Stockland Development WA Pty Limited

Environmental Offset Plan

Lot 1665 Wanneroo Road
Sinagra

14 May 2020

JBSG56862-126668 (Rev 3)

JBS&G Australia Pty Ltd T/A Strategen-JBS&G

www.jbsg.com.au

Table of Contents

List of Tables

List of Figures

Appendices

Executive Summary

Stockland Development WA Pty Limited (Stockland) has obtained conditional approval to develop Lot 1665 Wanneroo Road Sinagra (the site), located in the City of Wanneroo, for residential purposes. This necessitates the clearing of up to 14.5 ha of vegetation within the site that potentially provides habitat for listed threatened species under Section 18 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), specifically the Carnaby's Cockatoo (*Calyptorhynchus latirostris*) and Forest Red-tailed Cockatoo (*Calyptorhynchus banksii naso*).

This Environmental Offset Plan (EOP) has been prepared in accordance with the EPBC Act *Environmental Offsets Policy* (DSEWPaC 2012a), to satisfy conditions 3 to 6 of EPBC Act approval 2017/7921. Development of the EOP has been guided by the *Offsets Assessment Guide* (DSEWPaC 2012b) and associated offset calculator to assess the suitability of a selected 104 ha offset site within Lot 50 Reserve Road Chittering (Reserve Road Offset site), located in the Shire of Chittering, to compensate for the loss of 14.5 ha of identified Black Cockatoo habitat within Lot 1665 Wanneroo Road, Sinagra. The reserve Road Offset site is freehold, privately owned land and is zoned Rural Resource under the Shire of Chittering Town Planning Scheme No. 6.

The Reserve Road Offset site is intended to be purchased by Stockland and transferred to the Department of Biodiversity, Conservation and Attractions (DBCA), to be vested in the State conservation estate and protected as a Class A Nature Reserve in perpetuity.

A vegetation survey and Black Cockatoo habitat assessment undertaken over the Reserve Road Offset site by Strategen-JBS&G Senior Ecologists identified four vegetation types (VT1 – VT4) across the 142 ha site, assessing the majority of the vegetation (119 ha) to be in 'Very Good to Excellent' condition and the remainder being in 'Very Good' condition. With regards to habitat values, the Reserve Road Offset site is contiguous with a large area of vegetation to the north which is protected within conservation estate, and comprises of species known to be used by both species of Black Cockatoo for breeding, foraging and roosting, primarily *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri) and *Eucalyptus rudis* (Flooded Gum). The Reserve Road Offset site is estimated to contain 2,633 significant trees, with many hollow-bearing Jarrah and Marri trees observed during the field survey. Negligible areas of 'Completely Degraded' vegetation and weed infestation were observed during the field survey and were primarily associated with existing tracks and firebreaks. In addition to providing potential breeding, foraging and roosting habitat for Black Cockatoos, permanent water sources occur within close proximity, which is an important factor in determining the overall quality of habitat for Black Cockatoos. Based on the condition and type of vegetation present within the site, the potential breeding, foraging and roosting habitat values to Black Cockatoos, connectivity to surrounding vegetation and proximity to permanent water sources, a habitat quality value of 7 was assigned in the offset calculator.

Glevan Consulting (2020) undertook a linear *Phytophthora cinnamomi* (dieback) assessment over the Reserve Road Offset site which identified a 29.4 ha area of vegetation infested with dieback along the creek line at the southern boundary of the site at the lowest topographic relief. Although infested with dieback, this vegetation was assessed to be in 'Very Good' condition in accordance within the Keighery (1994) vegetation condition scale. Dieback within the site is unlikely to spread hydrologically upslope to vegetation in 'Very Good to Excellent' condition. As such, the presence of dieback is not considered to have a significant influence on the habitat quality score assigned in the offset calculator.

Extensive desktop assessment was undertaken to identify the key threatening processes to the Reserve Road Offset site, which include:

- subdivision or occupation for rural and rural lifestyle purposes including use of the site for stock grazing, as currently permitted by the 'Rural' zoning under the Shire of Chittering Local Planning Scheme No. 6;
- use for extractive industries;
- access by livestock entering the offset site from the surrounding land, spreading / introducing dieback, weeds and/or damaging vegetation directly;
- unauthorised public access;
- dieback spread;
- weed incursion; and
- bushfire.

Consultation has been undertaken with DBCA to determine management actions to be undertaken upon the transfer of ownership to DBCA. Management actions, monitoring actions and contingency actions have been developed for the proposed offset site based on the assessed onsite conditions, and in consultation with the DBCA's District Nature Conservation Program Coordinator. Specifically, management actions have been developed to focus on reducing the risk of the identified threatening processes from degrading the vegetation condition and to protect Black Cockatoo habitat values contained within the Reserve Road Offset site. Priority management actions for the Reserve Road Offset site have been identified as:

- undertake a baseline weed survey
- develop of a weed management program and implementation of dieback hygiene measures
- undertake repairs to perimeter fencing so as to prevent further livestock incursion and unauthorised public access to the property
- erect signage denoting the site as conservation
- undertake firebreak maintenance in accordance with the Shire of Chittering firebreak notice to meet bushfire protection requirements.

Giving consideration to vegetation condition, composition, habitat value for Black Cockatoos and threatening processes outlined above, the values assigned in the offset calculator (Appendix A) demonstrate that 100.16% of the impact of clearing 14.5 ha of Black Cockatoo habitat within Lot 1665 Wanneroo Road Sinagra will be offset by the proposed offset site.

1. Introduction

1.1 Project background

Stockland Development WA Pty Limited (Stockland) proposes to develop Lot 1665 Wanneroo Road Sinagra (the site), located in the City of Wanneroo, for residential purposes (the proposed action). The site comprises an area of approximately 40 ha and currently supports poultry operations.

The proposed development will include:

- residential land uses
- areas of Public Open Space (POS) and drainage
- a primary school
- internal road network

The site has supported poultry operations, inclusive of a feed lot since 1960, however, current Ingham Chicken poultry operations will cease and relocate prior to the development of the site. Native vegetation remaining within the site has been assessed to be in a predominantly 'Degraded' to 'Completely Degraded' condition (33.5 ha) and is extremely fragmented, with a significant portion consisting of isolated trees with no native understorey and non-endemic weed species.

On 2 September 2019 the proposal was approved with conditions (EPBC approval 2017/7921), of which four relate to the development and implementation of an Environmental Offset Plan (EOP).

Table 1.1 outlines conditions of EPBC 2017/7921 relevant to the EOP and identifies the section of the EOP that addresses each condition.

Table 1.1: EPBC 2017/7921 approval conditions relevant to the EOP

EPBC 2017/7921 Condition number	Requirement	EOP section
Condition 3	The approval holder must submit an Offset Plan for the Department's approval to offset the loss of 14.5 ha of black cockatoo habitat. If the Department approves the Offset Plan then the Offset Plan must be implemented.	This EOP.
Condition 4	The approval holder must not commence the action unless the Department has approved the Offset Plan in writing, and the offsets described in the Offset Plan are secured in accordance with the measures outlined in the Offset Plan i.e. tenure secured as described in Condition 6 (g).	Subject to future correspondence
Condition 5	The Offset Plan must be consistent with the Department's *Environmental Management Plan Guidelines,* and must include:	
	(a) The Offset Plan environmental objectives, details of the projects impacts on black cockatoos to be offset and the EPBC Act approval conditions which the Offset Plan addresses;	Section 1
	(b) A table of commitments made in the Offset Plan to achieve the objectives, and a guide to where the commitments are detailed in the Offset Plan	Section 4
	(c) Reporting and review mechanisms, and documentation standards to demonstrate compliance with the Offset Plan	Section 4
	(d) An assessment of risks to achieving the Offset Plan environmental objectives and risk management strategies that will be applied	Section 4
	(e) Impact avoidance, mitigation and or/repair measures, and their timing	N/A
	(f) A monitoring program, which must include: i. measurable performance indicators; ii. the timing and frequency of monitoring to detect changes in the performance indicators; iii. trigger values for corrective actions; and iv. proposed corrective actions, if trigger values are reached.	Section 4

EPBC 2017/7921 Condition number	Requirement	EOP section
Condition 6	The Offset Plan must also include:	
	(a) A description of each proposed offset site(s) or other type of offset proposed.	Section 2
	(b) The suitability of the location of any proposed offset sites(s).	Section 2
	(c) Details of the extent to which the proposed offset actions correlate to, and adequately compensate for, the significant residual impacts to black cockatoos.	Section 3 (Table 3.2 and Table 3.3) and Section 3.1
	(d) The conservation gain to be achieved by the offset i.e. positive management strategies that improve the site or avert future loss, degradation or damage to black cockatoos.	Section 3 (Table 3.2 and Table 3.3) and Section 3.1
	(e) The time it will take to achieve the proposed conservation gain.	Section 3 (Table 3.2 and Table 3.3)
	(f) The level of certainty that the proposed offset will be successful.	Section 3 (Table 3.2 and Table 3.3)
	(g) The current land tenure of any proposed offset site(s) and the method of securing and managing the offset site(s) for the life of the impact.	Section 3 (Table 3.2 and Table 3.3)
	(h) How the proposed offset(s) are consistent with the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*.	Section 3 (Table 3.1)

1.2 Impacts to Matters of National Environmental Significance

The proposed action necessitates the clearing of up to 14.5 ha of vegetation within the site that potentially provides habitat for listed threatened species under Section 18 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), specifically the Carnaby's Cockatoo (*Calyptorhynchus latirostris*) and Forest Red-tailed Cockatoo (*Calyptorhynchus banksii naso*).

Foraging habitat within the site comprises 7.07 ha of Eucalyptus woodland with understorey, and 6.43 ha of Eucalyptus woodland without understorey. The Eucalyptus woodland with understorey is in a 'Good to Degraded' or 'Degraded' condition, while the Eucalyptus woodland without understorey is in a 'Degraded to Completely Degraded' and 'Completely Degraded' condition.

The site contains 264 potential breeding trees, however none of these trees were recorded to have hollows.

The site is mapped within the buffer of a confirmed roosting area for Carnaby's Black Cockatoo (DBCA 2011), with approximately 30 roost sites occurring within 10 km (Birdlife Australia 2018). The site is not mapped as a confirmed or unconfirmed breeding area for Carnaby's Black Cockatoo.

The Black Cockatoo values of Lot 1665 Wanneroo Road, Sinagra have been defined through the referral and assessment process. In summary, the referral defined the proposed impact to Black Cockatoo habitat as follows:

- the project would not fragment an existing population into two or more populations
- the project will not adversely affect habitat critical to the survival of the Black Cockatoos because the site would not provide good quality habitat which would provide connectivity between habitats
- due to the absence of observable hollows, the site does not have any trees that are currently considered suitable breeding trees for Black Cockatoos. It is therefore unlikely that the proposed action will disrupt the breeding cycles of a Black Cockatoo population
- the clearing of potential breeding trees that do not have observable hollows with suitable dimensions for Black Cockatoo breeding and degraded foraging habitat is not deemed that it will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

- The proposed action is unlikely to interfere with the recovery of these species as the site is not deemed to contain good quality foraging species and does not contain any currently suitable hollows for breeding.

In response to the referral and with regard to the values of the Black Cockatoo habitat on site, the Preliminary Documentation request for additional information sought information on the following:

- describe and assess the likely effectiveness of measures proposed to avoid / or mitigate the direct and indirect impacts the proposed actions could have on the Black Cockatoo species
- demonstrate that the action is not inconsistent with relevant recovery plans.

Based on the level of information sought through the Preliminary Documentation, it can be taken that the assessment of Black Cockatoo values of the site and the impacts contained within the referral information was considered accurate and appropriate. On this basis, the impacts to the Black Cockatoo values from the project (1665 Wanneroo Road) can be described as follows:

- clearing of 14.5 ha of degraded (poor to moderate) quality foraging habitat within the buffer of a known roost
- clearing of 264 potential breeding trees (with no suitable hollows present)
- clearing of potential roost trees.

The objectives for the offset are therefore to provide adequate and compensatory habitat for the Carnaby's Cockatoo (*Calyptorhynchus latirostris*) and Forest Red-tailed Cockatoo (*Calyptorhynchus banksii naso*) that meets the following requirements:

- quality foraging habitat
- potential breeding habitat
- potential foraging habitat
- provision of adequate protection or management measures to provide certainty that the site's black cockatoo values can be maintained for the life of the approval.

1.3 Purpose and scope of Environmental Offset Plan

This EOP has been prepared in accordance with the EPBC Act *Environmental Offsets Policy* (DSEWPaC 2012a), to satisfy conditions 3 to 6 of EPBC Act approval 2017/7921.

