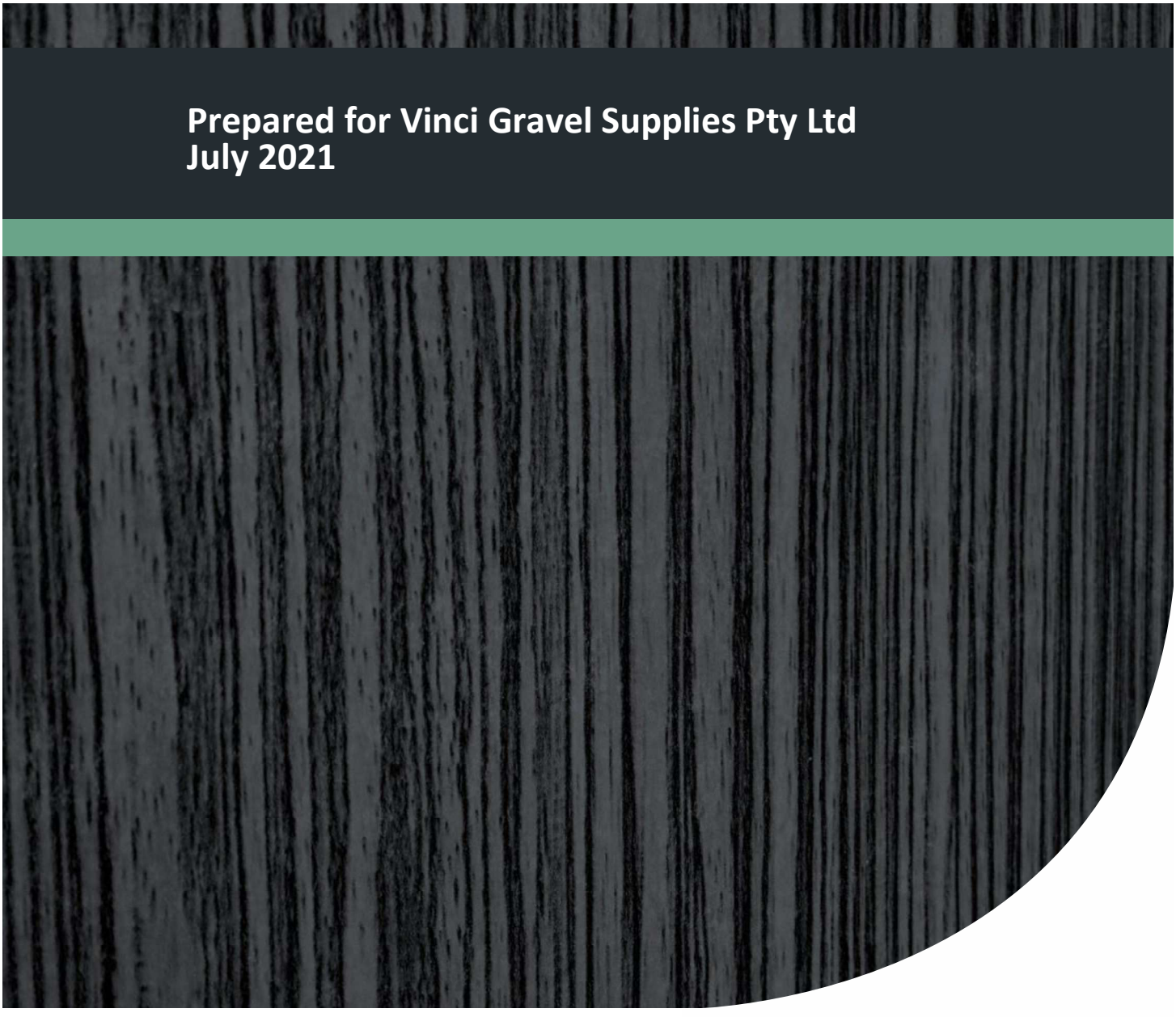
emerge ASSOCIATES
Integrated Science & Design

Targeted Black Cockatoo Assessment

Lot 9 Brookton Highway, Karragullen

Project No: EP20-040(05)

Prepared for Vinci Gravel Supplies Pty Ltd
July 2021



Document Control

Doc name:	Targeted Black Cockatoo Assessment Lot 9 Brookton Highway, Karragullen				
Doc no.:	**EP20-040(05)--009A SCM**				
Version	**Date**	**Author**		**Reviewer**	
1	February 2021	Sean Moylan	SCM	Rachel Weber	RAW
	Submitted for client review				
A	July 2021	Sean Moylan	SCM	Tom Atkinson	TAA
	Update following internal review				

Executive Summary

Vinci Gravel Supplies Pty Ltd intends to expand an existing gravel quarry within part of Lot 9 Brookton Highway in Karragullen (referred to herein as the 'site'). Emerge were engaged to conduct a 'targeted' assessment of habitat values for threatened species of black cockatoo within the site to inform future planning approvals.

As part of the assessment a desktop assessment of relevant background information was completed and a field survey was undertaken across several dates between September and December 2020.

Outcomes of the survey include the following:

- The site occurs within the modelled distribution of Carnaby's cockatoo, Baudin's cockatoos and forest red-tailed black cockatoo and within the breeding range of Carnaby's cockatoo and forest red-tailed black cockatoo.
- Remnant native jarrah/marri forest vegetation within the site provides habitat for all three species of black cockatoo.
- Forest red-tailed black cockatoos were recorded within the site and Baudin's cockatoos were observed adjacent to the site.
- Foraging evidence attributed to all three species was recorded and forest red-tailed black cockatoos were observed foraging within the site.
- A total of 468 habitat trees were recorded within the site of which two contained hollows that were considered suitable for use by black cockatoos for breeding. These hollows did not exhibit any signs of use.
- No evidence of black cockatoo roosting activity was recorded within the site. Roosting habitat for all three species of black cockatoo occurs within the site in the form of tall trees.
- A total of 29.01 ha of foraging habitat for Carnaby's cockatoo was mapped in the site of which 23.41 ha (81%) provides a high value resource, 0.26 ha (1%) provides a moderate value resource and 5.34 ha (18%) provides a low value resource.
- A total of 26.82 ha of foraging habitat for Baudin's cockatoo was mapped in the site, of which 22.85 ha (85%) provides a high value resource, 0.30 ha (1%) provides a moderate value resource and 3.65 ha (14%) provides a low value resource.
- A total of 24.97 ha of foraging habitat for forest red-tailed black cockatoo was mapped in the site, of which 23.46 ha (94%) provides a high value resource, 0.26 ha (1%) provides a moderate value resource and 1.25 ha (5%) provides a low value resource.
- Extensive areas of remnant native vegetation that provides foraging habitat for black cockatoo species occurs adjacent to the site and in the wider area.

This page has been left blank intentionally.

Table of Contents

List of Tables

Figures

Appendices

Abbreviation Tables

Table A1: Abbreviations – Organisations

Organisations	
EPA	Environmental Protection Authority
DBCA	Department of Biodiversity, Conservation and Attractions
DPaW	Department of Parks and Wildlife (now DBCA)
DAWE	Department of Agriculture, Water and the Environment
WA Museum	Western Australian Museum

Table A2: Abbreviations – General terms

General terms	
EN	Endangered
VU	Vulnerable

Table A3: Abbreviations – Legislation

Legislation	
BC Act	*Biodiversity Conservation Act 2016*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*

Table A4: Abbreviations – units of measurement

Units of measurement	
DBH	Diameter at breast height
cm	Centimetre
ha	Hectare
km	Kilometre
m	Metre

This page has been left blank intentionally.

1 Introduction

1.1 Project background

Vinci Gravel Supplies Pty Ltd (Vinci) intends to expand an existing gravel quarry within part of Lot 9 Brookton Highway in Karragullen. This lot (referred to herein as the 'site') is located approximately 29 kilometres (km) south-east of the Perth Central Business District within the City of Armadale and is zoned 'rural' under the Metropolitan Region Scheme and 'general rural' under the City of Armadale *Town Planning Scheme No 4.*

The site is approximately 48.23 hectares (ha) in size and is bound by Midgegooroo National Park to the east, Korung National Park to the north and rural lots to the west and south. The location and extent of the site is shown in **Figure 1**.

1.2 Purpose and scope of work

Emerge Associates (Emerge) were engaged by Vinci Gravel Supplies Pty Ltd to provide environmental consultancy services to support the planning process for the site. The purpose of this assessment is to provide sufficient information on the habitat values for threatened species of black cockatoo within the site to inform this process.

The scope of work was specifically to conduct a terrestrial vertebrate fauna assessment to the standard required of a 'targeted' black cockatoo survey in accordance with the Environmental Protection Authority's (EPA's) technical guidance (EPA 2020) and the *Environment Protection and Biodiversity Conservation Act* black cockatoo referral guidelines (DSEWPaC 2012).

As part of this scope of work, the following tasks were undertaken:

- Desktop assessment of relevant background information pertaining to the site and surrounds, including database and literature searches for black cockatoos.
- Field survey to identify potential habitat for species of black cockatoo.
- An assessment of the quality of black cockatoo habitat within the site.
- Mapping of black cockatoo habitat.
- Documentation of the desktop assessment, survey methodology and results into a report.

2 Background

2.1 Environmental Context

The site occurs within the northern jarrah forest subregion, as defined by the *Interim Biogeographic Regionalisation of Australia* (IBRA) (Environment Australia 2000).

The northern jarrah forest occurs in the south west of Western Australia and approximately extends from Dardanup in the south to Mogumber/ New Norcia in the north on its western side and then down to Williams / Darkan on its eastern side. This region comprises the northern part of the Darling Plateau and generally contains of acidic yellow-mottled soils with ironstone gravel (Beard 1990).

Finer-scale mapping by Beard *et al.* (2013) shows the majority of the site comprises vegetation association 'West Darling 3'. This association is described as 'mainly jarrah and marri *Eucalyptus marginata*, *Corymbia calophylla*' (Beard *et al.* 2013). A small area in the south western portion of the site comprises vegetation association "West Darling 4' which is described as 'jarrah, marri and wandoo *Eucalyptus marginata, Corymbia calophylla, E. wandoo*' (Beard *et al.* 2013).

2.2 Threatened fauna

Certain fauna taxa that are considered to be rare or under threat warrant special protection under Commonwealth and/or State legislation. At a Commonwealth level, fauna taxa may be listed as 'threatened' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Any action likely to have a significant impact on a taxon listed under the EPBC Act requires Ministerial approval.

In Western Australia fauna species may also be classed as 'threatened' under the *Biodiversity Conservation Act 2016* (BC Act). It is an offence to 'take' or 'disturb' threatened fauna without Ministerial approval.

Threatened fauna species listed under the EPBC Act and/or BC Act are assigned a conservation status according to attributes such as population size and geographic distribution. Further information on threatened species and their categories is provided in **Appendix A**.

2.3 Black cockatoos

Three threatened species of black cockatoo occur in the south-west of WA (referred to herein collectively as 'black cockatoos'):

- *Calyptorhynchus latirostris* (Carnaby's cockatoo) which is listed as 'endangered' under the EPBC Act and the BC Act.
- *Calyptorhynchus baudinii* (Baudin's cockatoo) which is listed as 'endangered' under the EPBC Act and the BC Act.
- *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) which is listed as 'vulnerable' under the EPBC Act and the BC Act.

Broad-scale maps are available for the modelled distribution of Baudin's cockatoo, Carnaby's cockatoo and forest red-tailed black cockatoo (DSEWPaC 2011; DoEE 2016a, c). The modelled distribution maps also include 'known breeding areas' and 'predicted breeding range' for Baudin's cockatoo and 'breeding range' and 'non-breeding range' for Carnaby's cockatoo. No breeding range modelling is available for forest red-tailed black cockatoo but the species is known to breed mainly in the jarrah forest region (DBCA 2017) and in small populations on the Swan Coastal Plain within the Baldivis, Stake Hill, Lake McLarty and Capel area and increasingly in the Perth metropolitan area (DAWE 2020).

Each black cockatoo species has a defined breeding season, with Baudin's cockatoo breeding from August/September to February/March and Carnaby's cockatoo breeding from July/August to January/February (DSEWPaC 2012). Forest red-tailed black cockatoo breeds in October/November but may breed in March/April if there is good autumn rainfall (DSEWPaC 2012). There is also evidence that forest red-tail black cockatoos breed throughout the year, with peaks in April – June and August – October (Johnstone *et al.* 2013).

Black cockatoo habitat is conventionally separated into breeding, roosting and foraging categories.

2.4 Black cockatoo habitat

2.4.1 Breeding habitat

Black cockatoos nest in hollows that form in large trees and so 'breeding habitat' is typically assessed as 'habitat' trees. Generally, habitat trees are native eucalypts with a hollow that is suitable for a black cockatoo to nest within or that are of sufficient size that a suitable nest hollow could develop in time (DSEWPaC 2012). Any tree that has a suitable hollow may provide breeding habitat for black cockatoos. However, as a tree may need to be more than 200 years old before it develops a suitable hollow, remnant native eucalypts are most likely to be recorded as habitat trees.

The suitability of a tree hollow for use by black cockatoos is principally contingent on its physical dimensions and orientation. Local studies indicate that to be suitable a hollow must generally:

- have an entrance opening of at least 10 cm but preferably 20-30 cm (Saunders *et al.* 1982; Groom 2010; Johnstone *et al.* 2013) (Groom 2010; Saunders et al. 1982; Johnstone et al 2013)
- be located at least 3 m from the ground (Saunders 1979b; Johnstone and Storr 1998; Groom 2010; Saunders 2014)
- be located in a trunk or branch that is generally large enough to contain a hollow that has a floor diameter of at least 40 cm and depth of 50-200 cm such that it could house an adult black cockatoo and nestlings (Saunders 1979a; Johnstone and Storr 1998; Saunders 2014; DPaW 2015)
- have vertical or near vertical orientation (Johnstone and Kirkby 2008; Johnstone *et al.* 2013).

The minimum size for a habitat tree is typically determined through measurement of trunk 'diameter at breast height' (DBH). For most native eucalypts minimum DBH is defined as ≥50 centimetres (cm). However, for some eucalypts such as *Eucalyptus wandoo* (wandoo) and *Eucalyptus salmonophloia* (salmon gum) that are known to form suitable hollows at smaller size a DBH of ≥30 cm is applied (DSEWPaC 2012).

Breeding habitat is also generally expected to be located within 7 km of food and water resources (Saunders 1990).

Department of Environment and Conservation (DEC, now Department of Biodiversity, Conservation and Attractions (DBCA)) and fauna experts, have identified and mapped breeding habitat used by Carnaby's cockatoo in the Swan Coastal Plain and Jarrah Forest regions (Glossop *et al.* 2011). This dataset includes point records of breeding from a range of sources. Breeding sites were classified as 'confirmed' where eggs or chicks were recorded and 'possible' where observations relating to Carnaby's cockatoo breeding that did not include actual records of eggs or chicks (e.g. chewed hollows or records of breeding or nesting behaviour by an expert observer).

A 12 km buffer applies to each site to 'reflect the flexible use of these areas by cockatoos and to indicate the important zone for access to potential feeding habitat' (Glossop *et al.* 2011). Glossop *et al.* (2011) state that the areas mapped in the dataset are not a comprehensive record of Carnaby's cockatoo breeding and that many nesting sites remain unknown.

While this dataset only applies to Carnaby's cockatoo, the information it contains is also applicable for Baudin's cockatoo and forest red-tailed black cockatoo as they have similar breeding habitat requirements. That is, breeding habitat that is suitable for Carnaby's cockatoo is likely to also be suitable for Baudin's cockatoo and forest red-tailed black cockatoo, if located within the latter species respective breeding range.

