Offset Proposal

Albany Ring Road Stage 2 and 3b

October 2021

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Project Manager	

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Contents

1 PROJECT & OFFSET SUMMARY

Project Location(s)	The project is located on Albany Ring Road (ARR) from South Coast Highway to Festing Street in the City of Albany
Project Details	The project involves the construction of a new road between South Coast Highway and Festing Street around the City of Albany. Up to 15.67 ha of native vegetation will be cleared for the project. The project starts at South Coast Highway (SLK 0.33) and ends at Festing Street, within the City of Albany as follows: Start: Latitude: -34.9986 Longitude: 117.814 End: Latitude: -35.0257 Longitude: 117.8681

Project Requirement	Main Roads Western Australia (Main Roads) is proposing to construct the ARR to provide for the long-term transport needs of Albany. The ARR will be a dedicated freight route around the City of Albany, in the Great Southern Region of Western Australia (WA) enabling the effective movement of freight to and from the Port of Albany. The ARR will cater for the travel demands associated with growth in grain, woodchip and other agricultural industries, increased mining production, increased population growth, urban expansion and the expected increase in tourists.
	
	Stage 2 of the ARR is the southern link of the ring road and is located between the Lower Denmark Road Link and Frenchman Bay Road. Stage 2 works end west of Festing Street. Stage 3b extends from South Coast Highway along George Street to Lower Denmark Road (Figure 1).
	
	The project includes the following key components:
	• Road construction and associated infrastructure for the Proposed Action including the following components:
	  ○ Approximately 7 km of new dual carriage road
	  ○ Grade separated interchanges at South Coast Highway and Frenchman Bay Road
	  ○ Bridges and culverts
	  ○ Water retention basins and other drainage structures
	  ○ Landscaping and revegetation works
	  ○ Modifications to local roads
	• Realignment of the Albany-Wagin railway line between George Street and Hanrahan / Frenchman Bay Interchange
	• Other road infrastructure including, but not limited to, lighting, noise barriers, fencing, road safety barriers, a fauna underpass and a rope bridge, and signs.

Measures to avoid, reduce, mitigate and manage project impacts	Main Roads utilised the hierarchy of avoid, minimise, reduce and rehabilitate to minimise the environmental impacts of the project. Potential impacts to conservation significant fauna, particularly Black Cockatoo species (*Calyptorhynchus latirostris*, *Calyptorhynchus banksii naso* and *Calyptorhynchus baudinii*) and Western Ringtail Possums (*Pseudocheirus occidentalis*) (WRPs), have been carefully considered.
	
	Impacts will be avoided or minimised through the following measures:
	• Selecting an alignment that fulfils safety objectives with the smallest practicable construction footprint:
	  ○ The width of the project footprint was reduced between Albany Highway and Lower Denmark Road to reduce the clearing required
	  ○ Connections at selected existing roads will be removed and access to suburbs and key transport routes will be controlled at key sections along the alignment which reduce the project footprint
	• Minimising clearing of native vegetation and fauna habitat through the detailed design process:
	  ○ The project was redesigned at South Western Highway to remove the requirement for a road realignment through native vegetation west of George Street
	  ○ The project was amended between Hanrahan Road and Princess Drive to minimise clearing impact and impacts to WWII tanks.
	  ○ Approximately 69 % of the native vegetation within the Proposal area is in Degraded or worse condition.
	  ○ Overall reductions of the project footprint has reduced size from 129.75 ha to 96.55 ha.
	• Development of a project specific Construction Environmental Management Plan to define techniques to minimise risks to the surrounding environment and provide monitoring during construction including:
	  ○ Measures to minimise the risk of over-clearing, such as clear demarcation of clearing areas and the implementation of an internal clearing permit system
	  ○ Measures to minimise the risk of impacting adjacent vegetation, such as temporary fencing and adherence to Shire fire restrictions
	  ○ Development of hygiene management procedures to ensure dieback and weeds are not introduced and/or spread to adjacent vegetation. The procedures will include detail such as machinery/vehicle clean down, weed treatments and restrictions on vehicle/machinery movements
	  ○ Development of topsoil management procedures to ensure topsoil health for re-use and to mitigate the risk of introducing weeds into the project area and surrounds. The procedures will include the development and implementation of a system to allow for traceability of disposed weed infested topsoil, predetermined stockpile locations and instructions on topsoil management
	  ○ Development of landscape management requirements to ensure that roadsides and medians will be vegetated and capable of acting as a biological filter for run-off to mitigate the risk of impact to adjacent vegetation
	• Implementation of a Drainage Strategy
	• Revegetation using suitable native species in areas disturbed during construction but not required for road and associated infrastructure.
	
	Further avoidance measures will be considered during the detailed design phase.

Related Documents	A number of Environmental Assessments and surveys have been conducted for the ARR project, these include: • Clearing Permit Supporting Document (GHD, 2020) • Biological Survey: Albany Ring Road (Southern Ecology, 2018) • Memorandum to Main Roads Western Australia, Defining habitat categories for Western Ringtail Possum in the South Coast population (Southern Ecology, 2019) • Biological Survey: Albany Ring Road (Southern Ecology, 2020a) • Phytophthora Dieback Management Plan: Albany Ring Road (Southern Ecology, 2020b) • Albany Ring Road Project: Western Ringtail Possum Assessment (Biota, 2018) • Albany Ring Road Black-Cockatoo Habitat Assessment (Biota, 2019) • Albany Ring Road Western Ringtail Possum Assessment (Biota, 2020).
Clearing Impacts	The Clearing Permit Supporting Document determined native vegetation clearing associated with the project activities was at variance with the following Clearing Principles: • At variance to Principle (a) native vegetation should not be cleared if it comprises a high level of biodiversity • At variance to Principle (b) native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significant habitat for fauna indigenous to Western Australia • At variance to Principle (f) native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland. The project is unlikely or not at variance with the other principles.
Offset Type	A combination of revegetation, direct and financial contribution to the Department of Water Environment Regulation (DWER) to purchase land for the purpose of mitigation of significant residual impacts associated with the project activities.
Offset Purpose	As an approval condition (CPS 9179/1), to offset significant residual impacts when project native vegetation clearing is at variance to one or more of the 10 Clearing Principles.
Offset Requirement	The project requires the clearing of a total of 15.67 ha of native vegetation. Residual impacts include: • 6.76 ha of Black Cockatoo foraging habitat, and 10 potential native breeding trees containing 14 hollows of a suitable breeding size for Black Cockatoos • 11.92 ha of core, core urban and supporting habitat for WRP • 5.8 ha of habitat that may be suitable for the South-western Brush-tailed Phascogale.
Offset Proposal	Main Roads' Offset Proposal is to revegetate cleared portions of six parcels of land over four properties (3.56 ha total, Figure 2), which is land currently under the ownership of either State of Western Australia or Commissioner of Main Roads, to contribute to WRP linkage habitat. The revegetation would also include suitable native vegetation species to provide other habitat, as follows: • 3.56 ha of foraging habitat for Black Cockatoo • 3.56 ha of core and supporting habitat for WRP • 3.56 ha of habitat for South-western Brush-tailed Phascogale The six parcels of land have existing vegetation values, which will provide a direct offset, as follows: • 1.97 ha of foraging habitat for Black Cockatoos (as well as breeding and roosting habitat) • 0.11 ha of supporting habitat for WRP • 0.16 ha of habitat for South-western Brush-tailed Phascogale

	A financial contribution of $311,850 for the purchase of approximately 63 ha of suitable land within the City of Albany to compensate for the remaining significant residual impacts associated with the clearing of native vegetation for the road project. The Offset Proposal was developed using the EPBC Offset Calculator Tool (Department of the Environment, 2012) to determine the area of the offset required in hectares, multiplied by the market valuation of the vegetated land within the City of Albany obtained from the Western Australian Valuer-General (Landgate, 2019). Main Roads is also proposing to offset impacts to potentially suitable breeding hollows. An offset ratio of 1:1 has been applied, resulting in a total of 14 artificial hollows.

1.1 Purpose

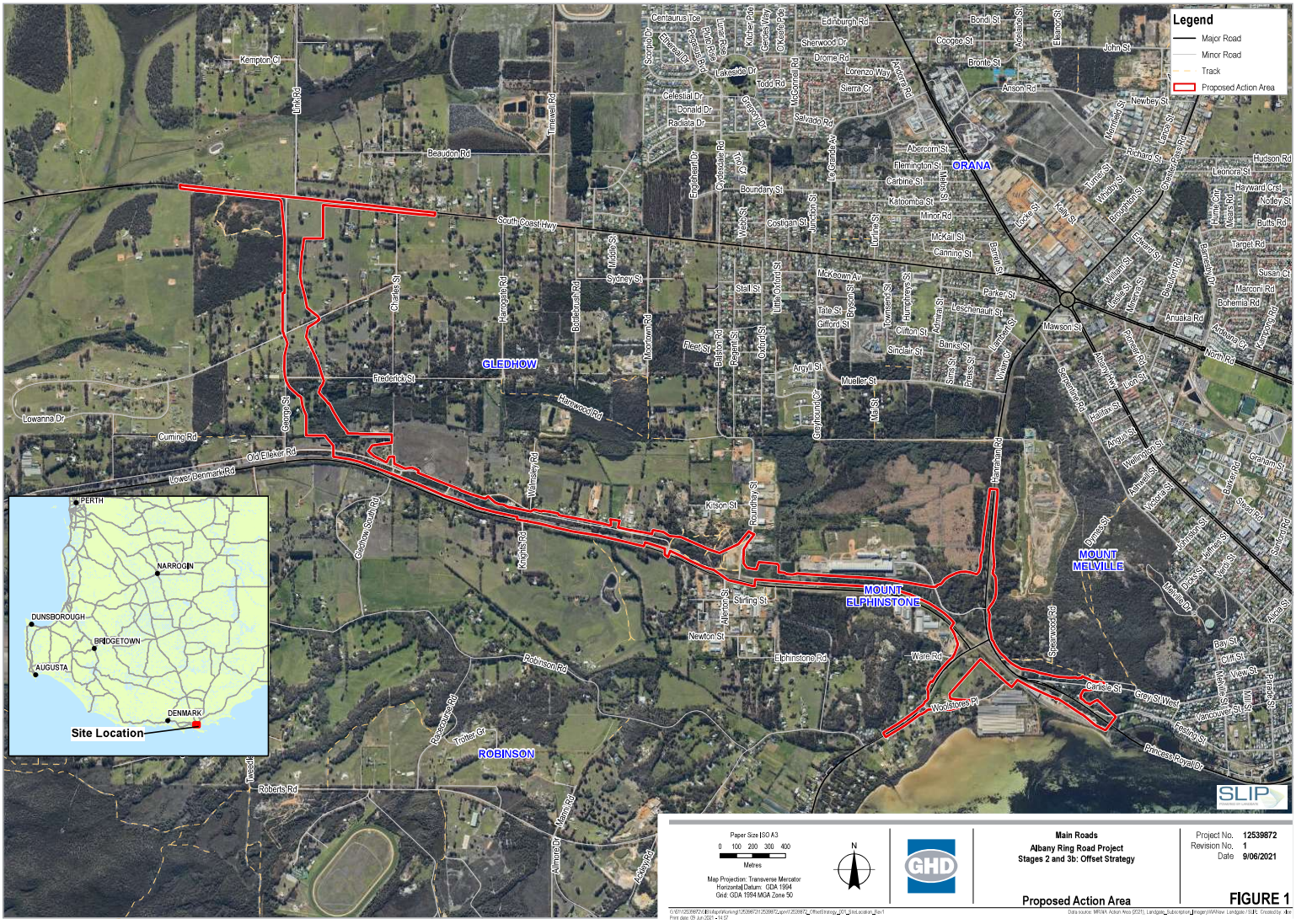
The offset proposal is required to offset vegetation values similar to those lost due to the ARR project, via revegetation, direct and a financial contribution for the purposes of purchasing land. The project has significant residual impacts which include the loss of:

- 6.76 ha of Black Cockatoo foraging habitat (including breeding and roosting habitat)
- 10 trees (with 14 hollows) potentially suitable for Black Cockatoo breeding
- 11.92 ha of WRP core and supporting habitat, including;
  - 0.91 ha of core and core (urban) habitat
  - 11.01 ha of supporting habitat
- 5.8 ha of potential habitat for South-western Brush-tailed Phascogale

1.2 Project Location of Vegetation Clearing

The project will comprise a dual carriageway road that connects the intersection of the South Coast Highway with ARR in the north and Hanrahan Road with ARR in the south. This will connect the intersection of South Coast Highway and Link Road, to the Port of Albany, bypassing the City of Albany. Stage 2 of the ARR is the southern link of the ring road located between the Lower Denmark Road George Street Intersection and Frenchman Bay Road. The end of the proposed Stage 2 works occurs west of Festing Street. Stage 3b proposes to connect South Coast Highway to Lower Denmark Road.

