpt282	50H	333727	6262184	Jarrah	>50	15-20	0					
wpt283	50H	333748	6262150	Jarrah	>50	20+	0					
wpt284	50H	333759	6262140	Jarrah	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt285	50H	333759	6262145	Jarrah	>50	15-20	0					
wpt286	50H	333762	6262129	Jarrah	>50	15-20	0					
wpt287	50H	333763	6262122	Jarrah	>50	15-20	0					
wpt288	50H	333762	6262101	Jarrah	>50	20+	0					
wpt289	50H	333771	6262104	Jarrah	>50	15-20	0					
wpt290	50H	333777	6262127	Marri	>50	20+	0					
wpt291	50H	333791	6262128	Jarrah	>50	15-20	0					
wpt292	50H	333797	6262133	Jarrah	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	
wpt293	50H	333805	6262125	Jarrah	>50	15-20	0					
wpt294	50H	333806	6262131	Jarrah	>50	15-20	0					
wpt295	50H	333808	6262143	Jarrah	>50	15-20	0					
wpt296	50H	333824	6262148	Jarrah	>50	15-20	0					
wpt297	50H	333840	6262157	Jarrah	>50	15-20	0					
wpt298	50H	333841	6262186	Jarrah	>50	15-20	0					
wpt299	50H	333832	6262180	Jarrah	>50	15-20	0					
wpt300	50H	333828	6262186	Jarrah	>50	15-20	0					
wpt301	50H	333820	6262198	Jarrah	>50	15-20	0					
wpt302	50H	333819	6262219	Jarrah	>50	15-20	0					
wpt303	50H	333814	6262227	Jarrah	>50	15-20	0					
wpt304	50H	333814	6262233	Jarrah	>50	15-20	0					
wpt305	50H	333814	6262235	Jarrah	>50	15-20	0					
wpt306	50H	333812	6262236	Jarrah	>50	15-20	0					
wpt307	50H	333801	6262248	Marri	>50	15-20	0					
wpt308	50H	333797	6262259	Marri	>50	15-20	0					
wpt309	50H	333793	6262256	Marri	>50	15-20	0					
wpt310	50H	333779	6262252	Jarrah	>50	15-20	0					
wpt311	50H	333766	6262264	Marri	>50	15-20	0					
wpt312	50H	333765	6262263	Marri	>50	15-20	0					
wpt313	50H	333739	6262228	Marri	>50	15-20	0					
wpt314	50H	333734	6262230	Marri	>50	15-20	0					
wpt315	50H	333732	6262222	Marri	>50	15-20	0					
wpt316	50H	333727	6262230	Marri	>50	15-20	0					
wpt317	50H	333724	6262227	Marri	>50	15-20	0					
wpt318	50H	333748	6262217	Marri	>50	15-20	0					
wpt319	50H	333752	6262201	Marri	>50	15-20	0					
wpt320	50H	333751	6262191	Jarrah	>50	20+	2+	Small & Medium	No Signs	No Signs	No	Examined with drone

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt321	50H	333743	6262185	Marri	>50	15-20	0					
wpt322	50H	333750	6262176	Marri	>50	15-20	0					
wpt323	50H	333750	6262176	Marri	>50	15-20	0					
wpt324	50H	333754	6262165	Marri	>50	15-20	0					
wpt325	50H	333752	6262163	Marri	>50	15-20	0					
wpt326	50H	333763	6262158	Jarrah	>50	15-20	0					
wpt327	50H	333764	6262156	Jarrah	>50	15-20	0					
wpt328	50H	333773	6262143	Marri	>50	15-20	0					
wpt329	50H	333790	6262134	Marri	>50	15-20	0					
wpt330	50H	333799	6262151	Marri	>50	15-20	0					
wpt331	50H	333811	6262157	Marri	>50	20+	0					
wpt332	50H	333806	6262162	Jarrah	>50	20+	0					
wpt333	50H	333815	6262189	Dead Jarrah	>50	20+	2+	Small & Medium	No Signs	No Signs	No	
wpt334	50H	333799	6262197	Marri	>50	15-20	0					
wpt335	50H	333806	6262222	Marri	>50	15-20	0					
wpt336	50H	333789	6262222	Marri	>50	15-20	0					
wpt337	50H	333774	6262230	Jarrah	>50	15-20	0					
wpt338	50H	333761	6262237	Dead Jarrah	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	
wpt339	50H	333756	6262231	Marri	>50	15-20	0					
wpt340	50H	333769	6262210	Marri	>50	15-20	0					
wpt341	50H	333773	6262193	Marri	>50	15-20	0					
wpt342	50H	333769	6262183	Marri	>50	15-20	0					
wpt343	50H	333775	6262173	Marri	>50	15-20	0					
wpt344	50H	333783	6262171	Jarrah	>50	15-20	0					
wpt345	50H	333787	6262163	Jarrah	>50	15-20	0					
wpt346	50H	333793	6262153	Jarrah	>50	15-20	0					
wpt347	50H	333794	6262178	Jarrah	>50	15-20	0					
wpt348	50H	333778	6262205	Jarrah	>50	15-20	0					
wpt349	50H	333688	6262047	Jarrah	>50	15-20	0					
wpt350	50H	333691	6262052	Jarrah	>50	15-20	0					
wpt351	50H	333700	6262053	Marri	>50	15-20	0					
wpt352	50H	333707	6262054	Jarrah	>50	15-20	0					
wpt353	50H	333726	6262063	Jarrah	>50	20+	2+	Small & Medium	No Signs	No Signs	No	
wpt354	50H	333736	6262059	Marri	>50	15-20	0					
wpt355	50H	333745	6262061	Marri	>50	15-20	0					
wpt356	50H	333749	6262071	Marri	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt357	50H	333756	6262074	Jarrah	>50	15-20	0					
wpt358	50H	333765	6262068	Marri	>50	15-20	0					
wpt359	50H	333774	6262070	Marri	>50	15-20	0					
wpt360	50H	333779	6262072	Marri	>50	15-20	0					
wpt361	50H	333782	6262078	Jarrah	>50	15-20	0					
wpt362	50H	333775	6262084	Jarrah	>50	15-20	0					
wpt363	50H	333770	6262080	Jarrah	>50	15-20	0					
wpt364	50H	333749	6262122	Jarrah	>50	15-20	0					
wpt365	50H	333739	6262130	Jarrah	>50	15-20	0					
wpt366	50H	333727	6262132	Jarrah	>50	15-20	0					
wpt367	50H	333719	6262126	Jarrah	>50	15-20	0					
wpt368	50H	333712	6262135	Jarrah	>50	15-20	0					
wpt369	50H	333707	6262132	Marri	>50	15-20	0					
wpt370	50H	333692	6262156	Marri	>50	15-20	0					
wpt371	50H	333669	6262158	Marri	>50	15-20	0					
wpt372	50H	333674	6262148	Marri	>50	15-20	0					
wpt373	50H	333676	6262143	Marri	>50	15-20	0					
wpt374	50H	333668	6262129	Marri	>50	15-20	0					
wpt375	50H	333656	6262135	Marri	>50	15-20	0					
wpt376	50H	333650	6262137	Marri	>50	15-20	0					
wpt377	50H	333648	6262129	Marri	>50	15-20	0					
wpt378	50H	333652	6262117	Marri	>50	15-20	0					
wpt379	50H	333608	6262108	Marri	>50	15-20	0					
wpt380	50H	333608	6262108	Marri	>50	20+	2+	Small & Medium	No Signs	No Signs	No	
wpt381	50H	333602	6262098	Dead Unknown	>50	10-15	2+	Small & Medium	No Signs	No Signs	No	
wpt382	50H	333601	6262104	Jarrah	>50	15-20	0					
wpt383	50H	333602	6262097	Marri	>50	15-20	0					
wpt384	50H	333591	6262090	Jarrah	>50	15-20	0					
wpt385	50H	333600	6262076	Dead Jarrah	>50	20+	2+	Small & Medium	No Signs	No Signs	No	Examined with drone
wpt386	50H	333589	6262055	Jarrah	>50	15-20	0					
wpt387	50H	333590	6262052	Dead Unknown	>50	15-20	0					
wpt388	50H	333579	6262030	Jarrah	>50	15-20	0					
wpt389	50H	333586	6262024	Marri	>50	15-20	0					
wpt390	50H	333587	6262020	Jarrah	>50	15-20	0					
wpt391	50H	333593	6262021	Jarrah	>50	20+	2+	Small	No Signs	No Signs	No	
wpt392	50H	333594	6262026	Jarrah	>50	20+	2+	Small	No Signs	No Signs	No	