The purpose of this EOP is to articulate how the selected offset site provides a suitable offset for the assessed impact to habitat for Carnaby's Cockatoo and Forest Red-tailed Cockatoo. This is to be achieved by a direct offset, through the acquisition of a 104 ha portion of land within Lot 50 Reserve Road in Chittering Western Australia (Figure 1.1), to be protected within the State conservation estate and managed in perpetuity by the Department of Biodiversity, Conservation and Attractions (DBCA). The portion of land to be acquired as an offset provides quality foraging and breeding habitat for both species of Black Cockatoo.

The *Offsets Assessment Guide* (DSEWPaC 2012b) and associated offset calculator was used to assess the suitability of the selected offset site to compensate for the loss of 14.5 ha of identified Black Cockatoo habitat within Lot 1665 Wanneroo Road, Sinagra.

1.4 Rationale and description of offset site

The EPBC Act *Environmental Offsets Policy* (DSEWPaC 2012a) was used to guide the selection of an offset site (Figure 1.1) to offset the loss of 14.5 ha of identified Black Cockatoo habitat within Lot 1665 Wanneroo Road Sinagra.

Strategen-JBS&G has assisted Stockland over a period of 18 months in the process of identifying an offset site. The process has been extensive and has involved independent investigations and interrogation of suitably vegetated properties that provide habitat for both species of Black Cockatoo. Extensive consultation has been undertaken with DBCA. It has become apparent through the course of these investigations that the availability of habitat for Forest Red-tailed Cockatoo suitable for use as an offset with proximity to the Swan Coastal Plain is highly limited.

Lot 50 Reserve Road in Chittering was ultimately identified by DBCA, which is adjacent to an existing DBCA managed conservation asset, Lot M2091 Ioppolo Road Chittering which was purchased and ceded to DBCA as an offset in 2015.

Lot 50 Reserve Road is a freehold, privately held property. It is identified as Lot 50 on Deposited Plan 39849. The property is zoned as 'Agricultural Resource' under the Shire of Chittering Local Planning Scheme No. 6.

M2091 Ioppolo Road, Chittering has been transferred to DBCA and is managed as part of the State conservation estate. It is the intent of DBCA that once Lot 50 Reserve Road is purchased, it will be provided the legal protection of an A Class Nature Reserve.

Combined, these properties provide a vegetated ecological linkage which extends north, south and east of Lot 50 Reserve Road.

A field assessment undertaken by Strategen-JBS&G over the proposed offset site found that the site contains foraging and potential breeding and roosting habitat for both species of Black Cockatoo and presents as a suitable offset site. The site is also within the mapped buffer of a known Carnaby's Cockatoo breeding site. DBCA are highly supportive of Lot 50 Reserve Road being purchased and ceded to the State Government for inclusion in the conservation estate.

The *Offsets Assessment Guide* (DSEWPaC 2012b) was used to estimate the ability of a portion of the selected site to offset Black Cockatoo habitat loss within Lot 1665 Wanneroo Road. The offset calculator (Appendix A) determined that for Forest Red-tailed Black Cockatoo 106.3% of the offset requirement will be met through conservation of a selected 104 ha area within Lot 50 Reserve Road and for Carnaby's Black Cockatoo, 100.16% of the offset requirement will be met through conservation of a selected 104 ha area within Lot 50 Reserve Road (hereafter referred to in this EOP as the Reserve Road Offset Site). Based on this, 104 ha of the Reserve Road Offset Site is proposed as an offset.

1.5 Conservation arrangements

Stockland propose to purchase the whole of Lot 50 Reserve Road (142 ha), which will be ceded to and managed by DBCA, with a 104 ha portion to be designated as an offset area to satisfy EPBC Act approval 2017/7921, specifically conditions 3 to 6 for the proposed action. This EOP relates to the whole of Lot 50. The balance of the site will be managed by DBCA with the offset values available as future credits for use by Stockland, in the event that a similar offset is required for a future project. This arrangement has been confirmed by written agreement between Stockland and DBCA (Appendix B).

The written agreement also identifies that Stockland are able to transfer the balance of the offset credit to a third party in the event that Stockland do not have a use for balance of Lot 50 Reserve Road as an offset.

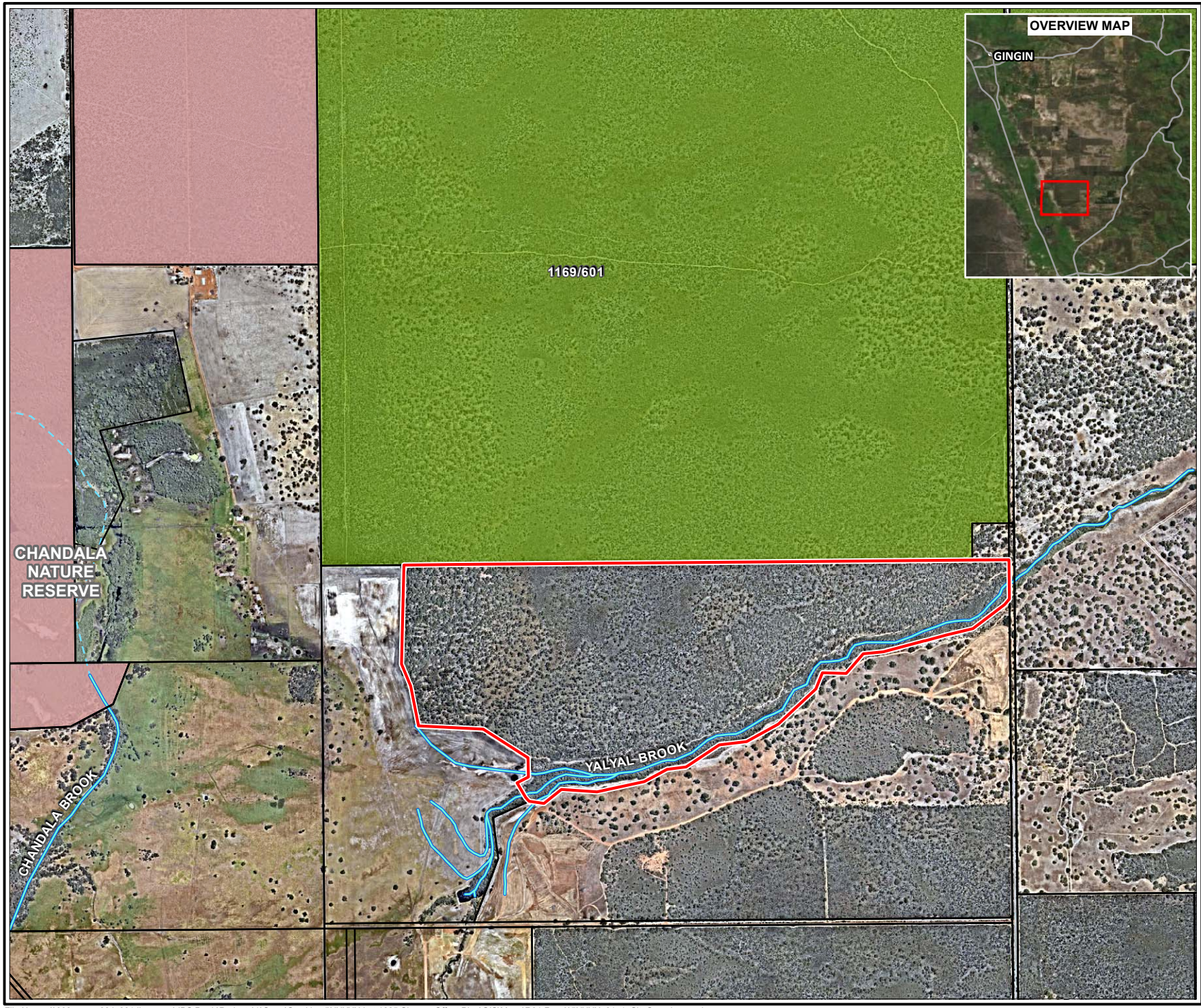
In summary, it is intended that the balance of Lot 50 Reserve Road will be:

- used by Stockland for potential future offset requirements; or
- made available for use as an offset site/s by a third party or parties by way of contractual agreement with DBCA, with financial compensation provided to Stockland for any portion of the remaining land sold as an offset to a third party or parties.

It is the intent of DBCA that once Lot 50 Reserve Road is purchased by Stockland and transferred to DBCA, it will be established as an A Class Nature Reserve and provided the legal protection afforded of this level of conservation.

Where the balance of the site is to be used as a future offset under the EPBC Act, it will need to meet the requirements of the EPBC Act environmental offsets policy and EPBC Act advanced offsets policy. To meet these requirements, for example, there will need to be sufficient information provided concerning the current baseline condition of the offset site, i.e. at the time the offset is established, particularly with respect to the condition of habitat for the relevant EPBC-listed black cockatoo species, as well as information tracking that condition over the time the offset is managed up until the time another offset opportunity arises. It is acknowledged that the balance of the site will be considered on its own merits, and according to the relevant methodologies at that time, as to whether it will be appropriate for any future proposed development under the EPBC Act.

As such, prior to the remainder of the site being utilised as an offset for a future project, a further assessment of that portion of the site (at maximum 29.4 ha) will be undertaken to determine its suitability as an offset.



Legend

- Offset site (141.89 ha)
- Cadastral boundaries
- DBCA Lands of Interest (DBCA-012)
- Nature Reserve
- Watercourse
- Connector

strategen JBS&G

Job No: 56862

Client: Stockland

Version: A	Date 17/12/2019
Drawn By: hsullivan	Checked By: CT

Scale 1:20,000 at A4

0 250 500
metres

Coord. Sys. GDA 1994 MGA Zone 50

Reserve Road
Chittering

SITE OVERVIEW

FIGURE 1.1

File Name: \\008pmpmr004v001.jbsg.aust\JBS Perth\Projects\1)Open\Stockland\XXXXX Lot 1665 Sinagra Offset Plan\GIS\Maps\R01 Rev A\5XXXX_01_1_SiteOverview.mxd
Reference: www.nearmap.com© - Imagery Date: 27 October 2019. Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

2. Reserve Road Offset Site

2.1 Site overview

2.1.1 Location and surrounding context

The proposed offset is situated approximately 50 km northeast of the proposed impact area in Sinagra, within Lot 50 Reserve Road (Lot on Plan 39849) (the offset site; Figure 1.1) in the Shire of Chittering. Lot 50 Reserve Road is approximately 142 ha in size, with a 104 ha portion of the lot to be set aside as the offset for EPBC Approval 2017/7921. Based on the *Offset Assessment Guide* calculation (Appendix A) 104 ha of the Lot 50 Reserve Road is to be conserved to achieve 100.16% of the offset requirements for Carnaby's Black Cockatoo and 106.3 % of the offset requirements for Forest Red-tailed Black Cockatoo. The 104 ha area is henceforth referred to as the Reserve Road Offset Site.

The proposed offset site lies directly below and is connected to a parcel of land, M2091 Ioppolo Road, of which a portion has been acquired as an offset site by Main Roads as a condition of approval for the NorthLink WA Project (EPBC 2016/7656). This site was assessed to contain at least 673.5 ha of Carnaby's Black Cockatoo foraging habitat associated with Eucalyptus woodland and Banksia woodland, and at least 279 ha of Forest Red-tailed Black Cockatoo habitat associated with Eucalyptus woodland and Banksia woodland. Suitable breeding habitat for both species is present within the site, containing an estimated 6,353 trees with a DBH greater than 500mm.

The Land Acquisition and Management plan prepared for Ioppolo Road site (Coffey 2017) noted that there have been regular sightings of Forest Red-tailed Cockatoo in the surrounding area. Correspondence from DBCA confirms that Forest Red-tailed Cockatoos utilise the surrounding area and have been recorded at 7 sites in the Chittering-Bindoon area. Given the sightings in the surrounding area and that the proposed offset site contains suitable foraging habitat for Forest Red-tailed Cockatoo, it is reasonable to expect that this species would utilise the Reserve Road Offset Site and on-site evidence supports this.

The area's habitat values for Carnaby's Black Cockatoo are well understood as evidenced by the Modelled Distribution of Carnaby's Black Cockatoo (Department of Environment and Energy 2016). The site falls within the buffer of a known Carnaby's Black Cockatoo breeding site, as shown in Plate 1.

The area's habitat values for Forest Red-tailed Black Cockatoos has been identified by DBCA observations which have previously been provided to the Department of Agriculture, Water and the Environment (DAWE).