BirdLife Australia also maintain a database of confirmed black cockatoo breeding sites which is accessible via a paid search system. BirdLife Australia have advised that their database is comprised of data collected during surveys by staff and volunteers of which most (>99%) surveys are of Carnaby's cockatoo. BirdLife Australia further advises that their dataset is not comprehensive and that an absence of nest records does not necessarily indicate a lack of breeding activity.

The Carnaby's cockatoo recovery plan also identifies 13 'important bird areas' for Carnaby's cockatoo, which are identified as 'sites of global bird conservation importance' (DPaW 2013b). These 'important bird areas' comprise sites supporting at least 20 breeding pairs or 1% of the population regularly utilising an area in the non-breeding part of the range.

2.4.2 Roosting habitat

Roosts are trees that black cockatoos reside and rest within during the day and overnight. Generally, roosting habitat comprises taller trees which may be native or non-native species (DSEWPaC 2012). Roosts are often located near a water source and within 6 km to 12 km of foraging resources (Shah 2006; DSEWPaC 2012; Le Roux 2017). The use of a particular roost site may vary over time depending on the local availability of water and food.

BirdLife Australia undertakes annual monitoring of black cockatoo overnight roost sites as part of the annual 'Great Cocky Count' community-based survey. Information gathered from these monitoring events provides roost locations and records of black cockatoo numbers (Peck *et al.* 2019).

2.4.3 Foraging habitat

Black cockatoos feed on the fruit and seeds of a range of native and non-native plants species. 'Foraging habitat' is therefore vegetation that contains plant species known to be foraged on by black cockatoos.

Glossop et al. (2011) mapped 'areas requiring investigation as Carnaby's cockatoo feeding habitat' for the Swan Coastal Plain and Jarrah Forest regions, based on regional vegetation mapping that may contain plant species known to be foraged upon by Carnaby's cockatoo. Note that this dataset does not include observations or point records of Carnaby's cockatoo feeding. This dataset represents areas of vegetation that may potentially provide foraging habitat for Carnaby's cockatoo.

Given this dataset was created in 2011 and in order to account for clearing of native vegetation that has occurred since this time, Emerge have updated this dataset using the current native vegetation extent as provided by DPIRD (2019a) to only show potential foraging habitat that currently exists (Emerge Associates 2020b).

Pine plantations also provide an important food source for Carnaby's cockatoo, but were not included in the Glossop et al. (2011) dataset. Mapping of pine plantations is available from the Forest Products Commission (Forest Products Commission 2020).

The Glossop et al. (2011) dataset is broadly applicable to other black cockatoos as many plant species that are foraged upon by Carnaby's cockatoo are also consumed by Baudins' cockatoo (e.g. fruit of *Banksia* spp., *Corymbia calophylla* (marri) and *Eucalyptus marginata* (jarrah)) and forest red-tailed black cockatoo (e.g. jarrah and marri fruit). However, using the Glossop et al. (2011) potential foraging habitat dataset for forest red-tailed cockatoos likely overestimates available foraging habitat as it includes multiple plant species that are not consumed by this species (e.g. *Banksia* spp.), and to a lesser extent the foraging value is also over-estimated for Baudin's cockatoo.

Emerge Associates (2020c) have used a similar methodology to Glossop et al. (2011) to define potential foraging habitat for forest-red tailed cockatoos. Specifically, DBCA (2019) regional vegetation complex mapping has been used to determine which areas of remnant vegetation support plant species known to be foraged upon by forest red-tailed cockatoos, including *Allocasuarina fraseriana* (sheoak), *Corymbia calophylla* (marri), *Eucalyptus gomphocephala* (tuart) and *Eucalyptus marginata* (jarrah). Where these vegetation complexes intersect remnant vegetation mapped by DPIRD (2019b) they were considered to represent potential foraging habitat for forest red-tailed cockatoos.

2.5 Previous surveys

No previous targeted black cockatoo surveys are known to have been undertaken over the site. Numerous studies have been completed over the south west of Western Australia in relation to the status of black cockatoo species (refer **Section 2.3** and **Section 7.1**).

Emerge have previously completed a basic fauna assessment within the site, which was undertaken at the same time as the targeted black cockatoo assessment. During this survey broad scale mapping of fauna habitat was completed (Emerge Associates 2020a).

3 Methods

3.1 Desktop assessment

A search was conducted of publicly available regional studies and spatial datasets that provide information on black cockatoo records and potential habitat mapping (Glossop *et al.* 2011; DPaW 2013a; DoEE 2016a, c, b; Emerge Associates 2020b, c).

3.2 Field survey

Four ecologists from Emerge visited the site on 11 September, 21 October, 27 November and 8 and 21 December 2020 during the day to conduct the targeted black cockatoo field survey.

The weather conditions prior to and during the survey were cool during the September - November surveys with minimum temperatures ranging between 6.3° and 11.5° to a maximum of 16.5° to 22.6°. The December surveys were hot, with minimum temperatures ranging between 12.2° and 14.3° to a maximum between 30.2° and 37.2° according to the Bickley weather station (no. 009240) (BoM 2021).

Transects were traversed across the site and potential black cockatoo breeding, night roosting and foraging habitat was recorded. If observed, the presence of black cockatoos within or near the site was noted. Active searches for secondary evidence of breeding, roosting and foraging activity such as chew marks, branch clippings, droppings, moulted feathers and chewed fruit were conducted.

3.2.1 Breeding habitat

Habitat trees were individually identified and the attributes outlined in **Table 1** were recorded for each tree.

Table 1: Attributes recorded for each habitat tree in the site

Attribute	Description
Image	Each habitat tree was individually photographed
GPS location	The location of each habitat tree was recorded using a handheld GPS unit
Tree species	Species and common name were identified
Diameter at breast height (DBH) (cm)	DBH was measured at breast height (1.3 metres) using a diameter tape
Hollows potentially suitable for breeding by a black cockatoo	Number of hollows potentially suitable for breeding by a black cockatoo (assessed from ground level only)

Habitat trees that appeared to have hollows potentially suitable for use by a black cockatoo from the ground were also tagged with a unique identifier on a metal tag. Hollows that appeared potentially suitable for use by a black cockatoo from the ground were further inspected using a drone and/or a pole-mounted camera. During the hollow inspection the internal dimensions of the hollow were confirmed, if possible, and an assessment was made for signs of use such as chew marks around the hollow entrance, nesting material, feathers or the presence of birds within the hollow.

Occasionally, native eucalypts were encountered that met DBH requirements but did not contain a trunk/branch of a sufficient size to support a hollow suitable for use by black cockatoos. For example, the tree may have been less than 3 m tall or had a trunk that forked between 1.3 m and 3 m in height and after the fork no limbs had a diameter such that they could contain a suitable hollow. These trees were not recorded as habitat trees as the likelihood they would ever form a suitable hollow was low. All recorded habitat trees were assigned to a category listed in **Table 2**.

Table 2: Habitat tree categories

Category	Specifications
Nest	The tree contains a hollow used by black cockatoos for breeding as confirmed by records of black cockatoos, their eggs or fledglings or other evidence of recent nesting activity by black cockatoos
Suitable hollow(s) with signs of use	The tree contains one or more hollows that are suitable for use by black cockatoos as breeding habitat as confirmed by internal hollow inspection^ and evidence of use by an unidentified bird such as feathers, chew marks or nest material has been recorded within a hollow
Suitable hollow(s)	The tree contains one or more hollows that are suitable for use by black cockatoos as breeding habitat as confirmed by internal hollow inspection^
Potentially suitable hollow(s)	The tree contains or is suspected to contain one or more hollows that have the potential to be suitable for use by black cockatoos when either viewed from the ground or following an internal hollow inspection that was inconclusive^
No suitable hollow(s)	The tree does not contain hollow(s) that have the potential to be suitable for use by black cockatoos when viewed from the ground or contains hollows that were determined to be unsuitable for use by black cockatoos by internal inspection^

^Hollow determined to be suitable for use as breeding habitat by black cockatoos as listed above in **Section 3.1.1**.

3.2.2 Roosting habitat

The site was assessed for the presence of active or historical roosts and its potential to provide roosting habitat for black cockatoos. However, no dusk roost survey was undertaken. Groups of tall native and non-native trees, if present, were assumed to provide potential roosting habitat.

3.2.3 Foraging habitat

Foraging habitat was identified by comparing the literature on plant species known to be foraged upon by black cockatoos (Davies 1966; Saunders 1980; Johnstone and Storr 1998; Johnstone and Kirkby 1999; Groom 2011; Johnstone *et al.* 2011; DSEWPaC 2012).

The value of foraging habitat was then further classified as 'high', 'moderate' or 'low' value based on the proportion of 'primary' or 'secondary' food plants it contained as outlined in **Table 3**.

Table 3: Foraging habitat values

Value	Definition
High	Greater than 50% primary food plants
Moderate	Greater than 10% to 50% primary food plants
Low	10% or less primary foodplants^
Nil	No primary or secondary food plants

^includes areas with 1-100% secondary food plants where no primary food plants are available

Primary food plants were defined as those with historical and contemporary records of regular consumption by a black cockatoo species. Secondary food plants were defined as plants that black cockatoo species have been recorded consuming occasionally or that, based on their limited extent or agricultural origin, should not be considered a sustaining resource. A list of plant species classified as primary or secondary food plants is provided as **Appendix B.**

Each patch of foraging habitat was assigned a foraging value for each species of black cockatoo likely to occur within the site. As it is not always possible to separate out food plants from non-food plants, mapped foraging habitat may also include vegetation comprising non-food plants. The proportion of non-food plants in mapped foraging habitat was minimised as far as practicable.

Evidence of black cockatoo foraging, such as chewed fruits, was searched for within the site and allocated to a species where possible. The locations of black cockatoo foraging evidence within the site were recorded using a hand-held GPS unit.

3.3 Data analysis, presentation and mapping

Habitat trees were classified according to the scheme outlined in **Table 2** and mapped on aerial imagery. A complete summary of the recorded attributes of habitat trees was compiled in a tabular format. Foraging habitat was mapped on aerial photography with the boundaries interpreted from aerial photography and notes taken in the field.

Foraging habitat was described according to the dominant flora species or vegetation type present and mapped using boundaries interpreted from aerial photography and notes taken in the field. The foraging value of each patch of foraging habitat was attributed separately for each species of black cockatoo likely to occur in the site. Foraging value was assigned as outlined in **Table 3**. The proportions of high, moderate and low value foraging habitat mapped within the site were calculated for each species of black cockatoo.

3.4 Nomenclature and sources of information

Taxonomy and nomenclature of scientific and common names for fauna species follow the *Western Australian Museum* (WAM) *Checklist of the Terrestrial Vertebrate Fauna of Western Australia* (WAM 2020). Where common names were not provided by Western Australian Museum (2019); (WAM 2020), these have been derived from other sources. Literature listed in **Appendix A** represent the main publications used to identify fauna species and habitats within the site.

3.5 Survey limitations

It is important to note the specific constraints imposed on surveys and the degree to which these may have limited survey outcomes. An evaluation of the survey methodology against standard constraints outlined in the EPA's document *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020) is provided in **Table 4**.

Table 4: Evaluation of survey methodology against standard constraints outlined in the EPA's Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020)

Constraint	Degree of limitation	Details
Level of survey	No limitation	A targeted black cockatoo habitat survey was undertaken. The level of survey and survey effort are considered adequate to assess the black cockatoo habitat values within the site.
Scope	No limitation	The survey focused on black cockatoo habitat within the site.
Proportion of fauna identified, recorded and/or collected.	No limitation	The survey primarily focused on identifying black cockatoo habitat. Nonetheless, all three species of black cockatoos were positively identified as occurring within the site through the presence of foraging evidence. The extent of foraging habitat was resolved such that the proportion of non-food plants within mapped habitat was less than 25%.
Sources of information e.g. previously available information (whether historic or recent) as distinct from new data.	Minor limitation	Adequate information was available from database searches and previous surveys to place habitat in context. Taxonomy and nomenclature of scientific and common names for fauna species follow the *Western Australian Museum* (WAM) *Checklist of the Terrestrial Vertebrate Fauna of Western Australia* (WAM 2020). This is contrary to the recent EPA (2020) advice to follow the Australian Faunal Directory (DAWE 2020b) nomenclature for birds.
The proportion of the task achieved and further work which might be needed.	No limitation	The targeted black cockatoo assessment was achieved in its entirety.
Experience level of personnel	No limitation	This fauna assessment was undertaken by qualified and experienced ecologists with between two and 18 years-experience in black cockatoo assessment in Western Australia.
Suitability of timing, weather and season	No limitation	Survey timing is not of great importance for a black cockatoo habitat assessment (with exception of detecting active nests). Nevertheless, the survey was undertaken within the main breeding season for all three species of black cockatoo (refer to **Section 2.4.1**).
Completeness	No limitation	The desktop assessment, field survey and targeted black cockatoo habitat assessment was completed comprehensively.
Spatial coverage and access	No limitation	Site coverage was comprehensive (track logged).
	No limitation	All parts of the site could be accessed as required.
Survey intensity	No limitation	The intensity of the survey was adequate given the size of the site.
Influence of disturbance	No limitation	The western portion of the site is modified due to historical disturbance associated with quarrying activities. However, no recent disturbance was noted that may have affected outcomes of the survey.

Table 4: Evaluation of survey methodology against standard constraints outlined in the EPA's Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020) (continued)

Constraint	Degree of limitation	Details
Adequacy of resources	No limitation	All resources required to perform the survey were available. The guidance currently available from Commonwealth and State agencies on the assessment of black cockatoo habitat is limited and relies heavily on technical experts preparing their own methodology. In response this assessment applies an internally developed methodology that is considered to provide a systematic and balanced characterisation of black cockatoo habitat.

4 Results

4.1 Desktop information

Publicly available regional datasets relating to black cockatoo distribution, records and extent of habitat types were reviewed in relation to the site and surrounding area, as summarised in **Table 5**, **Table 6** and **Table 7**, and shown in **Figure 2.** Detailed information on each dataset considered as part of the desktop review is provided in **Appendix A**.

Table 5: Summary of black cockatoo background review

Category		Site context	Source
Species distribution		• Site is within the modelled distribution of Baudin's cockatoo, but not within its known or predicted breeding range. • Site is within the modelled distribution of Carnaby's cockatoo and within its breeding range. • Site is within the modelled distribution for forest red-tailed black cockatoo and within its known breeding range.	(DoEE 2016a, c, b)
Breeding sites		• No nesting records occur within the site. • Breeding of forest red-tailed black cockatoo and white tailed^ black cockatoos has been reported in Bungendore Park approximately 12 km from the site#.	BirdLife Australia database search (2021)
Carnaby's cockatoo breeding areas (12 km radius surrounding breeding sites)		• One confirmed breeding area intersect the site. • Two possible breeding areas intersect the site.	(Glossop *et al.* 2011)
Important bird areas for Carnaby's cockatoo		• None within the site. • None within 12 km of the site	DPaW (2013a)
Roost site		• None within the site. • 21 roost sites within 12 km of the site (see **Table 6** and **Table 7**): o three associated with white-tailed^ black cockatoos o five associated with forest red-tailed black cockatoos o 13 associated with white^ and red-tailed black cockatoos	BirdLife Australia database search (2021)
Foraging habitat	White-tailed black cockatoo^	• Potential native foraging habitat mapped within the northern and portion of the site. • Extensive areas of potential native foraging habitat mapped within the wider local area of the site, to the north and east of the site within Korung and Midgegooroo National Parks.	(Emerge Associates 2020b)
	White-tailed black cockatoo^	• Several pine plantations are mapped within 12 km of the site, to the east and north-east.	(Forest Products Commission 2020)
	Forest red-tailed black cockatoo	• Potential native foraging habitat primarily mapped within the northern portion of the site. • Extensive areas of potential native foraging habitat mapped within the wider local area of the site, to the north and east of the site within Korung and Midgegooroo National Parks.	(Emerge Associates 2020c)

^Carnaby's and/or Baudin's cockatoo

#Data provided by Birdlife Australia includes information provided by Tony Kirkby, who has reported breeding within Bungendore Park, approximately 12 km from the site. However, exact coordinates have not been provided.