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt393	50H	333605	6262035	Marri	>50	20+	0					
wpt394	50H	333616	6262036	Dead Jarrah	>50	20+	2+	Small & Medium	No Signs	No Signs	No	Examined with drone
wpt395	50H	333617	6262031	Jarrah	>50	15-20	0					
wpt396	50H	333637	6262013	Marri	>50	15-20	0					
wpt397	50H	333647	6262029	Marri	>50	15-20	0					
wpt398	50H	333655	6262035	Marri	>50	15-20	0					
wpt399	50H	333651	6262045	Marri	>50	15-20	0					
wpt400	50H	333664	6262049	Marri	>50	15-20	0					
wpt401	50H	333659	6262053	Jarrah	>50	15-20	0					
wpt402	50H	333679	6262046	Jarrah	>50	15-20	0					
wpt403	50H	333691	6262074	Marri	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	Examined with drone
wpt404	50H	333705	6262061	Marri	>50	10-15	2+	Small & Medium	Bees	No Signs	No	
wpt405	50H	333708	6262068	Jarrah	>50	15-20	0					
wpt406	50H	333715	6262073	Jarrah	>50	15-20	0					
wpt407	50H	333734	6262076	Jarrah	>50	15-20	0					
wpt408	50H	333736	6262079	Jarrah	>50	15-20	0					
wpt409	50H	334469	6261802	Marri	>50	15-20	0					
wpt410	50H	333751	6262082	Jarrah	>50	15-20	0					
wpt411	50H	333732	6262109	Marri	>50	15-20	0					
wpt412	50H	333711	6262117	Marri	>50	15-20	0					
wpt413	50H	333702	6262117	Marri	>50	15-20	0					
wpt414	50H	333695	6262124	Marri	>50	15-20	0					
wpt415	50H	333695	6262123	Marri	>50	15-20	0					
wpt416	50H	333694	6262118	Jarrah	>50	15-20	0					
wpt417	50H	333689	6262120	Jarrah	>50	15-20	0					
wpt418	50H	333675	6262121	Jarrah	>50	15-20	0					
wpt419	50H	333672	6262118	Jarrah	>50	15-20	0					
wpt420	50H	333674	6262111	Jarrah	>50	15-20	0					
wpt421	50H	333662	6262101	Marri	>50	15-20	0					
wpt422	50H	333625	6262072	Marri	>50	15-20	1	Small	No Signs	No Signs	No	
wpt423	50H	333623	6262070	Marri	>50	15-20	0					
wpt424	50H	333626	6262059	Jarrah	>50	15-20	0					
wpt425	50H	333621	6262051	Jarrah	>50	15-20	0					
wpt426	50H	333621	6262044	Jarrah	>50	15-20	0					
wpt427	50H	333629	6262040	Marri	>50	15-20	0					
wpt428	50H	333634	6262037	Marri	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt429	50H	333639	6262046	Marri	>50	15-20	0					
wpt430	50H	333648	6262057	Marri	>50	20+	0					
wpt431	50H	333643	6262058	Jarrah	>50	15-20	0					
wpt432	50H	333643	6262058	Marri	>50	15-20	0					
wpt433	50H	333652	6262059	Jarrah	>50	15-20	0					
wpt434	50H	333663	6262069	Jarrah	>50	15-20	0					
wpt435	50H	333676	6262070	Marri	>50	15-20	0					
wpt436	50H	333670	6262080	Jarrah	>50	15-20	0					
wpt437	50H	333680	6262085	Jarrah	>50	15-20	0					
wpt438	50H	333688	6262087	Marri	>50	15-20	0					
wpt439	50H	333693	6262095	Marri	>50	20+	0					
wpt440	50H	333708	6262093	Jarrah	>50	15-20	0					
wpt441	50H	333718	6262099	Marri	>50	15-20	0					
wpt442	50H	333718	6262085	Jarrah	>50	15-20	0					
wpt443	50H	333733	6262088	Marri	>50	15-20	0					
wpt444	50H	333675	6262095	Marri	>50	15-20	0					
wpt445	50H	333666	6262085	Jarrah	>50	15-20	0					
wpt446	50H	334471	6261801	Jarrah	>50	15-20	0					
wpt447	50H	334474	6261807	Marri	>50	15-20	0					
wpt448	50H	334485	6261790	Marri	>50	15-20	0					
wpt449	50H	334485	6261789	Dead Marri	>50	15-20	0					
wpt450	50H	334492	6261789	Jarrah	>50	15-20	0					
wpt451	50H	334493	6261775	Marri	>50	20+	0					
wpt452	50H	334462	6261760	Marri	>50	15-20	0					
wpt453	50H	334477	6261729	Jarrah	>50	10-15	0					
wpt454	50H	334499	6261770	Marri	>50	15-20	0					
wpt455	50H	334499	6261780	Jarrah	>50	15-20	0					
wpt456	50H	334509	6261781	Marri	>50	15-20	0					
wpt457	50H	334521	6261785	Marri	>50	15-20	0					
wpt458	50H	334538	6261782	Jarrah	>50	15-20	0					
wpt459	50H	334508	6261795	Marri	>50	15-20	0					
wpt460	50H	334503	6261793	Marri	>50	20+	0					
wpt461	50H	334501	6261791	Marri	>50	15-20	0					
wpt462	50H	334495	6261801	Marri	>50	15-20	0					
wpt463	50H	334491	6261804	Jarrah	>50	15-20	0					
wpt464	50H	334472	6261811	Jarrah	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt465	50H	334460	6261815	Jarrah	>50	15-20	0					
wpt466	50H	334459	6261823	Jarrah	>50	15-20	0					
wpt467	50H	334468	6261829	Jarrah	>50	15-20	1	Small	Bees	No Signs	No	
wpt468	50H	334165	6261668	Marri	>50	15-20	0					
wpt469	50H	334446	6261838	Marri	>50	15-20	0					
wpt470	50H	334440	6261835	Jarrah	>50	15-20	0					
wpt471	50H	334439	6261844	Jarrah	>50	15-20	0					
wpt472	50H	334432	6261852	Jarrah	>50	15-20	0					
wpt473	50H	334432	6261855	Marri	>50	15-20	0					
wpt474	50H	334427	6261843	Jarrah	>50	15-20	0					
wpt475	50H	334423	6261841	Marri	>50	15-20	0					
wpt476	50H	334419	6261847	Marri	>50	15-20	0					
wpt477	50H	334415	6261860	Marri	>50	15-20	0					
wpt478	50H	334411	6261856	Dead Marri	>50	15-20	0					
wpt479	50H	334402	6261862	Jarrah	>50	15-20	0					
wpt480	50H	334385	6261875	Marri	>50	15-20	0					
wpt481	50H	334388	6261880	Marri	>50	15-20	0					
wpt482	50H	334383	6261892	Jarrah	>50	15-20	0					
wpt483	50H	334369	6261903	Dead Marri	>50	15-20	0					
wpt484	50H	334356	6261907	Marri	>50	15-20	0					
wpt485	50H	334349	6261901	Marri	>50	20+	0					
wpt486	50H	334351	6261899	Marri	>50	15-20	0					
wpt487	50H	334337	6261917	Marri	>50	15-20	0					
wpt488	50H	334329	6261913	Marri	>50	15-20	0					
wpt489	50H	334319	6261923	Marri	>50	15-20	0					
wpt490	50H	334317	6261929	Jarrah	>50	15-20	0					
wpt491	50H	334314	6261929	Marri	>50	15-20	0					
wpt492	50H	334313	6261923	Jarrah	>50	15-20	0					
wpt493	50H	334306	6261927	Marri	>50	15-20	0					
wpt494	50H	334299	6261932	Marri	>50	15-20	0					
wpt495	50H	334298	6261934	Marri	>50	15-20	0					
wpt496	50H	334305	6261945	Dead Marri	>50	15-20	0					
wpt497	50H	334285	6261911	Marri	>50	20+	2+	Small	Bees	No Signs	No	
wpt498	50H	334290	6261907	Dead Jarrah	>50	15-20	0					
wpt499	50H	334297	6261916	Jarrah	>50	15-20	0					
wpt500	50H	334305	6261913	Jarrah	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt501	50H	334311	6261914	Jarrah	>50	15-20	0					
wpt502	50H	334319	6261903	Jarrah	>50	20+	0					
wpt503	50H	334318	6261899	Jarrah	>50	20+	0					
wpt504	50H	334329	6261897	Jarrah	>50	15-20	0					
wpt505	50H	334337	6261903	Marri	>50	20+	0					Examined with drone
wpt506	50H	334324	6261881	Marri	>50	10-15	0					
wpt507	50H	334317	6261870	Marri	>50	15-20	0					
wpt508	50H	334332	6261876	Marri	>50	15-20	0					
wpt509	50H	334344	6261869	Marri	>50	15-20	0					
wpt510	50H	334345	6261867	Marri	>50	15-20	0					
wpt511	50H	334346	6261864	Marri	>50	15-20	0					
wpt512	50H	334348	6261862	Marri	>50	15-20	0					
wpt513	50H	334354	6261852	Marri	>50	15-20	0					
wpt514	50H	334356	6261843	Marri	>50	15-20	0					
wpt515	50H	334351	6261841	Marri	>50	15-20	0					
wpt516	50H	334358	6261833	Marri	>50	15-20	0					
wpt517	50H	334356	6261827	Marri	>50	15-20	0					
wpt518	50H	334382	6261835	Marri	>50	15-20	0					
wpt519	50H	334382	6261834	Marri	>50	15-20	0					
wpt520	50H	334396	6261831	Marri	>50	15-20	0					
wpt521	50H	334398	6261814	Marri	>50	20+	0					
wpt522	50H	334395	6261801	Marri	>50	15-20	0					
wpt523	50H	334397	6261798	Marri	>50	20+	0					
wpt524	50H	334424	6261808	Marri	>50	15-20	0					
wpt525	50H	334448	6261813	Jarrah	>50	15-20	0					Examined with drone
wpt526	50H	334443	6261818	Jarrah	>50	15-20	0					
wpt527	50H	334439	6261821	Marri	>50	15-20	0					
wpt528	50H	334438	6261830	Jarrah	>50	15-20	0					
wpt529	50H	334432	6261826	Jarrah	>50	15-20	0					
wpt530	50H	334424	6261833	Jarrah	>50	15-20	0					
wpt531	50H	334415	6261833	Jarrah	>50	15-20	0					
wpt532	50H	334407	6261844	Marri	>50	15-20	0					
wpt533	50H	334395	6261854	Jarrah	>50	15-20	0					
wpt534	50H	334394	6261853	Jarrah	>50	15-20	0					
wpt535	50H	334385	6261858	Marri	>50	15-20	0					
wpt536	50H	334376	6261878	Jarrah	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt537	50H	334373	6261884	Jarrah	>50	15-20	0					
wpt538	50H	334368	6261876	Jarrah	>50	15-20	0					
wpt539	50H	334365	6261869	Jarrah	>50	15-20	0					
wpt540	50H	334364	6261884	Dead Jarrah	>50	15-20	0					
wpt541	50H	334358	6261886	Jarrah	>50	15-20	0					
wpt542	50H	334352	6261895	Jarrah	>50	15-20	0					
wpt543	50H	334349	6261887	Marri	>50	15-20	0					
wpt544	50H	334263	6261899	Jarrah	>50	15-20	0					
wpt545	50H	334263	6261914	Marri	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	
wpt546	50H	334271	6261919	Jarrah	>50	15-20	0					
wpt547	50H	334270	6261930	Jarrah	>50	15-20	0					
wpt548	50H	334291	6261946	Marri	>50	15-20	0					
wpt549	50H	334284	6261948	Marri	>50	15-20	0					
wpt550	50H	334282	6261951	Marri	>50	15-20	0					
wpt551	50H	334268	6261941	Marri	>50	15-20	0					
wpt552	50H	334261	6261948	Jarrah	>50	15-20	0					
wpt553	50H	334260	6261956	Marri	>50	15-20	0					
wpt554	50H	334251	6261952	Marri	>50	15-20	0					
wpt555	50H	334246	6261961	Marri	>50	15-20	0					
wpt556	50H	334228	6261953	Jarrah	>50	15-20	0					
wpt557	50H	334219	6261958	Marri	>50	15-20	0					
wpt558	50H	334214	6261971	Marri	>50	15-20	0					
wpt559	50H	334208	6261970	Dead Unknown	>50	15-20	0					
wpt560	50H	334211	6261977	Marri	>50	15-20	0					
wpt561	50H	334205	6261990	Marri	>50	15-20	0					
wpt562	50H	334196	6261987	Marri	>50	0-5	0					
wpt563	50H	334185	6261995	Marri	>50	15-20	0					
wpt564	50H	334180	6262009	Marri	>50	15-20	0					
wpt565	50H	334163	6262019	Marri	>50	15-20	0					
wpt566	50H	334152	6262007	Jarrah	>50	15-20	0					
wpt567	50H	334163	6261992	Jarrah	>50	15-20	0					
wpt568	50H	334150	6261997	Jarrah	>50	15-20	0					
wpt569	50H	334152	6261981	Jarrah	>50	15-20	0					
wpt570	50H	334151	6261977	Marri	>50	15-20	0					
wpt571	50H	334162	6261966	Jarrah	>50	15-20	0					
wpt572	50H	334167	6261967	Marri	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt573	50H	334165	6261959	Marri	>50	15-20	0					
wpt574	50H	334162	6261948	Jarrah	>50	15-20	0					
wpt575	50H	334150	6261936	Jarrah	>50	15-20	0					
wpt576	50H	334147	6261933	Jarrah	>50	15-20	0					
wpt577	50H	334148	6261924	Jarrah	>50	15-20	0					
wpt578	50H	334152	6261915	Jarrah	>50	15-20	0					
wpt579	50H	334150	6261907	Jarrah	>50	15-20	0					
wpt580	50H	334155	6261899	Jarrah	>50	15-20	2+	Small	No Signs	No Signs	No	
wpt581	50H	334145	6261891	Jarrah	>50	15-20	0					
wpt582	50H	334142	6261892	Marri	>50	15-20	0					
wpt583	50H	334148	6261889	Marri	>50	15-20	0					
wpt584	50H	334151	6261885	Marri	>50	15-20	0					
wpt585	50H	334166	6261888	Marri	>50	15-20	0					
wpt586	50H	334166	6261898	Dead Jarrah	>50	5-10	1	Small	Bees	No Signs	No	
wpt587	50H	334172	6261900	Marri	>50	15-20	0					
wpt588	50H	334189	6261896	Jarrah	>50	15-20	0					
wpt589	50H	334197	6261898	Dead Jarrah	>50	15-20	0					
wpt590	50H	334200	6261899	Marri	>50	15-20	0					
wpt591	50H	334224	6261898	Jarrah	>50	15-20	0					
wpt592	50H	334224	6261897	Jarrah	>50	15-20	0					
wpt593	50H	334241	6261894	Marri	>50	15-20	0					
wpt594	50H	334242	6261905	Jarrah	>50	15-20	0					
wpt595	50H	334257	6261918	Jarrah	>50	15-20	0					
wpt596	50H	334254	6261940	Jarrah	>50	15-20	0					
wpt597	50H	334210	6261951	Jarrah	>50	15-20	0					
wpt598	50H	334204	6261960	Jarrah	>50	15-20	0					
wpt599	50H	334202	6261963	Jarrah	>50	15-20	0					
wpt600	50H	334198	6261966	Marri	>50	15-20	2+	Medium & Large (Cockatoo)	Bees	No Signs	Yes	Examined with drone
wpt601	50H	334197	6261975	Marri	>50	15-20	0					
wpt602	50H	334193	6261975	Marri	>50	15-20	0					
wpt603	50H	334185	6261983	Marri	>50	15-20	0					
wpt604	50H	334180	6261965	Dead Jarrah	>50	15-20	0					
wpt605	50H	334172	6261948	Marri	>50	15-20	1	Large (Cockatoo)	No Signs	No Signs	Yes	Examined with drone
wpt606	50H	334168	6261938	Jarrah	>50	15-20	2+	Small & Medium	Bees	No Signs	No	
wpt607	50H	334164	6261926	Jarrah	>50	15-20	0					
wpt608	50H	334166	6261919	Jarrah	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt609	50H	334179	6261910	Jarrah	>50	15-20	1	Medium	No Signs	No Signs	No	
wpt610	50H	334182	6261917	Marri	>50	15-20	0					
wpt611	50H	334190	6261906	Jarrah	>50	15-20	0					
wpt612	50H	334193	6261913	Jarrah	>50	15-20	0					
wpt613	50H	334204	6261906	Jarrah	>50	15-20	0					
wpt614	50H	334210	6261913	Jarrah	>50	15-20	0					
wpt615	50H	334215	6261906	Jarrah	>50	15-20	0					
wpt616	50H	334223	6261906	Marri	>50	10-15	1	Large	No Signs	No Signs	No	Examined with drone
wpt617	50H	334230	6261910	Jarrah	>50	15-20	0					
wpt618	50H	334232	6261904	Jarrah	>50	15-20	0					
wpt619	50H	334241	6261913	Jarrah	>50	15-20	0					Examined with drone
wpt620	50H	334237	6261925	Marri	>50	15-20	2+	Small & Medium	Bees	No Signs	No	
wpt621	50H	334240	6261931	Jarrah	>50	15-20	0					
wpt622	50H	334227	6261935	Jarrah	>50	15-20	0					
wpt623	50H	334220	6261933	Jarrah	>50	15-20	0					
wpt624	50H	334219	6261931	Jarrah	>50	15-20	0					
wpt625	50H	334186	6261939	Marri	>50	15-20	1	Large	No Signs	No Signs	No	Examined with drone
wpt626	50H	334184	6261953	Marri	>50	15-20	0					
wpt627	50H	334193	6261932	Jarrah	>50	15-20	0					
wpt628	50H	334178	6261926	Jarrah	>50	15-20	0					
wpt629	50H	334198	6261926	Jarrah	>50	15-20	0					
wpt630	50H	334237	6261861	Jarrah	>50	15-20	0					
wpt631	50H	334232	6261858	Jarrah	>50	15-20	0					
wpt632	50H	334237	6261854	Jarrah	>50	15-20	0					
wpt633	50H	334228	6261849	Jarrah	>50	15-20	0					
wpt634	50H	334227	6261856	Marri	>50	15-20	0					
wpt635	50H	334211	6261850	Jarrah	>50	15-20	0					
wpt636	50H	334197	6261859	Jarrah	>50	15-20	0					
wpt637	50H	334184	6261861	Marri	>50	15-20	0					
wpt638	50H	334186	6261849	Marri	>50	15-20	0					
wpt639	50H	334197	6261839	Marri	>50	15-20	0					
wpt640	50H	334193	6261829	Marri	>50	15-20	0					
wpt641	50H	334188	6261823	Jarrah	>50	15-20	0					
wpt642	50H	334147	6261834	Marri	>50	15-20	0					
wpt643	50H	334168	6261818	Jarrah	>50	15-20	0					
wpt644	50H	334162	6261812	Marri	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt645	50H	334164	6261810	Jarrah	>50	15-20	0					