The project location and vegetation clearing areas are shown in Figure 1.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Minor Road
Track
Proposed Action Area
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ORANA
MOUNT ELPHINSTONE
MOUNT MELVILLE
ROBINSON
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DUNSBOROUGH
BRIDGETOWN
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Main Roads
Albany Ring Road Project
Stages 2 and 3b: Offset Strategy
Project No. 12539872
Revision No. 1
Date 9/06/2021
Proposed Action Area
FIGURE 1

1.3 Clearing Principles likely to be at Variance

The clearing permit application supporting document (GHD 2020) determined native vegetation clearing associated with the project activities is at variance with the following clearing principles:

- At variance to Principle (a) *native vegetation should not be cleared if it comprises a high level of biodiversity*:
  - Clearing of eleven native vegetation types, of which approximately 31% is Excellent to Good condition, and represents high biodiversity vegetation
  - Clearing of habitat for native vegetation utilised by five significant fauna species (Carnaby's Cockatoo (*Calyptorhynchus latirostris*) (Endangered), Baudin's Cockatoo (*Calyptorhynchus baudinii*) (Endangered), Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable), WRP (Critically Endangered) and Quenda (*Isoodon fusciventer*) (Priority 4))
- At variance to Principle (b*) native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significant habitat for fauna indigenous to Western Australia*:
  - Removal of up to 13.28 ha of native vegetation habitat for Carnaby's Cockatoo, Baudin's Cockatoo and Forest Red-tailed Black Cockatoo habitat, including approximately:
    - 5.54 ha of breeding and high-quality foraging habitat
    - 1.22 ha of low-quality Black Cockatoo foraging habitat
    - 12.06 ha of roosting habitat (Note: this area overlaps with the breeding and foraging habitat)
    - Clearing of up to 191 potential native breeding trees suitable for Black Cockatoos including 24 trees with hollows, of which 18 were unsuitable for use and 10 trees had 14 potentially suitable breeding hollows.
  - Clearing of approximately 11.92 ha of WRP habitat, including:
    - 0.87 ha of Core habitat
    - 0.04 ha of Core (Urban) habitat
    - 11.01 ha Supporting habitat
  - Clearing of up to 15.68 ha of Quenda habitat
  - DWER has also identified clearing of 5.8 ha of potential habitat for South-western Brush-tailed Phascogale as a significant residual impact for the project
- At *variance* to Principle (f) *native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland:*
  - three vegetation types are considered to be wetland habitats, totalling 7.17 ha mapped as being in Very Good (2.65 ha) to Degraded/Completely Degraded (4.53 ha).

The project is unlikely or not at variance with the other principles.

1.4 Significant Residual Impacts

Consistent with a letter from DWER dated 11 August 2021, the project has significant residual impacts to be offset, which include the loss of:

- 6.76 ha of Black Cockatoo foraging habitat (including breeding and roosting habitat)
- 10 trees containing 14 hollows of a suitable breeding size for Black Cockatoos
- 11.92 ha of significant habitat for WRP
- 5.8 ha of habitat for South-western Brush-tailed Phascogale.

2 OFFSET PROPOSAL REQUIREMENTS

The letter from DWER dated 11 August 2021 included offset calculations utilising the Commonwealth Department of Agriculture, Water and the Environment offset calculator. Main Roads has used these calculations as a guide when preparing the offset proposal for the financial offset portion associated with the clearing of native vegetation for this project.

Further correspondence from DWER (3 September 2021) identified an expectation that land acquisition and revegetation would occur to offset loss of WRP linkage habitat. Main Roads has identified land suitable for this purpose (i.e. revegetation). Existing vegetation on these land parcels will contribute to the offset proposed for this project, and cleared and weed infested areas will be revegetated to provide habitat not just for WRP, but also for Black Cockatoo and South-western Brush-tailed Phascogale.

2.1 Summary of Offset(s) Proposed

Main Roads' Offset Proposal is to purchase and revegetate cleared portions of six parcels of land over four properties (3.56 ha total, Figure 2), which is land currently under the ownership of either State of Western Australia or Commissioner of Main Roads, to contribute to WRP linkage habitat. The revegetation would also include suitable species to provide other habitat as follows:

- 3.56 ha of foraging habitat for Black Cockatoo
- 3.56 ha of core and supporting habitat for WRP
- 3.56 ha of habitat for South-western Brush-tailed Phascogale.

The six parcels of land have existing vegetation values, which are proposed as a direct offset, as follows:

- 1.97 ha of foraging habitat for Black Cockatoos (as well as breeding and roosting habitat)
- 0.11 ha of supporting habitat for WRP
- 0.16 ha of habitat for South-western Brush-tailed Phascogale.

The proposed offset sites above will not provide a 100% offset for the significant residual impacts of the project. Therefore, Main Roads will provide $311,850 for the purchase of land within the City of Albany to compensate for the significant residual impacts remaining. It is proposed the financial offset for the project would be utilised towards the purchase of a 63 ha parcel of land to include:

- 23 ha of significant habitat for Black Cockatoos
- 63 ha of significant habitat for WRP
- 19 ha of suitable habitat for South-western Brush-tailed Phascogale.

Main Roads is also proposing to offset impacts to potentially suitable breeding hollows. An offset ratio of 1:1 has been applied, resulting in a total of 14 artificial hollows.

A summary of the offset proposed is provided in Table 1 below.

Table 1. Summary of Residual Impacts, Offset Type, Size of Offset and Percentage of Residual Impact Offset.

Significant Residual Impact		Revegetation mitigation for temporary clearing applicable? (Y/N)	Offset Type	*Size of offset applicable to residual impact (ha)	% of residual impact offset
1	Loss of 6.76 ha of significant habitat for Black Cockatoos.	N	Revegetation offset	3.56 ha	38.05%
		N	Direct offset	1.97 ha 14 artificial hollows	1.93% 1:1 ratio

	10 trees with 14 hollows potentially suitable for breeding	N	Financial offset	23 ha	60.52%
				Total	100.50%
2	Loss of 11.92 ha of WRP core and supporting habitat	N	Revegetation offset	3.56 ha	11.35%
		N	Direct offset	0.11 ha	0.05%
		N	Financial offset	63 ha	89.08%
				Total	100.48%
3	Loss of 5.8 ha of South-western Brush-tailed Phascogale	N	Revegetation offset	3.56 ha	41.92%
		N	Direct offset	0.16 ha	0.17%
		N	Financial offset	19 ha	58.97%
				Total	101.06%

*Size of offset applicable to significant residual impact (ha) is taken directly from the outputs of the EPBC Offset Calculator Tool (Department of the Environment, 2012).

2.2 Justification and assumptions for the Offset Proposal

The EPBC Offset Calculator Tool was used to evaluate project impacts for biodiversity clearing principles with significant residual impacts in accordance with the requirements of the WA Environmental Offsets Guidelines (Government of Western Australia, 2014). The values input into the EPBC Offset Calculator Tool for the significant residual impacts for Black Cockatoo species is provided in Section 3.

The offset calculations for the three listed Black Cockatoo species have been input based on Carnaby's Black Cockatoo, as the habitat for the three Black Cockatoo species overlap for this project, and Carnaby's Black Cockatoo (along with Baudin's Cockatoo) have the highest conservation status (Endangered).

The revegetation and direct offset calculations (Sections 3.1 and 3.2) are based on the assumption that existing habitat value in the offset locations, and revegetation efforts undertaken, will both provide commensurate habitat value with the vegetation to be cleared for the project (habitat value of 6). Further, the values put into the offset calculations for the offset sites (non-financial) are based on the biological surveys undertaken for the project (Biota 2019; Biota 2020; Southern Ecology 2020a), with some areas extrapolated based on aerial imagery and adjacent vegetation types. Approximately 70% of the extrapolated areas are cleared so additional survey effort is not considered to be required.

The 14 artificial breeding hollows will be installed in locations advised by Department of Biodiversity, Conservation and Attractions (DBCA) based on the most suitable location for breeding success and longevity of artificial hollows. The hollows will be located on DBCA managed lands or other secure tenure.

2.3 Overview of physical offset package

Six land parcels over four properties have been selected adjacent to the project to provide existing and future (revegetation) linkage habitat for WRP, as well as foraging habitat for Black Cockatoo; core and supporting habitat for WRP; and habitat for South-western Brush-tailed Phascogale. The land is currently under the ownership of either State of Western Australia or Commissioner of Main Roads. The location of the six parcels is detailed in Table 2.

Figure 2 outlines the revegetation areas proposed for the six land parcels. Figure 3 to Figure 5 details the existing habitat values for Black Cockatoos, WRP and Phascogale present on the six parcels.

2.3.1 Environmental values of the offset sites

The land parcels proposed for revegetation and direct offsets are rural/semi-rural lots, which are adjacent to Stage 3a or intersected by Stage 3b. The land parcels intersected by the ARR project

are in close proximity to the fauna underpass and are expected to further contribute to the benefit provided by this design aspect.

The vegetation present within the land parcels proposed for revegetation and direct offsets includes:

- *Homalospermum firmum*/*Callistemon glaucus* Peat Thicket
- Jarrah/Sheoak/E.staeri Sandy Woodland
- Mature Planted Trees (Iron Barks, Blue Gum, Tuart, other Eucalypts and Peppermint generally > 10 years old)
- Other Weeds (Watsonia, Bracken Fern or Blackberry with isolated native plants)

Up to 1.97 ha of this vegetation provides habitat value for WRP, Black Cockatoo, or South-western Brush-tailed Phascogale.