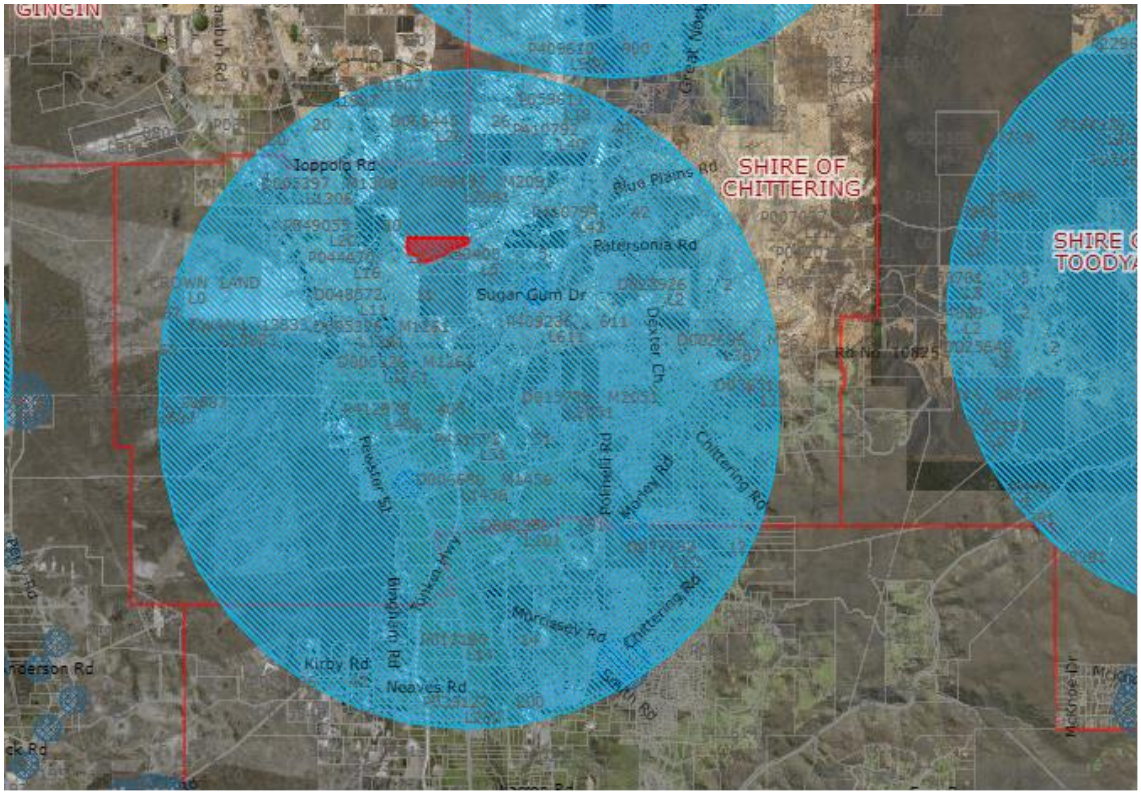


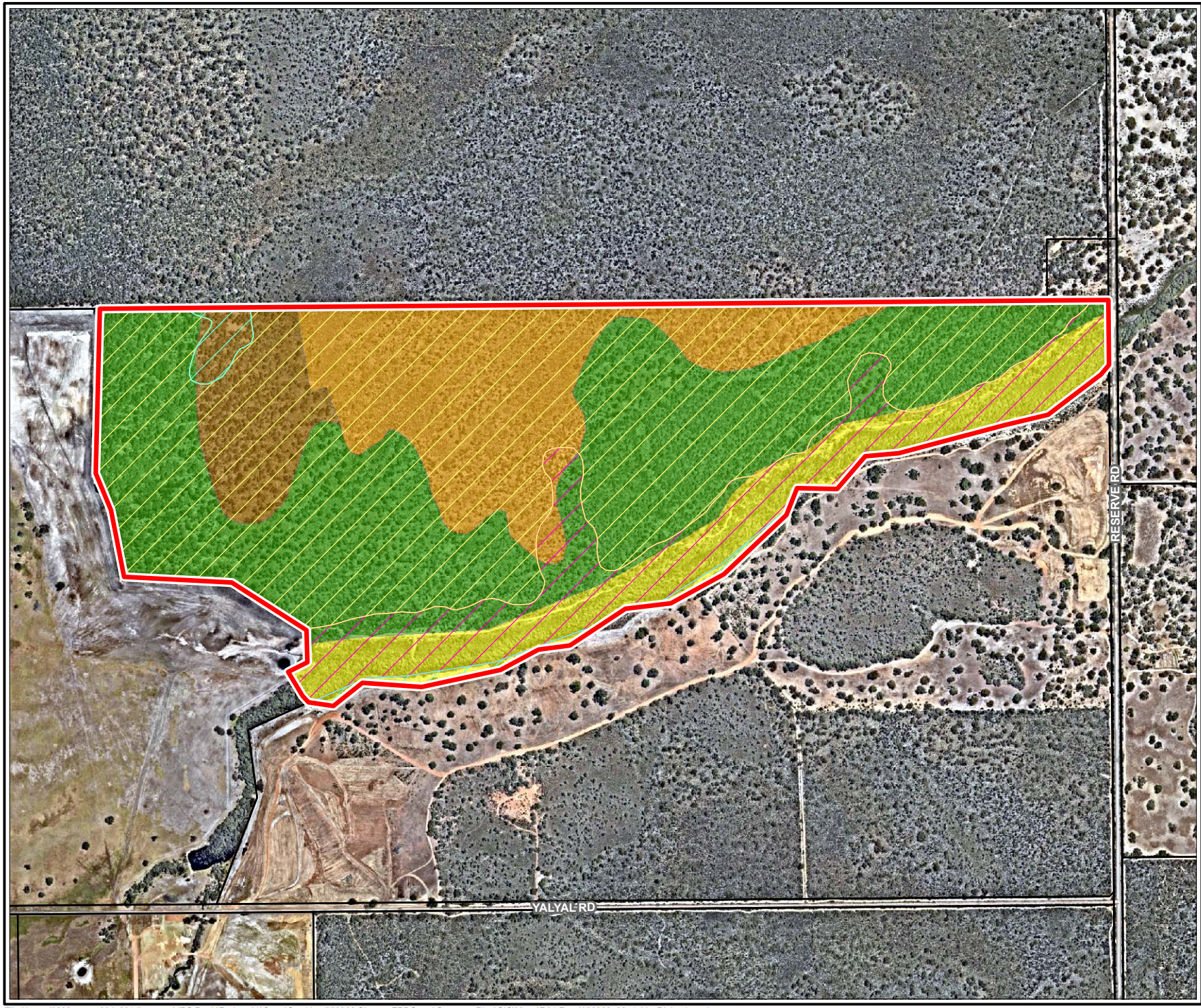
Plate 1 : Known Carnaby's Black Cockatoo breeding site and buffer (Birdlife 2018)

2.2 Assessment of suitability

A field assessment of Lot 50 Reserve Road was undertaken by two Senior Ecologists from Strategen-JBS&G on 8 July 2019 to identify the predominant vegetation type and condition, and to determine the extent of suitable foraging and breeding habitat for Black Cockatoos available within Lot 50 Reserve Road. The results of this assessment are considered to be an accurate assessment of the Black Cockatoo habitat values and have informed the values used in the offset calculations.

2.2.1 Vegetation type and condition

A total of four vegetation types were recorded within Lot 50 Reserve Road, as shown in Figure 2.1 and described in Table 2.1. Representative photos of each vegetation type are provided in Plates 2-5. The majority (119 ha) of all vegetation was determined to be in 'Very Good – Excellent' condition, with the remainder being in 'Very Good' condition (Figure 2.2), with minor areas in 'Completely Degraded' condition along tracks, firebreaks and minor cleared areas. The survey indicated that there are very few weeds and are restricted to the very minor areas assessed to be in 'Completely Degraded' condition.



Legend

- Offset site (141.892 ha)
- Cadastral boundaries

Dieback areas
- Infested
- Uninfested
- Uninterpretable

Vegetation type
- VT1 (32.804 ha)
- VT2 (74.631 ha)
- VT3 (11.624 ha)
- VT4 (22.833 ha)

strategen JBS&G

Job No: 56862

Client: Stockland

Version: A	Date 1/04/2020
Drawn By: cthatcher	Checked By: JH

Scale 1:12,000 at A4

0 100 200
metres

Coord. Sys. GDA 1994 MGA Zone 50

Reserve Road
Chittering

DIEBACK AND VEGETATION TYPES

FIGURE 2.1

File Name: \\008pmpmr004v001.jbsg.aust\JBS Perth\Projects\1)Open\Stockland\56862 Sinagra EPBC and Structure Plan\GIS\Maps\R01 Rev A\56862_02_1_VegDieback.mxd
Reference: www.nearmap.com© - Imagery Date: 27 October 2019.

Table 2.1: Vegetation type and extent within Lot 50 Reserve Road

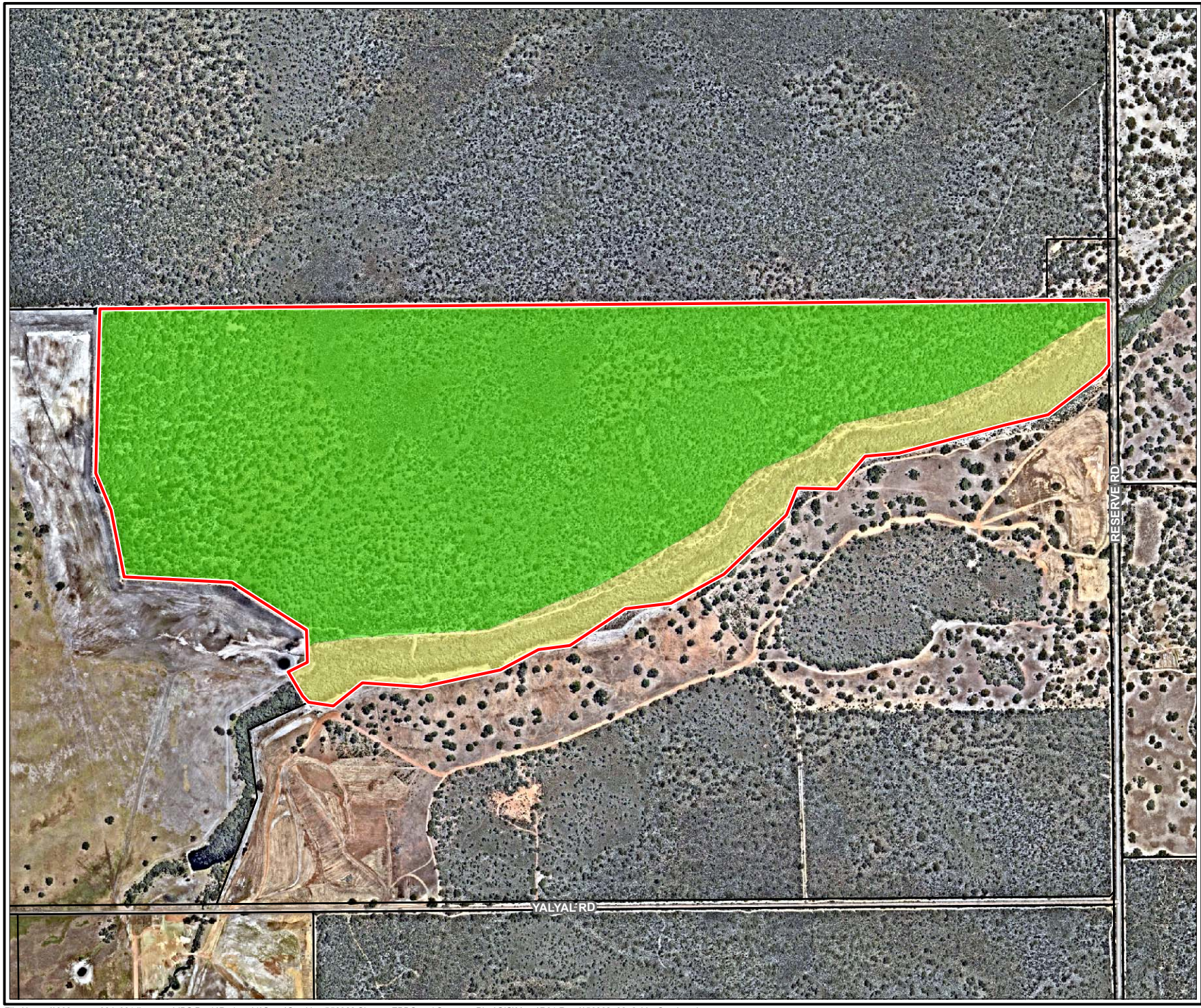
Vegetation Type	Vegetation description	Area (ha)
VT1	A mosaic of the following vegetation types: • open woodland of *Banksia attenuata* and *Banksia menziesii* over shrubland of *Adenanthos cygnorum*, *Xanthorrhoea preissii* and *Calothamnus ?sanguineus* over open herbland of *Desmocladus flexuosus* and *Mesomelaena pseudostygia* on sandy ridges • closed heath of *Calothamnus ?sanguineus*, *Allocasuarina humilis* and *Melaleuca* sp. over open herbland of *Mesomelaena pseudostygia*, *Lyginia barbata* and *Desmocladus flexuosus* with occasional emergent *Banksia attenuata* and *Banksia menziesii* on sandy ridges	32.8 ha
VT2	Woodland of *Eucalyptus marginata* and occasionally *Corymbia calophylla* over shrubland of *Hibbertia hypericoides*, *Xanthorrhoea preissii*, and *Banksia dallanneyi* over forbland of *Mesomelaena tetragona* and *Mesomelaena pseudostygia* on lateritic slopes	74.6 ha
VT3	Woodland of *Corymbia calophylla* over shrubland of *Xanthorrhoea preissii*, *Hibbertia hypericoides* and *Bossiaea eriocarpa* over isolated native and introduced herbs and grasses on lateritic slopes	11.6 ha
VT4	Closed woodland of *Melaleuca rhaphiophylla* and *Eucalyptus rudis* over shrubland of *Taxandria linearifolia* and *Paraserianthes lophantha* over forbland of *Juncus* sp., *Pteridium esculentum* and *Lepidosperma* sp. on loamy soils adjacent to creeklines	22.8 ha

Plate 2 : Vegetation type 1 (VT1).