Table 6: White-tailed black cockatoos recorded in roosts within 12 km of the site (Birdlife Australia 2021)

Roost ID	Year and number of individuals									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
ARMBEDR001	57	0	NS	0	0	0	0	6	0	98
ARMBEDR002	70	22	NS	3	0	NS	0	0	0	0
ARMBEDR003	385	NS	NS	0	0	60	6	3	12	5
ARMBEDR005	NS	NS	NS	NS	NS	NS	NS	0	36	0
ARMKELR001	14	0	0	0	0	NS	NS	NS	0	0
ARMKELR002	0	10	NS	0	0	0	0	0	0	NS
ARMROLR001	108	13	140	40	0	0	157	70	0	0
ARMROLR003	NS	0	0	50	0	0	0	0	0	0
ARMROLR004	NS	NS	NS	NS	0	NS	28	0	0	0
ARMROLR005	NS	NS	NS	NS	NS	NS	0	0	0	35
GOSMARR001	NS	NS	NS	NS	NS	NS	NS	0	120	36
KALCANR001	NS	NS	NS	NS	NS	NS	NS	NS	NS	1
KALCARR002	NS	NS	NS	NS	NS	NS	NS	90	NS	8
KALCARR003	NS	NS	NS	NS	NS	NS	NS	NS	NS	0
KALPICR001	NS	NS	NS	NS	NS	NS	NS	5	0	NS
KALPICR002	NS	NS	NS	NS	2	NS	0	0	NS	NS
KALWALR001	0	5	0	0	0	0	NS	0	0	NS

NS = not surveyed

Table 7: Forest red-tailed black cockatoos recorded in roosts within 12 km of the site (Birdlife Australia 2021)

Roost ID	Year and number of individuals					
	2014	2015	2016	2017	2018	2019
ARMBEDR001	21	0	0	0	0	13
ARMBEDR002	0	NS	0	22	0	0
ARMBEDR003	0	0	0	0	3	21
ARMBEDR004	NS	NS	18	6	0	7
ARMBEDR005	NS	NS	NS	0	4	18
ARMBEDR006	NS	NS	NS	14	14	15
ARMKELR004	NS	NS	NS	NS	NS	6
ARMROLR001	0	0	0	9	0	3
ARMROLR003	0	0	0	4	0	0
ARMROLR004	0	NS	35	0	0	50
ARMROLR005	NS	NS	0	36	40	12
GOSMARR001	NS	NS	NS	75	37	18
KALCANR001	NS	NS	NS	NS	NS	5
KALCARR001	NS	NS	0	12	0	NS
KALCARR002	NS	NS	NS	0	NS	24
KALCARR003	NS	NS	NS	NS	NS	76
KALPICR002	42	NS	0	7	NS	NS
KALWALR001	43	1	NS	0	0	NS

NS = not surveyed

4.2 General site conditions

The site slopes from north to south and supports sandy and clay soils with granite outcrops. Two creeks and three waterbodies (dams) are located within the site. Both creeks and two of the waterbodies within the site contained water at the time of the field survey.

Native vegetation is located primarily within the central and eastern part of the site, with smaller areas along the western boundary.

The western portion of the site has been heavily disturbed and supports an active gravel quarry.

4.3 Species inventory

Forest red-tailed black cockatoos were observed foraging within the site and Baudin's cockatoos were observed adjacent to the site. Foraging evidence attributed to all three species of black cockatoo was observed within the site.

4.4 Breeding habitat

A total of 468 black cockatoo habitat trees were recorded within the site as shown in **Figure 3**.

The habitat trees comprised 311 *Corymbia calophylla* (marri), 120 *Eucalyptus marginata* (jarrah) and 37 stags (dead trees).

An internal hollow inspection was undertaken for 20 habitat trees, which were originally assessed to potentially contain suitable hollows based on the initial inspection from ground level. Of the 20 trees inspected, two were determined to contain one suitable hollow (Tree IDs 206 and 208). The remaining trees were determined to not contain hollows suitable for black cockatoos.

The hollows within Tree IDs 206 and 208 were determined to be suitably sized for black cockatoos but no evidence of use by black cockatoos was observed.

A summary of the habitat trees recorded within the site is provided in **Table 8** and an inventory in **Appendix C.** Details of habitat trees with suitable hollows is provided in **Appendix D**.

Table 8: Habitat trees recorded within the site

Category	No. trees	No. suitable hollows
Confirmed nest	0	-
Potential nest	0	-
Suitable hollow(s)	2	2
Potentially suitable hollow(s)	0	-
No suitable hollow(s)	466	0
Total	**468**	**2**

4.5 Roosting habitat

No roosts or secondary evidence of roosting were observed within the site during the survey.

Native and non-native trees within the site have the potential to provide roosting habitat for black cockatoos.

4.6 Foraging habitat

A total of 29.01 ha of foraging habitat for Carnaby's cockatoo, 26.82 ha for Baudin's cockatoo and 24.97 ha for forest red-tailed black cockatoo was recorded in the site as shown in **Figure 4** to **Figure 6**.

Primary food plants within the site include marri, jarrah and *Banksia grandis* (bull banksia). Secondary foraging habitat comprises primarily *Xanthorrhoea preissii* (grass trees) and *Grevillea manglesii* subsp. *manglesii,* as well as, scattered individuals of *Eucalyptus camaldulensis* (river gum). Foraging habitat within the eastern and central portions of the site comprise forest with a continuous overstorey and intact understorey. Foraging habitat within the western portion of the site is fragmented by historical disturbance.

A summary of the food plant preferences for each species of black cockatoo is provided in **Table 9**.

Table 9: Dominant primary and secondary black cockatoo food plants recorded within the site

Food plant	Black cockatoo species		
	Carnaby's	Baudin's	Forest red-tailed
Marri	Primary	Primary	Primary
Jarrah	Primary	Secondary	Primary
Bull banksia	Primary	Secondary	-
Grass tree	Secondary	Secondary	-
River gum	-	-	Secondary

The extent of foraging habitat by value category is detailed in **Table 10**.

Table 10: Foraging habitat value

Foraging value	Black cockatoo species and foraging habitat area (ha)		
	Carnaby's	Baudin's	Forest red-tailed
High	23.41 (81%)	22.85 (85%)	23.46 (94%)
Moderate	0.26 (1%)	0.30 (1%)	0.26 (1%)
Low	5.34 (18%)	3.65 (14%)	1.25 (5%)
Total	29.01	26.82	24.97

5 Discussion

The three species of black cockatoo recorded are frequently sighted in the jarrah forest subregion, and so recording them within the site was not unexpected. However, while the site contains habitat trees and high value foraging habitat, extensive areas of similar habitat occur adjacent to the site and in the local area.

5.1 Breeding habitat

The two habitat trees classified as having 'suitable hollows' were inspected using a pole camera and have internal dimensions that match the requirements of black cockatoos for breeding. However, no evidence of use by black cockatoos or any other fauna was recorded. These habitat trees therefore represent breeding habitat that has the potential to be used by black cockatoos. As the site is located within the breeding range of Carnaby's cockatoo and forest red-tailed black cockatoo the hollows are most relevant to these species.

The remainder of the habitat trees within the site either contained no hollows or had hollows that are not suitable for use by black cockatoos for breeding. The reasons a hollow may have been considered unsuitable include that it had a shallow depth, an uneven base or, most commonly, an internal cavity size that would be too small for a black cockatoo to nest within. These habitat trees have the potential to form suitable hollows in the future, but it will likely take many years for hollows to form that are large enough to be of use to black cockatoos.

5.2 Roosting habitat

The field survey did not include an evening (sunset) visit to check for roosts. However, there was no indication from the current or previous surveys or other sources that roosting may occur within the site (such as local anecdotal information). Therefore, an evening survey was not considered crucial to confirming the absence of roosts within the site.

The tall stands of native and non-native trees within the site do have the potential to be used by black cockatoos for roosting. However, this is does not mean the site would ever be used for roosting. It is difficult to predict where black cockatoos may roost given that the (ostensibly unknowable) availability and suitability of nearby resources such as food and water would influence roosting behaviour. The best indicator of roosting is therefore roosting. As there are no BirdLife Australia (2021) roosts nearby, the importance of the site as roosting habitat is likely to be low.

5.3 Foraging habitat

The foraging habit in the site was classified as high value as it is dominated by primary food plants like jarrah and marri. Jarrah and marri trees are important sustaining resources for all three species of black cockatoo. While being of high value, the foraging habitat in the site is a relatively very small portion of the jarrah forest adjacent to that site and which contains foraging habit of similarly high value.

Extensive areas of foraging habitat of similar or higher value are located adjacent to the site and in the wider area. Therefore, while the extent of foraging habitat in the site is not insignificant, it is still a smaller part of extensive food resources available to black cockatoos in this part of the jarrah forest.

6 Conclusions

The site occurs within the modelled distribution of all three black cockatoos and within the breeding range of Carnaby's cockatoo and forest red-tailed black cockatoo. Direct or indirect evidence of all three species was recorded in the site.

A total of 468 habitat trees were recorded in the site of which two trees contain a hollow suitable for breeding by black cockatoos. The site therefore currently provides breeding habitat which is most relevant to Carnaby's cockatoo and forest red-tailed black cockatoo. However, no evidence of breeding by any species of black cockatoo was observed within the site.

No evidence of black cockatoo roosting activity was observed within the site. Potential roosting habitat that is suitable for all three species of black cockatoo occurs within the site in the form of tall native and non-native trees.

A total of 29.01 ha of foraging habitat for Carnaby's cockatoo was mapped in the site of which 23.41 ha (81%) provides a high value resource, 0.26 ha (1%) provides a moderate value resource and 5.34 ha (18%) provides a low value resource.

A total of 26.82 ha of foraging habitat for Baudin's cockatoo was mapped in the site, of which 22.85 ha (85%) provides a high value resource, 0.30 ha (1%) provides a moderate value resource and 3.65 ha (14%) provides a low value resource.

A total of 24.97 ha of foraging habitat for forest red-tailed black cockatoo was mapped in the site, of which 23.46 ha (94%) provides a high value resource, 0.26 ha (1%) provides a moderate value resource and 1.25 ha (5%) provides a low value resource.

Extensive areas of native vegetation that provides high value foraging habitat for all three species of black cockatoo occurs adjacent to the site and in the wider area.

References

7.1 General references

Beard, J. S. 1990, *Plant Life of Western Australia*, Kangaroo Press Pty Ltd., Kenthurst, N.S.W.

Beard, J. S., Beeston, G. R., Harvey, J. M., Hopkins, A. J. M. and Shepherd, D. P. 2013, *The vegetation of Western Australia at the 1:3,000,000 scale. Explanatory memoir. Second edition.*, Conservation Science Western Australia, 9: 1-152.

Davies, S. J. J. F. 1966, *The movements of the White-tailed Black Cockatoo (Calyptorhynchus baudinii) in south-western Australia*, Western Australian Naturalist 10: 33-42.

department of biodiversity Conservation and Attractions (DBCA) 2017, *Fauna Profile - Forest red-tailed black cockatoo Calyptorhynchus banksii naso*, Perth, Western Australia.

Department of Biodiversity Conservation and Attractions (DBCA) 2019, *Vegetation Complexes - South West forest region of Western Australia (DBCA-047)*, Kensington.

Department of Environment and Energy (DoEE) 2016a, *Modelled distribution for Baudin's Cockatoo (Calyptorhynchus baudinii)*, Canberra.

Department of the Environment and Energy (DoEE) 2016b, *Modelled distribution for Carnaby's Cockatoo (Calyptorhynchus latirostris)*, Canberra.

Department of Environment and Energy (DoEE) 2016c, *Modelled distribution for Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)*, Canberra.

Department of Parks and Wildlife (DPaW) 2013a, *Carnaby's cockatoo (Calyptorhynchus latirostris) Recovery Plan*, Perth, Western Australia.

Department of Parks and Wildlife (DPaW) 2013b, *Carnaby's Cockatoo (Calyptorphynchus latirostris) Recovery Plan*.

Department of Parks and Wildlife (DPaW) 2015, *How to design and place artificial hollows for Carnaby's cockatoo*, Perth.

Department of Primary Industries and Regional Development (DPIRD) 2019a, *Current Extent of Native Vegetation - Western Australia*, Perth, Western Australia.

Department of Primary Industries and Regional Development (DPIRD) 2019b, *Native Vegetation Extent Dataset (DPIRD-005)*, Perth.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2011, *Modelled distribution of Carnaby's black cockatoo (Calyptorhynchus latirostris)*, Commonwealth of Australia, Canberra, Australian Capital Territory.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 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, Commonwealth of Australia, Canberra.

Emerge Associates 2020a, *Level 1 Fauna Assessment - Lot 9 Brookton Highway, Karragullen*, EP20-040(04)--003 MS, Version 1.

Emerge Associates 2020b, *Potential foraging habitat (Swan Coastal Plain) for the Carnaby's black cockatoo (Calyptorhynchus latirostris) - spatial dataset*, Version dated 13 February 2020.

Emerge Associates 2020c, *Potential foraging habitat (Swan Coastal Plain) for the forest red-tailed black cockatoo (Calyptorhynchus banksii naso) - spatial dataset*, Version dated 13 February 2020.

Environment Australia 2000, *Revision of the Interim Biogeographic Regionalisation for Australia (IBRA) and Development of Version 5.1 - Summary Report*, Department of Environment and Heritage.

Environmental Protection Authority (EPA) 2020, *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment*, Joondalup, Western Australia.

Forest Products Commission 2020, *Forest Products Commission Plantations (FPC-001)*.

Glossop, B., Clarke, K., Mitchell, D. and Barrett, G. 2011, *Methods for mapping Carnaby's cockatoo habitat*, Department of Environment and Conservation, Perth.

Groom, C. 2010, *Artificial Hollows for Carnaby's Black Cockatoo: An investigation of the placement, use, monitoring and maintenance requirements of artificial hollows for Carnaby's black cockatoo*, Department of Environment and Conservation, Perth.

Groom, C. 2011, *Plants Used by Carnaby's Black Cockatoo*, Department of Environment and Conservation, Perth.

Johnstone, R., Kirby, T. and Sarti, K. 2013, *The breeding biology of the forest red-tailed black cockatoo Calyptorhynchus banksii naso Gould in south-western Australia. I. Characteristics of nest trees and nest hollows*, Pacific Conservation Biology, 19(2): 121-142.

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

Johnstone, R. E. and Kirkby, T. 1999, *Food of the Red-tailed Forest Black Cockatoo Calyptorhynchus banksii naso in Western Australia*, Western Australian Naturalist, 22: 167-178.

Johnstone, R. E. and Kirkby, T. 2008, *Distribution, status, social organisation, movements and conservation of Baudin' s Cockatoo (Calyptorhynchus baudinii) in South-west Western Australia*, Records of the Western Australian Museum, 25: 107-118.

Johnstone, R. E. and Storr, G. M. 1998, *Handbook of Western Australian Birds. Volume 1 - Non-Passerines (Emu to Dollarbird)*, Western Australian Museum, Perth.

Le Roux, C. 2017, *Nocturnal roost tree, roost site and landscape characteristics of Carnaby's Black-Cockatoo (Calyptorynchus latirostris) on the Swan Coastal Plain*, Edith Cowan University Research Online.

Peck, A., Barret, G. and 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.

Saunders, D. A. 1979a, *The Availability of Tree Hollows for Use as Nest Sites by White-tailed Black Cockatoos*, Australian Wildlife Research, 6: 205-216.