wpt646	50H	334156	6261810	Marri	>50	15-20	0					
wpt647	50H	334154	6261810	Marri	>50	15-20	0					
wpt648	50H	334162	6261808	Marri	>50	20+	1	Small	No Signs	No Signs	No	
wpt649	50H	334164	6261800	Jarrah	>50	15-20	0					
wpt650	50H	334170	6261794	Jarrah	>50	15-20	0					
wpt651	50H	334176	6261792	Jarrah	>50	15-20	0					
wpt652	50H	334168	6261779	Marri	>50	20+	2+	Small & Medium	Bees	No Signs	No	
wpt653	50H	334176	6261771	Jarrah	>50	15-20	0					
wpt654	50H	334187	6261762	Jarrah	>50	15-20	0					
wpt655	50H	334199	6261748	Jarrah	>50	15-20	0					
wpt656	50H	334195	6261744	Marri	>50	15-20	0					
wpt657	50H	334188	6261734	Jarrah	>50	15-20	1	Medium	No Signs	No Signs	No	
wpt658	50H	334191	6261728	Marri	>50	15-20	0					
wpt659	50H	334191	6261716	Jarrah	>50	15-20	0					
wpt660	50H	334180	6261703	Dead Unknown	>50	15-20	0					
wpt661	50H	334187	6261701	Marri	>50	15-20	0					
wpt662	50H	334185	6261693	Marri	>50	20+	0					
wpt663	50H	334189	6261689	Jarrah	>50	15-20	0					
wpt664	50H	334197	6261692	Dead Jarrah	>50	15-20	0					
wpt665	50H	334210	6261696	Marri	>50	15-20	0					
wpt666	50H	334225	6261699	Marri	>50	20+	2+	Small & Medium	Bees	No Signs	No	
wpt667	50H	334232	6261703	Dead Unknown	>50	5-10	0					
wpt668	50H	334235	6261713	Dead Unknown	>50	20+	2+	Small & Medium	No Signs	No Signs	No	Examined with drone
wpt669	50H	334248	6261714	Marri	>50	15-20	0					
wpt670	50H	334274	6261716	Jarrah	>50	15-20	0					
wpt671	50H	334291	6261713	Jarrah	>50	15-20	0					
wpt672	50H	334295	6261715	Jarrah	>50	15-20	0					
wpt673	50H	334309	6261720	Jarrah	>50	15-20	0					
wpt674	50H	334314	6261731	Jarrah	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	
wpt675	50H	334320	6261731	Jarrah	>50	15-20	0					
wpt676	50H	334323	6261733	Jarrah	>50	15-20	0					
wpt677	50H	334331	6261725	Marri	>50	20+	2+	Medium & Large (Cockatoo)	No Signs	No Signs	Yes	Examined with drone
wpt678	50H	334364	6261726	Marri	>50	15-20	0					
wpt679	50H	334383	6261729	Marri	>50	15-20	0					
wpt680	50H	334364	6261737	Marri	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt681	50H	334361	6261742	Marri	>50	15-20	0					
wpt682	50H	334355	6261747	Marri	>50	15-20	0					
wpt683	50H	334386	6261757	Marri	>50	15-20	0					
wpt684	50H	334381	6261760	Marri	>50	15-20	0					
wpt685	50H	334378	6261773	Marri	>50	15-20	0					
wpt686	50H	334377	6261776	Marri	>50	15-20	0					
wpt687	50H	334365	6261786	Marri	>50	15-20	0					
wpt688	50H	334365	6261797	Dead Marri	>50	15-20	0					
wpt689	50H	334360	6261794	Dead Jarrah	>50	15-20	0					
wpt690	50H	334343	6261759	Jarrah	>50	15-20	0					
wpt691	50H	334344	6261741	Marri	>50	20+	0					
wpt692	50H	334337	6261736	Jarrah	>50	15-20	0					
wpt693	50H	334332	6261737	Jarrah	>50	15-20	0					
wpt694	50H	334324	6261754	Jarrah	>50	15-20	0					
wpt695	50H	334311	6261768	Jarrah	>50	20+	0					
wpt696	50H	334308	6261773	Jarrah	>50	15-20	0					
wpt697	50H	334306	6261775	Jarrah	>50	20+	0					
wpt698	50H	334302	6261779	Marri	>50	15-20	0					
wpt699	50H	334300	6261786	Jarrah	>50	15-20	0					
wpt700	50H	334296	6261792	Jarrah	>50	15-20	0					
wpt701	50H	334303	6261794	Jarrah	>50	15-20	0					
wpt702	50H	334323	6261794	Marri	>50	15-20	0					
wpt703	50H	334336	6261789	Marri	>50	15-20	0					
wpt704	50H	334320	6261799	Marri	>50	15-20	0					
wpt705	50H	334311	6261812	Marri	>50	15-20	0					
wpt706	50H	334299	6261815	Marri	>50	15-20	0					
wpt707	50H	334286	6261814	Marri	>50	15-20	0					
wpt708	50H	334304	6261845	Marri	>50	15-20	0					
wpt709	50H	334296	6261851	Marri	>50	15-20	0					
wpt710	50H	334279	6261838	Marri	>50	15-20	0					
wpt711	50H	334279	6261844	Jarrah	>50	15-20	0					
wpt712	50H	334281	6261875	Jarrah	>50	15-20	0					
wpt713	50H	334277	6261886	Jarrah	>50	15-20	0					
wpt714	50H	334269	6261877	Jarrah	>50	15-20	0					
wpt715	50H	334266	6261873	Jarrah	>50	15-20	0					
wpt716	50H	334266	6261855	Jarrah	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt717	50H	334259	6261853	Jarrah	>50	15-20	0					
wpt718	50H	334247	6261843	Marri	>50	15-20	0					
wpt719	50H	334235	6261841	Jarrah	>50	15-20	0					
wpt720	50H	334229	6261840	Jarrah	>50	15-20	0					
wpt721	50H	334226	6261836	Jarrah	>50	15-20	0					
wpt722	50H	334214	6261831	Jarrah	>50	15-20	0					
wpt723	50H	334204	6261836	Jarrah	>50	15-20	0					
wpt724	50H	334203	6261843	Jarrah	>50	15-20	0					
wpt725	50H	334205	6261846	Jarrah	>50	15-20	0					
wpt726	50H	334197	6261816	Jarrah	>50	15-20	0					
wpt727	50H	334200	6261807	Jarrah	>50	15-20	0					
wpt728	50H	334195	6261802	Jarrah	>50	15-20	0					
wpt729	50H	334202	6261793	Jarrah	>50	15-20	0					
wpt730	50H	334201	6261786	Jarrah	>50	15-20	0					
wpt731	50H	334192	6261772	Jarrah	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	
wpt732	50H	334202	6261767	Jarrah	>50	15-20	0					
wpt733	50H	334207	6261778	Jarrah	>50	15-20	0					
wpt734	50H	334212	6261785	Jarrah	>50	15-20	0					
wpt735	50H	334201	6261757	Jarrah	>50	15-20	0					
wpt736	50H	334208	6261746	Jarrah	>50	15-20	0					
wpt737	50H	334206	6261733	Marri	>50	15-20	0					
wpt738	50H	334198	6261714	Marri	>50	10-15	1	Medium	No Signs	No Signs	No	
wpt739	50H	334201	6261705	Dead Marri	>50	15-20	0					
wpt740	50H	334216	6261710	Jarrah	>50	15-20	0					
wpt741	50H	334224	6261708	Jarrah	>50	15-20	0					
wpt742	50H	334228	6261719	Jarrah	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	
wpt743	50H	334242	6261730	Jarrah	>50	15-20	0					
wpt744	50H	334247	6261732	Jarrah	>50	15-20	0					
wpt745	50H	334165	6261666	Marri	>50	15-20	0					
wpt746	50H	334255	6261737	Jarrah	>50	15-20	0					
wpt747	50H	334282	6261743	Marri	>50	10-15	1	Large (Cockatoo)	No Signs	No Signs	Yes	Examined with drone
wpt748	50H	334284	6261741	Jarrah	>50	15-20	0					
wpt749	50H	334289	6261728	Jarrah	>50	15-20	0					
wpt750	50H	334294	6261739	Jarrah	>50	15-20	0					
wpt751	50H	334314	6261747	Jarrah	>50	15-20	0					
wpt752	50H	334314	6261748	Jarrah	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt753	50H	334296	6261756	Jarrah	>50	15-20	0					
wpt754	50H	334293	6261751	Jarrah	>50	15-20	0					
wpt755	50H	334295	6261771	Marri	>50	15-20	1	Large (Cockatoo)	No Signs	No Signs	Yes	Examined with drone
wpt756	50H	334288	6261782	Jarrah	>50	15-20	0					
wpt757	50H	334278	6261780	Marri	>50	15-20	2+	Small, Medium & Large	No Signs	No Signs	No	Examined with drone
wpt758	50H	334277	6261805	Jarrah	>50	15-20	0					
wpt759	50H	334257	6261813	Jarrah	>50	15-20	0					
wpt760	50H	334256	6261812	Jarrah	>50	15-20	0					
wpt761	50H	334250	6261826	Jarrah	>50	15-20	0					
wpt762	50H	334259	6261842	Jarrah	>50	15-20	0					
wpt763	50H	334235	6261818	Jarrah	>50	20+	2+	Small & Medium	No Signs	No Signs	No	
wpt764	50H	334219	6261818	Jarrah	>50	15-20	0					
wpt765	50H	334220	6261778	Jarrah	>50	15-20	0					
wpt766	50H	334216	6261759	Jarrah	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	
wpt767	50H	334221	6261756	Jarrah	>50	15-20	0					
wpt768	50H	334219	6261757	Jarrah	>50	15-20	0					
wpt769	50H	334220	6261754	Jarrah	>50	15-20	0					
wpt770	50H	334221	6261735	Jarrah	>50	15-20	0					
wpt771	50H	334221	6261730	Jarrah	>50	15-20	0					
wpt772	50H	334226	6261723	Jarrah	>50	15-20	0					
wpt773	50H	334275	6261751	Jarrah	>50	15-20	0					
wpt774	50H	334273	6261760	Jarrah	>50	15-20	0					
wpt775	50H	334275	6261767	Jarrah	>50	15-20	0					
wpt776	50H	334276	6261766	Jarrah	>50	15-20	0					
wpt777	50H	334268	6261774	Jarrah	>50	15-20	0					
wpt778	50H	334258	6261779	Marri	>50	15-20	0					
wpt779	50H	334256	6261791	Jarrah	>50	20+	0					
wpt780	50H	334256	6261792	Marri	>50	15-20	0					
wpt781	50H	334228	6261798	Jarrah	>50	15-20	1	Medium	No Signs	No Signs	No	
wpt782	50H	334233	6261776	Marri	>50	15-20	0					
wpt783	50H	334233	6261775	Jarrah	>50	15-20	0					
wpt784	50H	334231	6261772	Jarrah	>50	15-20	0					
wpt785	50H	334238	6261767	Jarrah	>50	15-20	0					
wpt786	50H	334229	6261762	Jarrah	>50	15-20	0					
wpt787	50H	334171	6261664	Marri	>50	15-20	0					
wpt788	50H	334172	6261658	Jarrah	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt789	50H	334171	6261647	Dead Jarrah	>50	15-20	0					
wpt790	50H	334171	6261642	Jarrah	>50	15-20	0					
wpt791	50H	334169	6261633	Jarrah	>50	15-20	0					
wpt792	50H	334179	6261621	Jarrah	>50	15-20	0					
wpt793	50H	334185	6261620	Jarrah	>50	15-20	0					
wpt794	50H	334191	6261616	Jarrah	>50	15-20	0					
wpt795	50H	334179	6261606	Marri	>50	15-20	0					
wpt796	50H	334184	6261604	Jarrah	>50	15-20	0					
wpt797	50H	334190	6261604	Jarrah	>50	15-20	0					
wpt798	50H	334192	6261594	Marri	>50	15-20	1	Large (Cockatoo)	No Signs	No Signs	Yes	Examined with drone
wpt799	50H	334192	6261594	Marri	>50	15-20	0					
wpt800	50H	334191	6261585	Jarrah	>50	15-20	0					
wpt801	50H	334200	6261588	Jarrah	>50	15-20	0					
wpt802	50H	334203	6261591	Jarrah	>50	15-20	0					
wpt803	50H	334206	6261587	Marri	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	
wpt804	50H	334214	6261578	Jarrah	>50	15-20	0					
wpt805	50H	334221	6261586	Jarrah	>50	15-20	0					
wpt806	50H	334225	6261590	Jarrah	>50	15-20	0					
wpt807	50H	334229	6261586	Jarrah	>50	15-20	0					
wpt808	50H	334232	6261574	Marri	>50	20+	0					
wpt809	50H	334241	6261582	Marri	>50	15-20	0					
wpt810	50H	334252	6261583	Jarrah	>50	15-20	0					
wpt811	50H	334252	6261582	Jarrah	>50	15-20	0					
wpt812	50H	334258	6261588	Jarrah	>50	15-20	0					
wpt813	50H	334253	6261599	Jarrah	>50	15-20	0					Examined with drone
wpt814	50H	334260	6261598	Marri	>50	15-20	0					
wpt815	50H	334263	6261600	Marri	>50	15-20	0					
wpt816	50H	334270	6261597	Marri	>50	15-20	0					
wpt817	50H	334282	6261594	Marri	>50	15-20	0					
wpt818	50H	334301	6261590	Marri	>50	15-20	0					
wpt819	50H	334306	6261595	Marri	>50	15-20	0					
wpt820	50H	334308	6261602	Marri	>50	15-20	0					
wpt821	50H	334317	6261597	Marri	>50	15-20	0					
wpt822	50H	334330	6261610	Marri	>50	20+	0					
wpt823	50H	334334	6261617	Marri	>50	20+	0					
wpt824	50H	334337	6261624	Jarrah	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt825	50H	334335	6261637	Jarrah	>50	15-20	0					
wpt826	50H	334330	6261642	Marri	>50	15-20	0					
wpt827	50H	334333	6261643	Jarrah	>50	15-20	0					
wpt828	50H	334341	6261647	Marri	>50	15-20	0					
wpt829	50H	334344	6261657	Marri	>50	15-20	0					
wpt830	50H	334338	6261650	Jarrah	>50	15-20	0					
wpt831	50H	334323	6261651	Jarrah	>50	15-20	0					
wpt832	50H	334318	6261644	Jarrah	>50	15-20	0					
wpt833	50H	334322	6261639	Jarrah	>50	15-20	0					
wpt834	50H	334321	6261630	Jarrah	>50	15-20	0					
wpt835	50H	334323	6261620	Marri	>50	15-20	0					
wpt836	50H	334312	6261614	Marri	>50	15-20	0					
wpt837	50H	334300	6261615	Jarrah	>50	15-20	0					
wpt838	50H	334298	6261620	Marri	>50	15-20	0					
wpt839	50H	334297	6261629	Jarrah	>50	15-20	0					
wpt840	50H	334302	6261637	Jarrah	>50	15-20	0					
wpt841	50H	334278	6261614	Marri	>50	15-20	0					
wpt842	50H	334277	6261615	Jarrah	>50	15-20	0					
wpt843	50H	334285	6261622	Jarrah	>50	15-20	0					
wpt844	50H	334287	6261625	Jarrah	>50	15-20	0					
wpt845	50H	334306	6261654	Marri	>50	15-20	0					
wpt846	50H	334320	6261676	Marri	>50	15-20	0					
wpt847	50H	334332	6261687	Jarrah	>50	15-20	0					
wpt848	50H	334335	6261693	Jarrah	>50	15-20	0					
wpt849	50H	334347	6261695	Jarrah	>50	20+	0					
wpt850	50H	334345	6261698	Jarrah	>50	15-20	0					
wpt851	50H	334355	6261712	Jarrah	>50	15-20	0					
wpt852	50H	334366	6261714	Jarrah	>50	15-20	0					
wpt853	50H	334390	6261710	Marri	>50	20+	0					
wpt854	50H	334347	6261716	Jarrah	>50	15-20	0					
wpt855	50H	334335	6261704	Jarrah	>50	15-20	0					
wpt856	50H	334322	6261713	Jarrah	>50	15-20	0					
wpt857	50H	334316	6261709	Jarrah	>50	15-20	0					
wpt858	50H	334297	6261700	Jarrah	>50	15-20	0					
wpt859	50H	334308	6261695	Jarrah	>50	15-20	0					
wpt860	50H	334299	6261690	Jarrah	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt861	50H	334282	6261691	Jarrah	>50	15-20	0					
wpt862	50H	334258	6261690	Jarrah	>50	15-20	1	Medium	No Signs	No Signs	No	
wpt863	50H	334229	6261680	Jarrah	>50	15-20	0					
wpt864	50H	334223	6261672	Jarrah	>50	15-20	0					
wpt865	50H	334221	6261670	Jarrah	>50	15-20	0					
wpt866	50H	334199	6261684	Marri	>50	15-20	0					
wpt867	50H	334200	6261680	Jarrah	>50	15-20	0					
wpt868	50H	334186	6261674	Jarrah	>50	15-20	0					
wpt869	50H	334177	6261668	Jarrah	>50	15-20	0					
wpt870	50H	334182	6261659	Marri	>50	15-20	0					
wpt871	50H	334190	6261643	Marri	>50	15-20	0					
wpt872	50H	334194	6261642	Jarrah	>50	15-20	0					
wpt873	50H	334204	6261628	Marri	>50	15-20	0					
wpt874	50H	334200	6261625	Jarrah	>50	15-20	0					
wpt875	50H	334212	6261620	Marri	>50	15-20	0					
wpt876	50H	334214	6261623	Marri	>50	15-20	0					
wpt877	50H	334217	6261605	Jarrah	>50	15-20	0					
wpt878	50H	334234	6261606	Jarrah	>50	15-20	0					
wpt879	50H	334244	6261604	Jarrah	>50	15-20	0					
wpt880	50H	334254	6261605	Marri	>50	15-20	0					
wpt881	50H	334256	6261610	Dead Jarrah	>50	5-10	0					
wpt882	50H	334271	6261623	Marri	>50	15-20	0					
wpt883	50H	334268	6261626	Marri	>50	15-20	0					
wpt884	50H	334282	6261640	Marri	>50	15-20	0					
wpt885	50H	334280	6261653	Jarrah	>50	15-20	0					
wpt886	50H	334283	6261655	Jarrah	>50	15-20	2+	Small & Medium	No Signs	No Signs	No	Examined with drone
wpt887	50H	334300	6261663	Jarrah	>50	15-20	0					
wpt888	50H	334297	6261675	Jarrah	>50	15-20	0					
wpt889	50H	334307	6261681	Jarrah	>50	15-20	0					
wpt890	50H	334310	6261683	Jarrah	>50	15-20	0					
wpt891	50H	334322	6261699	Jarrah	>50	15-20	0					
wpt892	50H	334289	6261678	Marri	>50	15-20	0					
wpt893	50H	334279	6261676	Jarrah	>50	15-20	0					
wpt894	50H	334276	6261661	Jarrah	>50	15-20	0					
wpt895	50H	334275	6261655	Marri	>50	15-20	0					
wpt896	50H	334268	6261678	Marri	>50	15-20	0					