Plate 3 : Vegetation type 2 (VT2).

Plate 4 : Vegetation type 3 (VT3).

Plate 5 : Vegetation type 4 (VT4).



Legend

- Offset site (141.892 ha)
- Cadastral boundaries

Vegetation condition

- Very good (22.83 ha)
- Very good – excellent (119.06 ha)

strategen JBS&G

Job No: 56862

Client: Stockland

Version: A	Date 1/04/2020
Drawn By: cthatcher	Checked By: JH

Scale 1:12,000 at A4

0 100 200
metres

Coord. Sys. GDA 1994 MGA Zone 50

Reserve Road
Chittering

VEGETATION CONDITION

FIGURE 2.2

File Name: \\008pmpmr004v001.jbsg.aust\JBS Perth\Projects\1)Open\Stockland\56862 Sinagra EPBC and Structure Plan\GIS\Maps\R01 Rev A\56862_02_2_VegCond.mxd
Reference: www.nearmap.com© - Imagery Date: 27 October 2019.

2.2.2 Foraging potential

Foraging habitat for Black Cockatoos is generally defined as the availability of plant food sources within an area (Finn 2012). Food availability for Black Cockatoos is a function of the diversity, abundance, distribution, energetic and nutritional qualities, and seasonality (phenology) of the food sources within a particular area.

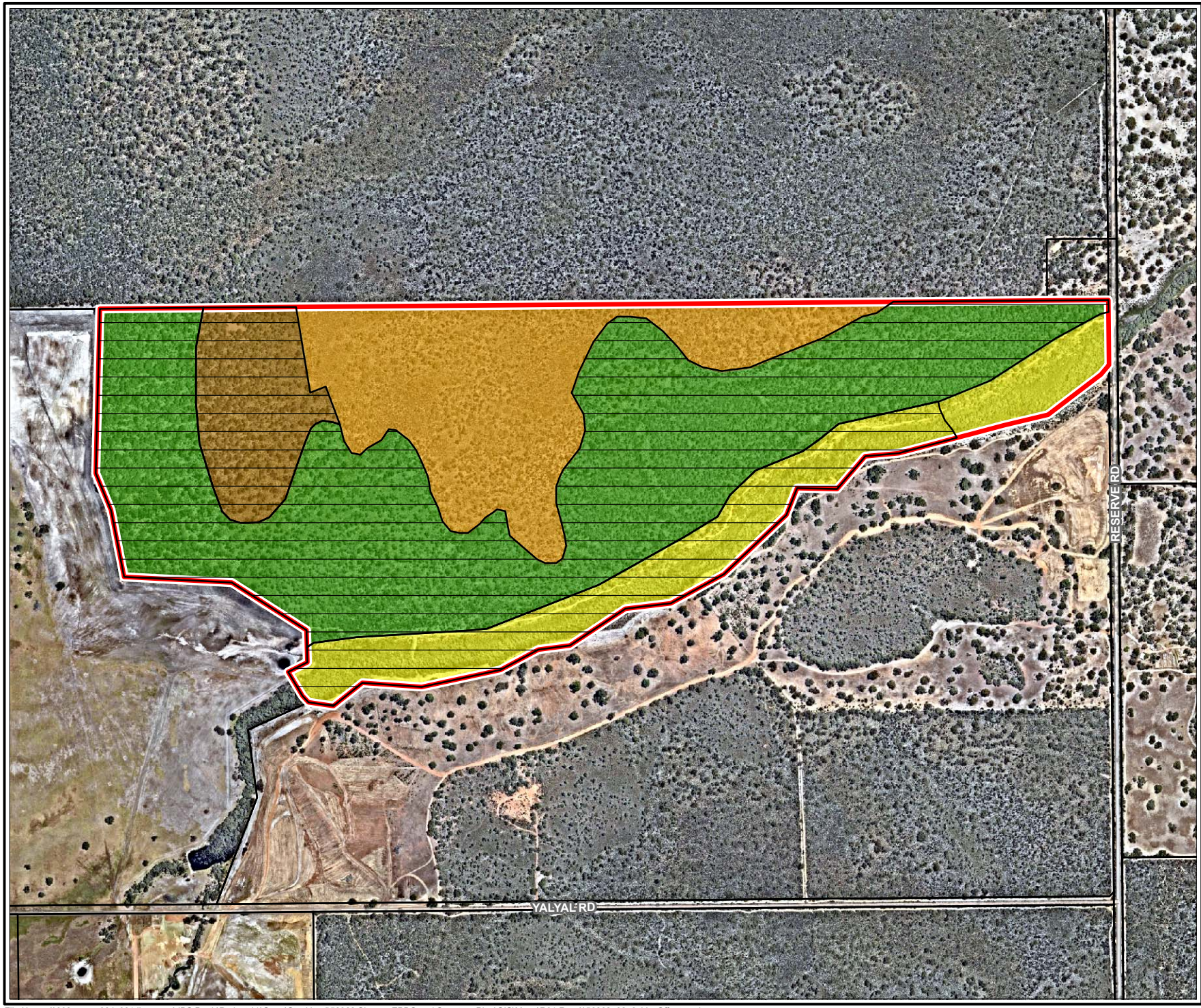
Lot 50 Reserve Road was surveyed to record any flora species with the potential to provide a food source for Black Cockatoos. This assessment was used to determine the foraging value of identified vegetation types, based on the presence and quantity of potential food species and any evidence of foraging by Black Cockatoos. Vegetation within Lot 50 Reserve Road has been described in terms of foraging quality for Black Cockatoos according to the definitions described in Table 2.2.

Table 2.2: Definitions of Black Cockatoo foraging habitat quality

Foraging quality	Justification
Excellent	High density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species >60%) and presence of food sources at several strata (i.e. canopy, midstorey and understorey).
Good	High density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species >60%) but food sources only present at one or two strata (i.e. canopy and midstorey).
Moderate	Moderate foraging value density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species 20-40%) and food sources only present at one or two strata (i.e. canopy and midstorey).
Poor	Low density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species 10-20%) and presence of food sources at only one stratum (i.e. canopy).
Very poor	Very low density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species <10%) and presence of food sources at only one stratum (i.e. canopy).
Nil	Cleared areas - no suitable vegetation present.

The entire 142 ha area of Lot 50 Reserve Road was identified as having valuable foraging and potential breeding habitat of varying quality for both species of Black Cockatoo. VT2, VT3 and VT4 have been identified as having the highest foraging value for both species, containing foraging species in the form of *Eucalyptus marginata*, *Corymbia calophylla*, *Xanthorrhoea preissii* and *Eucalyptus rudis* as well as *Allocasuarina* and *Banksia* species. Evidence of Forest Red-tailed Cockatoo foraging was recorded during the field assessment (Plate 6). Although VT1 will not form part of the designated Reserve Road Offset Site (Figure 2.3), Carnaby's Black Cockatoo will also utilise *Banksia attenuata* and *Banksia menziesii* species identified in VT1 for foraging, which are considered to be of high foraging value (Groom 2011). VT4 contains foraging habitat for Carnaby's Cockatoo in the form of *Eucalyptus rudis.*

Plate 6 : Evidence of Forest Red-tailed Cockatoo foraging recorded during the survey.



Legend

- Offset site (141.892 ha)
- Cadastral boundaries
- Proposed offset (104 ha)

Vegetation type (area within offset)

- VT1
- VT2 (74.631 ha)
- VT3 (11.624 ha)
- VT4 (17.738 ha)

strategen JBS&G

Job No: 56862

Client: Stockland

Version: A	Date 3/04/2020
Drawn By: cthatcher	Checked By: JH

Scale 1:12,000 at A4

0 100 200
metres

Coord. Sys. GDA 1994 MGA Zone 50

Reserve Road
Chittering

OFFSET VEGETATION TYPES

FIGURE 2.3

File Name: \\008pmpmr004v001.jbsg.aust\JBS Perth\Projects\1)Open\Stockland\56862 Sinagra EPBC and Structure Plan\GIS\Maps\R01 Rev A\56862_02_3_VegOffset.mxd
Reference: www.nearmap.com© - Imagery Date: 27 October 2019.

2.2.3 Breeding habitat

Breeding habitat for Black Cockatoos is defined in DSEWPaC (2012b) as trees of species known to support breeding within the range of the species which either have a suitable nest hollow or are of a suitable DBH to develop a nest hollow (≥300 mm for salmon gum and wandoo, and ≥500 mm for other species). These trees are known as significant trees. Trees of this size may also be large enough to provide roosting habitat (i.e. trees which provide a roost or rest area for the birds). Significant trees which contain hollows, that have an entrance diameter of more than 100 mm, are suitable for use by Black Cockatoos (Whitford and Williams 2002). In general, hollows of sufficient size to support black cockatoos do not form until trees are at least 230 years old, and the majority of nests are found in 300-500 year old trees (Johnstone 2006).

An estimate of the number of significant trees was made by two Senior Botanists from Strategen-JBS&G, following the below methodology:

1. Two 100m x 20m transects were taken within each vegetation type
2. All Eucalypts with a diameter at breast height (DBH) of ≥500mm were recorded, along with the species
3. An estimation of the number of significant trees (DBH ≥500mm) per hectare within each vegetation type was based on the number of significant trees present within the 200m^2 transect

Following the above methodology, Table 2.3 presents the estimated number of significant trees (DBH ≥500mm) per hectare, and the extrapolated total number of significant trees based on the area of each vegetation type.

Table 2.3: Estimated number of significant trees per hectare by vegetation type

Vegetation type	Description	Area	Significant trees per ha	Extrapolated total
VT1	Mosaic of the following vegetation types: • open woodland of *Banksia attenuata* and *Banksia menziesii* over shrubland of *Adenanthos cygnorum*, *Xanthorrhoea preissii* and *Calothamnus ?sanguineus* over open herbland of *Desmocladus flexuosus* and *Mesomelaena pseudostygia* on sandy ridges • closed heath of *Calothamnus ?sanguineus*, *Allocasuarina humilis* and *Melaleuca* sp. over open herbland of *Mesomelaena pseudostygia*, *Lyginia barbata* and *Desmocladus flexuosus* with occasional emergent *Banksia attenuata* and *Banksia menziesii* on sandy ridges	32.8 ha	0 trees / ha	0
VT2	Woodland of *Eucalyptus marginata* and occasionally *Corymbia calophylla* over shrubland of *Hibbertia hypericoides*, *Xanthorrhoea preissii*, and *Banksia dallanneyi* over forbland of *Mesomelaena tetragona* and *Mesomelaena pseudostygia* on lateritic slopes	74.6 ha	27.5 trees / ha	2051
VT3	Woodland of *Corymbia calophylla* over shrubland of *Xanthorrhoea preissii*, *Hibbertia hypericoides* and *Bossiaea eriocarpa* over isolated native and introduced herbs and grasses on lateritic slopes	11.6 ha	40 trees / ha	464
VT4	Closed woodland of *Melaleuca rhaphiophylla* and *Eucalyptus rudis* over shrubland of *Taxandria linearifolia* and *Paraserianthes lophantha* over forbland of *Juncus* sp., *Pteridium esculentum* and *Lepidosperma* sp. on loamy soils adjacent to creeklines	22.8 ha	10 trees / ha	228

Based on the extrapolated total number of significant trees per hectare, the total site could support up to 2,743 significant trees. VT2, VT3 and VT4 represent the most suitable vegetation types to provide suitable breeding habitat based on the extrapolated total number of significant trees per hectare. Stockland will utilise 74.6 ha of VT2, 11.6 ha VT3 and 17.8 ha of VT4 to form the 104 ha

Reserve Road Offset Site, which is estimated to support 2,692 significant trees. The Reserve Road Offset Site is within a confirmed breeding area for Carnaby's Black Cockatoo according to mapping by the Department of Biodiversity, Conservation and Attractions (DBCA 2011), and observations made during the site survey indicate that there are trees with hollows present.

2.2.4 Water availability

Permanent water sources occur within 3km to the north-east, west and south of the Reserve Road Offset Site, with the closest being approximately 800m to the south of the site. Wetland habitat with surface water expression occurs approximately 1.6 km to the west of the site within Chandala Nature Reserve. The creek line to the south of the site has been dammed which has created large artificial water sources to the north-east and south-west.