Saunders, D. A. 1979b, *Distribution and taxonomy of the white-tailed and yellow-tailed Black-Cockatoos Calyptorhynchus spp.*, Emu, 79(215-227).

Saunders, D. A. 1980, *Food and Movements of the Short-billed Form of the White-tailed Black Cockatoo*, Australian Wildlife Research, 7: 257-269.

Saunders, D. A. 1990, *Problems of Survival in an Extentively Cultivated Landscape: the case of Carnaby's Cockatoo Calyptorhynchus funereus latirostris*, Biological Conservation, 54: 277-290.

Saunders, D. A., Mawson, P.R., Dawson, R. 2014, *Use of tree hollows by Carnaby's Cockatoo and the fate of large hollow-bearing trees at Coomallo Creek, Western Australia 1969-2013.*, Biological Conservation, 177: 185-193.

Saunders, D. A., Smith, G. T. and Rowley, I. 1982, *The availability and dimensions of Tree Hollows that Provide Nest Sites for Cockatoos (Psittaciformes) in Western Australia*, Australian Wildlife Research, 9: 541-556.

Shah, B. 2006, *Conservation of Carnaby's Black Cockatoo on the Swan Coastal Plain, Western Australia*, Birds Australia, Perth.

Western Australian Museum (WAM) 2020, *WA Museum Checklist of the Terrestrial Vertebrate Fauna of Western Australia*, Perth, Western Australia.

Western Australian Museum 2019, *WA Museum Checklist of the Terrestrial Vertebrate Fauna of Western Australia*, Perth, Western Australia.

7.2 Online references

Bureau of Meteorology (BoM) 2021, *Climate Averages,* viewed 15 February 2021, <http://www.bom.gov.au/climate/data/>.

This page has been left blank intentionally.

Figures

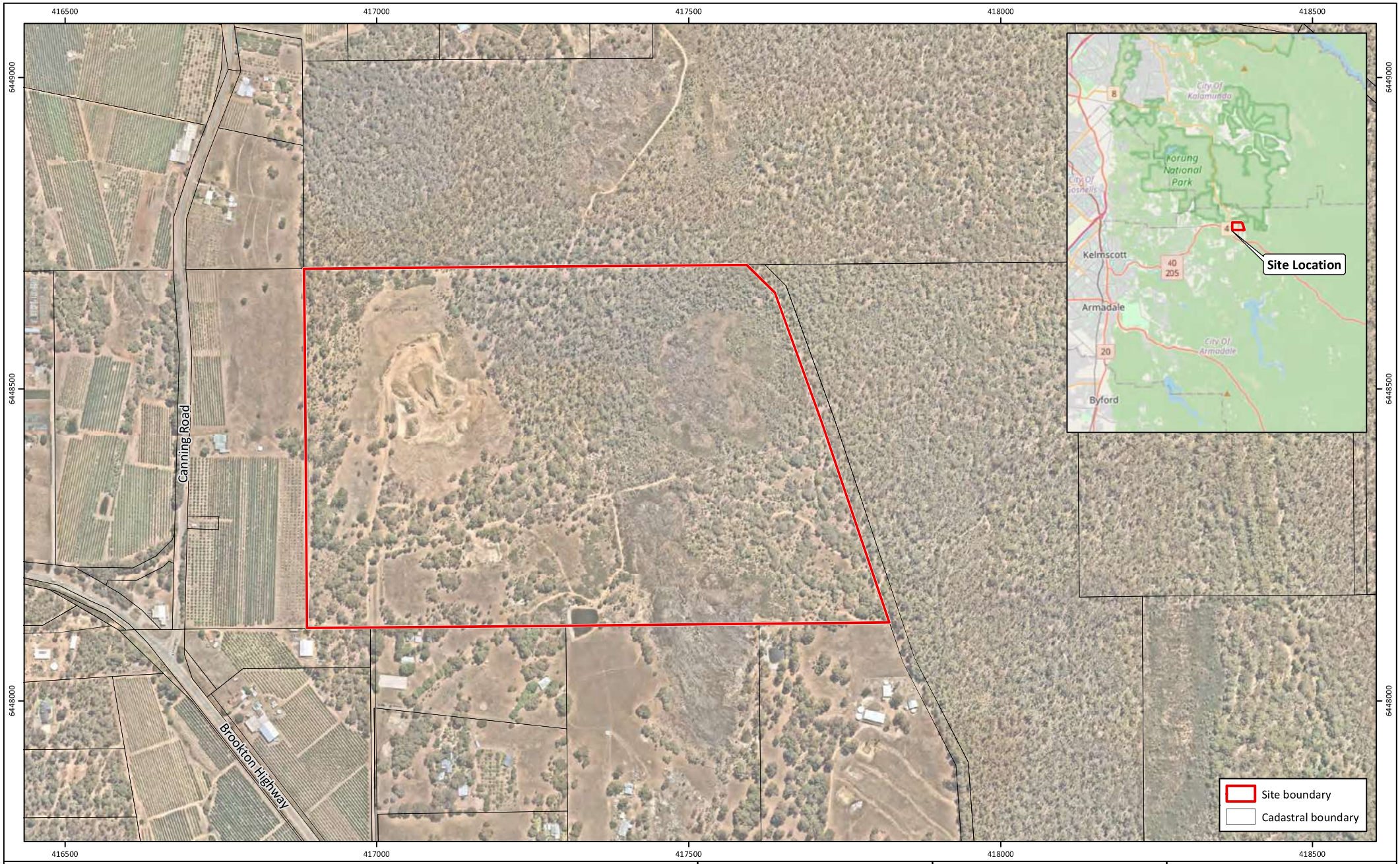


Figure 1: Site Location

Project:	Targeted Black Cockatoo Assessment Lot 9 Brookton Highway, Karragullen
Client:	Vinci Gravel Supplies Pty Ltd

Plan Number:
EP20-040(05)--F42

Drawn:	GAR
Date:	17/02/2021
Checked:	SCM
Approved:	RAW
Date:	19/02/2021

N

0 100 200 300
Metres

Scale: 1:8,000@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

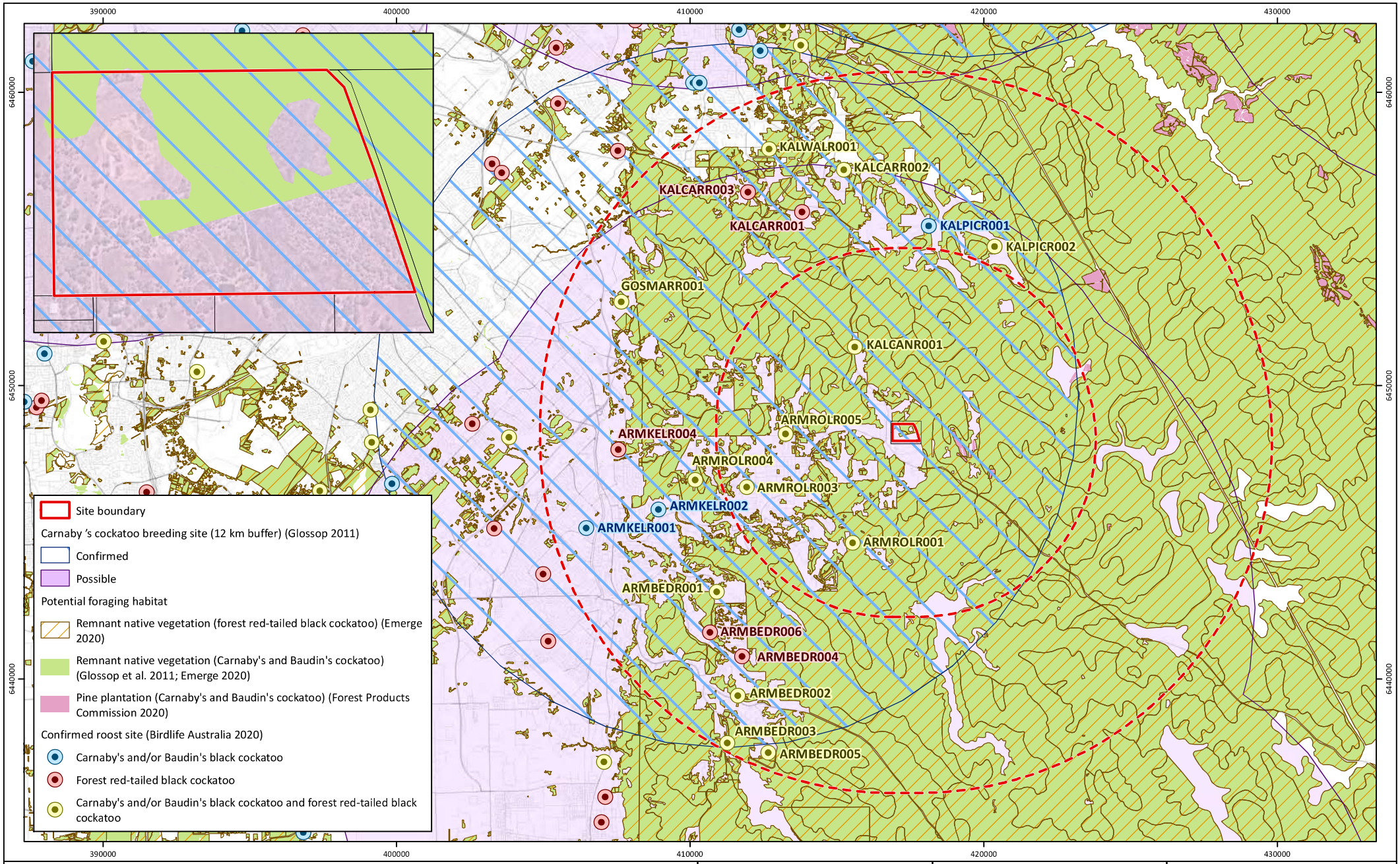


Figure 2: Black Cockatoo Habitat Context

Project: Targeted Black Cockatoo Assessment
Lot 9 Brookton Highway, Karragullen
Client: Vinci Gravel Supplies Pty Ltd

Plan Number:
EP20-040(05)--F43
Drawn: GAR
Date: 17/02/2021
Checked: SCM
Approved: RAW
Date: 19/02/2021

N

0 2 4 6
Kilometres
Scale: 1:170,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

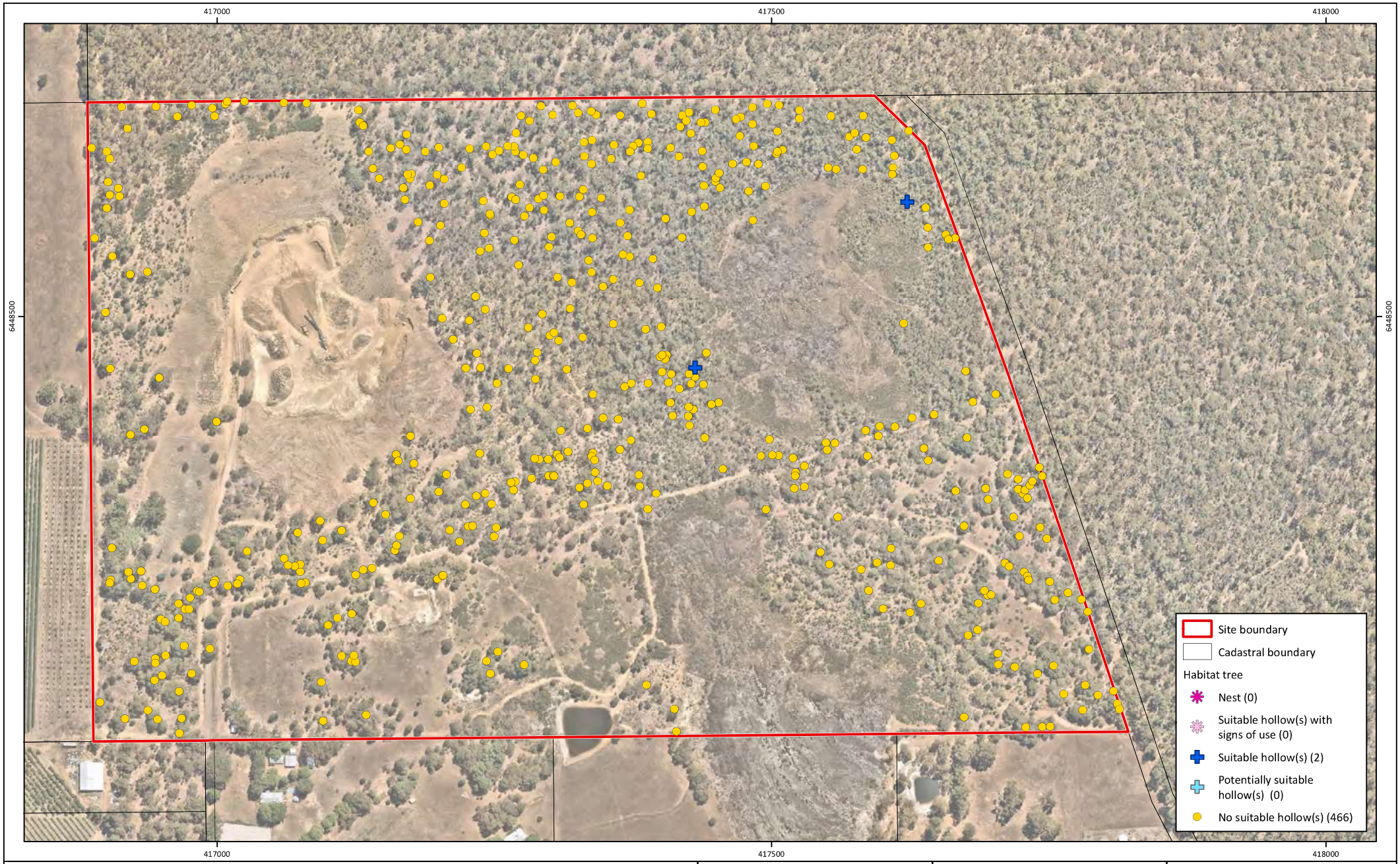


Figure 3: **Black Cockatoo Habitat Trees**

Project: Targeted Black Cockatoo Assessment
Lot 9 Brookton Highway, Karragullen
Client: Vinci Gravel Supplies Pty Ltd

Plan Number:
EP20-040(05)--F44a
Drawn: SCM
Date: 28/07/2021
Checked: SCM
Approved: TAA
Date: 28/07/2021

N

0 50 100 150
Metres
Scale: 1:4,500@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