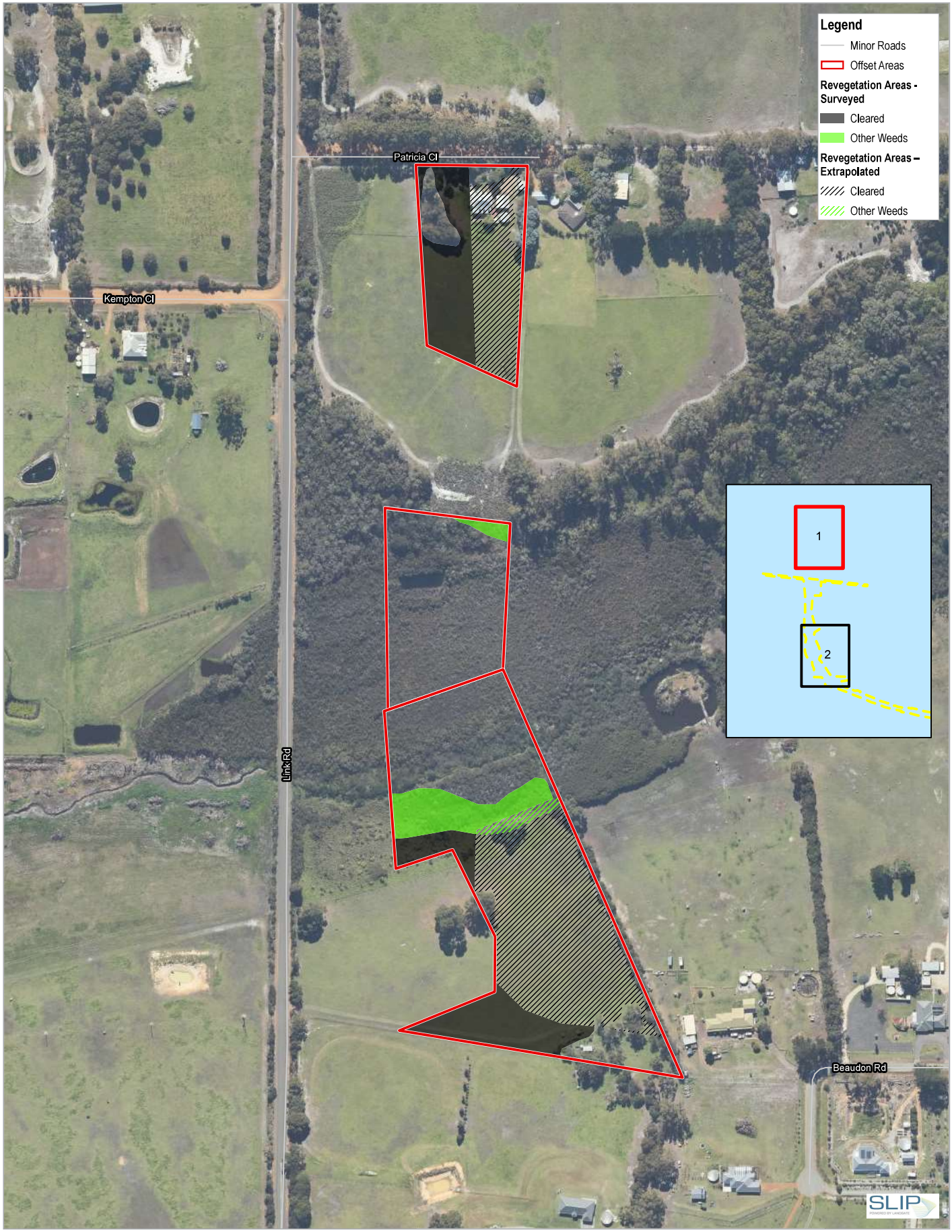
2.3.2 WRP, Black Cockatoo and Phascogale habitat creation

Main Roads currently has several on-going revegetation projects underway as environmental offset commitments for other road projects. These offset sites have been revegetated in order to create WRP and / or Black Cockatoo habitat. Although these revegetation projects are in the early stages of development, Main Roads is confident of being able to re-create WRP, Black Cockatoo and South-western Brush-tailed Phascogale habitat.

The revegetation will include a mix of species to re-introduce an upper, mid and ground structural layer. Flora taxa will include representative species suitable for WRP, Black Cockatoo and South-western Brush-tailed Phascogale, and include marri and native proteaceous plant species such as *Banksia* spp., *Hakea* spp. and *Dryandra* spp..

Table 2. Summary of Revegetation offset sites

Offset type	Offset summary	Property location and tenure (Figure 2)
Revegetation offset	Revegetation of cleared and completely degraded areas to provide: • 3.56 ha of foraging habitat for Black Cockatoo • 3.56 ha of core and supporting habitat for WRP (and subsequent linkage habitat) • 3.56 ha of habitat for South-western Brush-tailed Phascogale	1 Patricia Close, Mckail – 2 parcels - Freehold Land ID 1262383/Parcel D060157– Road Reserve
Direct offset land acquisition	Six parcels of land over four properties (Figure 2) containing 1.97 ha of native vegetation providing: • 1.97 ha of foraging habitat for Black Cockatoos (as well as breeding and roosting habitat) • 0.11 ha of supporting habitat for WRP • 0.16 ha of habitat for South-western Brush-tailed Phascogale	54 Frederick Street, Gledhow – 2 parcels - Crown land 300 Old Elleker Road, Gledhow – Road reserve



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Main Roads WA
Albany Ring Road Stage 2 and 3b
Preliminary Documentation

Proposed Revegetation areas

Project No. 12539872
Revision No. 0
Date 5/10/2021

FIGURE 2

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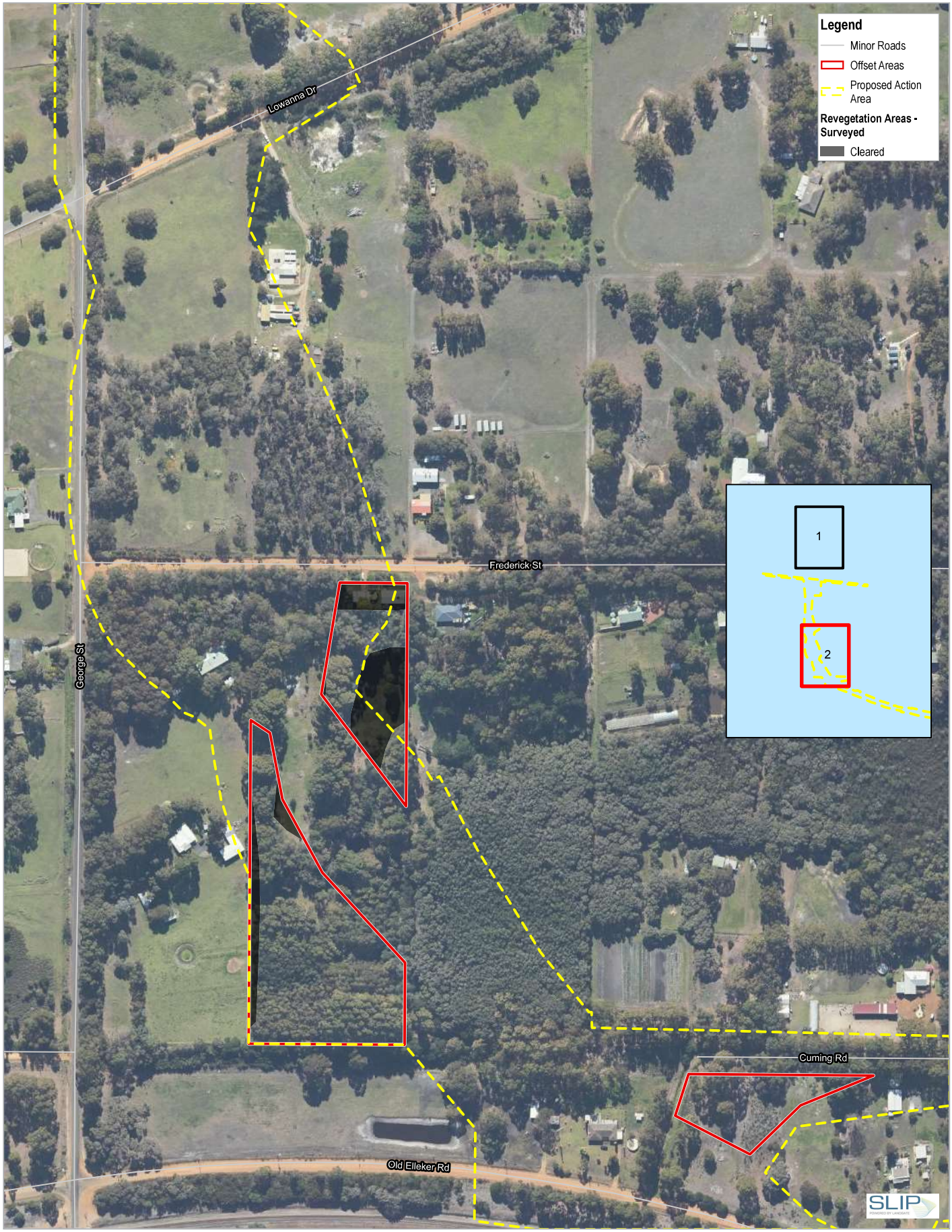

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Albany Ring Road Stage 2 and 3b
Preliminary Documentation

Proposed Revegetation areas

Project No. 12539872
Revision No. 0
Date 5/10/2021

FIGURE 2

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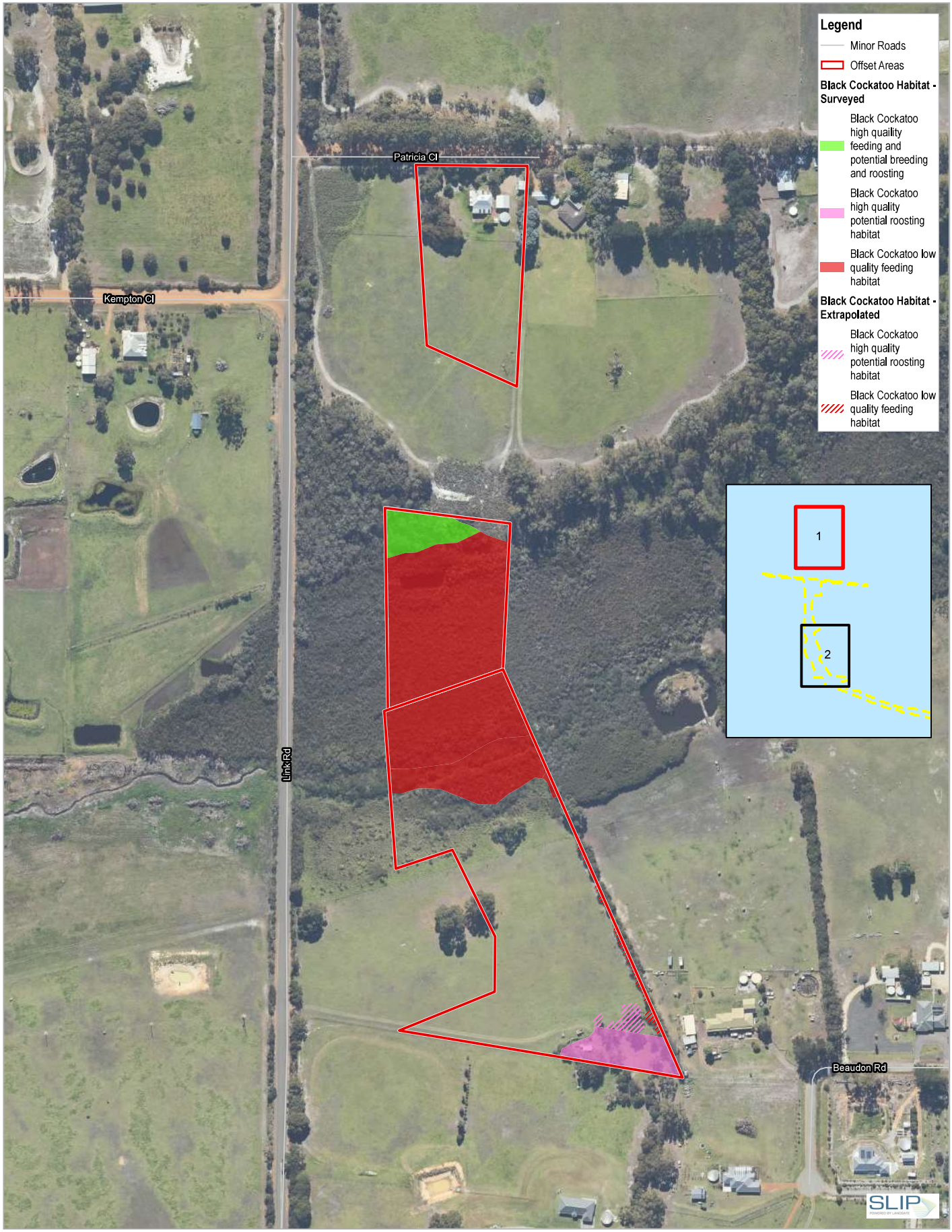