The proximity of permanent water sources is an important habitat feature. Black Cockatoos get very little moisture from the food they eat, so need to drink regularly, particularly in hot weather, often drinking right before going to roost for the evening. They find water at soaks and pools, dams and troughs, preferring still water to flowing water of rivers and creeks (Birdlife Australia, undated).

2.3 Threatening processes

Based on assessment of current site disturbance, its location and position in relation to surrounding land uses, and the demonstrated motivation of the current owner to seek a financial outcome from the property by virtue of the recent for sale advertisement, the following threatening processes were identified as potential risks to the offset area:

- subdivision or occupation for rural and rural lifestyle purposes including use of the site for stock grazing;
- use for extractive industries;
- access by livestock entering the offset site from the surrounding land, spreading / introducing dieback, weeds and/or damaging vegetation directly;
- unauthorised public access;
- dieback spread;
- weed incursion; and.
- bushfire.

2.3.1 Rural use and subdivision

Current land use planning provides for the establishment of rural agricultural pursuits over the proposed offset site with a single dwelling with the potential for future rural subdivision as evidenced by similar subdivision that has occurred between 2km and 5km south, south east and east of the site.

Under the Shire of Chittering Local Planning Scheme No. 6 the proposed offset site is zoned as 'Agricultural resource'. The objectives of the Local Planning Scheme for the Agricultural Resource zone, are:

- a) preserve productive land suitable for grazing, cropping and intensive horticulture and other compatible productive rural uses in a sustainable manner;
- b) protect the landform and landscape values of the district against despoliation and land degradation;
- c) encourage intensive agriculture and associated tourist facilities, where appropriate;
- d) allow for the extraction of basic raw materials where it is environmentally and socially acceptable.

Examples of permitted uses for this zone include but are not limited to:

- agriculture extensive – including raising of stock or crops
- agriculture intensive
- agroforestry
- single dwelling

The potential exists for the current landowner to introduce or permit the grazing of stock on the property. This is an 'as rights' use of the land and therefore if done without direct clearing of the vegetation, could be undertaken by the landowner without the need for approval by State or Local Government.

The site does not currently support a dwelling. The introduction of a dwelling would have a direct impact on a small area of the site, however the potential for increased utilisation of the site and movement within the site increases the risk of exacerbating existing on-site threatening processes such as weeds and dieback.

2.3.2 Use for extractive industries

Basic raw material extraction is currently occurring on properties immediately adjacent to the west and south west of Lot 50 Reserve Road. The sand resource being extracted is also present across much of Lot 50 Reserve Road as is shown by the surface geology map at Plate 7.

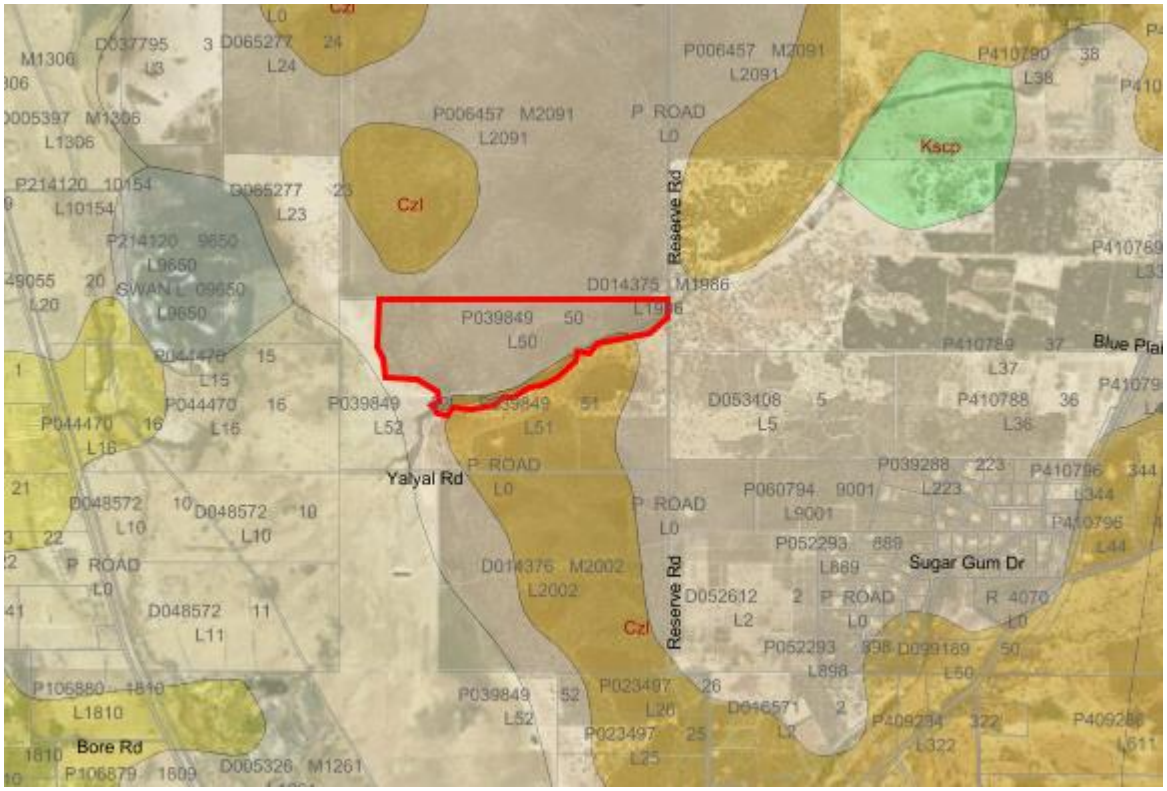


Plate 7 : Surface geology

2.3.3 Livestock incursion

Currently, Lot 50 Reserve Road is fenced and based on vegetation condition and limited distribution of weeds, the fencing has been successful in keeping livestock from surrounding properties out. In consultation with DBCA's District Nature Conservation Program Coordinator it has been identified that the fencing along the southern and western boundaries requires maintenance and upgrades in order to provide better protection for the vegetation and reduce the risk of livestock incursion. Without the currently required investment in fencing, the risk of livestock incursion onto Lot 50 is increased.

2.3.4 Unauthorised public access

The risk of unauthorised public access is considered generally low given the relatively remote nature of the site, however the risk to the site from this threatening process is emphasised by the dieback mapping undertaken by Glevan Consulting (2020) (Figure 2.1), which highlights two northerly spurs of distribution that are associated with informal 4WD tracks.

2.3.5 Weed incursion

Current weed infestation is generally limited to the area adjacent to the waterway, within VT4. This is associated with both the hydrological processes that mobilise weeds from upstream and an internal track that is located adjacent to the heavily vegetated waterway. The risk of further weed infestation is limited, however an increased use of the site by livestock, foot traffic or vehicles will increase the risk of spread of weeds and reduce vegetation quality.

2.3.6 Dieback spread

Dieback can spread through natural processes, primarily hydrological, as well as via livestock or human and machinery movement. A linear dieback assessment has been undertaken over Lot 50 Reserve Road by Glevan Consulting (2020), which identified an area of infestation, totalling approximately 29.4 ha (or approximately 20.7% of the 142 ha area) at the southern boundary along the creek line. The dieback assessment also identified that Reserve Road itself, to the east of the offset site, to be a high-risk vector as it crosses the infested creek line on the southern side of the project area and is a gazetted road with public access (Glevan 2020). Vegetation along the creek line within VT4 was assessed to be in 'Very Good' condition despite the presence of dieback, in line with the Keighery (1994) vegetation scale.

The assessment identified approximately 112.6 ha of vegetation categorised as uninfested 'Protectable Area' within Lot 50, which is inclusive of approximately 3.7 ha classed as uninterpretable due to the lack of indicator species which are susceptible to dieback. Uninfested areas are situated to the north of the creek line, and up-gradient of the creek line and therefore it is not likely that dieback spread will occur hydrologically; rather it may spread by root to root contact, or through livestock, vehicle or machinery movement through the area. Vegetation to the north of the creek line has been assessed to be in 'Very Good to Excellent', despite there being small pockets of dieback infestation (displayed in Figure 2.1).

It is unlikely that dieback was introduced directly into Lot 50; rather, it is likely that it was introduced via waterflow along the creek line, which would have mobilised the pathogen from further upstream. Two small spot infestations to the north of the creek line are likely a result of informal 4WD tracks. Based on the area affected and knowledge of dieback in the area, Glevan estimate that the site is not recently impacted, but rather dieback has been present for at least 5-10 years.

The natural spread of dieback further on the site would be limited by gradient as the dieback is present in the lowest part of the site. While the potential for anthropogenic or livestock driven disturbance represents the greatest risk of dieback spread, it is not anticipated that this will result in substantial decline in vegetation condition, as vegetation may still be classified to be in 'Very Good' condition where dieback disturbance has occurred.

2.3.7 Bushfire

Bushfire represents a low risk to the values of the site. The maintenance of firebreaks is a statutory requirement of all landowners of properties that qualify as requiring firebreaks. Whilst a statutory requirement, many landowners do not maintain adequate firebreaks and there is evidence that the southern firebreaks are poorly maintained on Lot 50 Reserve Road, exacerbating the risk that firefighting efforts could be hampered.

2.4 Overall suitability

Given the composition and quality of vegetation, location of the offset site within the known range for both species of Black Cockatoo and within the buffer of a known breeding site for Carnaby's Black Cockatoo, the presence of quality foraging habitat and breeding/roosting trees and proximity to permanent water sources; it can be inferred that the offset site provides excellent quality habitat for both species of Black Cockatoos.

Accordingly, the site was assigned a habitat quality value of 7 for Carnaby's Black Cockatoo and Forest Red-tailed Black Cockatoo, guided by the *Environmental Offsets Assessment Guide* (DSEWPaC 2012a).

3. Offset assessment guide

The *Offsets Assessment Guide* (DSEWPaC 2012a) and the associated offset calculator (Appendix A) was used to assess the suitability of the selected offset site to compensate for the loss of 14.5 ha of identified Black Cockatoo habitat within Lot 1665 Wanneroo Road.

Table 3.1 explains how the proposed offset site meets the requirements of an offset site as per the EPBC Act *Environmental Offsets Policy* (DSEWPaC 2012a).

Table 3.1: Offset requirements and justification of proposed offset site

Offset requirements	Proposed offset site justification
Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the aspect of the protected matter that is protected by national environmental laws and affected by the proposed action	The proposed offset for Black Cockatoo species will result in an improved overall conservation outcome, ensuring protection of key habitat for the species. The location and scale of the offset secures habitat in perpetuity for the species. The site is considered to be subject to a number of threatening processes that have the potential to degrade the vegetation values. Conservation eliminates the majority of these threatening processes and reduces other risks. The Reserve Road offset site provides potential breeding, foraging and roosting habitat at proportions that meet and exceed the values of the impact site.
Suitable offsets must be built around direct offsets but may include other compensatory measures	100% of the proposed offset is a direct offset. The selected offset site will provide habitat of equal or better value to that on the impact site (Lot 1665) that is conditionally approved to be cleared, directly compensating for the loss of Black Cockatoo habitat, ensuring long term viability of suitable habitat within the region i.e. this is a direct offset.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter	The offsets proposed are consistent with DEE policy and the offset calculator. Statutory protection will be provided for the offset, being the placement under formal protection in perpetuity and managed by DBCA as an A Class Reserve, with contribution of funds to manage the offset site.
Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter	The extent of habitat to be protected at Lot 50 Reserve Road will be proportionate to the residual impacts from clearing within Lot 1665 Wanneroo Road. The proposed action will result in the clearing of 14.5 ha of potential foraging and breeding habitat for Carnaby's Black Cockatoo and Forest Red-tailed Black Cockatoo. The extent of habitat to be protected at Lot 50 Reserve Road is 104 ha, which is proportionate to the residual impacts on the protected matter, providing 100.16% offset of impacts to Carnaby's Black Cockatoo and 106.3% of impacts to Forest Red-tailed Black Cockatoo. The Reserve Road offset site provides potential breeding, foraging and roosting habitat at proportions that meet and exceed the values of the impact site. The local and regional aspect of the offset connects with existing conservation estate, increasing the environmental reliance and security of the existing adjacent conservation estate.
Suitable offsets must effectively account for and manage the risk of the offset not succeeding	The risk of the offset option not fulfilling the aims for which it is designed is considered to be very low following implementation of all the measures identified in this document, and a confidence level of 90% has been used in the offset calculator. The offset site will be vested in the conservation estate to be managed by DBCA as an A Class Nature Reserve and protected in perpetuity, ensuring that the offset measures undertaken are enduring in terms of their improvement of the local habitat values.
Suitable offsets must be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action)	The proposed offset package represents additional conservation outcomes for the proposed offset site. The proposed offset site is freehold, privately held land. Under the Shire of Chittering Local Planning Scheme No. 6 the proposed offset site is zoned as 'Agricultural resource'. The objectives of the Local Planning Scheme for the Agricultural Resource zone, are:

	a) preserve productive land suitable for grazing, cropping and intensive horticulture and other compatible productive rural uses in a sustainable manner; b) protect the landform and landscape values of the district against despoliation and land degradation; c) encourage intensive agriculture and associated tourist facilities, where appropriate; d) allow for the extraction of basic raw materials where it is environmentally and socially acceptable. Examples of permitted uses for this zone include but are not limited to: • agriculture extensive – including raising of stock or crops • agriculture intensive • agroforestry • single dwelling Once vested with the State Government, the Shire of Chittering Town Planning Scheme No.6 will be amended to change to site's zone from Agricultural Resource to Environmental Conservation Zone. The objectives of the Environmental Conservation Zone are to: a) Identify land set aside for environmental conservation purposes. b) Provide for the preservation, maintenance, restoration or sustainable use of the natural environment.
Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable	The proposed offset meets the requirements of *EPBC Act Environmental Offsets Policy* (DSEWPaC 2012a). The purchase and protection of the proposed offset site with supporting management measures provides immediate and permanent protection for the significant values contained within the property.
Suitable offsets must have transparent governance arrangements, including being able to be readily measured, monitored, audited and enforced	The offset site will either be purchased by Stockland and transferred to DBCA immediately or funds provided by Stockland to DBCA for direct purchase. The site will be managed by DBCA as part of the Conservation Estate and with the Conservation Program, and will be designated as Class A Nature Reserve. Management arrangements are established by this EOP and will be subject to reporting requirements as defined in Section 5.