Waypoint Number	Zone	mE	mN	Tree Species	DBH (cm)	Tree Height (m)	Number of Hollows	Estimate Hollow Entrance Size	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt898	50H	334259	6261665	Marri	>50	15-20	0					
wpt899	50H	334257	6261657	Jarrah	>50	15-20	0					
wpt900	50H	334250	6261654	Dead Marri	>50	5-10	0					
wpt901	50H	334267	6261641	Dead Marri	>50	10-15	0					
wpt902	50H	334272	6261638	Jarrah	>50	15-20	0					
wpt903	50H	334248	6261642	Jarrah	>50	15-20	0					
wpt904	50H	334244	6261650	Jarrah	>50	15-20	0					
wpt905	50H	334232	6261648	Jarrah	>50	15-20	0					
wpt906	50H	334244	6261626	Jarrah	>50	15-20	0					
wpt907	50H	334244	6261616	Jarrah	>50	15-20	0					
wpt908	50H	334232	6261621	Jarrah	>50	15-20	0					
wpt909	50H	334240	6261619	Dead Marri	>50	5-10	0					
wpt910	50H	334220	6261633	Jarrah	>50	15-20	0					
wpt911	50H	334215	6261633	Jarrah	>50	15-20	0					
wpt912	50H	334212	6261645	Jarrah	>50	15-20	0					
wpt913	50H	334206	6261652	Jarrah	>50	15-20	0					
wpt914	50H	334203	6261652	Jarrah	>50	15-20	0					
wpt915	50H	334247	6261664	Jarrah	>50	15-20	0					
wpt897	50H	334255	6261672	Marri	>50	15-20	2+	Small	Bees	No Signs	No	