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Preliminary Documentation

Black Cockatoo Habitat

Project No. 12539872
Revision No. 0
Date 5/10/2021

FIGURE 3

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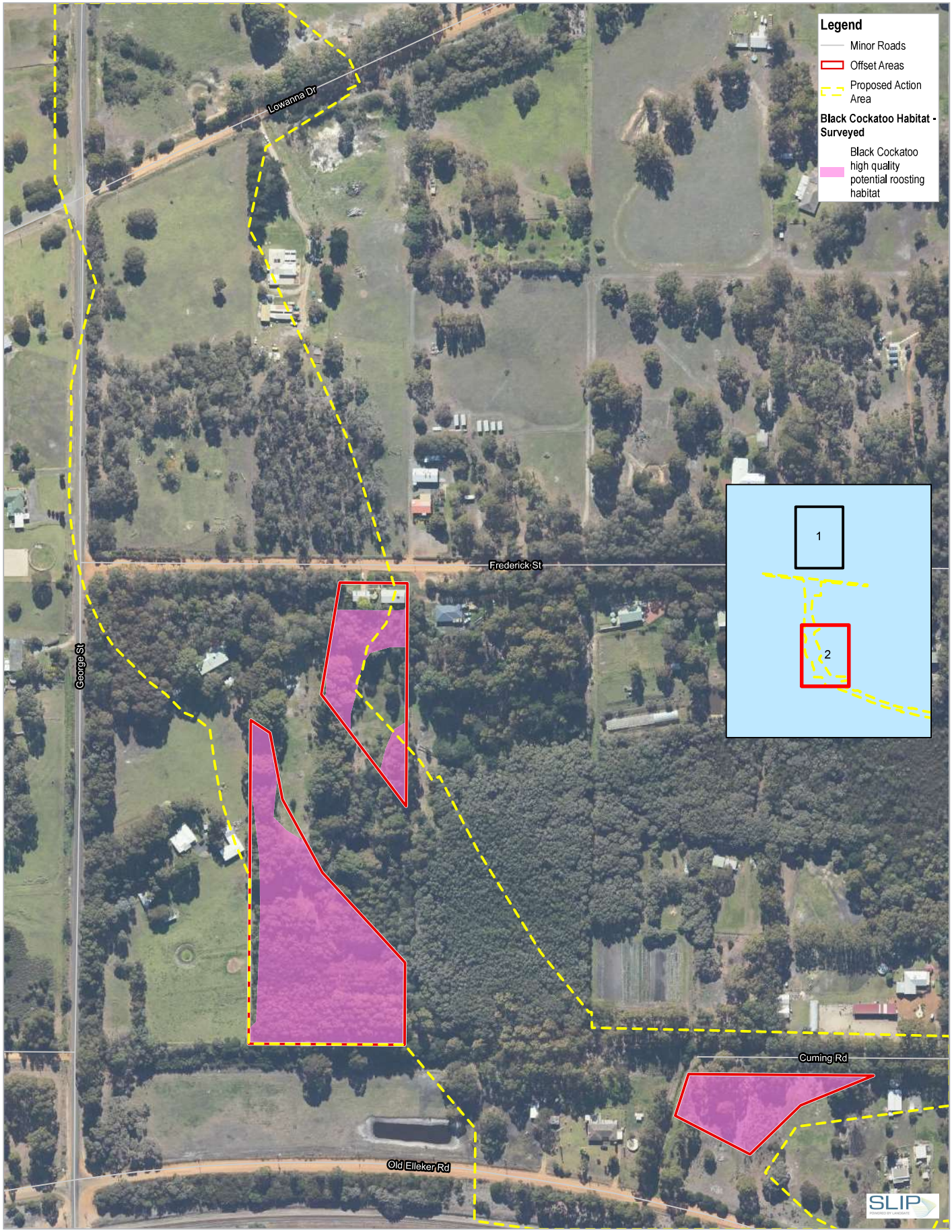

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Main Roads WA
Albany Ring Road Stage 2 and 3b
Preliminary Documentation

Black Cockatoo Habitat

Project No. 12539872
Revision No. 0
Date 5/10/2021

FIGURE 3

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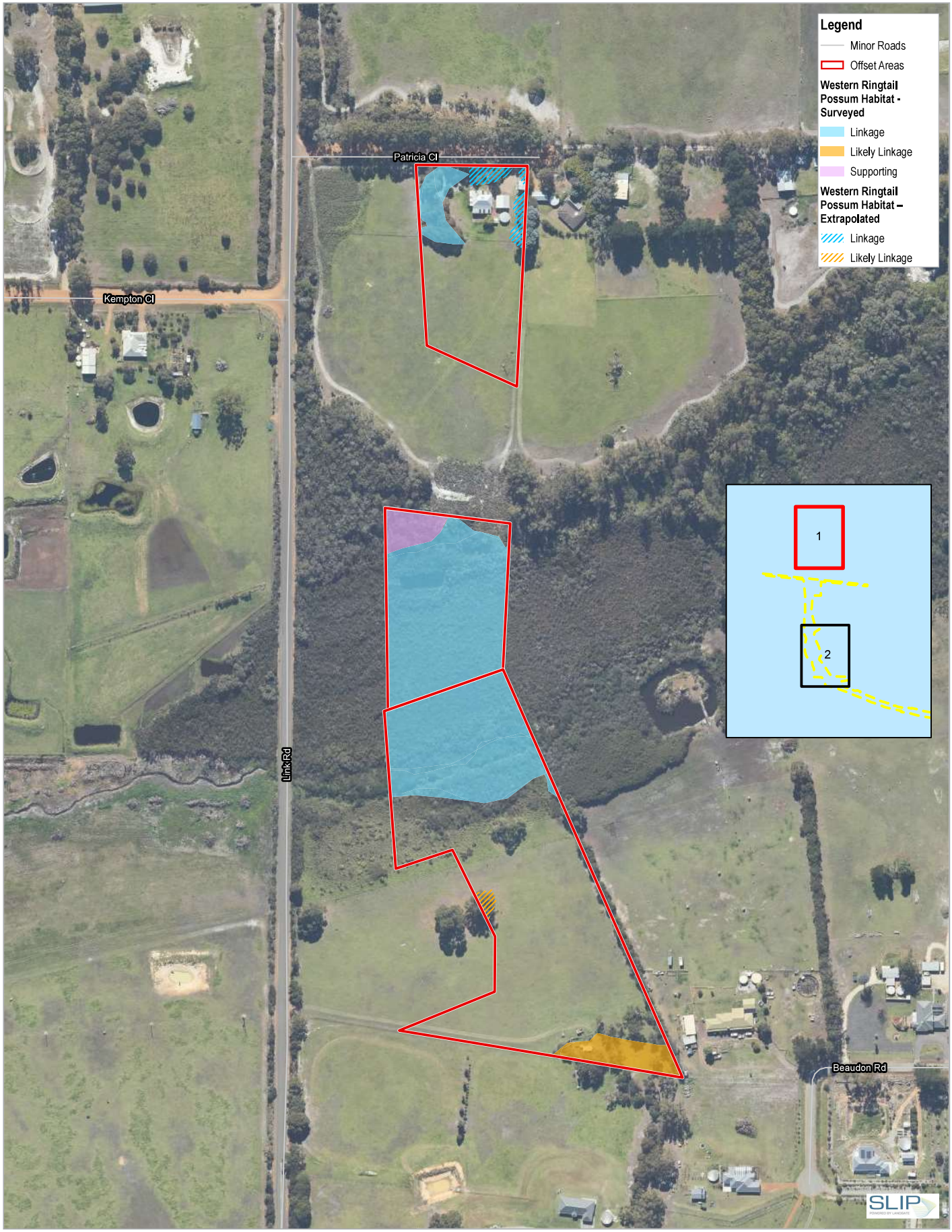

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Main Roads WA
Albany Ring Road Stage 2 and 3b
Preliminary Documentation

Western Ringtail Possum Habitat

Project No. 12539872
Revision No. 0
Date 5/10/2021

Page 1 of 2

FIGURE 4

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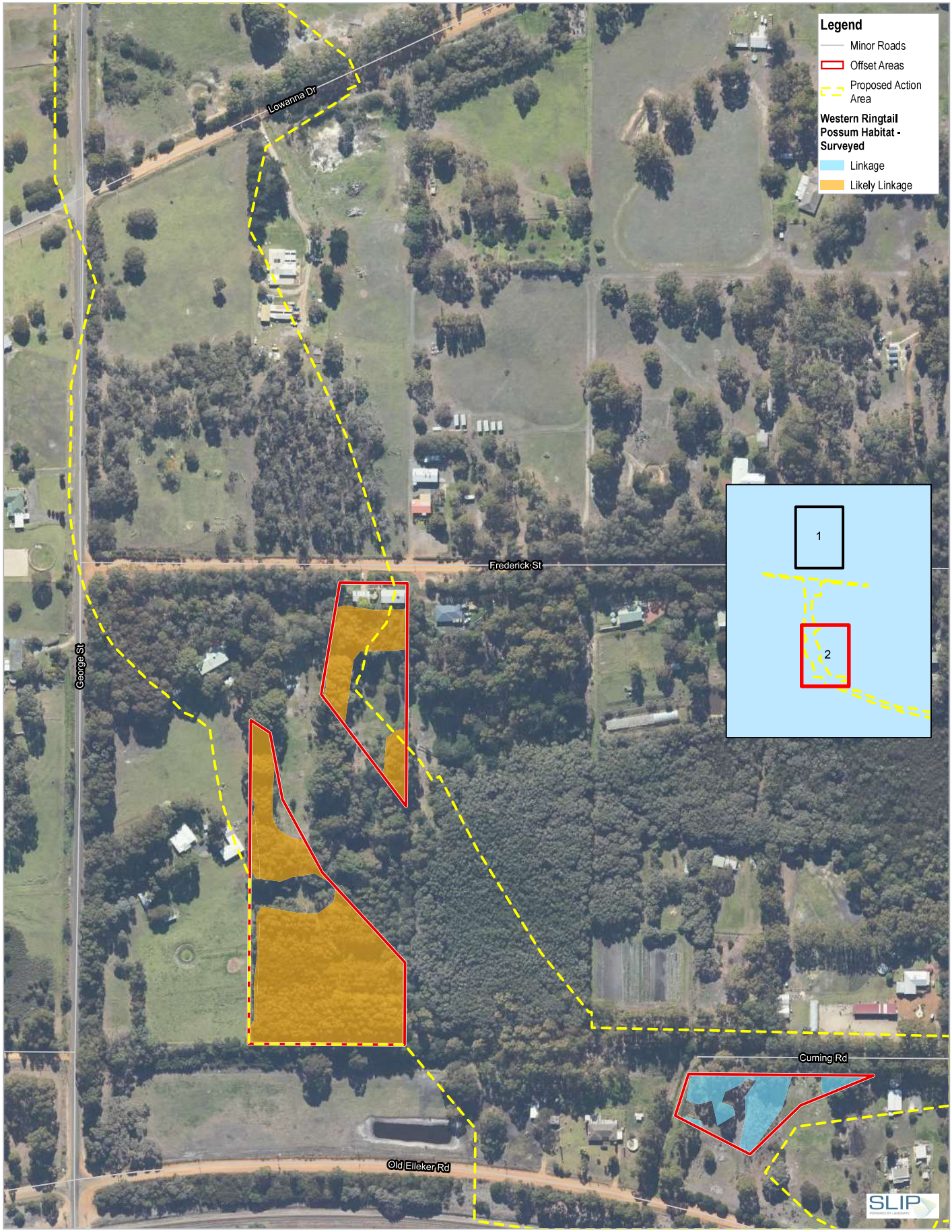