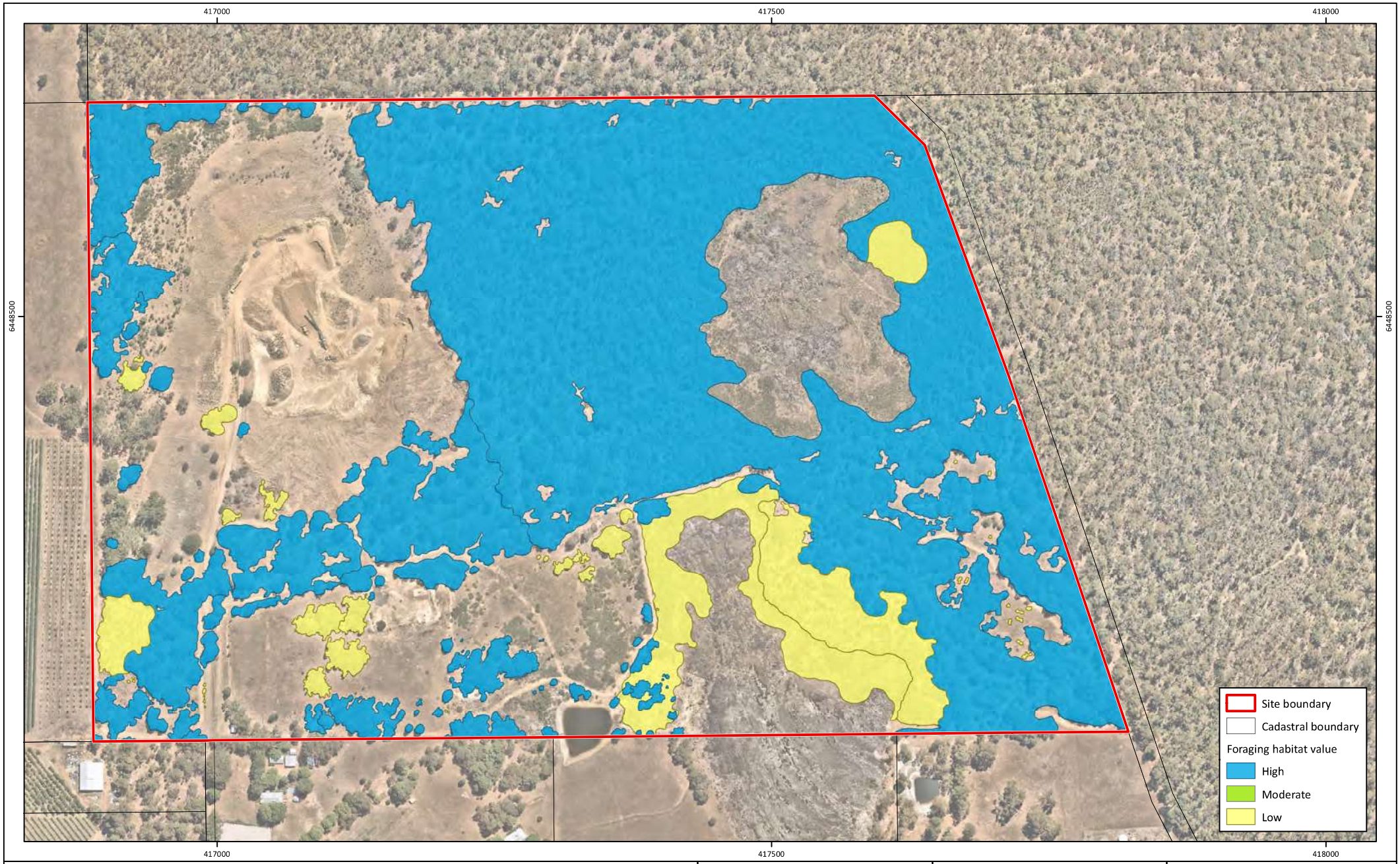


Figure 4: **Baudin's Cockatoo Foraging Habitat**

Project: Targeted Black Cockatoo Assessment
Lot 9 Brookton Highway, Karragullen
Client: Vinci Gravel Supplies Pty Ltd

Plan Number:
EP20-040(05)--F45a

Drawn:	SCM
Date:	22/07/2021
Checked:	SCM
Approved:	TAA
Date:	28/07/2021

N

0 50 100 150
Metres

Scale: 1:4,500@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

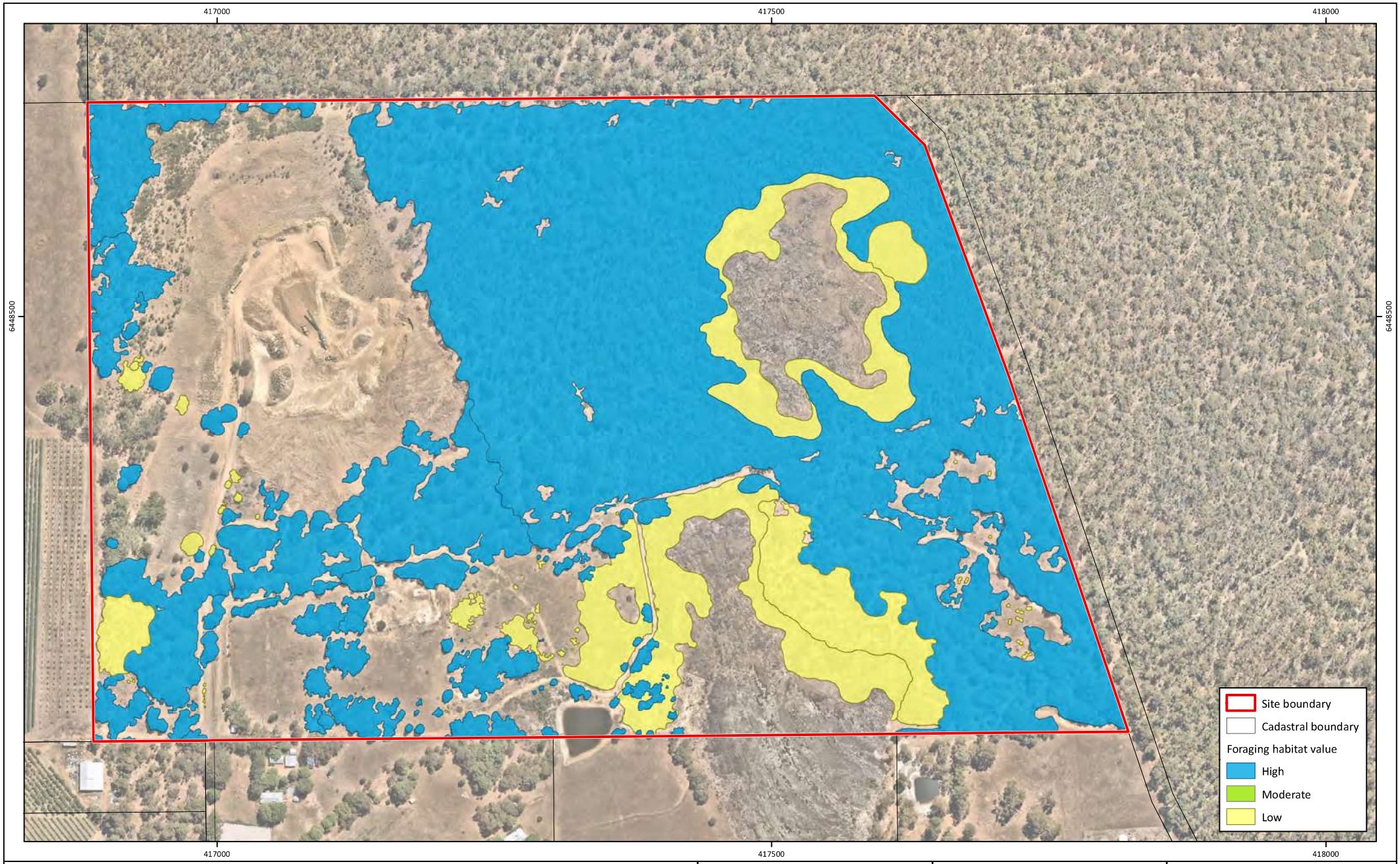


Figure 5: Carnaby's Cockatoo Foraging Habitat

Project: Targeted Black Cockatoo Assessment
Lot 9 Brookton Highway, Karragullen
Client: Vinci Gravel Supplies Pty Ltd

Plan Number:
EP20-040(05)--F46a
Drawn: SCM
Date: 22/07/2021
Checked: SCM
Approved: TAA
Date: 28/07/2021

N

0 50 100 150
Metres
Scale: 1:4,500@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

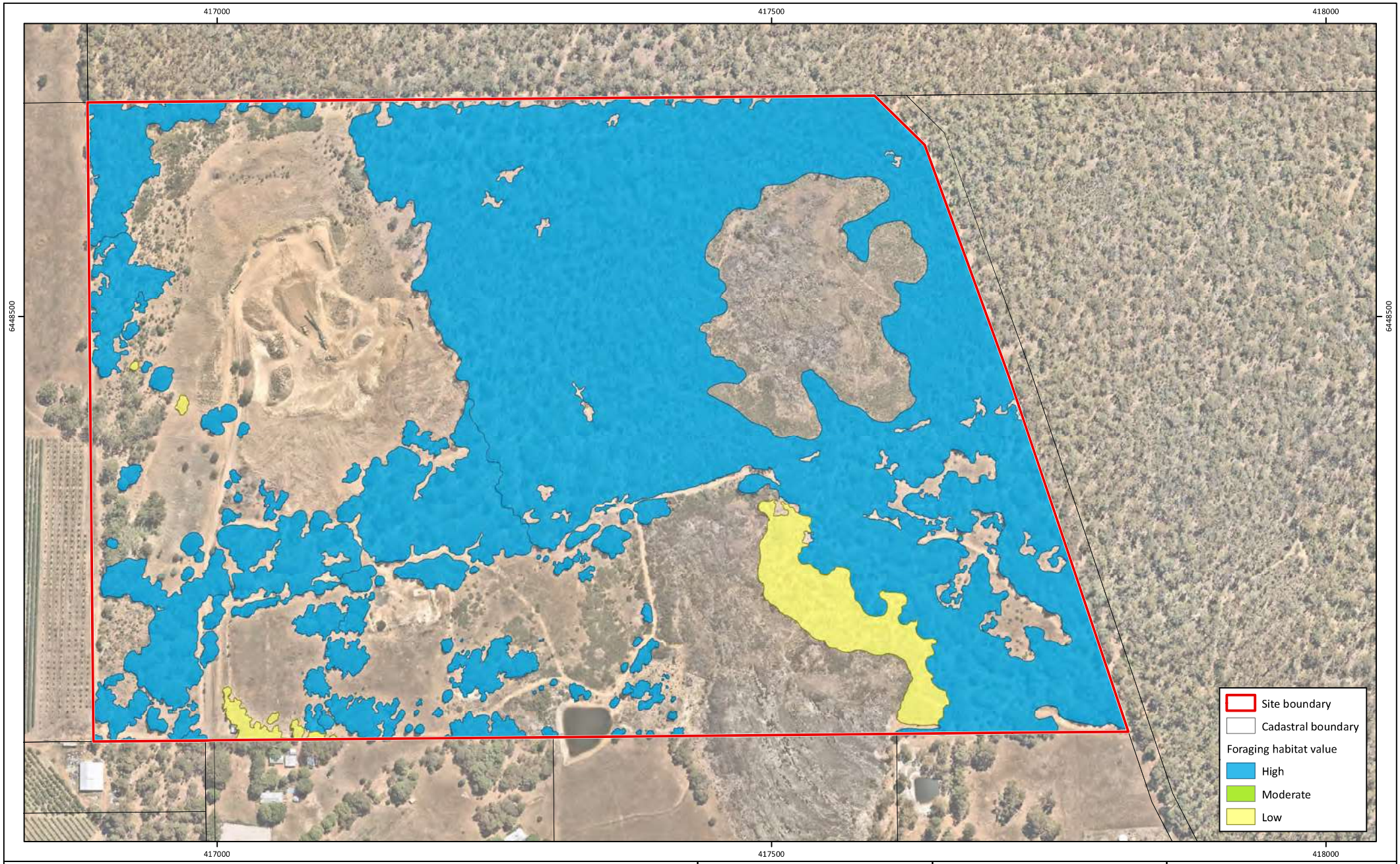


Figure 6: Forest Red-tailed Black Cockatoo Foraging Habitat

Project: Targeted Black Cockatoo Assessment
Lot 9 Brookton Highway, Karragullen
Client: Vinci Gravel Supplies Pty Ltd

Plan Number:
EP20-040(05)--F47a

Drawn:	SCM
Date:	22/07/2021
Checked:	SCM
Approved:	TAA
Date:	28/07/2021

N

0 50 100 150
Metres

Scale: 1:4,500@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

Appendix A

Additional Information

Conservation Significant Fauna

Threatened and priority fauna

Fauna species considered rare or under threat warrant special protection under Commonwealth and/or State legislation. At the Commonwealth level, fauna species can be listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as 'threatened', 'migratory' or 'marine' as described in **Table 1**.

Migratory species comprise birds recognised under international treaties including:

- *Japan Australia Migratory Bird Agreement 1981* (JAMBA)
- *China Australia Migratory Bird Agreement 1998* (CAMBA)
- *Republic of Korea-Australia Migratory Bird Agreement 2007* (ROKAMBA)
- *Bonn Convention 1979* (The Convention on the Conservation of Migratory Species of Wild Animals).

Fauna species listed as threatened and migratory are protected in Australia as 'matters of national environmental significance' (MNES) under the EPBC Act.

Table 1: Definitions of conservation significant fauna species pursuant to the EPBC Act

Conservation Code	Category
X	Threatened Fauna –Extinct There is no reasonable doubt that the last member of the species has died.
EW[#]	Threatened Fauna –Extinct in the Wild Taxa which are known only to survive in cultivation, captivity or as a naturalised population outside its past range, or taxa which have not been recorded in its known and/or expected habitat despite appropriate exhaustive surveys.
CR[#]	Threatened Fauna – Critically Endangered Taxa which are considered to be facing an extremely high risk of extinction in the wild.
EN[#]	Threatened Fauna – Endangered Taxa which are considered to be facing a very high risk of extinction in the wild.
VU[#]	Threatened Fauna – Vulnerable Taxa which are considered to be facing a high risk of extinction in the wild.
Migratory[#]	Migratory Fauna All migratory species that are: (i) native species; and (ii) from time to time included in the appendices to the Bonn Convention; and (b) all migratory species from time to time included in annexes established under JAMBA, CAMBA and ROKAMBA; and All native species from time to time identified in a list established under, or an instrument made under, an international agreement approved by the Minister.
Ma	Marine Fauna Species in the list established under s248 of the EPBC Act

[#]matters of national environmental significance (MNES) under the EPBC Act

In Western Australia, fauna taxa may be classed as 'threatened', 'extinct', or 'specially protected' under the *Biodiversity Conservation Act 2016* (BC Act), which is enforced by Department of Biodiversity Conservation and Attractions (DBCA) (DBCA 2019a). The definitions of these categories are provided in **Table 2**.

Table 2: Definitions of specially protected fauna schedules under the BC Act (DBCA 2019a)

Category	Conservation Code	Definition
Threatened	CR	Critically endangered Threatened species considered to be facing an extremely high risk of extinction in the wild in the immediate future.
	EN	Endangered Threatened species considered to be facing a very high risk of extinction in the wild in the near future.
	VU	Vulnerable Threatened species considered to be facing a high risk of extinction in the wild in the medium-term future.
Extinct	EX	Extinct Species where there is no reasonable doubt that the last member of the species has died.
	EW	Extinct in the wild Species that is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form. Note that no species are currently listed as EW.
Specially protected	MI	Migratory species Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth Includes birds that subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds.
	CD	Species of special conservation interest (conservation dependent fauna) Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
	OS	Other specially protected species Fauna otherwise in need of special protection to ensure their conservation.

Fauna species that may be threatened or near threatened but lack sufficient information to be legislatively listed may be added to the DBCA's *Priority Fauna List* (DBCA 2018). Species listed under priorities 1-3 comprise possible threatened species that do not meet survey criteria or are otherwise data deficient. Species listed under priority 4 are those that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons (DBCA 2019a).

Priority fauna species are considered during State approval processes. Priority fauna categories and definitions are listed in **Table 3** (DBCA 2019a).

Table 3: Definitions of priority fauna categories on DBCA's Priority Fauna List (DBCA 2019a)

Conservation Code	Category
P1	Priority 1 – Poorly known Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	Priority 2 – Poorly known Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	Priority 3 – Poorly known Species that are known from several locations and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	(a) Priority 4 – Rare species Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Priority 4 – Near Threatened Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Priority 4 – Other Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Black cockatoos

Three threatened species of black cockatoo occur on the Swan Coastal Plain (referred to herein collectively as 'black cockatoos'):

- *Calyptorhynchus latirostris* (Carnaby's cockatoo) which is listed as 'endangered' under the EPBC Act and the BC Act.
- *Calyptorhynchus baudinii* (Baudin's cockatoo) which is listed as 'endangered' under the EPBC Act and the BC Act.
- *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) which is listed as 'vulnerable' under the EPBC Act and the BC Act.