Justification of the values utilised in the offset calculator (Appendix A), are included in Table 3.2 and Table 3.3 below for the Reserve Road Offset site. Using these input values, the offset calculator determined that acquisition of a 104 ha portion of land within Lot 50 Reserve Road will account for 100.16 % of the impact required to be directly offset under the EPBC Act *Environmental Offsets Policy*.

Table 3.2: Carnaby's Cockatoo (Endangered) offset calculations and justification

Offset parameter	Values used in calculator	Justification of value
The site - Lot 1665 Wanneroo Road Sinagra		
Area of impact (ha)	14.5	This is the total area of Black Cockatoo foraging and potential breeding habitat to be cleared, comprising two foraging habitat types and 264 potential breeding trees.
Start quality (impacted area)	6	Foraging habitat within the site comprises 7.07 ha of *Eucalyptus* woodland with understorey, and 6.43 ha of *Eucalyptus* woodland without understorey. The *Eucalyptus* woodland with understorey is in a 'Good to Degraded' or 'Degraded' condition, while the *Eucalyptus* woodland without understorey is in a 'Degraded to Completely Degraded' and 'Completely Degraded' condition. The quality of the foraging habitat was identified as being 'not good quality' in the referral. The site contains 264 potential breeding trees, however none of these trees were recorded to have hollows.

		The site is mapped within the buffer of a confirmed roosting area for Carnaby's Black Cockatoo (DBCA 2011), with approximately 30 roost sites occurring within 10 km (Birdlife Australia 2018). The site is not mapped as a confirmed or unconfirmed breeding area for Carnaby's Black Cockatoo.
Proposed offset site – Lot 50 Reserve Road Chittering		
Proposed offset (ha)	104	This is the minimum offset area required to offset 100% of the impact of clearing 14.5 ha of Black Cockatoo foraging and potential breeding habitat.
Time over which loss is averted (years)	20	It is intended that the proposed offset site will be purchased and placed under formal protection within the State of Western Australia Conservation Estate as an A Class Reserve. The maximum time allowed in the calculator is 20 years, however the offset site would be formally protected in perpetuity and managed by DBCA.
Time until ecological benefit (years)	6	It is conservatively estimated that, given the clear intent for the current owner to gain an economic outcome from the site, that the site could face increased risk, or, if a sale is unable to be achieved, maintenance of key infrastructure such as fences may continue to decline, as is evidenced from the current state of the southern fence. Two scenarios are considered for the future quality without the offset. The first is for a gradual decline in quality as a result of threatening processes such as livestock incursion, dieback and weed spread and anthropogenic exacerbation of risks such as dieback. It is acknowledged that these processes may take longer than 6 years to impact future quality. The second scenario is where quality is impacted significantly over part or all of the site through economic driven threatening processes that are permitted under the site's current zoning. These would likely have a much more significant impact to quality without the offset. The assessment of time until ecological benefit represents an estimate of the balance of these threatening processes.
Start quality	7	This value has been determined in consideration of the value of foraging habitat and presence of significant trees offering potential breeding habitat and location of the site within the buffer of a known breeding site. The entire offset site provides suitable foraging habitat for this species across all four vegetation types. VT2 and VT3 provide the highest quality of foraging habitat for Carnaby's Cockatoo, being 'Moderate to Good' foraging quality. VT2 and VT3 contain vegetation assessed to be in 'Very Good – Excellent' condition and contains foraging species such as *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri), *Xanthorrhoea preissii* and *Banksia dallanneyi.* Jarrah is considered 'Medium' priority and is used for breeding, feeding and roosting, while Marri is considered 'High' priority and is used for feeding, nesting and roosting. It is estimated that VT2, VT3 and VT4 contain 27.5, 40 and 10 significant trees per ha respectively. Transects within VT2 and VT3 indicate that there are hollow-bearing trees potentially suitable for breeding. Based on the estimated number of significant trees per ha: • 74.6 ha of VT2 could provide up to 2,052 significant trees • 11.6 ha of VT3 could provide up to 464 significant trees • 17.7 ha of VT4 could provide up to 177 significant trees VT2 and VT3 represent 86.2 ha or 83% of the 104 ha offset area, with VT4 comprising the other 17.7 ha (17%). VT4 provides poor quality foraging habitat and 10 significant trees per ha, or potentially 177 significant trees and roosting habitat. Being the vegetation type that is surrounding and adjacent to the waterway, this habitat type is important supporting habitat to the better quality foraging habitat in VT2 and VT3. This vegetation type is also where the majority of the dieback infestation is present and the presence of weeds is most evident (albeit

		limited). The vegetation condition of VT4 has been assessed as 'Very Good', indicating that dieback and weeds have not had a significant impact. In total, up to 2,633 significant trees could be present within VT2, VT3 and VT4 based on the above extrapolations. Furthermore, the proposed offset site is contiguous with potential foraging habitat mapped by DBCA to the north. Foraging habitat for Carnaby's Black Cockatoo has been mapped by Coffey (2015) in the site directly above the proposed offset site, comprising vegetation in 'Very Good' and 'Excellent' condition, which is considered to equate to "Quality" and "High Quality" foraging habitat for Black Cockatoos.
Risk of loss (%) without offset	0%	Based on advice from the Department, it cannot be demonstrated that all of the values on the site have the potential to be lost and therefore this value has been assessed at 0%.
Future quality without offset	6	The risk of impacts to the site and threatening processes are defined in Section 2.3. Given the current private owner has sought to sell the property the risk exists that the current owner, or future owner, seeking to achieve an economic return from the site could seek utilise the site's 'Agricultural Resource' zoning either for the basic raw material that lays beneath the site or for agricultural purposes. Poor management of the site could also exacerbate a number of the threatening processes identified for the site. There is potential that the quality of the proposed offset site would decline without the offset, through: • poor fence maintenance allowing stock from adjacent properties to enter and degrade • ongoing 4WD access to the site (either by owner or informal) and spread of dieback and weeds.
Risk of loss (%) with offset	0%	Based on advice from the Department, it cannot be demonstrated that all of the values on the site have the potential to be lost and therefore this value has been assessed at 0%.
Future quality with offset	7	It is not expected that the quality of the proposed offset site will increase as a result of the offset, given that the vegetation is already in a 'Very Good – Excellent' condition.
Confidence in result (%)	90%	The proposed offset site is mapped directly below land already within the conservation estate and has been endorsed by DBCA for addition to the estate. The proposed offset site: • comprises vegetation in 'Very Good – Excellent' condition; • contains an estimated 2,633 significant trees within 104 ha • contains species suitable for foraging, roosting and breeding (hollows have been recorded in potential breeding trees) • is contiguous with an area mapped by DBCA as containing potential foraging habitat • is within a mapped confirmed breeding area • would be placed under formal protection in perpetuity and managed by DBCA • the estimation of risk of loss and change in quality is considered to be highly conservative and therefore the confidence that the offset can be achieved as identified is high.

Table 3.3: Forest Red-tailed Cockatoo (Vulnerable) offset calculations and justification

Offset parameter	Values used in calculator	Justification of value
The site - Lot 1665 Wanneroo Road Sinagra		
Area of impact (ha)	14.5	This is the total area of Black Cockatoo foraging and potential breeding habitat to be cleared, comprising two foraging habitat types and 264 potential breeding trees.

Start quality (impacted area)	6	Foraging habitat within the site comprises 7.07 ha of *Eucalyptus* woodland with understorey, and 6.43 ha of *Eucalyptus* woodland without understorey. The *Eucalyptus* woodland with understorey is in a 'Good to Degraded' or 'Degraded' condition, while the *Eucalyptus* woodland without understorey is in a 'Degraded to Completely Degraded' and 'Completely Degraded' condition. An assessment of the quality of foraging habitat was not made. The site contains 264 potential breeding trees, however none of these trees were recorded to have hollows. The site is mapped as a confirmed roosting area (DBCA 2011), with approximately 30 roost sites occurring within 10 km (Birdlife Australia 2018). While there have been records of this species breeding on the Swan Coastal Plain, this species is known to prefer dense Jarrah forest habitat (TSSC 2009) which is not present within the site.
Proposed offset site – Lot 50 Reserve Road Chittering		
Proposed offset (ha)	104	For Forest Red-tailed Black Cockatoo, this area will offset 112.18% of the impact of clearing 14.5 ha of Black Cockatoo foraging and potential breeding habitat.
Time over which loss is averted (years)	20	It is intended that the proposed offset site will be purchased and placed under formal protection within the State of Western Australia Conservation Estate as an A Class Reserve. The maximum time allowed in the calculator is 20 years, however the offset site would be formally protected in perpetuity and managed by DBCA.
Time until ecological benefit (years)	6	It is conservatively estimated that, given the clear intent for the current owner to gain an economic outcome from the site, that the site could face increased risk, or, if a sale is unable to be achieved, maintenance of key infrastructure such as fences may continue to decline, as is evidenced from the current state of the southern fence. Two scenarios are considered for the future quality without the offset. The first is for a gradual decline in quality as a result of threatening processes such as livestock incursion, dieback and weed spread and anthropogenic exacerbation of risks such as dieback. It is acknowledged that these processes may take longer than 6 years to impact future quality. The second scenario is where quality is impacted significantly over part or all of the site through economic driven threatening processes that are permitted under the site's current zoning. These would likely have a much more significant impact to quality without the offset. The assessment of time until ecological benefit represents an estimate of the balance of these threatening processes.
Start quality	7	This value has been determined in consideration of the value of foraging habitat and presence of significant trees offering potential breeding habitat. 86.2 ha of the proposed offset site contains foraging species suitable for Forest Red-tailed Black Cockatoo. VT2 and VT3 contain vegetation assessed to be in 'Very Good – Excellent' condition, and contain species such as *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri). Jarrah and Marri comprises approximately 90% of the Forest Red-tailed Black Cockatoo diet, while also providing breeding and roosting habitat. It is estimated that VT2, VT3 and VT4 contain 27.5, 40 and 10 significant trees per ha respectively. Transects within VT2 and VT3 indicate that there are hollow-bearing trees potentially suitable for breeding. Based on the estimated number of significant trees per ha: • 74.6 ha of VT2 could provide up to 2,052 significant trees • 11.6 ha of VT3 could provide up to 464 significant trees • 17.7 ha of VT4 could provide up to 177 significant trees

		VT2 and VT3 represent 86.2 ha or 83% of the 104 ha offset area, with VT4 comprising the other 17.7 ha (17%). VT4 provides poor quality foraging habitat and 10 significant trees per ha, or potentially 177 significant trees and roosting habitat. Being the vegetation type that is surrounding and adjacent to the waterway, this habitat type is important supporting habitat to the better quality foraging habitat in VT2 and VT3. This vegetation type is also where the majority of the dieback infestation is present and the presence of weeds is most evident (albeit limited). The vegetation condition of VT4 has been assessed as 'Very Good', indicating that dieback and weeds have not had a significant impact. In total, up to 2,633 significant trees could be present within VT2, VT3 and VT4 based on the above extrapolations. Furthermore, the proposed offset site is contiguous with potential foraging habitat mapped by DBCA to the north. Foraging habitat for Forest Red-tailed Black Cockatoo has been mapped by Coffey (2015) in the site directly above the proposed offset site, comprising vegetation in 'Very Good' and 'Excellent' condition, which is considered to equate to "Quality" and "High Quality" foraging habitat for Black Cockatoos.
Risk of loss (%) without offset	0%	Based on advice from the Department, it cannot be demonstrated that all of the values on the site have the potential to be lost and therefore this value has been assessed at 0%.
Future quality without offset	6	The risk of impacts to the site and threatening processes are defined in Section 2.3. Given the current private owner has sought to sell the property the risk exists that the current owner, or future owner, seeking to achieve an economic return from the site could seek utilise the site's 'Agricultural Resource' zoning either for the basic raw material that lays beneath the site or for agricultural purposes. Poor management of the site could also exacerbate a number of the threatening processes identified for the site. There is potential that the quality of the proposed offset site would decline without the offset, through: • poor fence maintenance allowing stock from adjacent properties to enter and degrade • ongoing 4WD access to the site (either by owner or informal) and spread of dieback and weeds.
Risk of loss (%) with offset	0%	Based on advice from the Department, it cannot be demonstrated that all of the values on the site have the potential to be lost and therefore this value has been assessed at 0%.
Future quality with offset	7	It is not expected that the quality of the proposed offset site will increase as a result of the offset, given that the vegetation is already in a 'Very Good – Excellent' condition.
Confidence in result (%)	90%	The proposed offset site is mapped directly below land already within the conservation estate and has been endorsed by DBCA for addition to the estate. The proposed offset site: • comprises vegetation in 'Very Good – Excellent' condition; • contains an estimated 2,633 significant trees within 104 ha • contains species suitable for foraging, roosting and breeding (hollows have been recorded in potential breeding trees) • is contiguous with an area mapped by DBCA as containing potential foraging habitat • is within a mapped confirmed breeding area • would be placed under formal protection in perpetuity and managed by DBCA • the estimation of risk of loss and change in quality is considered to be highly conservative and therefore the confidence that the offset can be achieved as identified is high.