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Main Roads WA
Albany Ring Road Stage 2 and 3b
Preliminary Documentation

Western Ringtail Possum Habitat

Project No. 12539872
Revision No. 0
Date 5/10/2021

FIGURE 4

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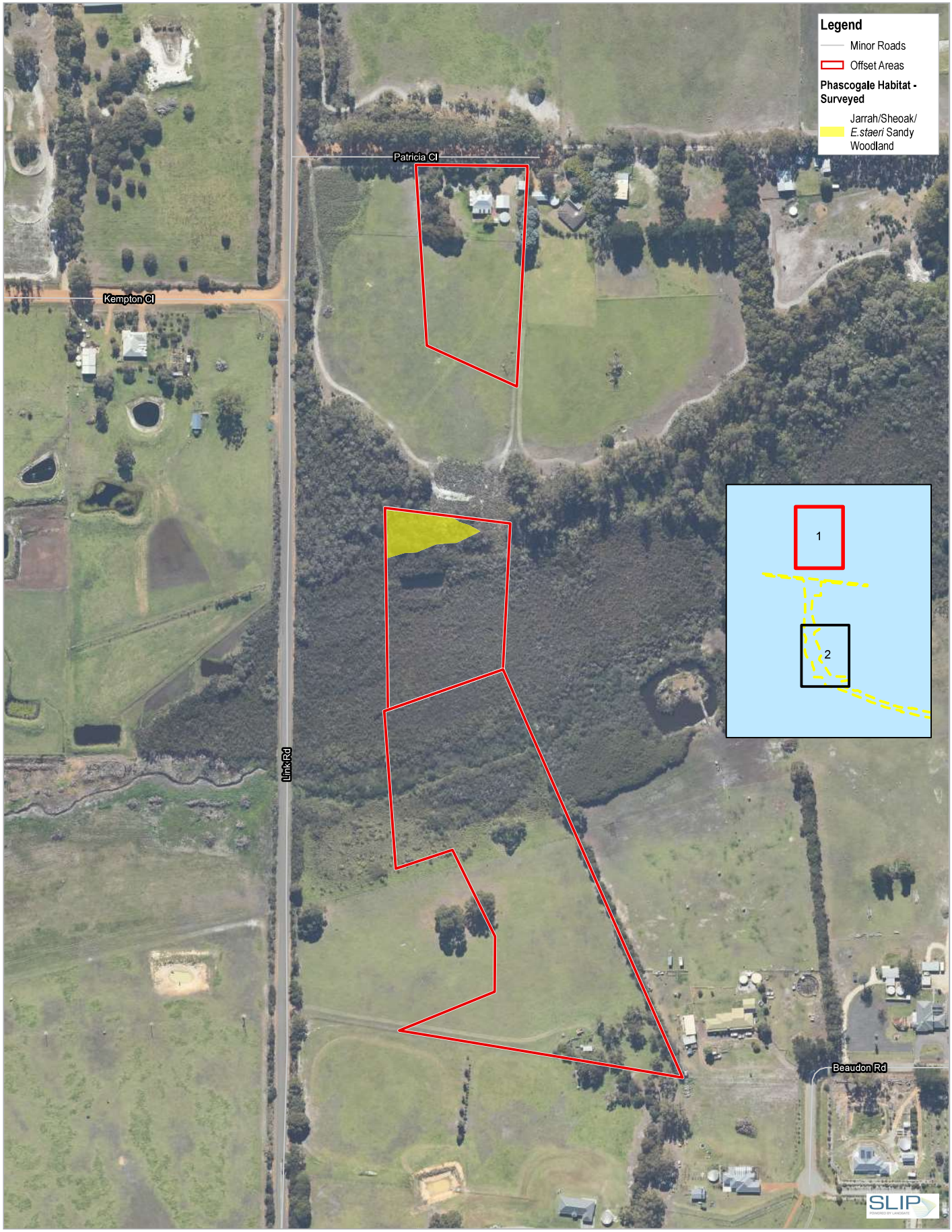

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Main Roads WA
Albany Ring Road Stage 2 and 3b
Preliminary Documentation

Phascogale Habitat

Project No. 12539872
Revision No. 0
Date 5/10/2021

FIGURE 5

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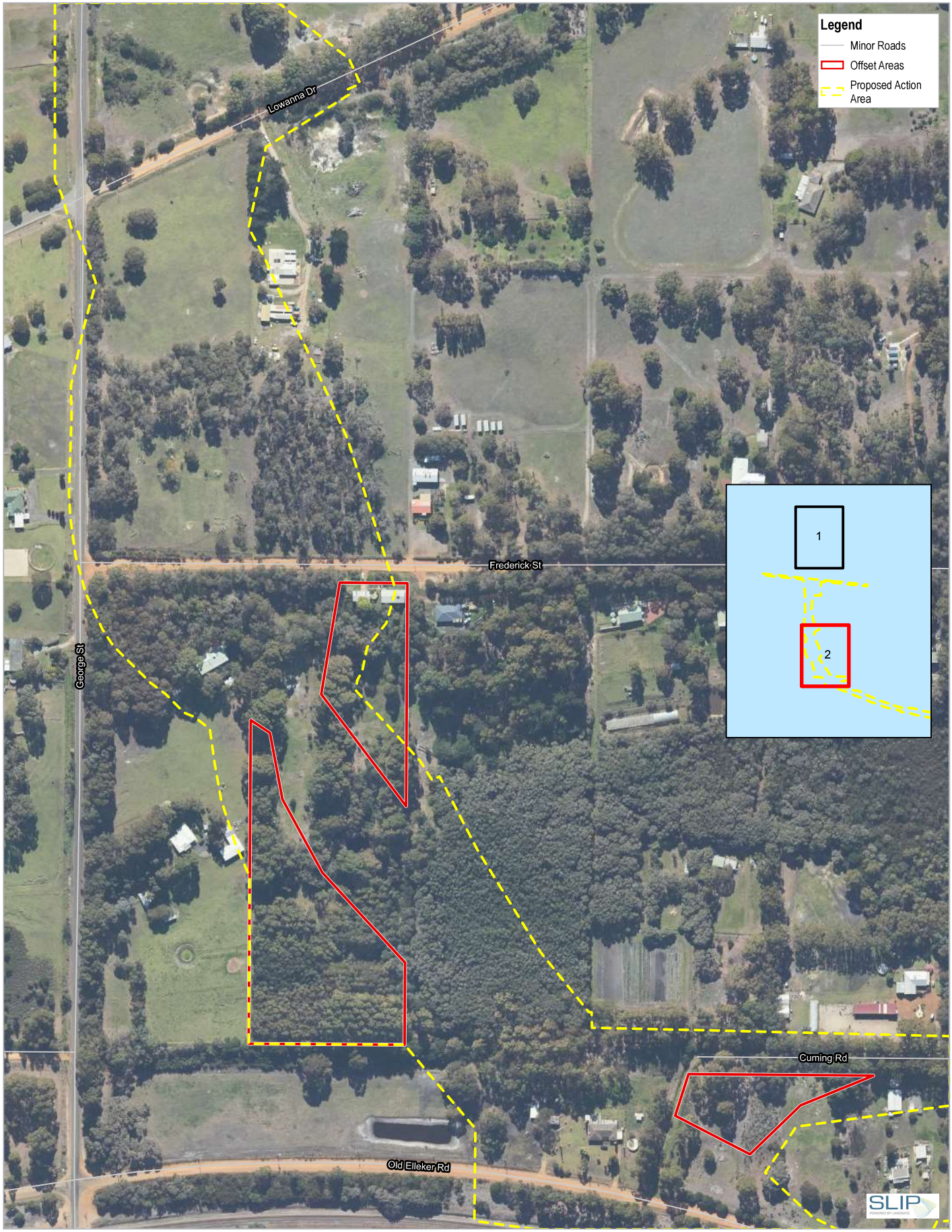
Print date: 05 Oct 2021 - 09:54

Data source: Landgate_Subscription_ImageryWANow: Landgate / SLIP. Created by: mmikkonen



Paper Size ISO A3

0 25 50 75 100

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 50

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GHD

Main Roads WA
Albany Ring Road Stage 2 and 3b
Preliminary Documentation

Phascogale Habitat

Project No. 12539872
Revision No. 0
Date 5/10/2021

FIGURE 5

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3 OFFSET GUIDE INPUTS AND JUSTIFICATION

Offset calculations have been based on the EPBC *Offsets Assessment Guide* (DSEWPaC, 2012b). The offset calculations are included in Appendix A for reference.

3.1 WRP

Table 3 to Table 6 provide inputs used in the EPBC Offset Assessment Guide in relation to WRP.

Table 3. Impact calculator – WRP

Attribute	Value	Justification
Area of community/habitat impacted	11.92 ha	Loss of 11.92 ha of core and supporting WRP habitat.
Vegetation/Habitat quality **of Impacted area** (takes into account the regional context and stocking rate)	6	The majority of the suitable habitat is in a Good or Degraded condition. Suitable WRP exists along the majority of the clearing footprint, and the project area includes core, supporting and linkage habitat.