There are a range of regional studies and spatial datasets available which provide information on black cockatoo records and potential habitat mapping. These are detailed below.

Species distribution and breeding range

Broad-scale maps are available for the modelled distribution of Baudin's cockatoo, Carnaby's cockatoo and forest red-tailed black cockatoo (DSEWPaC 2011; DoEE 2016a, b).

The modelled distribution maps also include 'known breeding areas' and 'predicted breeding range' for Baudin's cockatoo and 'breeding range' and 'non-breeding range' for Carnaby's cockatoo.

No breeding range modelling is available for forest red-tailed black cockatoo but the species is known to breed mainly in the jarrah forest region (DBCA 2017) and in small populations on the Swan Coastal Plain within the Baldivis, Stake Hill, Lake McLarty and Capel area and increasingly in the Perth metropolitan area (DAWE 2020).

Breeding habitat

Department of Environment and Conservation (DEC, now Department of Biodiversity, Conservation and Attractions (DBCA)) and fauna experts, have identified and mapped Carnaby's cockatoo habitat on the Swan Coastal Plain and Jarrah Forest regions (Glossop *et al.* 2011). This dataset includes mapping of Carnaby's cockatoo breeding sites based on point records of breeding from a range of sources. Breeding sites were classified as 'confirmed' where eggs or chicks were recorded and 'possible' where observations relating to Carnaby's cockatoo breeding that did not include actual records of eggs or chicks (e.g. chewed hollows or records of breeding or nesting behaviour by an expert observer).

A 12 km buffer applies to each site to 'reflect the flexible use of these areas by cockatoos and to indicate the important zone for access to potential feeding habitat' (Glossop *et al.* 2011). Glossop *et al.* (2011) state that the areas mapped in the dataset are not a comprehensive record of Carnaby's cockatoo breeding and that many nesting sites are not known.

While this dataset only applies to Carnaby's cockatoo, the information it contains is also applicable for Baudin's cockatoo and forest red-tailed black cockatoo as they have similar breeding habitat requirements. That is, breeding sites that are suitable for Carnaby's cockatoo may also be suitable for

Baudin's cockatoo and forest red-tailed black cockatoo, if located within their distribution/breeding ranges.

BirdLife Australia also maintain a database of confirmed black cockatoo breeding sites which is accessible via a paid search system. BirdLife Australia have advised that their database is comprised of data collected during surveys by staff and volunteers of which most (>99%) surveys are of Carnaby's cockatoo. They have also advised that the dataset is not comprehensive and that an absence of known nests does not necessarily indicate a lack of breeding activity.

The Carnaby's cockatoo recovery plan also identifies 13 'important bird areas' for Carnaby's cockatoo, which are identified as 'sites of global bird conservation importance' (DPaW 2013). These 'important bird areas' comprise sites supporting at least 20 breeding pairs or 1% of the population regularly utilising an area in the non-breeding part of the range.

Confirmed roost sites

BirdLife Australia undertakes annual monitoring of black cockatoo overnight roost sites as part of the annual 'Great Cocky Count' community-based survey. Information gathered from these monitoring events provides roost locations and recorded black cockatoo numbers (Peck *et al.* 2019).

Native foraging habitat

Glossop et al. (2011) also mapped 'areas requiring investigation as Carnaby's cockatoo feeding habitat' for the Swan Coastal Plain and Jarrah Forest regions, based on regional vegetation mapping that may contain plant species known to be foraged upon by Carnaby's cockatoo. Note that this dataset does not include observations or point records of Carnaby's cockatoo feeding. This dataset represents areas of vegetation that may potentially provide foraging habitat for Carnaby's cockatoo.

Given this dataset was created in 2011 and in order to account for clearing of native vegetation that has occurred since this time, Emerge have updated this dataset using the current native vegetation extent as provided by DPIRD (2019a) to only show potential foraging habitat that currently exists (Emerge Associates 2020a).

Pine plantations also provide an important food source for Carnaby's cockatoo, but were not included in the Glossop et al. (2011) dataset. Mapping of pine plantations is available from the Forest Products Commission (Forest Products Commission 2020).

The Glossop et al. (2011) dataset is broadly applicable to other black cockatoos as many plant species that are foraged upon by Carnaby's cockatoo are also consumed by Baudins' cockatoo (e.g. fruit of *Banksia* spp., *Corymbia calophylla* (marri) and *Eucalyptus marginata* (jarrah)) and forest red-tailed black cockatoo (e.g. jarrah and marri fruit). However, using the Glossop et al. (2011) potential foraging habitat dataset for forest red-tailed cockatoos likely overestimates available foraging habitat as it includes multiple plant species that are not consumed by this species (e.g. *Banksia* spp.), and to a lesser extent the foraging value is also over-estimated for Baudin's cockatoo.

Emerge Associates (2020b) have used a similar methodology to Glossop et al. (2011) to define potential foraging habitat for forest-red tailed cockatoos. Specifically, DBCA (2019b) regional vegetation complex mapping has been used to determine which areas of remnant vegetation

support plant species known to be foraged upon by forest red-tailed cockatoos, including *Allocasuarina fraseriana* (sheoak), *Corymbia calophylla* (marri), *Eucalyptus gomphocephala* (tuart) and *Eucalyptus marginata* (jarrah). Where these vegetation complexes intersect remnant vegetation mapped by DPIRD (2019b) they were considered to represent potential foraging habitat for forest red-tailed cockatoos.

References

General references

department of biodiversity Conservation and Attractions (DBCA) 2017, *Fauna Profile - Forest red-tailed black cockatoo Calyptorhynchus banksii naso*, Perth, Western Australia.

Department of Biodiversity, Conservation and Attractions (DBCA) 2018, *Threatened and Priority Fauna List 15 February 2018*, Perth.

Department of Biodiversity Conservation and Attractions (DBCA) 2019a, *Conservation Codes for Western Australian Flora and Fauna - last updated 3 January 2019*.

Department of Biodiversity Conservation and Attractions (DBCA) 2019b, *Vegetation Complexes - South West forest region of Western Australia (DBCA-047)*, Kensington.

Department of Environment and Energy (DoEE) 2016a, *Modelled distribution for Baudin's Cockatoo (Calyptorhynchus baudinii)*, Canberra.

Department of Environment and Energy (DoEE) 2016b, *Modelled distribution for Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)*, Canberra.

Department of Parks and Wildlife (DPaW) 2013, *Carnaby's Cockatoo (Calyptorphynchus latirostris) Recovery Plan*.

Department of Primary Industries and Regional Development (DPIRD) 2019a, *Current Extent of Native Vegetation - Western Australia*, Perth, Western Australia.

Department of Primary Industries and Regional Development (DPIRD) 2019b, *Native Vegetation Extent Dataset (DPIRD-005)*, Perth.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2011, *Modelled distribution of Carnaby's black cockatoo (Calyptorhynchus latirostris)*, Commonwealth of Australia, Canberra, Australian Capital Territory.

Emerge Associates 2020a, *Potential foraging habitat (Swan Coastal Plain) for the Carnaby's black cockatoo (Calyptorhynchus latirostris) - spatial dataset*, Version dated 13 February 2020.

Emerge Associates 2020b, *Potential foraging habitat (Swan Coastal Plain) for the forest red-tailed black cockatoo (Calyptorhynchus banksii naso) - spatial dataset*, Version dated 13 February 2020.

Forest Products Commission 2020, *Forest Products Commission Plantations (FPC-001)*.

Glossop, B., Clarke, K., Mitchell, D. and Barrett, G. 2011, *Methods for mapping Carnaby's cockatoo habitat*, Department of Environment and Conservation, Perth.

Peck, A., Barret, G. and 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.

Appendix B

Black Cockatoo Foraging Plants

		Foraging category as assigned by Emerge			
Species name	**Common name**	**CBC**	**BBC**	**FRTBC**	**Literature references**
Acacia baileyana	Cootamundra wattle	Secondary			Groom 2011
Acacia pentadenia	Karri wattle	Secondary			Groom 2011
Acacia saligna	Orange wattle	Secondary			Groom 2011
Agonis flexuosa	Peppermint tree	Secondary			Groom 2011
Allocasuarina fraseriana	Sheoak		Secondary	Secondary	Johnstone & Storr 1998; Johnstone et al. 2010; Johnstone 2017; DoEE 2017
Allocasuarina spp.		Secondary		Secondary	Johnstone et al. 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Anigozanthos flavidus	Tall kangaroo paw		Secondary		Johnstone et al. 2010; DSEWPaC 2012; DoEE 2017
Araucaria heterophylla	Norfolk island pine	Secondary			Groom 2011; DoEE 2017
Banksia ashbyi	Ashby's banksia	Primary	Secondary		Saunders 1980; Groom 2011; DoEE 2017
Banksia attenuata	Slender banksia	Primary	Secondary		Saunders 1980; Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia baxteri	Baxter's banksia	Primary	Secondary		Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia carlinoides	Pink dryandra	Primary	Secondary		Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia coccinea	Scarlet banksia	Primary	Secondary		Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia dallanneyi	Couch honeypot dryandra	Primary	Secondary		Groom 2011; DoEE 2017
Banksia ericifolia	Heath-leaved banksia	Primary	Secondary		Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia fraseri		Primary	Secondary		Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia gardneri	Prostrate banksia	Primary	Secondary		Groom 2011; DoEE 2017
Banksia grandis	Bull banksia	Primary	Secondary		Saunders 1980; Johnstone & Storr 1998; Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia hookeriana	Hooker's banksia	Primary	Secondary		Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia ilicifolia	Holly banksia	Primary	Secondary		Johnstone et al. 2010; Groom 2011; Johnstone & Storr 1998; DoEE 2017
Banksia kippistiana		Primary	Secondary		Groom 2011; DoEE 2017
Banksia leptophylla		Primary	Secondary		Groom 2011; DoEE 2017
Banksia lindleyana	Porcupine banksia	Primary	Secondary		Johnstone et al. 2010; DoEE 2017

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Banksia littoralis	Swamp banksia	Primary	Secondary		Saunders 1980; Groom 2011Johnstone & Storr 1998; Johnstone et al. 2010; DoEE 2017
Banksia menziesii	Firewood banksia	Primary	Secondary		Saunders 1980; Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia mucronulata	Swordfish dryandra	Primary	Secondary		Groom 2011; DoEE 2017
Banksia nivea	Honeypot dryandra	Primary	Secondary		Saunders 1980; Groom 2011; DoEE 2017
Banksia nobilis	Golden dryandra	Primary	Secondary		Saunders 1980; Groom 2011; DoEE 2017
Banksia praemorsa	Cut-leaf banksia	Primary	Secondary		Saunders 1980; Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia prionotes	Acorn banksia	Primary	Secondary		Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia prolata		Primary	Secondary		Johnstone et al. 2010; DoEE 2017
Banksia quercifolia	Oak-leaved banksia	Primary	Secondary		Johnstone & Storr 1998; Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia sessilis	Parrot bush	Primary	Secondary		Saunders 1980; Johnstone & Storr 1998; Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia speciosa	Showy banksia	Primary	Secondary		Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia spp.		Primary	Secondary		Saunders 1979; DSEWPaC 2012; DoEE 2017
Banksia squarrosa	Pingle	Primary	Secondary		Johnstone et al. 2010; Groom 2011; DoEE 2017
Banksia tricuspis	Pine banksia	Primary	Secondary		Groom 2011; DoEE 2017
Banksia undata	Urchin dryandra	Primary	Secondary		Groom 2011; DoEE 2017
Banksia verticillata	Granite banksia	Primary	Secondary		Saunders 1980; Groom 2011; DoEE 2017
Brassica campestris	Canola	Secondary			Groom 2011; DoEE 2017
Callistemon spp.		Secondary	Secondary		Johnstone et al. 2010; DoEE 2017
Callistemon viminalis	Captain cook bottlebrush	Secondary			Groom 2011
Callitris sp.		Secondary			Johnstone et al. 2010; Groom 2011
Carya illnoinensis	Pecan	Primary	Secondary		Johnstone et al. 2010; Groom 2011; Groom 2014; DoEE 2017
Casuarina cunninghamiana	River sheoak	Secondary			Groom 2011
Citrullus lanatus	Pie or afghan melon	Secondary			Johnstone et al. 2010; Groom 2011

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Corymbia calophylla	Marri	Primary	Primary	Primary	Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone et al. 2010; DSEWPaC 2012; DoEE 2017; Johnstone 2017; Saunders 1979; Johnstone & Kirkby 2008
Corymbia citriodora	Lemon scented gum	Secondary	Secondary	Secondary	Johnstone et al. 2010; DSEWPaC 2012; Groom 2011; Johnstone 2017
Corymbia ficifolia	Red flowering gum	Secondary			Groom 2011
Corymbia haematoxylon	Mountain marri	Secondary		Secondary	Groom 2011; DoEE 2012; DoEE 2017
Corymbia maculata	Spotted gum	-	-	-	-
Darwinia citriodora	Lemon-scented darwinia	Secondary	Secondary		Groom 2011; Johnstone et al. 2010
Diospryros sp.	Sweet persimmon	Secondary	Secondary		Johnstone et al. 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Eremophila glabra	Tarbush	Secondary			Groom 2011
Erodium aureum		Secondary			Groom 2011
Erodium botrys	Long storksbill	Secondary	Secondary		Groom 2011; Johnstone & Storr 1998; Johnstone et al. 2010
Erodium spp.		Secondary	Secondary		Johnstone et al. 2010; DoEE 2017
Eucalyptus accedens	Powderbark	-	-	-	-
Eucalyptus caesia	Silver princess	Secondary		Secondary	Johnstone et al. 2010; Groom 2011; DSEWPaC 2012; DoEE 2017; Johnstone 2017
Eucalyptus camaldulensis	River red gum			Secondary	DoEE 2012; DoEE 2017
Eucalyptus decipiens	Red heart/moit			Secondary	Johnstone 2017
Eucalyptus diversicolor	Karri			Primary	Johnstone et al. 2010; DSEWPaC 2012; DoEE 2017; Johnstone & Storr 1998
Eucalyptus erythrocorys	Illyarrie	Secondary		Secondary	DSEWPaC 2012; DoEE 2017; Johnstone 2017, Johnstone et al. 2010
Eucalyptus globulus	Tasmanian blue gum	-	-	-	-
Eucalyptus gomphocephala	Tuart	Secondary		Secondary	Johnstone et al. 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Eucalyptus grandis	Flooded gum, rose gum			Secondary	DoEE 2012; DoEE 2017

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Eucalyptus lehmannii	Bushy yate			Secondary	Johnstone 2017
Eucalyptus leucoxylon	Yellow gum	Secondary			Groom 2014
Eucalyptus longicornis	Red morrell	-	-	-	-
Eucalyptus loxophleba	York gum	Secondary			Johnstone et al. 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Eucalyptus marginata	Jarrah	Primary	Secondary	Primary	Saunders 1980; Johnstone et al. 2010; Groom 2011; DSEWPaC 2012; DoEE 2017; Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone 2017
Eucalyptus megacarpa	Bullich	-	-	-	-
Eucalyptus occidentalis	Swamp yate	-	-	-	-
Eucalyptus patens	Blackbutt	Primary		Primary	Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone et al. 2010; DSEWPaC 2012; DoEE 2017; Johnstone 2017; Groom 2011
Eucalyptus pleurocarpa	Tallerack	Secondary			Groom 2011
Eucalyptus preissiana	Bell-fruited mallee	Secondary			Groom 2011
Eucalyptus robusta	Swamp mahogany	Secondary			Johnstone et al. 2010; Groom 2011
Eucalyptus rudis	Flooded gum	-	-	-	-
Eucalyptus salmonophloia	Salmon gum	Primary			Johnstone et al. 2010; Groom 2011; DSEWPaC 2012; DSEWPaC 2012; DoEE 2017
Eucalyptus salubris	Gimlet	-	-	-	-
Eucalyptus staeri	Albany blackbutt			Secondary	Johnstone & Storr 1998
Eucalyptus todtiana	Coastal blackbutt	Secondary			Saunders 1980; Johnstone et al. 2010; Groom 2011; Johnstone & Kirkby 2008
Eucalyptus wandoo	Wandoo	Primary	Secondary	Primary	Saunders 1980; Johnstone et al. 2010; Groom 2011; DSEWPaC 2012; DoEE 2017
Ficus sp.	Fig	Secondary			Groom 2011
Grevillea armigera	Prickly toothbrushes	Primary			Groom 2011
Grevillea bipinnatifida	Fuschia grevillea	Primary			Groom 2011