3.1 Conservation Gain

The provision of the 104 ha offset reflects an offset ratio of approximately 7:1. The conversion of freehold land which is zoned 'Agricultural Resource' under the Shire of Chittering Local Planning Scheme No. 6 to a Class A Nature Reserve owned and managed by the State Government is a significant gain and averted future loss.

The risk of broad scale change to the environmental values of the site are real and are demonstrated by the rural residential properties in proximity to the site and the basic raw material extraction occurring immediately adjacent to the site. Similarly, the ability for the land to be used for livestock grazing purposes under the current land use zone, is a realistic threat to the vegetation condition.

An activity such as basic raw material extraction is likely to be required to be assessed under the EPBC Act and it is assumed it would be approved, given the relatively low number of projects that have been refused under the Act.

The conservation gain is enhanced by the management measures proposed to be implemented as described in Section 4.4, which are aimed at minimising the risk of identified threatening processes and averting a decline in vegetation condition.

4. Conservation and Management Commitments

4.1 Offset objectives

The offset objectives are established with reference to the Black Cockatoo habitat values impacted by the project (1665 Wanneroo Road). The objectives of the offset site are therefore to provide adequate and compensatory habitat for the Carnaby's Cockatoo (*Calyptorhynchus latirostris*) and Forest Red-tailed Cockatoo (*Calyptorhynchus banksii naso*) that meets the following requirements:

- quality foraging habitat
- potential breeding habitat
- potential roosting habitat
- provision of adequate threat abatement measures to provide certainty that the site's Black Cockatoo values can be maintained.

4.2 Targets

With the existing vegetation already identified as being in 'Very Good to Excellent' and 'Very Good' condition and providing quality foraging and breeding/roosting potential for Black Cockatoos, the primary target is to ensure this vegetation retains its habitat value of 7 (assigned through the offsets calculation) in perpetuity through limiting the risk of key identified threatening processes. This will involve transfer of the property to the State Government Conservation Estate, the implementation of weed management, fencing repairs/upgrades, firebreak maintenance and dieback hygiene and prevention measures, as discussed in the subsequent sections.

With consideration of the site's existing values and potential risks, the targets that inform management responses are:

- transfer ownership of property to State Government (Conservation Commission)
- property to become part of the conservation estate and classified as a Class A Nature Reserve
- amend Local Planning Scheme Zone from Agricultural Resource to 'Environmental Conservation'
- undertake weed survey and reduce weed occurrences in VT4
- reduce spread of dieback caused by human movement and reduce risk of spread by livestock
- exclude livestock from property
- inhibit illegal site access
- maintain appropriate fire breaks.

4.3 Risk assessment

A qualitative risk assessment was conducted in accordance with the Department of Environment (now DAWE) *Environmental Management Plan Guidelines 2014,* to assess the risks posed to the offset site (Table 4.1). Each potential impact identified has been provided a likelihood and consequence rating using the criteria established within the guidelines. These ratings were then combined to generate a risk rating of Low, Medium, High or Severe. Residual risk ratings following the implementation of management actions have also been provided in Table 4.1.

Table 4.1: Risk assessment of impacts to the offset site

Threatening processes	Inherent Risk Rating			Management measures	Residual Risk Rating		
	Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Subdivision for rural and rural lifestyle purposes	Likely	High	**High**	Refer to Section 4.4.	Rare	High	**Low**
Use for agricultural purposes	Possible	Major	**High**		Rare	Major	**Medium**
Use for extractive industries	Possible	Major	**High**		Rare	Major	**Medium**
Uncontrolled livestock access	Possible	High	**Medium**		Rare	High	**Low**
Introduction / spread of weed species	Likely	Moderate	**Medium**		Possible	Minor	**Low**
Unauthorised zone access	Likely	Moderate	**Medium**		Unlikely	Moderate	**Low**
Bushfire	Possible	Moderate	**Medium**		Possible	Moderate	**Medium**
Dieback introduction and spread	Likely	High	**High**		Possible	Moderate	**Medium**

4.4 Completion criteria

Following the purchase of Lot 50 Reserve Road, the land will be ceded to the DBCA and vested in the State conservation estate. Stockland will continue to manage the site for a period of at minimum 3 years, until the following completion criteria are met and responsibility for management of the site is ceded to the DBCA. Where all completion criteria are not met after the minimum three year management period, Stockland will continue to be responsible for management measures until all completion criteria are met, as per the contingency actions stipulated within Section 4.7.

If any of the following completion criteria are determined unable to be met, then an additional 29.4 ha, or part thereof from the balance of the site (i.e. the area of the site not currently used by this offset) will be included as part of this offset.

Completion criteria are described below in Table 4.2

Table 4.2: Completion criteria

Parameter	Completion criteria
Vegetation condition	There has been no net decrease in vegetation condition when compared with the baseline survey
Weeds	The number of weed species within the offset site is no greater than that recorded from the baseline survey
	There has been no increase in weed density / cover at the offset site when compared with the baseline survey.
Dieback introduction and spread	There has been no spread of dieback into uninfested areas of the offset site compared to the baseline survey
Fencing and signage	Perimeter fencing and signage (including dieback related signage) is present and functional, with no additional repairs or replacements outstanding.
Firebreaks	Firebreaks meet the requirements of the Shire of Chittering firebreak notice

4.5 Management measures

. The management measures identified below reflect discussions with DBCA's District Conservation Coordinator who has knowledge of the proposed offset site and surrounding area. DBCA have specifically identified that fencing requires repairing/upgrading along the southern boundary of the site, and that existing firebreaks require some maintenance work in order to meet bushfire protection requirements outlined in the Shire of Chittering firebreak notice.

The flora and vegetation survey report, dieback survey results and weed mapping will be packaged and provided to DBCA at the point of transfer of land ownership.

The management measures below are designed to avoid and mitigate impacts through implementation of the threat abatement measures and, repair the potential threatening processes and risks to the site's Black Cockatoo values.

In order to maintain the vegetation condition and Black Cockatoo habitat values, management measures have been identified in consultation with DBCA and are outlined in Table 4.3.

Table 4.3: Proposed management measures

Threatening process	Management action	Responsibility	Proposed timing	Estimated cost
Subdivision for rural and rural lifestyle purposes / Use of site for agricultural purposes / Use of site for extractive industries	Transfer of ownership and management of the offset site to the DBCA.	Stockland	Ownership will be transferred upon purchase of the offset site, while management will be transferred at the conclusion of Stockland's 3 year management period.	Fee covered by DBCA
	Provision of funding to the DBCA for ongoing management of the offset site.	Stockland	Following the conclusion of Stockland's 3 year management period.	$30,000
Uncontrolled access (livestock and public)	Undertake fencing repairs/upgrades along southern boundary of the site (approximately 2.5 km) to standards agreed with DBCA	Stockland	Within 1 year of land acquisition.	$15,000
	Installation of 3 Nature Reserve signs identifying Lot 50 Reserve Road as a Nature Reserve.	DBCA (Stockland to provide funding)	Within 1 year of land acquisition.	$1,950
Bushfire	Maintain firebreaks at the perimeter of the site to minimise fire risk to vegetation.	Stockland (prior to transfer of management to DBCA), followed by DBCA	Prior to transfer of land to DBCA, then ongoing by DBCA as required by Shire of Chittering's firebreak notice.	TBC
	Ensure firebreaks meet the Shire of Chittering firebreak notice requirements at the time of transfer of property to DBCA.	Stockland (prior to transfer of management to DBCA), followed by DBCA	Prior to transfer of land to DBCA, then ongoing by DBCA as required by Shire of Chittering's firebreak notice.	TBC
Weeds	Conduct baseline weed survey of entire site in accordance with DBCA standard operating procedures (DEC 2011) to identify weed species present, establish baseline weed densities, and determine where weed management is required.	Stockland	First winter/spring following acquisition and prior to transfer of land to DBCA.	$5,000
	Monitor weeds through annual surveys in accordance with Table 4.2.	Stockland	Annually in winter/spring for 3 years, prior to transfer of management to DBCA.	$36,000 (i.e. $12,000 annually)

Threatening process	Management action	Responsibility	Proposed timing	Estimated cost
	If necessary, based on monitoring, develop a weed control program and appoint an experienced contractor to manage weeds within the impacted areas. Weed control techniques may include the following: • spot spraying – where hand-spraying apparatus is applied directly to the target plant • hand weeding – physical removal of the weed	Stockland	Frequency of any weed control will depend on the type of weeds present based on the advice of a weed control expert.	
	During weed control, if required, the following practices will be implemented: • use of biodegradable marking dye during all spot spraying tasks • installation of safety warning signage around the perimeter of the area to be controlled, including information on the type of weed control and planned timing (signage shall be placed prior to application and removed once area has dried) • undertaking spraying only under calm weather conditions as identified in the herbicide manufacturer's recommendations	Site personnel	Annually for 3 years, or as required based on the advice of a weed control expert.	
	All vehicles, machinery and equipment will be free of mud and soil prior to entering to prevent the introduction and spread of weeds/pathogens	Site personnel	During active management.	
Dieback introduction and spread	Installation of signage along tracks where weed management will be undertaken, demarcating dieback infested zones and dieback free zones.	Stockland	Prior to implementation of weed management measures.	$1,000
	All vehicles, machinery and footwear of personnel undertaken work onsite are to be inspected for soil and plant material prior to entering the offsite.	Site personnel	During active management.	N/A
	All works on site are to be undertaken in dry soil conditions only.	Site personnel	During active management and monitoring periods	N/A
	Prior to moving from dieback infected areas to dieback free areas, vehicles, machinery and footwear are to be cleaned of soil and vegetative material.	Site personnel	During active management and monitoring periods	N/A

4.6 Monitoring

A monitoring program has been developed focussing on monitoring of weeds, dieback hygiene control measures and fence condition and comprises of the following actions (Table 4.4).

Contingency actions (see Section 4.7) will be initiated if monitoring indicates that performance indicators outlined in Table 4.4 are not being met.

The proposed monitoring program includes an initial baseline assessment of the site which will be undertaken at the commencement of the three year maintenance period. A final assessment, including *Phytophthora* dieback assessment, weed density/cover and vegetation condition assessment (utilising Keighery 1994), will be undertaken at the end of the three year maintenance period which will assess the condition of the site against the completion criteria.