Table 4. Offset calculator – WRP (Revegetation)

Attribute	Value	Justification
Proposed offset area	3.56 ha	The cleared (3.18 ha) and weed infested areas (0.38 ha) will be revegetated.
Start quality Vegetation/habitat Quality **of offset area** (takes into account the regional context and stocking rate)	1	The cleared areas are assumed to have limited habitat value for WRP other than to oportunisticly utilise the habitat to traverse the area to more suitable habitat.
Future Quality without Offset	1	Unlikely to change without an offset.
Future Quality with Offset	6	It is assumed that the cleared (3.18 ha) and weed infested areas (0.38 ha) will be revegetated to the same habitat quality for WRP as the vegetation being cleared for the project.
Time Horizon over which loss is averted (security of land tenure)	1 year	The offset site would be protected for conservation purposes. The *How to use the offsets assessment guide* (DSEWPaC, 2012), states that "longer timeframes are valued more highly than shorter timeframes." However in this instance a value of 1 represents a longer time period for the purpose of this calculation. As such 1 has been selected to maximise the value of the offset assigned by this component of the calculation.
Time until ecological benefit	10 year	It is assumed that the revegetation would take 10 years to be of value to Black Cockatoo species for foraging habitat.
Risk of loss without offset	7.43%	Risk of loss over 20 years taken from *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act* (UoQ 2017), taking into account background rates of deforestation in this local government area.
Risk of loss with offset	0%	Very low risk through protection for conservation purposes, the risk of loss is 0% in accordance with the *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act* (UoQ 2017).
Confidence in result (%) – risk of loss (habitat/community)	90%	High degree of confidence. Main Roads is an experienced land manager.
Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)	80%	An 80% confidence rating has been applied taking into account factors that can impact revegetation success such as rainfall, bushfires, seed set or weed infestation.

Table 5. Offset calculator – WRP (Direct)

Attribute	Value	Justification
Proposed offset area	0.11 ha	The six parcels of land over the four properties have existing vegetation values, which include supporting habitat for WRP.
Start quality Vegetation/habitat Quality **of offset area** (takes into account the regional context and stocking rate)	6	The habitat within the offset site would provide similar WRP habitat values to the proposed clearing area.
Future Quality without Offset	6	Unlikely to change over a period of one year.
Future Quality with Offset	6	Acquisition only therefore no change. It is assumed the offset vegetation is likely to remain the same without ongoing management measures.
Time Horizon over which loss is averted (security of land tenure)	1 year	The offset site would be protected for conservation purposes. The *How to use the offsets assessment guide* (DSEWPaC, 2012), states that "longer timeframes are valued more highly than shorter timeframes." However in this instance a value of 1 represents a longer time period for the purpose of this calculation. As such 1 has been selected to maximise the value of the offset assigned by this component of the calculation.
Time until ecological benefit	1 year	Short time-frame required for land to be purchased.
Risk of loss without offset	7.43%	Risk of loss over 20 years taken from *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act* (UoQ 2017), taking into account background rates of deforestation in this local government area.
Risk of loss with offset	0%	Very low risk through protection for conservation purposes, the risk of loss is 0% in accordance with the *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act* (UoQ 2017).
Confidence in result (%) – risk of loss (habitat/community)	90%	High degree of confidence. Main Roads is an experienced land manager.
Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)	90%	No change in the habitat value is expected, therefore a confidence of 90% has been applied.

Table 6. Offset calculator – WRP (Financial)

Attribute	Value	Justification
Start quality Vegetation/habitat Quality **of offset area** (takes into account the regional context and stocking rate)	6	It is assumed the offset site would provide similar WRP habitat values to the proposed clearing area.
Future Quality without Offset	6	Unlikely to change over a period of one year.
Future Quality with Offset	6	Acquisition only therefore no change. It is assumed that the offset vegetation is likely to remain the same without ongoing management measures committed to by the applicant.
Time Horizon over which loss is averted (security of land tenure)	1 year	The offset site would be protected in perpetuity. The *How to use the offsets assessment guide (*DSEWPaC, 2012), states that "longer timeframes are valued more highly than shorter timeframes." However in this instance a value of 1 represents a longer time period for the purpose of this calculation. As such 1 has been selected to maximise the value of the offset assigned by this component of the calculation.
Time until ecological benefit	1 year	Short time-frame required for land to be purchased and placed into the conservation estate.
Risk of loss without offset	30%	Moderate risk of loss. It is assumed the land acquired would be zoned rural or similar, and not be subject to any existing

		planning approvals.
Risk of loss with offset	10%	Minimal risk. Offset placed into secure tenure managed by the State (i.e. conservation estate). Ten percent allows for ongoing management of the offset site.
Confidence in result (%) – risk of loss (habitat/community)	90%	High degree of confidence. Financial contributions are used to purchase land that is added to the conservation estate through a State guaranteed scheme.
Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)	100%	As there is no change in the habitat value proposed following the purchased land being added to the State conservation estate, therefore a confidence of 100 has been applied.

3.2 Back Cockatoo

Table 7 to Table 10 provide inputs used in the EPBC Offset Assessment Guide in relation to Black Cockatoos.

Table 7. Impact calculator – Black Cockatoos

Attribute	Value	Justification
Area of community/habitat impacted	6.76 ha	Loss of 6.76 ha of significant habitat for Black Cockatoos breeding and foraging habitat.
Vegetation/Habitat quality **of the impacted area** (takes into account the regional context and stocking rate)	6	The vegetation largely ranges from Good to Degraded condition and includes 5.54 ha of high quality black cockatoo foraging habitat and 1.22 ha of low quality foraging habitat. This foraging habitat supports roosting and potentially breeding, noting the presence of 10 trees with 14 potentially suitable hollows in the project area and multiple known roost sites within 6 km.

Table 8. Offset calculator – Black Cockatoos (Revegetation)

Attribute	Value	Justification
Proposed offset area	3.56 ha	The cleared (3.18 ha) and weed infested areas (0.38 ha) will be revegetated.
Start quality Vegetation/habitat Quality **of the offset area** (takes into account the regional context and stocking rate)	0	The cleared areas are assumed to have no Black Cockatoo foraging value
Future Quality without Offset	0	Unlikely to change without an offset.
Future Quality with Offset	6	It is assumed that the cleared (3.18 ha) and weed infested areas (0.38 ha) will be revegetated to the same habitat quality as the vegetation being cleared for the project.
Time Horizon over which loss is averted (security of land tenure)	1 year	The offset site would be protected for conservation purposes. The *How to use the offsets assessment guide* (DSEWPaC, 2012), states that "longer timeframes are valued more highly than shorter timeframes." However in this instance a value of 1 represents a longer time period for the purpose of this calculation. As such 1 has been selected to maximise the value of the offset assigned by this component of the calculation.
Time until ecological benefit	10 year	It is assumed that the revegetation would take 10 years to be of value to Black Cockatoo species for foraging habitat.
Risk of loss without offset	7.43%	Risk of loss over 20 years taken from *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act* (UoQ 2017), taking into account background rates of deforestation in this local government area.
Risk of loss with offset	0%	Very low risk through protection for conservation purposes, the risk of loss is 0% in accordance with the *Guidance for*

		deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act (UoQ 2017).
Confidence in result (%) – risk of loss (habitat/community)	90%	High degree of confidence. Main Roads is an experienced land manager.
Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)	80%	An 80% confidence rating has been applied taking into account factors that can impact revegetation success such as rainfall, bushfires, seed set or weed infestation.

Table 9. Offset calculator – Black Cockatoos (Direct)

Attribute	Value	Justification
Proposed offset area	1.97 ha	The six parcels of land over the four properties have existing vegetation values, which include foraging habitat for Black Cockatoos (as well as breeding and roosting habitat).
Start quality Vegetation/habitat Quality **of the offset area** (takes into account the regional context and stocking rate)	6	The habitat within the offset site would provide similar Black Cockatoo habitat values to the proposed clearing area.
Future Quality without Offset	6	Unlikely to change over a period of one year.
Future Quality with Offset	6	Acquisition only therefore no change. It is assumed the offset vegetation is likely to remain the same without ongoing management measures.
Time Horizon over which loss is averted (security of land tenure)	1 year	The offset site would be protected for conservation purposes. The *How to use the offsets assessment guide* (DSEWPaC, 2012), states that "longer timeframes are valued more highly than shorter timeframes." However in this instance a value of 1 represents a longer time period for the purpose of this calculation. As such 1 has been selected to maximise the value of the offset assigned by this component of the calculation.
Time until ecological benefit	1 year	Short time-frame required for land to be purchased.
Risk of loss without offset	7.43%	Risk of loss over 20 years taken from *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act* (UoQ 2017), taking into account background rates of deforestation in this local government area.
Risk of loss with offset	0%	Very low risk through protection for conservation purposes, the risk of loss is 0% in accordance with the *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act* (UoQ 2017).
Confidence in result (%) – risk of loss (habitat/community)	90%	High degree of confidence. Main Roads is an experienced land manager.
Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)	90%	No change in the habitat value is expected, therefore a confidence of 90% has been applied.

Table 10. Offset calculator – Black Cockatoos (Financial)

Attribute	Value	Justification
Start quality Vegetation/habitat Quality **of the offset area** (takes into account the regional context and stocking rate)	6	It is assumed the offset site would provide similar Black Cockatoo habitat values to the proposed clearing area.
Future Quality without Offset	6	Unlikely to change over a period of one year.
Future Quality with Offset	6	Acquisition only therefore no change. It is assumed the offset vegetation is likely to remain the same without ongoing management measures.

Time Horizon over which loss is averted (security of land tenure)	1 year	The offset site would be protected in perpetuity. The *How to use the offsets assessment guide* (DSEWPaC, 2012), states that "longer timeframes are valued more highly than shorter timeframes." However in this instance a value of 1 represents a longer time period for the purpose of this calculation. As such 1 has been selected to maximise the value of the offset assigned by this component of the calculation.
Time until ecological benefit	1 year	Short time-frame required for land to be purchased and placed into the conservation estate.
Risk of loss without offset	30%	Moderate risk of loss. It is assumed that the land acquired would be zoned rural or similar, and not be subject to any existing planning approvals.
Risk of loss with offset	10%	Minimal risk. Offset placed into secure tenure managed by the State (i.e. conservation estate). Ten percent allows for ongoing management of the offset site.
Confidence in result (%) – risk of loss (habitat/community)	90%	High degree of confidence. Financial contributions are used to purchase land that is added to the conservation estate through a State guaranteed scheme.
Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)	100%	As there is no change in the habitat value proposed following the purchased land being added to the State conservation estate, therefore a confidence of 100 has been applied.

3.3 South-western Brush-tailed Phascogale

Table 11 to Table 14 provide inputs used in the EPBC Offset Assessment Guide in relation to South-western Brush-tailed Phascogale.

Table 11. Impact calculator – South-western Brush-tailed Phascogale

Attribute	Value	Justification
Area of community/habitat impacted	5.8 ha	Loss of 5.8 ha of habitat for South-western Brush-tailed Phascogale.
Vegetation/Habitat quality **of Impacted area** (takes into account the regional context and stocking rate)	6	The vegetation largely ranges from Good to Degraded condition and includes 5.8 ha of preferred habitat for phascogale.

Table 12. Offset calculator – South-western Brush-tailed Phascogale (Revegetation)

Attribute	Value	Justification
Proposed offset area	3.56 ha	The cleared (3.18 ha) and weed infested areas (0.38 ha) will be revegetated.
Start quality Vegetation/habitat Quality **of offset area** (takes into account the regional context and stocking rate)	1	The cleared areas are assumed to have limited habitat value for Phascogale other than to oportunisiticly utilise the habitat to traverse the area to more suitable habitat.
Future Quality without Offset	1	Unlikely to change without an offset.
Future Quality with Offset	6	It is assumed that the cleared (3.18 ha) and weed infested areas (0.38 ha) will be revegetated to the same habitat quality for phascogale as the vegetation being cleared for the project.
Time Horizon over which loss is averted (security of land tenure)	1 year	The offset site would be protected for conservation purposes. The *How to use the offsets assessment guide* (DSEWPaC, 2012), states that "longer timeframes are valued more highly than shorter timeframes." However in this instance a value of 1 represents a longer time period for the purpose of this calculation. As such 1 has been selected to maximise the value of the offset assigned by this component of the calculation.

