Coomera Connector Stage One (1): Public Environmental Report

Queensland Department of Transport and Main Roads

Appendix Fifteen – Offset Strategy

OFFSET STRATEGY
FOR COASTAL SWAMP OAK TEC, KOALA AND GREY-HEADED FLYING-FOX

COOMERA CONNECTOR STAGE 1 - EPBC 2020/8646

Prepared for
Queensland Department of Transport and Main RoadS

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Document Control Sheet

File Number: 0101-030a

Project Manager/s: Paulette Jones

Client: Queensland Department of Transport and Main Roads

Project Title: Coomera Connector Stage 1 Offset Strategy - EPBC 2020/8646
Offsets for Coastal Swamp Oak TEC, Koala and Grey-headed Flying-fox

Project Author/s: Paulette Jones, Emma Green, Elizabeth Williams and Alan Key

Project Summary: An Offset Strategy for impacts to matters of national environmental significance (MNES) from the construction and operation of the Coomera Connector Stage 1 road project. This draft of the report focuses on the requirement to offset impacts on Coastal Swamp Oak TEC, Koala and Grey-headed Flying-fox as a result of Stage 1 of the Project.

Draft Preparation History:

Draft No.	Date draft completed	Reviewed by	Issued by
0101-030a Draft A	29/06/2022	Penn Lloyd	Paulette Jones
0101-030a Draft B	05/08/2022	Jedd Appleton	Paulette Jones
0101-030a Draft C	19/08/2022	Jedd Appleton	Paulette Jones
0101-030a Draft D	24/08/2022	Jedd Appleton	Paulette Jones

Revision/ Checking History Track:

Version	Date of Issue	Checked by	Issued by
0101-030a Version 0	30/09/2022	Jedd Appleton	Paulette Jones

Document Distribution:

Destination	Revision/date									
	1	Date	2	Date	3	Date	4	Date	5	Date
Client Copy 1 - digital	A	29/06/2022	B	05/08/2022	C	19/08/2022	D	24/08/2022	0	30/09/2022
Client Copy 1- hard copy										
Cloud backup	A	29/06/2022	B	05/08/2022	C	19/08/2022	D	24/08/2022	0	30/09/2022

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COOMERA CONNECTOR STAGE 1

OFFSET STRATEGY – EPBC 2020/8646

OFFSETS FOR COASTAL SWAMP OAK TEC, KOALA AND GREY-HEADED FLYING-FOX

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Glossary and Sources

AU/AUs	Assessment Unit/s
BAAM	Biodiversity Assessment and Management Pty Ltd
BioCondition	A vegetation condition assessment used to measure the capacity of a terrestrial ecosystem to maintain biodiversity values at a local or property scale
BoM	Bureau of Meteorology
BVG	Broad Vegetation Group
DAMP	Declared Area Management Plan; part of the voluntary declaration application under the VM act
DAWE	Commonwealth Department of Agriculture, Water and Environment (until May 2022)
DBH	Diameter at Breast Height (for vegetation)
DCCEEW	Department of Climate Change, Energy, Environment and Water (from May 2022)
DE	Commonwealth Department of the Environment (2013-2016)
DEE	Commonwealth Department of the Environment and Energy (2016-2020)
DES	Queensland Department of Environment and Science (since 2016)
DNRME	Queensland Department of Natural Resources, Mines and Energy (2017-2020)
DR	Queensland Department of Resources (since 2020)
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities
EDL	Ecologically dominant layer
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GHFF	Grey-headed Flying-fox
GPS	Global Positioning System
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NC Act	*Queensland Nature Conservation Act 1992*

NRM	Natural Resource Management
OAMP	Offset Area Management Plan
PER	Public Environment Report
PMAV	Property Map of Assessable Vegetation
the Project	Stage 1 of proposed Coomera Connector transport corridor by TMR
Ramsar	A treaty between several nations aimed at conserving natural resources
RE/REs	Regional Ecosystem/s
SAT	Spot Assessment Technique; a method to evaluate Koala presence and estimate activity, as per Phillips and Callaghan, 2011
SEQ	South-east Queensland
TEC	Threatened Ecological Community
TMR	Queensland Department of Transport and Main Roads
VM Act	*Queensland Vegetation Management Act 1999*
VDEC	Voluntary Declaration

Key Reference Documents

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Grey-headed Flying-fox:
https://bie.ala.org.au/species/urn:lsid:biodiversity.org.au:afd.taxon:7065d246-3017-4768-9c8f-8c58c0e538c1

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1.0 INTRODUCTION

Biodiversity Assessment and Management Pty Ltd was commissioned by the Queensland Department of Transport and Main Roads (TMR) to develop an Offset Strategy for impacts to Matters of National Environmental Significance (MNES) from the construction and operation of the proposed action.