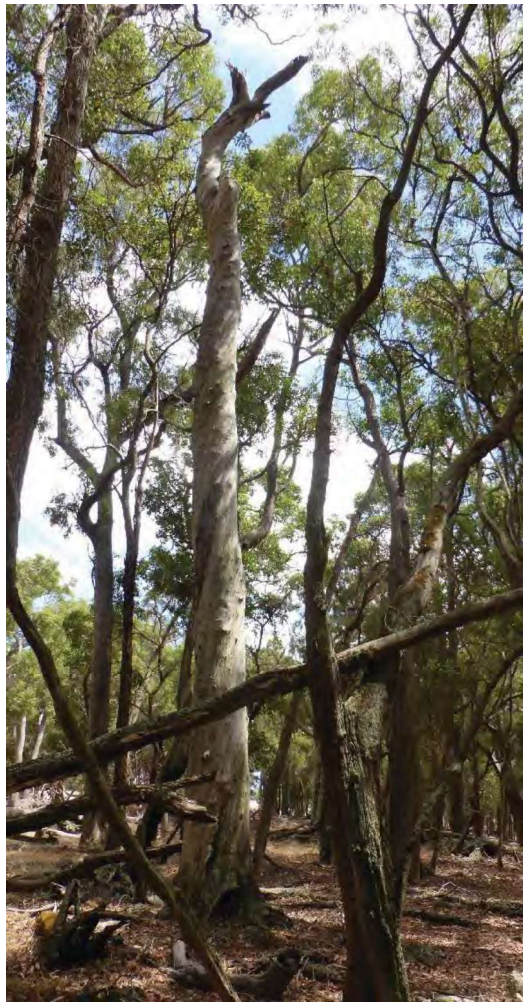
APPENDIX B

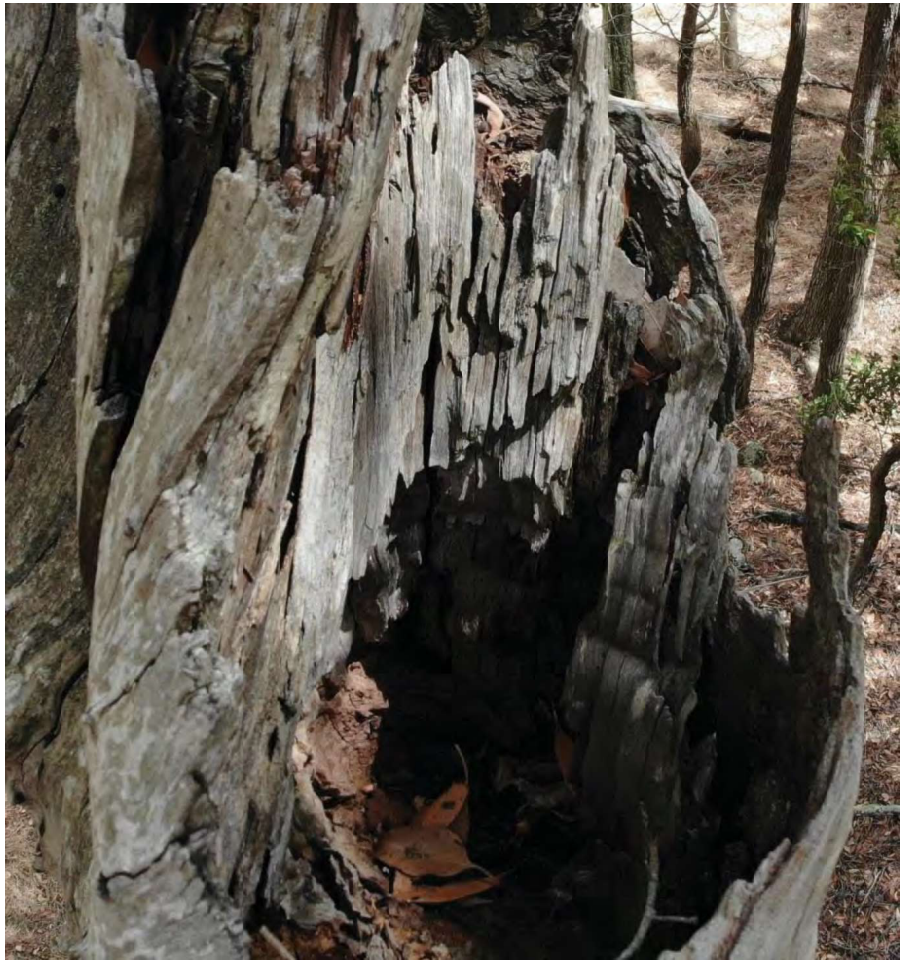
DRONE INSPECTION RESULTS

WPT	Coordinates (MGA 94/Z50)	334071 mE	6261967 mN	Tree Species	Jarrah	Survey Date	26/02/2021
64	Comments	Jarrah with an upward facing spout type hollow. The hollow has a large entrance, though it appears to narrow with depth. Small number of minor chew/chip marks that cannot be conclusively attributed to black cockatoo activity. Base of hollow not visible. Must be considered potentially suitable for black cockatoos to use for nesting purposes. Several smaller possible spout type hollows.				Classification	Unused Hollow.