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Grevillea hookeriana	Red toothbrushes	Primary			Groom 2011
Grevillea hookeriana subsp. apic	Black toothbrushes	Primary			Groom 2011
Grevillea paniculata	Kerosene bush	Primary			Groom 2011
Grevillea paradoxa	Bottlebrush grevillea	Primary			Groom 2011
Grevillea petrophiloides	Pink poker	Primary			Groom 2011
Grevillea robusta	Silky oak	Primary			Johnstone et al. 2010; Groom 2011
Grevillea spp.		Primary			Saunders 1979; Johnstone et al. 2010; DSEWPaC 2012; DoEE 2017
Grevillea wilsonii	Native fuchsia		Secondary		Johnstone et al. 2010
Hakea auriculata		Primary			Saunders 1980; Groom 2011
Hakea candolleana		Primary			Groom 2011
Hakea circumalata	Coastal hakea	Primary			Groom 2011
Hakea commutata		Primary			Groom 2011
Hakea conchifolia	Shell-leaved hakea	Primary			Groom 2011
Hakea costata	Ribbed hakea	Primary			Groom 2011
Hakea cristata	Snail hakea	Primary	Secondary		Groom 2011; Johnstone et al. 2010
Hakea cucullata	Snail hakea	Primary			Groom 2011
Hakea cyclocarpa	Ramshorn	Primary			Saunders 1980; Groom 2011
Hakea eneabba		Primary			Groom 2011
Hakea erinacea	Hedgehog hakea	Primary	Secondary		Johnstone et al. 2010; Groom 2011
Hakea falcata	Sickle hakea	Primary			Groom 2011
Hakea flabellifolia	Fan-leaved hakea	Primary			Groom 2011
Hakea gilbertii		Primary			Saunders 1980; Groom 2011
Hakea incrassata	Golfball or marble hakea	Primary			Johnstone et al. 2010; Groom 2011
Hakea lasiantha	Woolly flowered hakea	Primary			Johnstone et al. 2010; Groom 2011
Hakea lasianthoides		Primary	Secondary		Johnstone et al. 2010; Groom 2011
Hakea laurina	Pin-cushion hakea	Primary			Johnstone et al. 2010; Groom 2011
Hakea lissocarpha	Honeybush	Primary	Secondary		Saunders 1980; Johnstone et al. 2010; Groom 2011
Hakea marginata			Secondary		Johnstone et al. 2010

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Hakea megalosperma	Lesueur hakea	Primary			Groom 2011
Hakea multilineata	Grass leaf hakea	Primary			Groom 2011
Hakea neospathulata		Primary			Groom 2011
Hakea obliqua	Needles and corks	Primary			Saunders 1980; Groom 2011
Hakea oleifolia	Dungyn	Primary			Groom 2011
Hakea pandanicarpa subsp. crassifolia	Thick-leaved hakea	Primary			Groom 2011
Hakea petiolaris	Sea urchin hakea	Primary			Groom 2011
Hakea polyanthema		Primary			Groom 2011
Hakea preissii	Needle tree	Primary			Groom 2011
Hakea prostrata	Harsh hakea	Primary	Secondary		Saunders 1980; Johnstone et al. 2010; Groom 2011
Hakea psilorrhyncha		Primary			Groom 2011
Hakea ruscifolia	Candle hakea	Primary	Secondary		Saunders 1980; Groom 2011; Johnstone et al. 2010
Hakea scoparia	Kangaroo bush	Primary			Groom 2011
Hakea smilacifolia		Primary			Groom 2011
Hakea spp.		Primary	Secondary		Saunders 1979; DSEWPaC 2012; DoEE 2017
Hakea stenocarpa	Narrow-fruited hakea	Primary	Secondary		Johnstone et al. 2010; Groom 2011
Hakea sulcata	Furrowed hakea	Primary			Groom 2011
Hakea trifurcata	Two-leaved hakea	Primary	Secondary		Saunders 1980; Johnstone et al. 2010; Groom 2011
Hakea undulata	Wavy-leaved hakea	Primary	Secondary		Saunders 1980; Johnstone et al. 2010; Groom 2011
Hakea varia	Variable-leaved hakea	Primary	Secondary		Saunders 1980; Groom 2011
Harpephyllum caffrum	Kaffir plum			Secondary	Johnstone 2017
Helianthus annuus	Sunflower	Secondary			Johnstone et al. 2010; Groom 2011
Hibiscus sp.	Hibiscus	Secondary			Groom 2011
Isopogon scabriusculus		Secondary			Groom 2011
Jacaranda mimosifolia	Jacaranda	Secondary	Secondary		Johnstone et al. 2010; Groom 2011

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Jacksonia furcellata	Grey stinkwood	Secondary			Groom 2011
Kingia australis	Kingia		Secondary		Johnstone et al. 2010
Lambertia inermis	Chittick	Secondary			Johnstone & Storr 1998; Groom 2011
Lambertia multiflora	Many-flowered honeysuckle	Secondary			Saunders 1980; Groom 2011
Liquidamber styraciflua	Liquid amber	Primary		Secondary	Johnstone et al. 2010; Groom 2011; Groom 2014; Personal observation
Lupinus sp.	Lupin	Secondary			Saunders 1980; Groom 2011
Macadamia integrifolia	Macadamia	Primary	Secondary		Johnstone et al. 2010; Grooms 2011; Groom 2014
Malus domestica	Apple	Secondary	Secondary		Johnstone et al. 2010; Johnstone & Storr 1998; DSEWPaC 2012; DoEE 2017; Groom 2011
Melaleuca leuropoma		Secondary			Saunders 1980; Groom 2011
Melia azedarach	Cape lilac or white cedar	Secondary		Primary	Johnstone et al. 2010; Groom 2011
Mesomeleana spp.		Secondary			Johnstone et al. 2010; Groom 2011
Olea europea	Olive			Secondary	Johnstone 2017
Persoonia longifolia	Snottygobble			Secondary	Johnstone & Storr 1998; Johnstone & Kirkby 1999; Johnstone et al. 2010; DSEWPaC 2012; DoEE 2017
Pinus canariensis	Canary island pine	Primary			Johnstone et al. 2010; Groom 2011
Pinus caribea	Caribbean pine	Primary			Johnstone et al. 2010; Groom 2011
Pinus pinaster	Pinaster or maritime pine	Primary			Groom 2011
Pinus radiata	Radiata pine	Primary	Secondary		Johnstone et al. 2010; Groom 2011
Pinus spp.		Primary	Secondary		Johnstone & Storr 1998; Saunders 1979; Johnstone et al. 2010; DSEWPaC 2012; DoEE 2017
Protea 'Pink Ice'		Secondary			Groom 2011
Protea repens		Secondary			Groom 2011
Protea spp.		Secondary			Johnstone et al. 2010

Species name	Common name	Foraging category as assigned by Emerge			Literature references
		CBC	BBC	FRTBC	
Prunus amygdalus	Almond tree	Secondary			Johnstone & Storr 1998; Johnstone et al. 2010; Groom 2011; DoEE 2017
Pyrus communis	European pear		Secondary		Johnstone & Storr 1998; Johnstone et al. 2010; DSEWPaC 2012; DoEE 2017
Quercus spp.	Oak		Secondary		Johnstone et al. 2010
Raphanus raphanistrum	Wild radish	Secondary			Groom 2011; DoEE 2017
Reedia spathacea			Secondary		Johnstone et al. 2010
Rumex hypogaeus	Doublegee	Secondary			Saunders 1980
Stenocarpus sinuatus		Secondary			Johnstone et al. 2010
Syzygium smithii	Lilly pilly	Secondary			Groom 2014
Tipuana tipu	Tipu or rosewood tree	Primary			Groom 2011, Groom 2014
Xanthorrhoea preissii	Grass tree	Secondary	Secondary		Groom 2011; Johnstone et al. 2010
Xylomelum occidentale	Woody pear	Secondary			Groom 2014

CBC=Carnaby's cockatoo, BBC=Baudin's cockatoo and FRTBC=Forest red-tailed black cockatoo

References

Department of the Environment and Energy (DoEE) 2017, 'Revised draft referral guideline for three threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black Cockatoo, Commonwealth of Australia.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2012, EPBC Act referral guidelines for three threatened black cockatoo species, Australian Government, Canberra.

Groom, C. 2011, Plants Used by Carnaby's Black Cockatoo, Department of Environment and Conservation, Perth.

Groom C. J , Mawson P. R , Roberts J. D. and Mitchell N. J. 2014, Meeting an expanding human population's needs whilst conserving a threatened parrot species in an urban environment, WIT Transactions on Ecology and The Environment, 191: 1199-1212.Johnstone, R. E. and Storr, G. M. 1998, *Handbook of Western Australian Birds. Volume 1 - Non-Passerines (Emu to Dollarbird)*, Western Australian Museum, Perth.

Johnstone, R. E. and Kirkby, T. 1999, Food of the Red-tailed Forest Black Cockatoo Calyptorhynchus banksii naso in Western Australia, Western Australian Naturalist, 22: 167-178.

Johnstone, R. E. and Kirkby, T. 2008, Distribution, status, social organisation, movements and conservation of Baudin's cockatoo (Calyptorhynchus baudinii) in South-west Western Australia, Records of the Western Australian Museum, 25: 107-118.

Johnstone, R. E. and Storr, G. M. 1998, Handbook of Western Australian Birds. Volume 1 - Non-Passerines (Emu to Dollarbird), Western Australian Museum, Perth.

Johnstone, R. E., Johnstone, C. and Kirkby, T. 2010, Black Cockatoos on the Swan Coastal Plain: Carnaby's Cockatoo (Calyptorhynchus latirostris), Baudin's Cockatoo (Calyptorhynchus baudinii) and the Forest Red-tailed Black Cockatoo (Calyptorhynchus banksii naso) on the Swan Coastal Plain (Lancelin–Dunsborough), Western Australia. Studies on distribution, status, breeding, food, movements and historical changes., Department of Planning, Western Australia.

Johnstone, R. E., Kirkby, T. and Sarti, K. 2017, The distribution, status movements and diet of the forest red-tailed black cockatoo in the south-west with emphasis on the greater Perth region, Western Australia, The West Australian Naturalist, 30(4): 193-219.

Saunders, D. A. 1979, Distribution and taxonomy of the white-tailed and yellow-tailed Black-Cockatoos Calyptorhynchus spp., Emu, 79(215-227).

Appendix C

Black Cockatoo Habitat Tree Data

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
50	417607.48	6448275.91	-	*Eucalyptus marginata*	No suitable hollow(s)	
52	417203.75	6448266.87	-	*Eucalyptus marginata*	No suitable hollow(s)	
55	417544.14	6448287.52	-	*Corymbia calophylla*	No suitable hollow(s)	
55	417595.31	6448278.36	-	*Corymbia calophylla*	No suitable hollow(s)	
57	417580.62	6448272.14	-	*Corymbia calophylla*	No suitable hollow(s)	
57	417121.55	6448232.17	-	*Eucalyptus marginata*	No suitable hollow(s)	
58	417125.04	6448188.62	-	*Eucalyptus marginata*	No suitable hollow(s)	
64	417600.42	6448236.81	-	*Corymbia calophylla*	No suitable hollow(s)	
68	417625.16	6448233.27	-	*Corymbia calophylla*	No suitable hollow(s)	
68	417552.36	6448276.57	-	*Corymbia calophylla*	No suitable hollow(s)	
69	417123.38	6448194.27	-	*Eucalyptus marginata*	No suitable hollow(s)	
70	417494.95	6448326.10	-	*Corymbia calophylla*	No suitable hollow(s)	
70	417112.25	6448194.06	-	*Eucalyptus marginata*	No suitable hollow(s)	
72	417203.47	6448266.30	-	*Eucalyptus marginata*	No suitable hollow(s)	
73	417677.53	6448212.82	-	*Corymbia calophylla*	No suitable hollow(s)	
74	417121.05	6448189.59	-	*Eucalyptus marginata*	No suitable hollow(s)	
82	417587.54	6448253.14	-	*Corymbia calophylla*	No suitable hollow(s)	
84	417673.67	6448138.79	-	*Corymbia calophylla*	No suitable hollow(s)	
84	417198.69	6448263.18	-	*Eucalyptus marginata*	No suitable hollow(s)	
85	417634.84	6448241.09	-	*Corymbia calophylla*	No suitable hollow(s)	
86	417094.12	6448170.29	-	*Eucalyptus marginata*	No suitable hollow(s)	
90	417108.49	6448228.41	-	*Corymbia calophylla*	No suitable hollow(s)	
96	417650.95	6448280.14	-	*Corymbia calophylla*	No suitable hollow(s)	
111	417388.51	6448326.69	-	*Corymbia calophylla*	No suitable hollow(s)	
113	416993.68	6448200.65	-	*Corymbia calophylla*	No suitable hollow(s)	
130	417100.32	6448221.67	-	*Eucalyptus marginata*	No suitable hollow(s)	
156	417607.83	6448291.00	-	*Corymbia calophylla*	No suitable hollow(s)	
201	417289.79	6448606.45	93	*Corymbia calophylla*	No suitable hollow(s)	
204	417299.20	6448563.08	63	*Eucalyptus marginata*	No suitable hollow(s)	
205	417372.58	6448649.14	97	*Eucalyptus marginata*	No suitable hollow(s)	

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
206	417622.27	6448603.72	78	Stag	Suitable hollow(s)	Mulch chips in base, hollow dimensions suitable for black cockatoos but no evidence of use by black cockatoos.
207	417431.14	6448445.75	68	Stag	No suitable hollow(s)	
208	417431.26	6448454.07	83	Stag	Suitable hollow(s)	Mulch in base, hollow dimensions suitable for black cockatoos but no evidence of use by black cockatoos.
210	417174.33	6448392.56	185	*Eucalyptus marginata*	No suitable hollow(s)	
249	417560.02	6448319.42	0	*Corymbia calophylla*	No suitable hollow(s)	
250	417582.21	6448633.33	80	Stag	No suitable hollow(s)	
251	417577.06	6448651.13	110	Stag	No suitable hollow(s)	
252	417525.22	6448678.87	90	Stag	No suitable hollow(s)	
253	417504.62	6448647.33	85	*Corymbia calophylla*	No suitable hollow(s)	
254	417479.41	6448613.21	60	Stag	No suitable hollow(s)	
255	417477.69	6448639.46	115	Stag	No suitable hollow(s)	
256	417404.40	6448588.54	56	Stag	No suitable hollow(s)	
257	417409.15	6448422.51	83	Stag	No suitable hollow(s)	
258	417698.08	6448249.26	64	*Corymbia calophylla*	No suitable hollow(s)	
901	417167.88	6448616.44	119	*Corymbia calophylla*	No suitable hollow(s)	
902	417201.56	6448582.68	96	*Eucalyptus marginata*	No suitable hollow(s)	
903	417237.14	6448559.36	72	Stag	No suitable hollow(s)	
904	417220.58	6448634.60	93	Stag	No suitable hollow(s)	
N/A	417412.53	6448145.95	81	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417387.34	6448167.92	74	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417276.79	6448185.98	62	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417243.17	6448189.36	59	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417124.86	6448267.33	51	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417131.62	6448271.60	63	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417139.63	6448273.22	54	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417414.48	6448125.90	60	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417401.25	6448465.46	77	*Corymbia calophylla*	No suitable hollow(s)	