1.1 PURPOSE AND SCOPE OF THE DOCUMENT

This strategy identifies the proposed offset sites, the proposed offset outcomes, quantifies both environmental impact from the proposed action and environment gain from the proposed offsets, and on that basis demonstrates the proposed offsets will be adequate to compensate for the proposed action's impacts on Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland threatened ecological community ('Coastal Swamp Oak TEC'), Koala *Phascolarctos cinereus*, and Grey-headed Flying-fox *Pteropus poliocephalus*.

In accordance with the Public Environmental Report (PER) guidelines, where significant residual impacts remain after consideration of avoidance, mitigation and management measures, environmental offsets are required to compensate for the impacts in accordance with the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (EPBC Offsets Policy).

This Offset Strategy addresses potential significant residual impacts on Koala, Grey-headed Flying-fox and Coastal Swamp Oak TEC arising from the construction and operation of the proposed action.

The purpose of this Offset Strategy is to provide an overarching document that:

- details the quantum of significant residual impacts to MNES proposed to be offset;
- proposes offsets to meet the requirement of the EPBC Offsets Policy;
- explains the proposed offset delivery methods and pathways to securing the required offsets; and
- provides management actions that describe how the offsets compensate for residual significant impacts of the proposed action on relevant MNES, and/or their habitat.

1.1.1 Foundations of this Strategy

This Offset Strategy has been prepared taking into consideration:

- the PER guidelines for the proposed action;
- the Commonwealth legislative offsets framework;
- results of the ecological investigations undertaken to inform the PER;
- results of the ecological investigations undertaken at the proposed offset locations;
- advice of the Department of Climate Changes, Energy, Environment and Water (DCCEEW);
- results of the application of the EPBC Act Offsets Assessment Guide; and
- conservation and ecological outcomes.

This Offset Strategy has been structured to address:

- MNES requiring offsets;
- The intended delivery approach for:

  - Habitat offsets for Koala, Grey-headed Flying-fox and Coastal Swamp Oak TEC.
- management actions for each required MNES offset matter; and
- timeframes for securing the intended offsets and likely method of legally securing the offsets.

1.2 PROPOSED ACTION DESCRIPTION

The proposed action includes the construction and operation of a new 16km high-speed arterial road between Shipper Drive, Coomera and Nerang-Broadbeach Road, Nerang (Figure 1.1). The 282.8 ha footprint of the proposed action (shown on Figure 1.2) is described in detail in chapter 2 of the PER.

As the proposed action is the construction and operation of a permanent road corridor, it requires the permanent removal of habitat within the proposed action corridor (impact area). Therefore, the duration of the impact is tied to the success of the offsets, and the time required for the offsets to achieve target quality/ condition.

Detail for the proposed offsets for the proposed action are provided in Section 1.3. How these will meet the requirements of the EPBC Act Offsets Policy 2012 are detailed in Section 1.4.2.

1.3 IMPACT AND OFFSET SUMMARY

The extent of MNES to be impacted has been confirmed via detailed ecological surveys (Section 3.1). The results of these surveys and subsequent impact assessment are provided in the PER, which identifies significant residual impact of the proposed action on Coastal Swamp Oak (TEC), Koala habitat and Grey-headed Flying-fox habitat.

Offset opportunities were sought throughout 2020 until early 2022, as close as possible to the impact area; however, at the time when TMR started to look for offset properties, there were no suitable, larger properties for sale within the Gold Coast local government area (LGA) for all three matters and available options were small and scattered across the landscape. These would have provided a fragmented offset within a highly urbanised landscape and were therefore considered not suitable as offsets especially for Koala and Grey-headed Flying-fox. Opportunities were subsequently sought in the neighbouring Scenic Rim Regional Council LGA.

A number of potential properties with appropriate attributes for Koala and Grey-headed Flying-fox were subject to desktop analysis, and in some cases preliminary field investigation were conducted to test their suitability. TMR was finally successful in purchasing a proposed offset property for Koala and Grey-headed Flying-fox at Farringdon Road, Tabooba ('Tabooba'), located south of the township of Beaudesert in the Scenic Rim Regional Council LGA (Figure 1.3). Details of Tabooba are contained in chapter 9 of the PER. The property has been subject to field investigation to inform the Offsets Assessments Guide (Section 5.2).