WPT	Coordinates (MGA 94/Z50)	334119 mE	6261937 mN	Tree Species	Jarrah	Survey Date	26/02/2021
71	Comments	Large Jarrah with a possible side entry/spout type hollow and a possible large side entry hollow where a large branch has recently broken off. Neither hollow appeared to have any depth when examined with a drone. Several smaller possible side entry and spout type hollows.				Classification	Unsuitable Hollow/No Hollow.

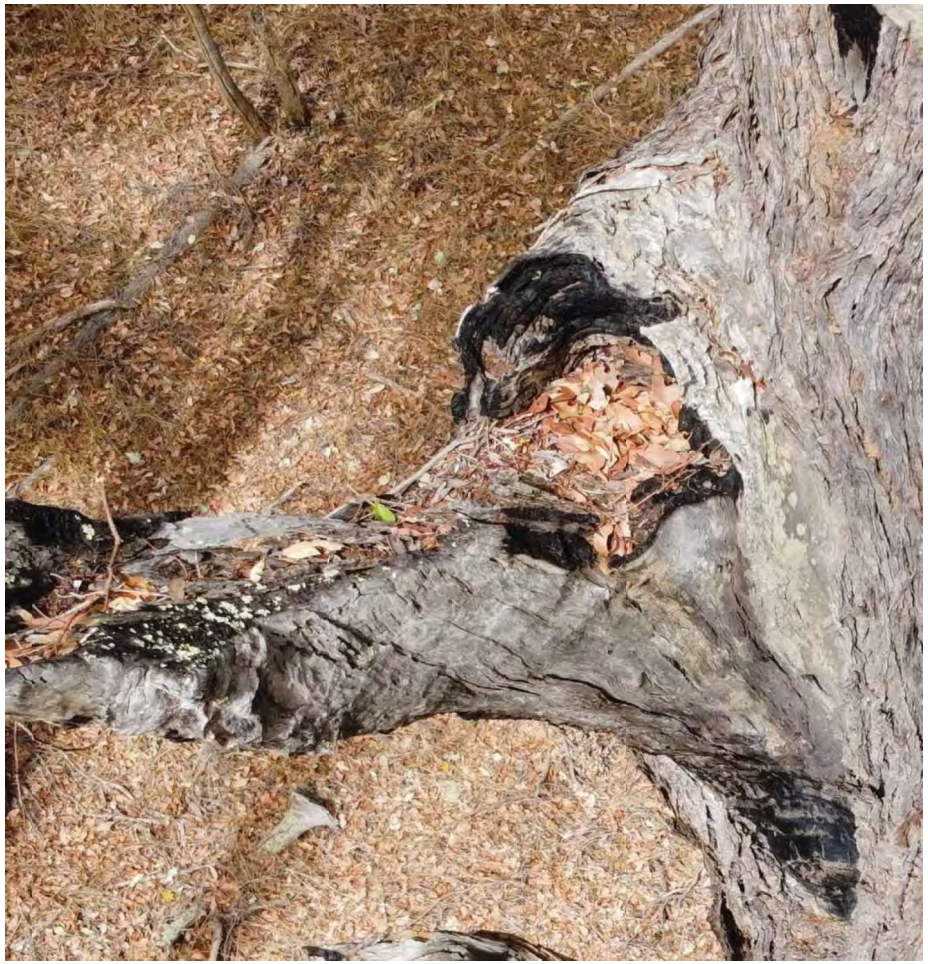
WPT	Coordinates (MGA 94/Z50)	333842 mE	6262060 mN	Tree Species	Dead Unknown	Survey Date	26/02/2021
211	Comments	Dead tree with a possible upward facing spout type hollow. The hollow was found to have no depth when examined with a drone. Several smaller possible spout type hollows.				Classification	No Hollow.





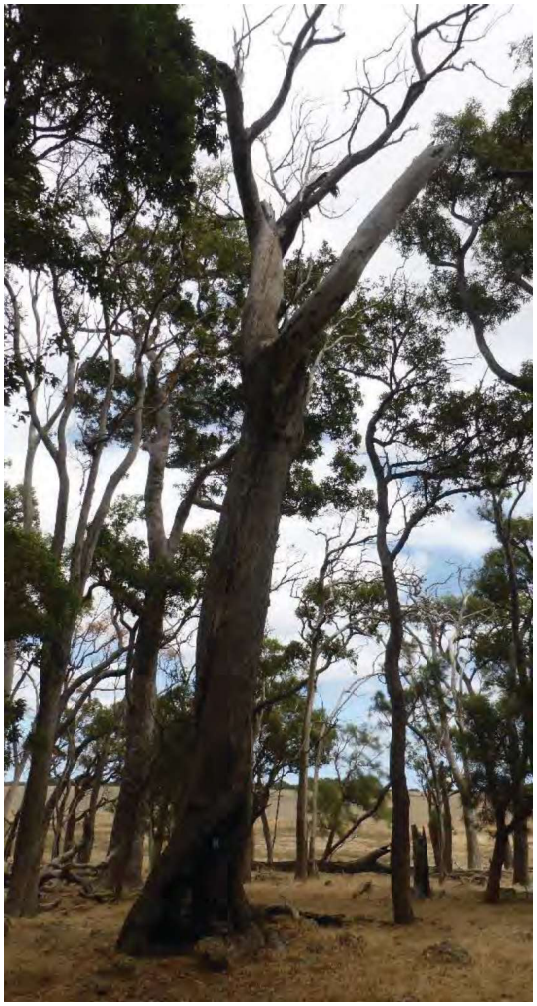
WPT	Coordinates (MGA 94/Z50)	333867 mE	6262022 mN	Tree Species	Dead Unknown	Survey Date	26/02/2021
223	Comments	Dead tree with a possible upward facing chimney type hollow. The hollow was found to have no depth when examined with a drone.				Classification	No Hollow.

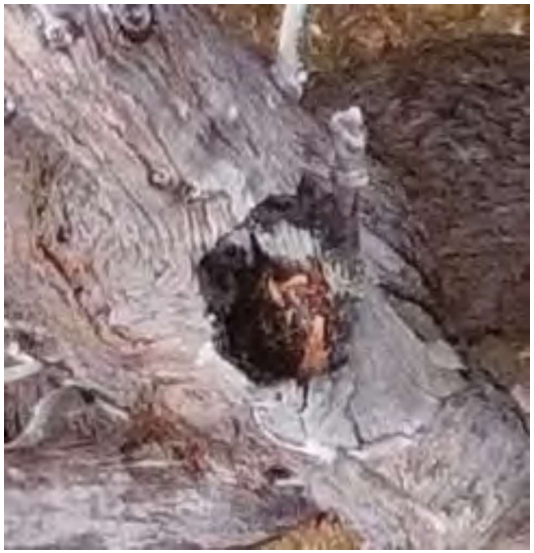
WPT	Coordinates (MGA 94/Z50)	333751 mE	6262192 mN	Tree Species	Jarrah	Survey Date	26/02/2021
320	**Comments**	Jarrah with possible side entry/spout type hollow. The hollow was found to have no depth when examined with a drone. Several much smaller possible spout type hollows in dead branches.				**Classification**	No Hollow.



WPT	Coordinates (MGA 94/Z50)	333601. mE	6262076 mN	Tree Species	Dead Jarrah	Survey Date	26/02/2021
385	Comments	Dead Jarrah with possible spout type hollow and large side entry hollow. The spout type hollow was found to have no depth when examined with a drone. The side entry hollow also has no depth and is open on several sides – appears unsuitable. Several much smaller possible spout type hollows in dead branches.				Classification	Unsuitable Hollow/No Hollow.

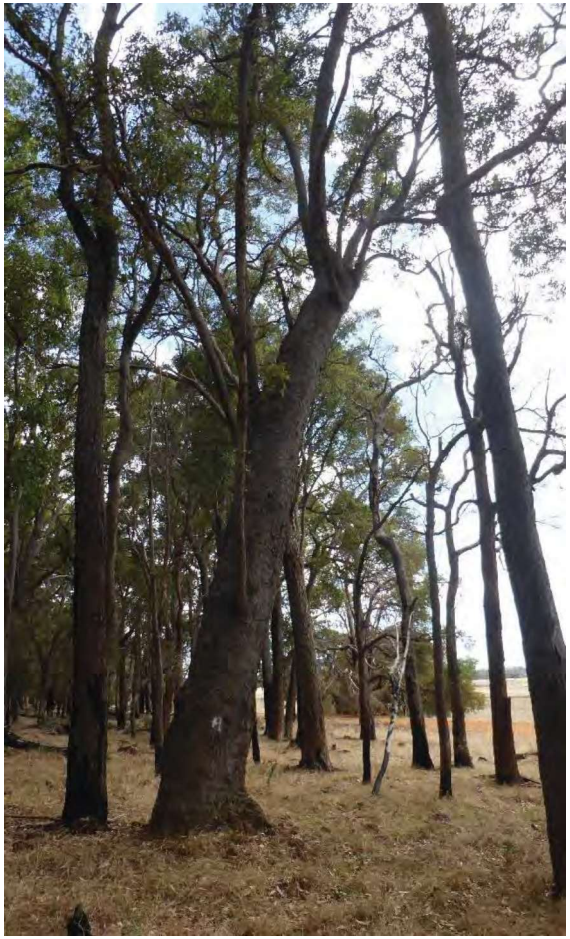
WPT	Coordinates (MGA 94/Z50)	333616 mE	6262036 mN	Tree Species	Dead Jarrah	Survey Date	26/02/2021
394	Comments	Dead Jarrah with three upward facing spout type hollows. Two hollows were found to have no depth at all while the third was too shallow and small internally to be suitable for black cockatoos.				Classification	Unsuitable Hollow/No Hollow.





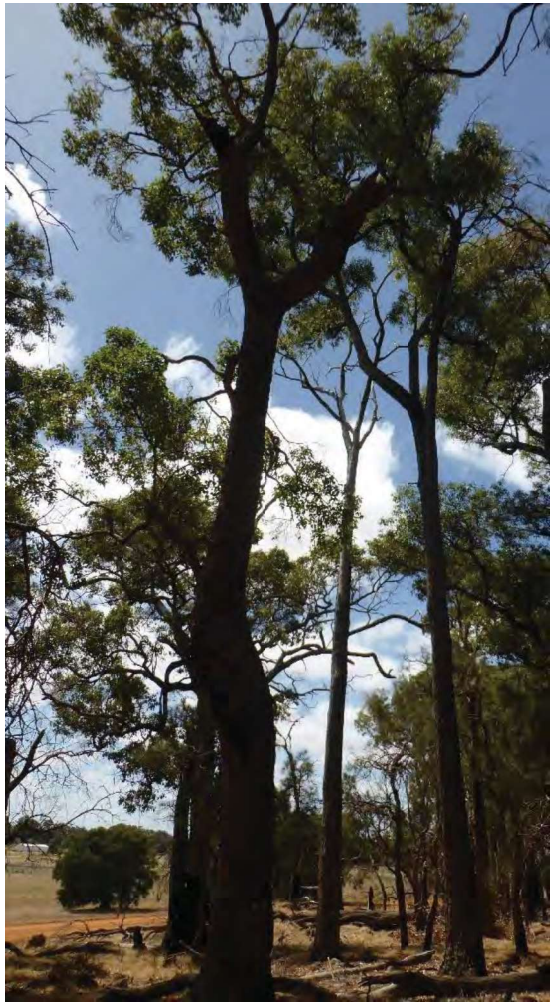
WPT	Coordinates (MGA 94/Z50)	333691 mE	6262074 mN	Tree Species	Marri	Survey Date	26/02/2021
403	**Comments**	Marri with an angled spout type hollow. The hollow is horizontal and has little depth. It therefore appears unsuitable for black cockatoos to use for nesting purposes. Several much smaller possible spout type hollows in dead branches. No evidence of use by fauna of any type.				**Classification**	Unsuitable Hollow.