Time until ecological benefit	10 year	It is assumed that the revegetation would take 10 years to be of value to Black Cockatoo species for foraging habitat.
Risk of loss without offset	7.43%	Risk of loss over 20 years taken from *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act* (UoQ 2017), taking into account background rates of deforestation in this local government area.
Risk of loss with offset	0%	Very low risk through protection for conservation purposes, the risk of loss is 0% in accordance with the *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act* (UoQ 2017).
Confidence in result (%) – risk of loss (habitat/community)	90%	High degree of confidence. Main Roads is an experienced land manager.
Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)	80%	An 80% confidence rating has been applied taking into account factors that can impact revegetation success such as rainfall, bushfires, seed set or weed infestation.

Table 13. Offset calculator – South-western Brush-tailed Phascogale (Direct)

Attribute	Value	Justification
Proposed offset area	0.16 ha	The six parcels of land over the four properties have existing vegetation values, which include habitat for South-western Brush-tailed Phascogale.
Start quality Vegetation/habitat Quality **of offset area** (takes into account the regional context and stocking rate)	6	The habitat within the offset site would provide similar Phascogale habitat values to the proposed clearing area.
Future Quality without Offset	6	Unlikely to change over a period of one year.
Future Quality with Offset	6	Acquisition only therefore no change. It is assumed that the offset vegetation is likely to remain the same without ongoing management measures.
Time Horizon over which loss is averted (security of land tenure)	1 year	The offset site would be protected for conservation purposes. The *How to use the offsets assessment guide* (DSEWPaC, 2012), states that "longer timeframes are valued more highly than shorter timeframes." However in this instance a value of 1 represents a longer time period for the purpose of this calculation. As such 1 has been selected to maximise the value of the offset assigned by this component of the calculation.
Time until ecological benefit	1 year	Short time-frame required for land to be purchased.
Risk of loss without offset	7.43%	Risk of loss over 20 years taken from *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act* (UoQ 2017), taking into account background rates of deforestation in this local government area.
Risk of loss with offset	0%	Very low risk through protection for conservation purposes, the risk of loss is 0% in accordance with the *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act* (UoQ 2017).
Confidence in result (%) – risk of loss (habitat/community)	90%	High degree of confidence. Main Roads is an experienced land manager.
Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)	90%	No change in the habitat value is expected, therefore a confidence of 90% has been applied.

Table 14. Offset calculator – South-western Brush-tailed Phascogale (Financial)

Attribute	Value	Justification
Start quality Vegetation/habitat Quality **of offset area** (takes into account the regional context and stocking rate)	6	It is assumed the offset site would provide habitat values to the proposed clearing area.
Future Quality without Offset	6	Unlikely to change over a period of one year.
Future Quality with Offset	6	Acquisition only therefore no change. It is assumed that the offset vegetation is likely to remain the same without ongoing management measures committed to by the applicant.
Time Horizon over which loss is averted (security of land tenure)	1 year	The offset site would be protected in perpetuity. The *How to use the offsets assessment guide* (DSEWPaC, 2012), states that "longer timeframes are valued more highly than shorter timeframes." However in this instance a value of 1 represents a longer time period for the purpose of this calculation. As such 1 has been selected to maximise the value of the offset assigned by this component of the calculation.
Time until ecological benefit	1 year	Short time-frame required for land to be purchased and placed into the conservation estate.
Risk of loss without offset	30%	Moderate risk of loss. Assumed the land acquired would be zoned rural or similar, and not be subject to any existing planning approvals.
Risk of loss with offset	10%	Minimal risk. Offset placed into secure tenure managed by the State (i.e. conservation estate). Ten percent allows for ongoing management of the offset site.
Confidence in result (%) – risk of loss (habitat/community)	90%	High degree of confidence. Financial contributions are used to purchase land that is added to the conservation estate through a State guaranteed scheme.
Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)	100%	As there is no change in the habitat value proposed following the purchased land being added to the State conservation estate, therefore a confidence of 100 has been applied.

3.4 Financial Contribution

The financial contribution was calculated using the EPBC Offset Calculator Tool to determine the area of the offset required in hectares (63 ha) multiplied by the market valuation of the unimproved (vegetated) land ($4,950/ha for a land parcel size of 50 ha within the City of Albany) obtained from the Valuer-General (Landgate, 2019).

The market valuation of the vegetated land was based on the valuation obtained from the Valuer-General (on a $/ha basis) for unimproved (vegetated) land within the LGA (Landgate, 2016). As the Valuer-General's market valuation ($/ha) of vegetated land differs according to the size of the land parcel, the valuation of the closest 'standard parcels' of land (i.e. 10, 50, 100, 200 or 500 ha) was used to determine the market valuation of the offset area.

3.5 Offset Condition Milestones

Condition Milestone 1 – Main Roads shall provide documentary evidence to the CEO of DWER that funding of $311,850 has been transferred to the Department.

Timeframe for Completion – Prior to undertaking any clearing for works authorised under the project clearing permit.

Condition Milestone 2 – Convert offset parcels to Commissioner of Main Roads Land or Crown Land, and provision of evidence to the CEO of DWER the land has been purchased and specified for conservation purposes.

Timeframe for Completion – Within 12 months of project commencement

Condition Milestone 3 – Main Roads shall provide documentary evidence to the CEO of DWER that 14 artificial hollows have been installed.

Timeframe for Completion – Prior to completion of the project construction works.

Condition Milestone 4 – Revegetation of cleared land on the six parcels of land located as per Figure 2.

Timeframe for Completion – Revegetation to be commenced within 12 months of project completion.

4 APPLICATION OF ENVIRONMENTAL OFFSET POLICY PRINCIPLES

The WA Environmental Offsets Policy (Government of Western Australia, 2011) states that environmental offsets are to be used as a last resort, and details six principles to be applied in the assessment and decision making with respect to offsets.

The application of the environmental offset policy principles to the project Offset Proposal is provided in Table 15.

Table 15. Application of WA Environmental Offset Policy Principles to the Offset Proposal

Principle No.	Principle	Comment

1.	Environmental offsets will only be considered after avoidance and mitigation options have been pursued.	All strategies to avoid and mitigate environmental impacts have been explored and implemented including:
		• Selecting an alignment that fulfils safety objectives with the smallest practicable construction footprint:
		  ○ The width of the project footprint was reduced between Albany Highway and Lower Denmark Road to reduce the clearing required
		  ○ Connections at selected existing roads will be removed and access to suburbs and key transport routes will be controlled at key sections along the alignment which reduce the project footprint
		• Minimising clearing of native vegetation and fauna habitat through the detailed design process:
		  ○ The project was redesigned at South Western Highway to remove the requirement for a road realignment through native vegetation west of George Street
		  ○ The project was amended between Hanrahan Road and Princess Drive to minimise clearing impact and impacts to WWII tanks.
		  ○ Approximately 69 % of the native vegetation within the Proposal area is in Degraded or worse condition.
		  ○ Overall reductions of the project footprint has reduced size from 129.75 ha to 96.55 ha.
		• Development of project specific Construction Environmental Management Plan to define techniques to minimise risks to the surrounding environment and provide monitoring during construction including:
		  ○ Measures to minimise the risk of over-clearing, such as clear demarcation of clearing areas and the implementation of an internal clearing permit system
		  ○ Measures to minimise the risk of impacting adjacent vegetation, such as temporary fencing and adherence to Shire fire restrictions
		  ○ Development of hygiene management procedures to ensure that dieback and weeds are not introduced and/or spread to adjacent vegetation. The procedures will include detail such as machinery/vehicle clean down, weed treatments and restrictions on vehicle/machinery movements
		  ○ Development of topsoil management procedures to ensure topsoil health for re-use and to mitigate the risk of introducing weeds into the project area and surrounds. The procedures will include the development and implementation of a system to allow for traceability of disposed weed infested topsoil, predetermined stockpile locations and instructions on topsoil management procedures

		○ Development of landscape management requirements to ensure that roadsides and medians will be vegetated and capable of acting as a biological filter for run-off to mitigate the risk of impact to adjacent vegetation • Implementation of a Drainage Strategy • Revegetation using suitable native species in any areas disturbed during construction but not required for road and associated infrastructure.
2	Environmental offsets are not appropriate for all projects.	Environmental offsets are required when a significant residual impact remains (Department of Environment Regulation, 2014). Correspondence from DWER dated 30 March 2021 and 11 August 2021, determined that the project has significant residual impacts to Western Ringtail Possum habitat, Black Cockatoo habitat and South-western Brush-tailed Phascogale habitat.
3.	Environmental offsets will be cost effective, as well as relevant and proportionate to the significance of the environmental value being impacted.	Main Roads believes the proposed offset represents a cost-effective solution that is proportionate to the environmental value being impacted by the project. The area to be purchased with the financial contribution will consist of environmental values that are equal or of higher value than the vegetation proposed to be cleared within the project footprint. The revegetation and direct offset calculations assume that existing habitat value in the offset locations, and revegetation efforts undertaken, will both provide commensurate habitat value with the vegetation to be cleared for the project (habitat value of 6). Further, the values put into the offset calculations for the six offset sites are based on the biological surveys undertaken for the project, with some minor areas extrapolated based on aerial imagery and adjacent vegetation types. Approximately 94% of the extrapolated areas are cleared so additional survey effort is not required.
4.	Environmental offsets will be based on sound environmental information and knowledge.	Funds will be provided for the purchase of land of suitable environmental values as close as practical to the location of clearing. The selection and management of land to be purchased will be based on sound environmental information and knowledge. The six sites to be revegetated have been surveyed and the current habitat values extrapolated based on aerial imagery and directly adjacent vegetation. The 14 artificial breeding hollows will be installed in locations advised by DBCA based on the most suitable location for breeding success and longevity of artificial hollows.
5.	Environmental offsets will be applied within a framework of adaptive management.	Funds will be provided for the purchase of land of suitable environmental values. The land will be added to the conservation estate and will be managed in accordance with advances in environmental knowledge and understanding. Revegetation efforts at the six land parcels will be assessed yearly and the management of the sites adapted to improve revegetation success.
6.	Environmental offsets will be focussed on longer term strategic outcomes.	The proposed offset will contribute to the Offset Fund established by DWER under the EP Act for the acquisition of offset sites. Land to be purchased with offset funds will be added to the conservation estate. The six parcels of land to be revegetated will contribute to the movement of WRP through the landscape and is considered to contribute to strategic outcomes for WRP movement throughout the region, as well as providing current and future habitat for WRP, Black Cockatoo and Phascogale. The 14 artificial breeding hollows will be installed in locations advised by Department of Biodiversity, Conservation and Attractions based on the most suitable location for breeding success and longevity of artificial hollows.

5 STAKEHOLDER CONSULTATION

Stakeholder consultation was done in association with the planning and design works, starting in 2006 when the alignment definition works began. Discussions were initially limited to government agencies and heritage groups. Stakeholder consultation was reinitiated in 2019 when the project was identified as an option for funding and construction and the Construction and Stakeholder Engagement Plan was actioned. Stakeholder and community engagement is continuing with landowners and local residents, local community, environmental groups, local government authorities and State Government agencies.

Specific stakeholder consultation has been undertaken in relation to this Offset. DBCA were engaged to identify proposed locations for the artificial cockatoo hollows. Final Black Cockatoo artificial hollow locations will be determined in consultation with DBCA.