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
N/A	417399.47	6448463.90	60	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417404.11	6448461.94	69	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417405.59	6448465.61	76	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417246.56	6448177.97	79	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417253.10	6448197.98	76	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417134.29	6448140.81	80	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417095.74	6448135.28	52	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417438.84	6448438.83	60	Stag	No suitable hollow(s)	
N/A	417446.15	6448421.04	83	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417452.27	6448422.42	72	Stag	No suitable hollow(s)	
N/A	417498.22	6448389.32	58	Stag	No suitable hollow(s)	
N/A	417441.34	6448467.45	69	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417425.64	6448448.37	51	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417646.57	6448411.69	52	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417626.87	6448408.98	80	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417611.08	6448400.87	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417596.33	6448392.55	62	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417500.78	6448375.15	72	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417550.48	6448379.87	51	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417549.10	6448386.51	50	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417557.32	6448385.91	54	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417657.24	6448574.29	56	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417639.02	6448598.31	63	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417357.19	6448533.84	70	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417597.39	6448401.20	60	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417584.97	6448397.34	59	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417640.95	6448580.48	95	Stag	No suitable hollow(s)	
N/A	417659.72	6448570.10	74	Stag	No suitable hollow(s)	
N/A	417372.12	6448554.25	74	Stag	No suitable hollow(s)	
N/A	417370.37	6448573.08	53	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417363.86	6448584.77	55	*Eucalyptus marginata*	No suitable hollow(s)	

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
N/A	417371.97	6448596.48	63	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417348.19	6448527.22	51	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417357.14	6448493.60	50	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417381.00	6448530.70	51	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417366.07	6448556.08	65	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417274.36	6448681.38	51	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417281.67	6448677.12	50	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417292.13	6448690.17	67	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417302.67	6448682.39	70	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417382.48	6448627.38	74	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417375.09	6448654.26	73	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417380.25	6448657.08	64	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417383.65	6448692.47	55	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417363.63	6448681.88	52	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417337.94	6448638.22	62	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417331.19	6448644.93	80	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417320.81	6448690.63	63	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417325.77	6448684.01	53	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417337.56	6448685.55	73	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417341.92	6448682.37	56	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417346.69	6448607.14	53	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417305.56	6448639.62	57	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417285.34	6448643.45	68	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417276.07	6448646.14	58	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417330.80	6448657.56	51	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417338.05	6448659.50	58	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417358.19	6448655.23	64	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417355.46	6448642.68	53	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417328.37	6448573.95	59	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417325.51	6448577.48	51	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417317.99	6448584.73	74	*Corymbia calophylla*	No suitable hollow(s)	

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
N/A	417294.20	6448632.87	51	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417309.30	6448608.94	75	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417330.30	6448614.88	51	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417326.95	6448608.53	67	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417306.78	6448535.76	75	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417320.03	6448531.21	80	Stag	No suitable hollow(s)	
N/A	417318.34	6448507.36	59	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417301.67	6448572.19	89	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417281.74	6448598.30	79	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417294.68	6448596.30	129	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417294.29	6448609.37	60	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417337.98	6448540.11	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417335.16	6448551.06	52	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417338.58	6448571.16	69	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417338.20	6448594.32	57	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417293.18	6448502.39	51	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417303.89	6448485.85	60	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417308.00	6448478.67	58	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417329.87	6448481.51	58	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417416.97	6448435.22	50	Stag	No suitable hollow(s)	
N/A	417425.31	6448418.88	54	Stag	No suitable hollow(s)	
N/A	417429.49	6448416.47	64	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417409.98	6448448.35	54	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417401.47	6448450.17	68	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417407.30	6448440.68	83	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417427.79	6448439.63	86	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417519.49	6448372.53	53	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417676.55	6448391.09	116	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417675.22	6448450.94	62	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417681.58	6448423.17	91	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417425.19	6448410.45	58	*Corymbia calophylla*	No suitable hollow(s)	

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
N/A	417410.85	6448410.56	59	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417490.69	6448374.62	53	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417506.45	6448374.97	58	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417694.88	6448248.90	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417755.49	6448244.62	65	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417739.99	6448177.87	76	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417704.17	6448196.43	52	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417685.79	6448217.79	58	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417686.82	6448241.74	107	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417692.11	6448253.09	61	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417744.06	6448129.91	58	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417751.32	6448130.41	69	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417780.64	6448145.28	88	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417814.04	6448146.21	66	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417754.56	6448185.20	81	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417782.92	6448167.58	63	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417763.73	6448159.66	72	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417729.44	6448129.57	125	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417785.21	6448234.11	66	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417779.55	6448245.15	66	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417767.43	6448251.26	74	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417751.02	6448261.11	50	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417811.83	6448150.96	71	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417808.63	6448162.46	54	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417794.41	6448158.47	64	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417786.43	6448200.09	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417727.92	6448269.90	74	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417673.61	6448311.36	55	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417666.09	6448343.01	60	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417693.25	6448345.11	52	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417714.39	6448274.89	63	*Corymbia calophylla*	No suitable hollow(s)	

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
N/A	417710.78	6448277.85	58	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417731.85	6448262.39	81	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417730.88	6448266.04	53	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417718.18	6448319.26	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417730.88	6448336.33	89	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417745.27	6448365.93	56	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417747.97	6448358.19	77	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417695.60	6448335.15	145	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417723.70	6448302.34	69	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417748.25	6448299.88	66	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417742.32	6448310.03	76	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417726.60	6448340.61	51	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417723.26	6448344.91	53	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417722.62	6448353.55	91	Stag	No suitable hollow(s)	
N/A	417712.77	6448358.35	77	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417735.38	6448351.66	55	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417733.15	6448347.76	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417728.55	6448343.84	52	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417722.60	6448344.46	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417520.47	6448345.15	50	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417521.41	6448356.80	60	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417521.77	6448359.57	77	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417529.83	6448365.40	51	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417641.43	6448370.19	53	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417637.57	6448381.24	53	Stag	No suitable hollow(s)	
N/A	417586.66	6448374.62	61	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417529.80	6448346.56	63	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417290.57	6448371.44	53	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417309.05	6448373.04	51	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417298.49	6448371.62	50	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417306.76	6448375.90	57	*Corymbia calophylla*	No suitable hollow(s)	

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
N/A	417303.90	6448356.37	83	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417303.33	6448357.14	64	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417299.09	6448356.77	51	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417286.22	6448372.18	67	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417363.16	6448380.24	96	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417340.87	6448359.55	86	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417340.40	6448370.63	69	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417337.82	6448374.05	52	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417316.56	6448378.20	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417309.98	6448397.32	72	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417334.03	6448399.40	60	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417361.99	6448407.72	51	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417343.01	6448351.69	74	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417351.82	6448347.66	89	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417265.07	6448350.73	68	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417268.84	6448351.20	73	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417339.03	6448377.05	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417330.44	6448330.86	98	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417326.91	6448346.13	67	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417333.87	6448349.96	60	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417161.63	6448375.61	61	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417243.19	6448418.51	61	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417315.39	6448452.46	52	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417236.92	6448376.66	75	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417206.97	6448357.90	63	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417177.55	6448367.53	71	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417163.56	6448369.86	59	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417388.81	6448440.09	102	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417373.09	6448388.52	66	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417380.52	6448357.32	75	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417381.17	6448347.24	55	*Corymbia calophylla*	No suitable hollow(s)	

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
N/A	417373.71	6448440.19	50	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417367.70	6448437.14	59	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417338.97	6448430.04	50	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417348.11	6448408.83	58	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416997.68	6448681.12	79	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417080.91	6448693.00	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417060.24	6448693.27	56	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417028.61	6448695.01	63	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417396.03	6448340.82	59	Stag	No suitable hollow(s)	
N/A	417456.15	6448362.92	54	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417426.11	6448401.81	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417440.07	6448391.06	66	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	416964.37	6448680.74	60	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416944.85	6448689.78	65	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416914.09	6448689.64	50	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416919.06	6448669.95	65	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417009.08	6448694.41	69	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417007.68	6448692.07	73	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416995.64	6448688.20	51	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416977.12	6448691.15	71	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416912.11	6448608.70	52	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416911.01	6448615.90	52	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416903.23	6448609.96	90	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416900.68	6448597.96	50	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	416886.84	6448652.39	78	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416900.46	6448649.07	52	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416903.24	6448642.66	50	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	416901.81	6448621.59	57	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	416899.38	6448504.06	64	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416999.45	6448405.32	70	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	416947.99	6448444.81	96	*Corymbia calophylla*	No suitable hollow(s)	

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
N/A	416903.75	6448453.54	90	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	416889.58	6448571.05	57	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416905.47	6448554.77	64	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416921.65	6448538.38	50	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416937.01	6448540.72	73	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417267.48	6448343.65	59	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	416977.16	6448177.87	68	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417241.85	6448340.80	72	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417018.42	6448259.10	71	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416974.69	6448236.29	56	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417075.65	6448259.63	72	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416970.24	6448203.32	117	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416975.74	6448246.60	65	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417247.59	6448331.30	70	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416937.41	6448144.87	83	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417161.93	6448293.67	57	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417152.05	6448321.43	97	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417095.26	6448298.45	76	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417092.75	6448315.84	63	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416894.51	6448152.17	77	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416997.06	6448259.43	89	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417063.84	6448275.81	64	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416968.06	6448137.78	76	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	416953.52	6448194.43	72	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417020.69	6448263.08	70	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416965.77	6448162.04	106	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416943.51	6448171.84	107	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416983.83	6448251.98	100	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417230.47	6448311.20	80	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417072.65	6448305.04	66	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416944.43	6448187.71	83	*Corymbia calophylla*	No suitable hollow(s)	

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
N/A	417112.18	6448307.03	57	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416998.27	6448262.21	65	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417209.75	6448307.60	58	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417079.72	6448260.32	83	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417251.91	6448309.61	61	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417199.75	6448342.31	70	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417160.23	6448289.25	100	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417141.02	6448332.33	62	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417174.59	6448336.03	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417164.39	6448302.13	94	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416917.16	6448137.18	78	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417218.50	6448297.13	73	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417009.63	6448257.42	70	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417027.03	6448288.61	89	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417226.71	6448311.08	64	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416946.36	6448136.94	57	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417060.66	6448281.89	63	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417074.97	6448276.69	77	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417070.17	6448274.98	73	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416950.56	6448176.68	81	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417283.91	6448354.21	73	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	416981.93	6448252.63	55	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417075.21	6448270.36	76	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417233.93	6448338.18	71	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417704.63	6448186.23	50	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417719.28	6448184.14	54	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416944.21	6448191.58	77	*Corymbia calophylla*	No suitable hollow(s)	
N/A	416966.17	6448124.35	94	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417223.99	6448330.89	54	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417249.79	6448301.82	94	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417449.28	6448686.68	50	*Corymbia calophylla*	No suitable hollow(s)	

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
N/A	417436.54	6448675.60	50	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417440.31	6448675.30	52	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417437.81	6448635.48	50	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417702.28	6448429.99	68	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417619.19	6448494.17	75	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417641.47	6448562.75	58	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417665.57	6448571.04	59	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417419.78	6448681.79	62	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417417.89	6448671.46	66	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417409.07	6448652.65	51	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417416.59	6448644.40	51	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417437.60	6448649.67	53	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417427.47	6448665.44	90	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417423.31	6448677.05	50	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417425.61	6448684.38	67	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417388.51	6448651.71	62	Stag	No suitable hollow(s)	
N/A	417388.36	6448657.81	64	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417391.74	6448683.11	54	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417386.72	6448488.96	58	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417400.48	6448490.95	59	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417397.08	6448525.96	51	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417393.09	6448552.42	51	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417468.13	6448678.30	73	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417472.07	6448680.44	51	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417482.95	6448689.06	53	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417496.23	6448692.16	65	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417419.45	6448571.59	74	Stag	No suitable hollow(s)	
N/A	417428.13	6448594.83	59	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417439.17	6448618.31	56	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417471.37	6448663.14	78	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417465.15	6448638.25	53	*Eucalyptus marginata*	No suitable hollow(s)	

Tag No.	Easting	Northing	DBH (cm)	Species	Category	Notes
N/A	417452.95	6448629.73	62	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417449.97	6448625.27	56	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417483.07	6448673.87	52	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417483.90	6448653.93	58	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417505.36	6448649.00	83	Stag	No suitable hollow(s)	
N/A	417488.37	6448637.56	168	Stag	No suitable hollow(s)	
N/A	417494.57	6448617.98	106	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417509.97	6448650.59	57	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417449.52	6448621.94	78	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417453.44	6448616.21	52	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417439.61	6448599.80	78	*Eucalyptus marginata*	No suitable hollow(s)	
N/A	417483.12	6448587.07	107	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417551.24	6448634.74	78	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417558.33	6448633.13	99	Stag	No suitable hollow(s)	
N/A	417553.60	6448680.99	65	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417575.15	6448665.97	51	Stag	No suitable hollow(s)	
N/A	417505.21	6448667.40	64	*Corymbia calophylla*	No suitable hollow(s)	
N/A	417507.09	6448691.14	63	*Eucalyptus marginata*	No suitable hollow(s)	

Appendix D

Black Cockatoo Habitat Tree Hollow Data

Black Cockatoo Hollow Data

Lots 9 Brookton Highway, Karragullen

Tree ID 206

Project no.: EP20-040(05)
Inspection date: 8/12/2020
DBH (cm): 78
Species: Stag
No. hollows: 1
Hollow suitability: 1

Hollow ID	1
Hollow type:	Top entry
Inspection type(s):	Ground
	Go Pro

Hollow characteristics

Hollow entrance >10cm
Hollow distance from ground >3 m
Hollow internal diameter >30 cm
Hollow depth approx 50-200 cm
Hollow orientation vertical or near vertical

Evidence of nesting

Fledglings: No
Egg/s or egg fragments: No
Feathers: No
Nest material No
Other: N/A

Evidence of hollow use

Fauna observed: None
Chew marks: None
Other N/A

Determined hollow category

~~Confirmed nest~~
~~Potential nest~~
Suitable hollow(s)
~~Potentially suitable hollow(s)~~
~~No suitable hollow(s)~~

Reason:
Mulch chips in base, hollow dimensions suitable for black cockatoos but no evidence of use by black cockatoos.

Black Cockatoo Hollow Data

Lots 9 Brookton Highway, Karragullen

Tree ID 208

Project no.: EP20-040(05)
Inspection date: 8/12/2020
DBH (cm): 83
Species: Stag
No. hollows: 1
Hollow suitability: 1

Hollow ID	1
Hollow type:	Top entry
Inspection type(s):	Ground
	Go Pro

Hollow characteristics

Hollow entrance >10cm
Hollow distance from ground >3 m
Hollow internal diameter >30 cm
Hollow depth approx 50-200 cm
Hollow orientation vertical or near vertical

Evidence of nesting

Fledglings: No
Egg/s or egg fragments: No
Feathers: No
Nest material No
Other: N/A

Evidence of hollow use

Fauna observed: None
Chew marks: None
Other N/A

Determined hollow category

~~Confirmed nest~~
~~Potential nest~~
Suitable hollow(s)
~~Potentially suitable hollow(s)~~
~~No suitable hollow(s)~~

Reason:
Mulch in base, hollow dimensions suitable for black cockatoos but no evidence of use by black cockatoos.