WPT	Coordinates (MGA 94/Z50)	334337 mE	6261903 mN	Tree Species	Marri	Survey Date	26/02/2021
505	**Comments**	Marri with a possible chimney type hollow. The hollow was found to have no depth when examined with a drone.				**Classification**	No Hollow.

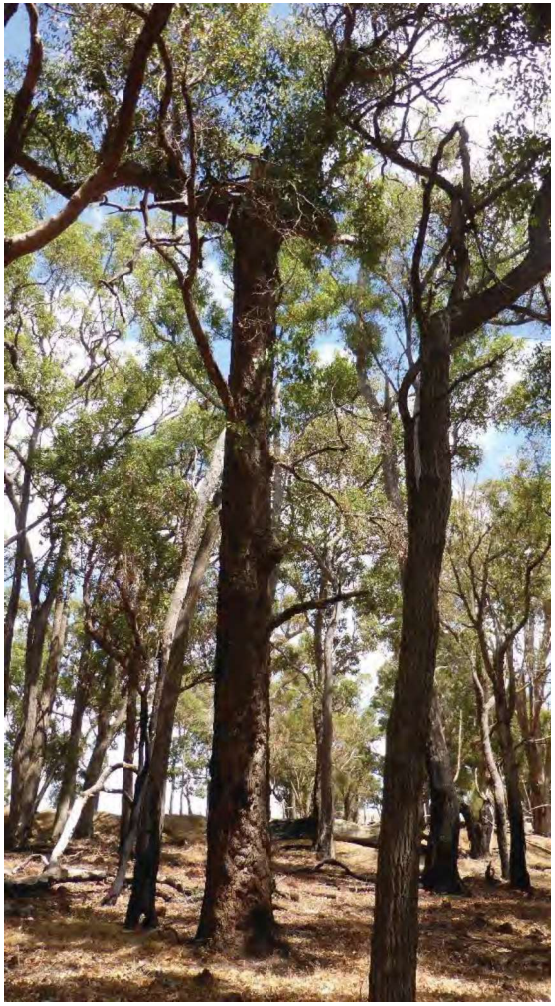


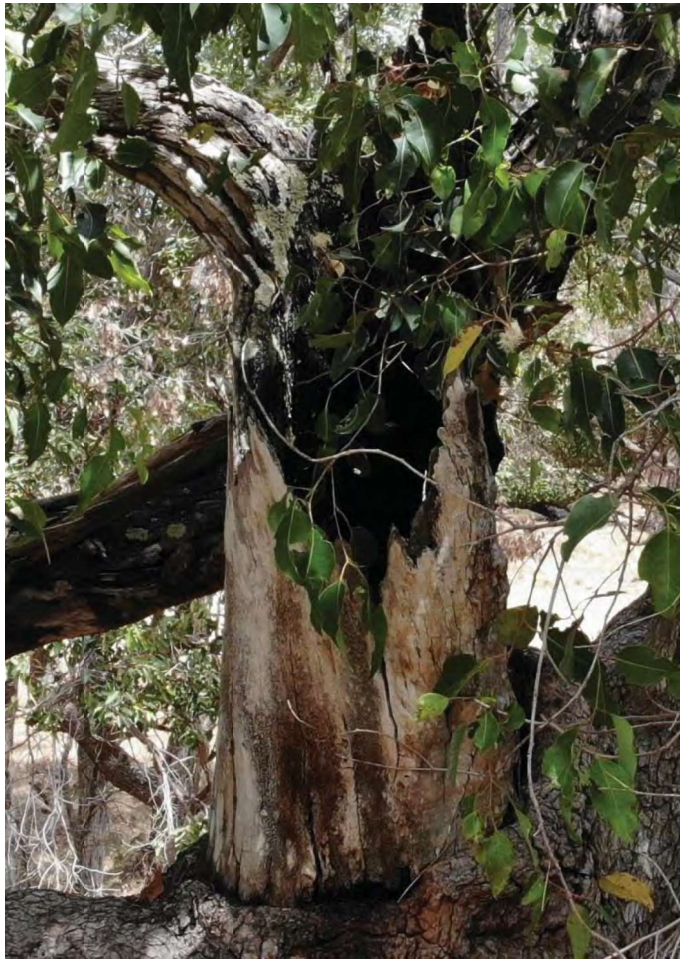
WPT	Coordinates (MGA 94/Z50)	334448 mE	6261813 mN	Tree Species	Jarrah	Survey Date	26/02/2021
525	**Comments**	Jarrah with a possible chimney type hollow. The hollow was found to have no depth when examined with a drone.				**Classification**	No Hollow.

WPT	Coordinates (MGA 94/Z50)	334198 mE	6261966 mN	Tree Species	Marri	Survey Date	26/02/2021
600	Comments	Marri with a large spout type hollow and a spout type hollow. Both hollows appear of a size and orientation to be considered potentially suitable for black cockatoos to use for nesting purposes, though neither shows evidence of use for this purpose. The side entry hollow has some rub marks which suggest use by other fauna (e.g. brushtail possums?). Bees present in smaller hollow.				Classification	Unused Hollows.

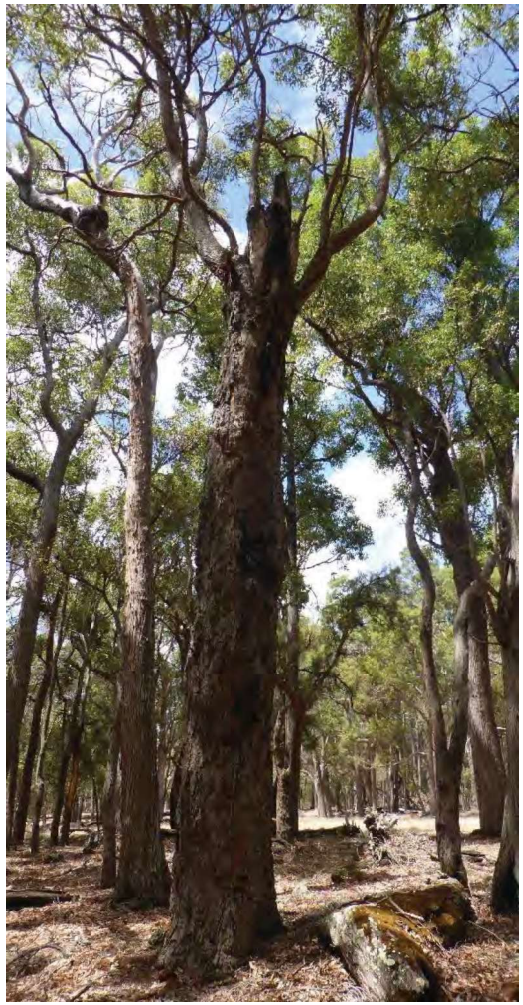


WPT	Coordinates (MGA 94/Z50)	334172 mE	6261948 mN	Tree Species	Marri	Survey Date	26/02/2021
605	**Comments**	Marri with a chimney type hollow. The hollow is shrouded in branches and could not be examined closely with a drone. The hollow does however appear to have a large entrance and some depth and therefore it must be considered potentially suitable for black cockatoos to use for nesting purposes. No evidence of use by fauna of any type.				**Classification**	Unused Hollow.

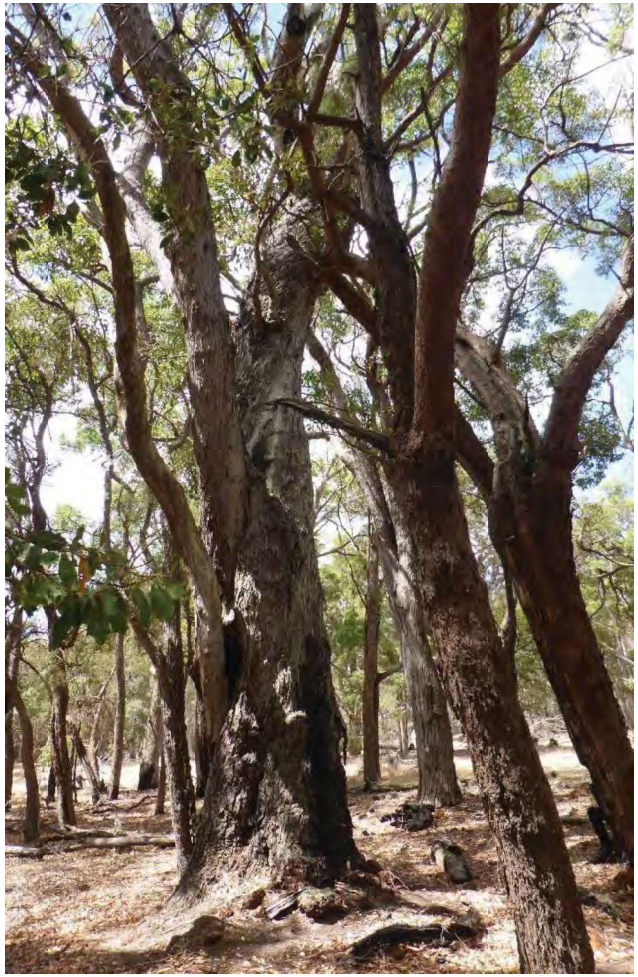




WPT	Coordinates (MGA 94/Z50)	334223 mE	6261906 mN	Tree Species	Marri	Survey Date	26/02/2021
616	Comments	Marri with a possible chimney type hollow. The hollow was found to have little depth when examined with a drone and would not be suitable for black cockatoo to use for nesting purposes.				Classification	Unsuitable Hollow.



WPT	Coordinates (MGA 94/Z50)	334241 mE	6261913 mN	Tree Species	Jarrah	Survey Date	26/02/2021
619	**Comments**	Jarrah with two possible side entry hollows. Both hollows were found to have little or no depth when examined with the drone.				**Classification**	No Hollows.