Table 4.4: Proposed monitoring actions

Monitoring action	Purpose	Performance indicator	Frequency	Location	Responsibility
Weed management and dieback prevention					
Visual observation and assessment of distribution, abundance and density/cover of weed species	To minimise the spread or introduction of weeds into areas of vegetation upslope (north) of the creek line. To track progression towards completion criteria To determine the effectiveness of weed control management measures (if implemented).	Monitoring indicates that there has been no increase in the distribution, abundance or density/cover of weed species recorded during the baseline weed survey.	Annually for 3 years (minimum) prior to transfer of management to DBCA	Across the entire site, using methodology established as part of the baseline survey.	Stockland
Visual observation and assessment of vegetation condition	To assess success of management actions against completion criteria	Visual inspection of vegetation indicates that there has been no decline in vegetation condition and health.	After 3 years prior to transfer of management to the DBCA. Results will be compared to the baseline survey	Across entire site, using methodology established as part of the baseline survey	Stockland
Dieback assessment	To assess the extent of spread of dieback within the site, and compare these results against the completion criteria	No spread of dieback into uninfested areas when compared to the baseline survey	After 3 years prior to transfer of management to the DBCA	Across the entire site, using methodology established as part of the initial assessment	Stockland
Fence and signage condition					
Visual observation of condition of fencing and signage around the reserve area	To ensure that fencing and signage is in good condition and that there has been no damage caused by livestock incursion or unauthorised access.	Visual inspection of fencing and signage around the reserve area indicates that no damage has been caused to fencing by livestock or as a result of unauthorised public access.	Annually for 3 years (minimum) prior to transfer of management to DBCA.	Fencing and signage locations	Stockland
Firebreak condition					

Monitoring action	Purpose	Performance indicator	Frequency	Location	Responsibility
Visual observation of condition of firebreak	To ensure that firebreaks are maintained in accordance with Shire of Chittering firebreak notice.	Visual inspection of firebreaks within the reserve area indicates that firebreaks have been maintained to the required standard and in accordance with the Shire of Chittering firebreak notice.	Annually for 3 years (minimum) prior to transfer of management to DBCA	Firebreaks	Stockland

4.7 Contingency measures

The key ongoing management measures relate to weed management, and the associated dieback control measures. The contingency of additional funding following the first year provides DBCA with discretionary funds to implement further action, in the event that they consider additional action is required after the first year's effort.

The following contingency actions are applicable during both the active management and monitoring periods and will be initiated if the appropriate trigger criteria have been met. Contingency actions and the associated triggers are presented in Table 4.5.

Table 4.5: Proposed contingency actions

Performance indicator	Trigger	Contingency action
Weed management and dieback prevention		
Weed species recorded during opportunistic surveys	Monitoring indicates a new weed species has been introduced compared to the baseline weed survey.	• Map the distribution of the newly introduced weed species • Identify activities which may have potentially introduced the weed species • Plan and implement weed control program (may involve seeking advice from relevant authorities) • Apply hygiene control and education measures for site personnel
Weed density/cover	Monitoring indicates that there has been a 5% increase in weed species density/cover compared to baseline levels	• Map revised extent of the specific weed species • Identify activities that may have potentially increased the abundance, distribution or density/cover of weed species • Plan and implement a weed control program (may involve seeking advice from relevant authorities) • Apply hygiene control and education measures for site personnel
No reporting of incorrect dieback hygiene procedures being undertaken	Vehicles, machinery and footwear are not clean on entry to / exit from the site	• Determine why appropriate hygiene procedures were not followed • Clean-down affected vehicles, machinery or footwear offsite prior to entering the site • Educate site personnel on appropriate hygiene measures • Ensure there are sufficient dieback warning signs throughout the area
Fence condition		
No damage to perimeter fencing during inspection	Perimeter fencing is observed to be compromised, allowing livestock or public access	• Investigate cause • Immediately remove livestock from the offset site that may have entered • Repair fencing to a standard that prevents livestock ingress or unauthorised public access
Firebreak		
Firebreak meets requirements of Shire of Chittering firebreak notice	Firebreak is not maintained to requirements of the Shire of Chittering firebreak notice	• Undertake firebreak maintenance to required standard of the Shire of Chittering Firebreak notice
Completion criteria		
Final site assessment confirms all completion criteria have been met	One or more completion criteria are not met at the end of the three year active management period	• Increase the active management period of the site to allow Stockland time to meet completion criteria • Undertake further monitoring (including dieback assessment) to assess the site against the completion criteria • Continue to provide annual reports on the status of the site and progression towards meeting completion criteria • If completion criteria are determined unable to be met, an additional 29.4 ha (or part thereof) of the site, as agreed by the Commonwealth Minister, is to be used as part of this offset, and transferred to the DBCA.

4.8 Implementation

The offset site will be purchased by Stockland and the transfer to DBCA being facilitated by that Department. The site will be managed by DBCA as part of the Conservation Estate and with the Conservation Program.

The site is currently under contract and finalisation of the purchase will proceed following acceptance of this EOP. This is expected to transact between March and June 2020.

5. Reporting requirements

Stockland will provide a report on the actions described in the EOP annually for 3 years after the completion of the sale and transfer. A final report will be provided at the conclusion of the 3 year management period, where completion criteria are met. Where not met, additional management by Stockland and subsequent additional annual reports will be required and provided until all handover criteria are met. This timeframe has been selected to permit reporting 3 months following the conclusion of the 3 year weed management program proposed to be implemented by Stockland. This reporting framework will demonstrate the successful implementation of all management measures, the meeting of all completion criteria and permit the closure of reporting on this EOP.

It is not proposed that DBCA provide ongoing reports for the site as is typically the arrangement for sites being transferred into the Conservation Estate.

6. References

Birdlife Australia. 2018. *Great Cocky Count data.* Dataset later available via WALGA Environmental Planning Tool.

Birdlife Australia. undated. *Black cockatoos and your property.* On-line resource sheet.

Coffey Services Australia Pty Ltd (Coffey). 2015. *Flora, Vegetation and Fauna Assessment: Lot M2091 Ioppolo Road, Chittering*. Report prepared for Main Roads Western Australia.

Coffey Services Australia Pty Ltd (Coffey). 2017. *Ioppolo Road Site Land Acquisition and Management Plan: Perth-Darwin National Highway (Swan Valley Section)*. Report prepared for Main Roads Western Australia. Available from: https://project.mainroads.wa.gov.au/northlinkwa/PublishingImages/Ioppolo%20Road%20Site%20LAMP.PDF [11 November 2019].

Department of Biodiversity, Conservation and Attractions (DBCA). 2011. *Carnaby's Cockatoos Habitat.* Dataset layer available via WALGA Environmental Planning Tool.

Department of Environment and Energy. 2016. *Map 3: Modelled Distribution for Carnaby's Cockatoo (Calyptorhynchus latirostris*).

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC). 2012a. *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*. Commonwealth of Australia. Available from: http://www.environment.gov.au/system/files/resources/12630bb4-2c10-4c8e-815f-2d7862bf87e7/files/offsets-policy_2.pdf. [12 August 2019].

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC). 2012b. *Environment Protection and Biodiversity Conservation Act 1999 referral guidelines for three black cockatoo species: Carnaby's cockatoo (endangered) Calyptorhynchus latirostris, Baudin's cockatoo (vulnerable) Calyptorhynchus baudinii, Forest red-tailed black cockatoo (vulnerable) Calyptorhynchus banksii naso,* Australian Government, Canberra. Available from: https://www.environment.gov.au/system/files/resources/895d4094-af63-4dd3-8dff-ad2b9b943312/files/referral-guidelines-wa-black-cockatoo.pdf. [12 August 2019].

Finn, H. 2012. *Assessment of habitat values for black-cockatoos within selected sites at Newmont Boddington Gold Mine*. Report prepared for Newmont Boddington Gold Pty Ltd.

Groom, C. 2011. *Plants used by Carnaby's Black Cockatoo.* Prepared by Christine Groom, Department of Environment and Conservation. Available from: https://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/carnabys/Plants_used_by_Carnabys_black_cockatoo_20110415.pdf [11 November 2019].

Johnstone, R. 2006. *Going, going, gone! Veteran and stag trees: a valuable resource.* Western Australian Museum, Perth.

Kieghery, B. J. 1994. *Bushland Plant Survey: a Guide to Plant Community Survey for the Community.* Wildflower Society of WA (Inc.), Nedlands, Western Australia.

Whitford, K. R. and Williams, M. R. 2002. *Hollows in jarrah (Eucalyptus marginata) and marri (Corymbia calophylla) trees II. Selecting trees to retain for follow dependent fauna.* Forest Ecology and Management, vol. 160: pp. 215-232.

7. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

Strategen-JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by Strategen-JBS&G, and should not be relied upon by other parties, who should make their own enquires.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, Strategen-JBS&G reserves the right to review the report in the context of the additional information.

Appendix A Offset calculator

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	CBC
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	Black cockatoo foraging and potential breeding habitat	**Area**	14.5	Hectares	360 Environmetnal 2017
			Quality	**6**	Scale 0-10	
			Total quantum of impact	8.70	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	Yes				Count	
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	8.70	Adjusted hectares	60	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	104	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	0%	0.00	90%	0.00	0.00	8.71	100.16%	Yes	TBC	TBC
									Future area without offset (adjusted hectares)	104.0	**Future area with offset (adjusted hectares)**	104.0								
					Time until ecological benefit	6	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**7**	1.00	90%	0.90	0.84				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	8.7	8.71	100.16%	**Yes**	TBC	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	FRTBC
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	Black cockatoo foraging and potential breeding habitat	**Area**	14.5	Hectares	360 Environmetnal 2017
			Quality	**6**	Scale 0-10	
			Total quantum of impact	8.70	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	Yes				Count	
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	8.70	Adjusted hectares	60	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	104	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	0%	0.00	90%	0.00	0.00	9.25	106.30%	Yes	TBC	TBC
									Future area without offset (adjusted hectares)	104.0	**Future area with offset (adjusted hectares)**	104.0								
					Time until ecological benefit	6	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**7**	1.00	90%	0.90	0.89				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	8.7	9.25	106.30%	**Yes**	TBC	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Appendix B DBCA Letter

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**
Office of the Director General

Your ref:
Our ref:
Enquiries: Alex Errington
Phone: 9219 8775
Email: Alex.Errington@dbca.wa.gov.au

Mr Andrew Wallis
Senior Development Manager – Residential WA
Stockland
Level 12 Durack Centre
263 Adelaide Terrace
PERTH WA 6000

Dear Andrew

The purpose of this letter is to record an understanding between Stockland and the Department of Biodiversity, Conservation and Attractions (the Department) relating to the transfer of Lot 50 Reserve Road, Chittering into the conservation estate.

Lot 50 Reserve Road is proposed to be purchased by Stockland as an offset, consistent with the requirements of EPBC Approval 2017/7921. The property is one of only a few cases that are available for purchase that the Department is aware of which provides habitat for both Carnaby's and Forest Red-tailed Black Cockatoos. Once Stockland acquires the property, the Department will happily accept its transfer into the Department's management. The Department will arrange the formal transfer of ownership, at no cost to Stockland.

The Department acknowledges that Lot 50 Reserve Road contains a greater area of potential offset values than is required to satisfy EPBC Approval 2017/7921 and therefore expects that the balance of the property will be available for use by Stockland to meet a future offset need, be it under State or Commonwealth legislation. The Department will support Stockland's engagement with the Commonwealth Department of Environment (the "approving" body) should such circumstances arise.

The Department acknowledges that pending the conclusion of the Offset Plan as required by Condition 3 of EPBC Approval 2017/7921, a portion of Lot 50 Reserve Road will be uncommitted as an offset. The Department confirms its support for the use of this unallocated portion by Stockland to meet a future offset need, subject to the agreement by the relevant Commonwealth and/or State approval agencies that the balance of the site is suitable for the intended offset purpose. The Department agrees that Stockland is the only party to which the balance of Lot 50 Reserve Road is available, unless Stockland elects to on-sell the right of the use of the balance of the Lot for offset purposes.

The Department understands that Stockland may elect to on-sell the un-used offset credit balance to a third party. This correspondence confirms DBCA's commitment to confer the agreements contained herein with regard to access of the balance of Lot 50 Reserve Road for offset purposes to any such third party. The Department will not, however be engaged in the 'sale' of the balance of Lot 50 Reserve Road and confirms that no transfer of ownership will occur in the event of such a 'sale'.

I hope that this "understanding" satisfies Stockland's requirements.

Yours sincerely

Alex Errington
for Mark Webb
DIRECTOR GENERAL

31 March 2020

cc. Dale Newsome, Strategen - JBSAG

Document Distribution

Rev No.	Copies	Recipient	Date
A	1 (Electronic)	Stockland Development WA Pty Limited (Client)	12 December 2019
0	1 (Electronic)	Department of the Environment and Energy (Agency)	20 December 2019
1	1 (Electronic)	Department of Agriculture, Water and the Environment (Agency)	3 April 2020
2	1 (Electronic)	Department of Agriculture, Water and the Environment (Agency)	7 May 2020
3	1 (Electronic)	Department of Agriculture, Water and the Environment (Agency)	14 May 2020

Document Status

Rev No.	Author	Reviewer	Approved for Issue		
		Name	Name	Signature	Date
A	J Hyatt	D Newsome	D Newsome		12 December 2019
0	J Hyatt	D Newsome	D Newsome		20 December 2019
1	J Hyatt	D Newsome	D Newsome		3 April 2020
2	W Oversby	D Newsome	D Newsome		7 May 2020
3	W Oversby	D Newsome	D Newsome		14 May 2020

www.jbsg.com.au