6 REFERENCES AND RELATED DOCUMENTS

Biota (2018). *Albany Ring Road Project: Western Ringtail Possum Assessment*. Unpublished report prepared for Main Roads Western Australia.

Biota (2019). *Albany Ring Road Black-Cockatoo Habitat Assessment*. Unpublished report prepared for Main Roads Western Australia.

Biota (2020). *Albany Ring Road Western Ringtail Possum Assessment*. Unpublished report prepared for Main Roads Western Australia.

Department of Environment Regulation (2014). Guideline, Clearing of Native Vegetation Offsets Procedure under the *Environmental Protection Act 1986.* Available online: http://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/clearing_of_native_vegetation_-_offsets_procedure.pdf

Department of the Environment (2012). The Offsets Assessment Guide. Available online: http://www.environment.gov.au/system/files/resources/12630bb4-2c10-4c8e-815f-2d7862bf87e7/files/offset-assessment-guide.xlsm

GHD (2020). Albany Ring Road Stage 2 and 3B Native Vegetation Clearing Permit Supporting Document. Unpublished report for Main Roads Western Australia. Perth, WA.

Government of Western Australia (2011). *WA Environmental Offset Policy (September 2011).* Govt. of WA. Perth, WA. Available online: http://www.epa.wa.gov.au/EPADocLib/WAEnvOffsetsPolicy-270911.pdf

Government of Western Australia (2014) *WA Environmental Offsets Guidelines (August 2014).* Govt. of WA. Perth, WA. Available online: http://www.epa.wa.gov.au/EPADocLib/WA%20Environmental%20Offsets%20Guideline%20August%202014.pdf

Gilfillan, S. and Maciejewski, S. (2015). Community Fauna Survey of Mt Melville/Kardarup, for the City of Albany. Report prepared by Sandra Gilfillan, June 2015.

Keighery, B. J. (1994). *Bushland Plant Survey: A Guide to Plant Community Survey for the Community.* Wildflower Society of WA (Inc). Nedlands, WA.

Land Information Authority, WA (Landgate). (2019). *Landgate Land Valuations of Unimproved Land, 2018-2019 – *Confidential*.* Unpublished report prepared for Main Road's WA. Perth, WA.

Southern Ecology (2018). *Biological Survey: Albany Ring Road*. Report prepared for Main Roads Western Australia. Unpublished report prepared for Main Roads Western Australia.

Southern Ecology (2019). *Memorandum to Main Roads Western Australia, Defining habitat categories for Western Ringtail Possum in the South Coast population*. 31st October 2019. Dr Sandra Gilfillan (Southern Ecology). Unpublished memorandum prepared for Main Roads Western Australia.

Southern Ecology (2020a). *Biological Survey: Albany Ring Road*. Report prepared for Main Roads Western Australia. Unpublished report prepared for Main Roads Western Australia.

Southern Ecology (2020b). *Phytophthora Dieback Management Plan: Albany Ring Road.* Report prepared for Main Roads Western Australia. Unpublished report prepared for Main Roads Western Australia.

7 APPENDICES

Appendix	Title
Appendix A	EPBC Offset Calculator Tool Calculations

Appendix A: EPBC Offset Calculator Tool Calculations

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	Black Cockatoo
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	Clearing of black cockatoo foraging habitat	Area	6.76	Hectares	
			Quality	6	Scale 0-10	
			Total quantum of impact	4.06	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	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					

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 Future area without offset (adjusted hectares)	0.0	Risk of loss (%) with offset 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	4.06	Adjusted hectares	1.97 ha of foraging habitat present in offset sites	Time over which loss is averted (max. 20 years)	1	Start area (hectares)	1.97	Risk of loss (%) without offset Future area without offset (adjusted hectares)	7% 1.8	Risk of loss (%) with offset Future area with offset (adjusted hectares)	0% 2.0	0.15	90%	0.13	0.13	0.08	1.93%	No	
					Time until ecological benefit	1	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	6	Future quality with offset (scale of 0-10)	6	0.00	90%	0.00	0.00				
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	4.056	0.08	1.93%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

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	Black Cockatoo
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	Clearing of black cockatoo breeding and foraging habitat	**Area**	6.76	Hectares	
			Quality	**6**	Scale 0-10	
			Total quantum of impact	4.06	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	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					

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	4.06	Adjusted hectares	Financial offset	**Time over which loss is averted (max. 20 years)**	1	**Start area (hectares)**	23	**Risk of loss (%) without offset**	30%	**Risk of loss (%) with offset**	10%	4.60	90%	4.14	4.09	2.45	60.52%	No	
									Future area without offset (adjusted hectares)	16.1	**Future area with offset (adjusted hectares)**	20.7								
					Time until ecological benefit	1	**Start quality (scale of 0-10)**	6	**Future quality without offset (scale of 0-10)**	6	**Future quality with offset (scale of 0-10)**	6	0.00	100%	0.00	0.00				
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	4.056	2.45	60.52%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

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	Black Cockatoo
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	Clearing of black cockatoo foraging habitat	Area	6.76	Hectares	
			Quality	6	Scale 0-10	
			Total quantum of impact	4.06	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	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					

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	4.06	Adjusted hectares	Revegetation offset 3.56 ha of cleared vegetation and wands to be revegetated	Time over which loss is averted (max. 20 years)	1	Start area (hectares)	3.56	Risk of loss (%) without offset	7%	Risk of loss (%) with offset	0%	0.25	90%	0.22	0.22	38.05%	No		
									Future area without offset (adjusted hectares)	3.3	Future area with offset (adjusted hectares)	3.6				1.54				
					Time until ecological benefit	10	Start quality (scale of 0-10)	0	Future quality without offset (scale of 0-10)	0	Future quality with offset (scale of 0-10)	6	6.00	80%	4.80	4.26				
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	4.056	1.54	38.05%	No	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

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	Phascogale
EPBC Act status	Other
Annual probability of extinction Based on IUCN category definitions	0.0%

Other annual probability of extinction	Information source

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	Clearing of South-western Brush-tailed Phascogale habitat	Area	5.8	Hectares	
			Quality	6	Scale 0-10	
			Total quantum of impact	3.48	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	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					

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 Future area without offset (adjusted hectares)	0.0	Risk of loss (%) with offset 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	3.48	Adjusted hectares	0.16 ha of existing vegetation suitable for phascogale	Time over which loss is averted (max. 20 years)	1	Start area (hectares)	0.16	Risk of loss (%) without offset Future area without offset (adjusted hectares)	7% 0.1	Risk of loss (%) with offset Future area with offset (adjusted hectares)	0% 0.2	0.01	90%	0.01	0.01	0.01	0.17%	No	
					Time until ecological benefit	1	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	6	Future quality with offset (scale of 0-10)	6	0.00	90%	0.00	0.00				
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	3.48	0.01	0.17%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

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	Phascogale
EPBC Act status	Other
Annual probability of extinction Based on IUCN category definitions	0.0%

Other annual probability of extinction	Information source

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	Clearing of South-western Brush-tailed Phascogale habitat	Area	5.8	Hectares	
			Quality	6	Scale 0-10	
			Total quantum of impact	3.48	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	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					

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 Future area without offset (adjusted hectares)	0.0	Risk of loss (%) with offset 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	3.48	Adjusted hectares	Financial offset	Time over which loss is averted (max. 20 years)	1	Start area (hectares)	19	Risk of loss (%) without offset Future area without offset (adjusted hectares)	30% 13.3	Risk of loss (%) with offset Future area with offset (adjusted hectares)	10% 17.1	3.80	90%	3.42	3.42	2.05	58.97%	No	
					Time until ecological benefit	1	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	6	Future quality with offset (scale of 0-10)	6	0.00	100%	0.00	0.00				
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	3.48	2.05	58.97%	No	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

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	Phascogale
EPBC Act status	Other
Annual probability of extinction Based on IUCN category definitions	0.0%

Other annual probability of extinction	Information source

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	Clearing of South-western Brush-tailed Phascogale habitat	Area	5.8	Hectares	
			Quality	6	Scale 0-10	
			Total quantum of impact	3.48	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	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					

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 Future area without offset (adjusted hectares)	0.0	Risk of loss (%) with offset 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	3.48	Adjusted hectares	Revegetation offset 3.56 ha of cleared vegetation and wands to be revegetated	Time over which loss is averted (max. 20 years)	1	Start area (hectares)	3.56	Risk of loss (%) without offset Future area without offset (adjusted hectares)	7% 3.3	Risk of loss (%) with offset Future area with offset (adjusted hectares)	0% 3.6	0.25	90%	0.22	1.46	41.92%	No		
					Time until ecological benefit	10	Start quality (scale of 0-10)	1	Future quality without offset (scale of 0-10)	1	Future quality with offset (scale of 0-10)	6	5.00	80%	4.00	4.00				
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	3.48	1.46	41.92%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

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	WRP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	6.8%

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	Revegetation offset	Area	11.92	Hectares	
			Quality	6	Scale 0-10	
			Total quantum of impact	7.15	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	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					

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 Future area without offset (adjusted hectares)	0.0	Risk of loss (%) with offset 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	7.15	Adjusted hectares	0.11 ha of supporting habitat for WRP present in offset sites	Time over which loss is averted (max. 20 years)	1	Start area (hectares)	0.11	Risk of loss (%) without offset Future area without offset (adjusted hectares)	7% 0.1	Risk of loss (%) with offset Future area with offset (adjusted hectares)	0% 0.1	0.01	90%	0.01	0.01	0.00	0.05%	No	
					Time until ecological benefit	1	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	6	Future quality with offset (scale of 0-10)	6	0.00	90%	0.00	0.00				
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	7.152	0.00	0.05%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

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	WRP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	6.8%

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	Revegetation offset	Area	11.92	Hectares	
			Quality	6	Scale 0-10	
			Total quantum of impact	7.15	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	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					

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 Future area without offset (adjusted hectares)	0.0	Risk of loss (%) with offset 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	7.15	Adjusted hectares	Financial offset	Time over which loss is averted (max. 20 years)	1	Start area (hectares)	63	Risk of loss (%) without offset Future area without offset (adjusted hectares)	30% 44.1	Risk of loss (%) with offset Future area with offset (adjusted hectares)	10% 56.7	12.60	90%	11.34	10.62	6.37	89.08%	No	
					Time until ecological benefit	1	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	6	Future quality with offset (scale of 0-10)	6	0.00	100%	0.00	0.00				
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	7.152	6.37	89.08%	No	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

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Name	WRP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	6.8%

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	Revegetation offset	Area	11.92	Hectares	
			Quality	6	Scale 0-10	
			Total quantum of impact	7.15	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	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					

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 Future area without offset (adjusted hectares)	0.0	Risk of loss (%) with offset 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	7.15	Adjusted hectares	Revegetation of 3.56 ha of core and supporting habitat (also to be used as hikage habitat for possums)	Time over which loss is averted (max. 20 years)	1	Start area (hectares)	3.56	Risk of loss (%) without offset Future area without offset (adjusted hectares)	7% 3.3	Risk of loss (%) with offset Future area with offset (adjusted hectares)	0% 3.6	0.25	90%	0.22	0.21	0.81	11.35%	No	
					Time until ecological benefit	10	Start quality (scale of 0-10)	1	Future quality without offset (scale of 0-10)	1	Future quality with offset (scale of 0-10)	6	5.00	80%	4.00	2.07				
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	7.152	0.81	11.35%	**No**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**