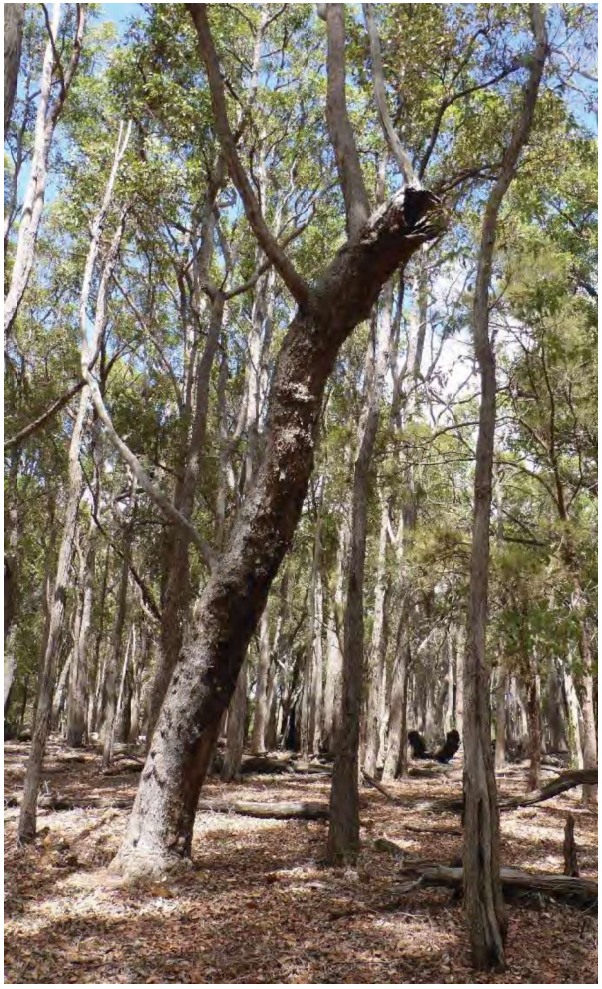


WPT	Coordinates (MGA 94/Z50)	334186 mE	6261939 mN	Tree Species	Marri	Survey Date	26/02/2021
625	Comments	Marri with a chimney type hollow. The hollow appears to be very shallow/open and is therefore considered unsuitable for black cockatoos to use for nesting purposes. No evidence of use by fauna of any type.				Classification	Unsuitable Hollow.

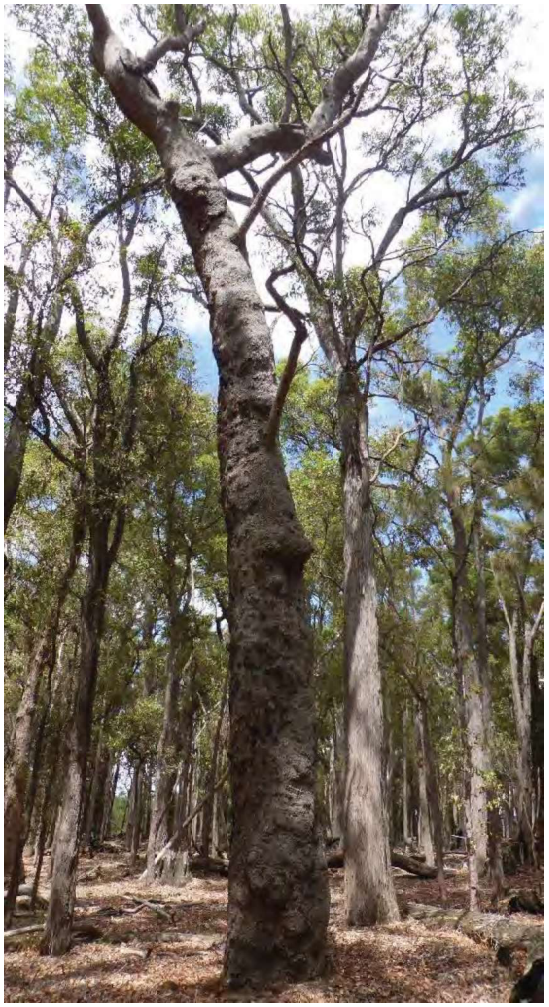
WPT	Coordinates (MGA 94/Z50)	334235 mE	6261713 mN	Tree Species	Dead Unknown	Survey Date	26/02/2021
668	**Comments**	Dead tree with possible upwards facing spout/side entry type hollows. Both hollows were found to have no depth when examined with a drone. Several much smaller possible spout type hollows in dead branches.				**Classification**	No Hollows.

WPT	Coordinates (MGA 94/Z50)	334331 mE	6261725 mN	Tree Species	Marri	Survey Date	26/02/2021
677	**Comments**	Marri with a chimney type hollow. The hollow is shrouded in branches and could not be examined closely with a drone. The hollow does however appear to have a large entrance and some depth and therefore it must be considered potentially suitable for black cockatoos to use for nesting purposes. No evidence of use by fauna of any type.				**Classification**	Unused Hollow.

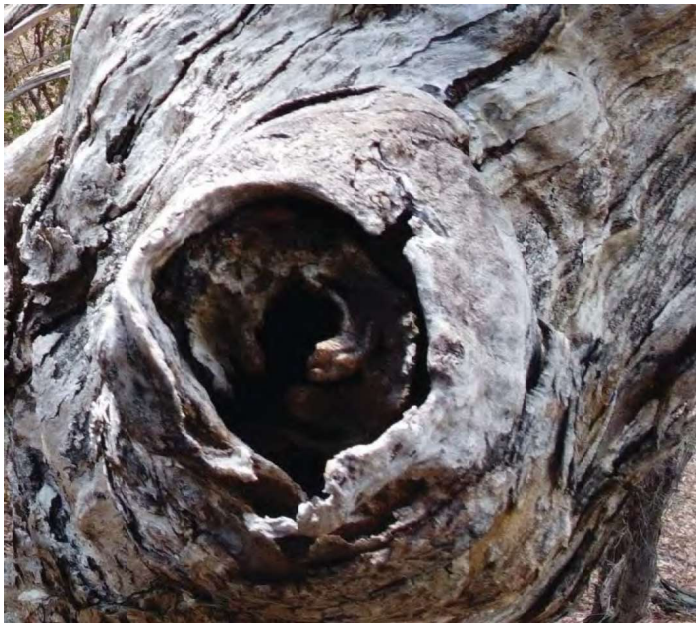
WPT	Coordinates (MGA 94/Z50)	334282 mE	6261743 mN	Tree Species	Marri	Survey Date	26/02/2021
747	**Comments**	Marri with an angled chimney type hollow. The hollow has a large entrance and appears to have some depth and therefore it must be considered potentially suitable for black cockatoos to use for nesting purposes, though possibly marginal given relatively low height. No evidence of use by fauna of any type.				**Classification**	Unused Hollow.



WPT	Coordinates (MGA 94/Z50)	334295 mE	6261771 mN	Tree Species	Marri	Survey Date	26/02/2021
755	**Comments**	Marri with a possible chimney type hollow. The hollow was difficult to examine but appears to be suitable (size and orientation) to be classified as potentially suitable for black cockatoos to use for nesting purposes. No evidence of use. Several much smaller possible spout type hollows in dead branches.				**Classification**	Unused Hollow.

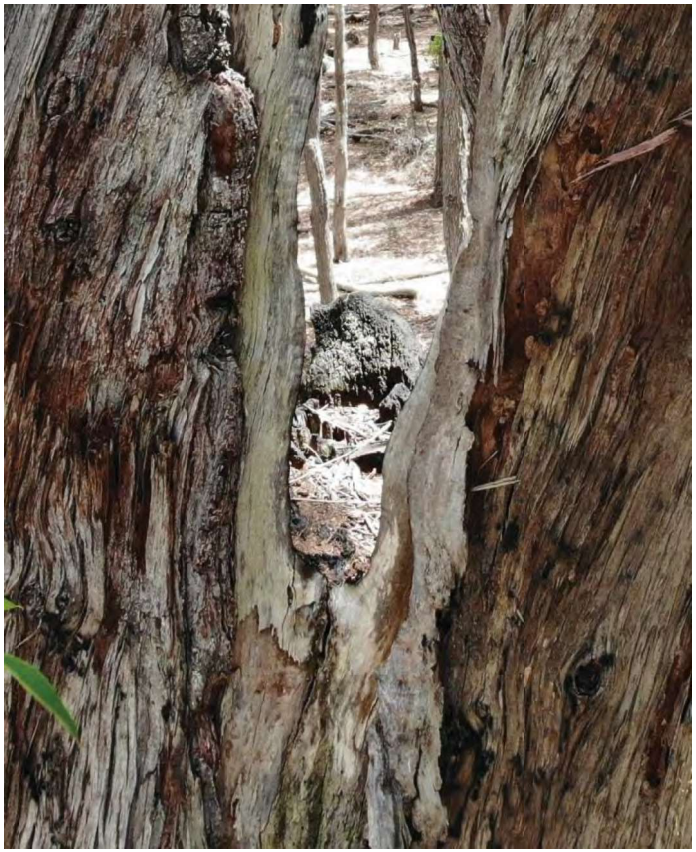


WPT	Coordinates (MGA 94/Z50)	334278 mE	6261780 mN	Tree Species	Marri	Survey Date	26/02/2021
757	Comments	Marri with possible chimney type hollow and a side entry hollow. Side entry hollow was found to have small internal dimensions. Chimney style hollow is obstructed with branches and also appears to be very shallow. No signs of use evident. Several much smaller possible spout type hollows in dead branches.				Classification	Unsuitable Hollows.



WPT	Coordinates (MGA 94/Z50)	334192 mE	6261594 mN	Tree Species	Marri	Survey Date	26/02/2021
798	**Comments**	Near dead Marri with a possible upward facing spout type hollow and a side entry hollow. The side entry hollow was found to have no depth. The upward facing spout type hollow had depth and was found to be occupied by a common brushtail possum. The hollow appears to be of a size potentially suitable for black cockatoos to use for nesting purposes but showed no evidence of previous use for this purpose. Several smaller possible spout type hollows.				**Classification**	Unused Hollow.

WPT	Coordinates (MGA 94/Z50)	334253 mE	6261599 mN	Tree Species	Jarrah	Survey Date	26/02/2021
813	Comments	Jarrah with a possible chimney type hollow and a spout type hollow. Neither potential hollow has any depth when examined with drone.				Classification	No Hollows.



WPT	Coordinates (MGA 94/Z50)	334283 mE	6261655 mN	Tree Species	Jarrah	Survey Date	26/02/2021
886	**Comments**	Jarrah with a chimney type hollow. The hollow was found to have no depth when examined with a drone. Several smaller possible spout type hollows in dead branches.				**Classification**	No Hollow.

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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.

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