In July 2022, TMR were successful in purchasing the property 'Greenridge' at Pimpama for the purpose of offsetting Costal Swamp Oak TEC (as well as some Queensland offsets for the proposed action and potential future MNES offsets for TMR projects). Greenridge is located in the Gold Coast City Council LGA (Figure 1.3). The property also supports habitat suitable for Koala and Grey-headed Flying-fox, as well as Subtropical and Temperate Coastal Saltmarsh, although the latter does not need to be offset under the EPBC Act. For the purposes of the proposed action Offset Strategy, Greenridge is proposed for Coastal Swamp Oak TEC offset with a minor component of Koala and Grey-headed Flying-fox habitat offset in ecosystems where the three matters are co-located. Details of Greenridge are contained in chapter 9 of the PER. The property has been subject to field investigation to inform the Offsets Assessment Guide (Section 6.7).

As detailed in chapter 6 of the PER, there is no Moreton Bay Ramsar Wetland within the proposed action corridor and/or that would be significantly impacted by the proposed action and, therefore, no offsets are proposed for this matter.

Figure 1.1 Nearmap 2021 Image of the proposed action

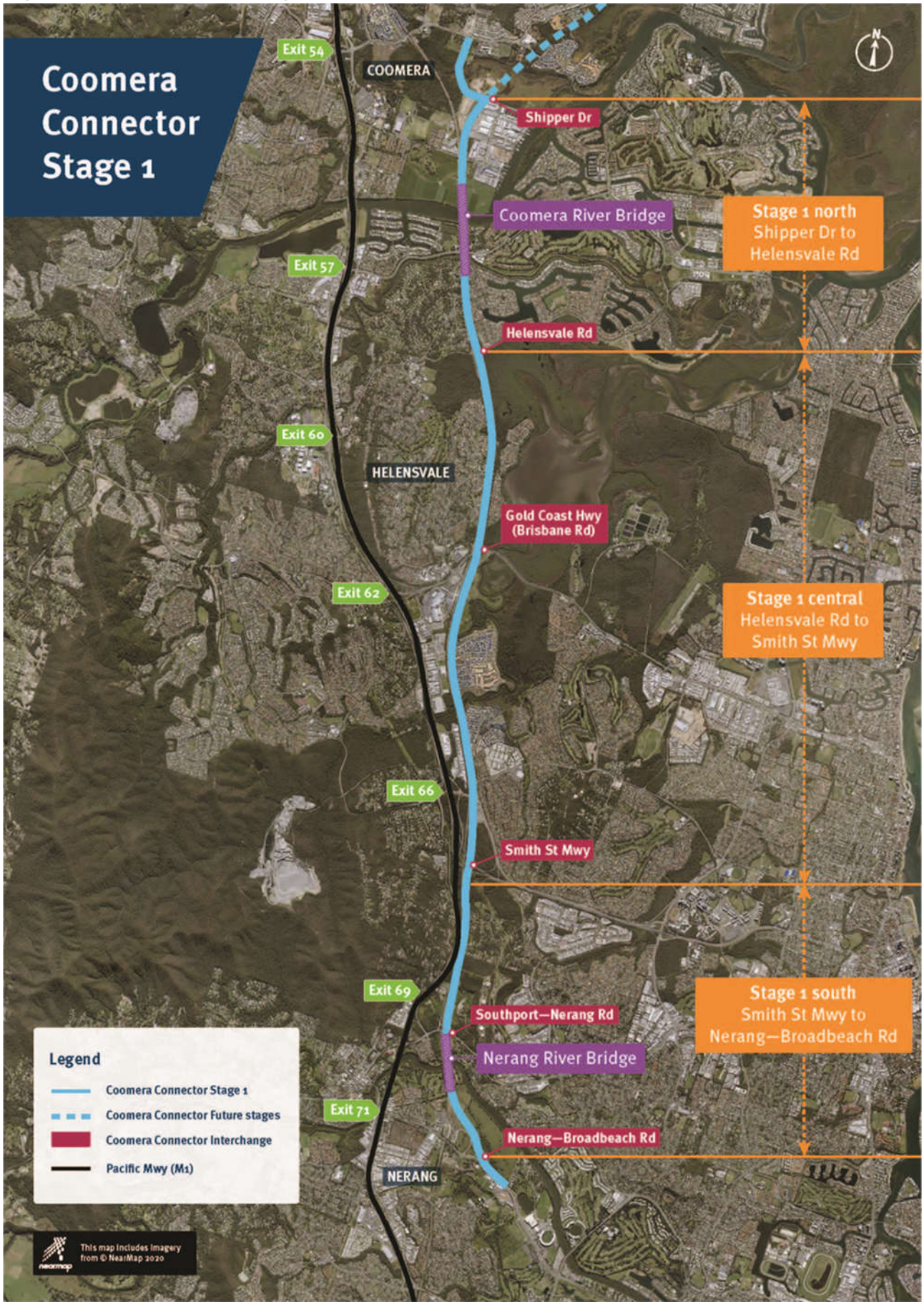
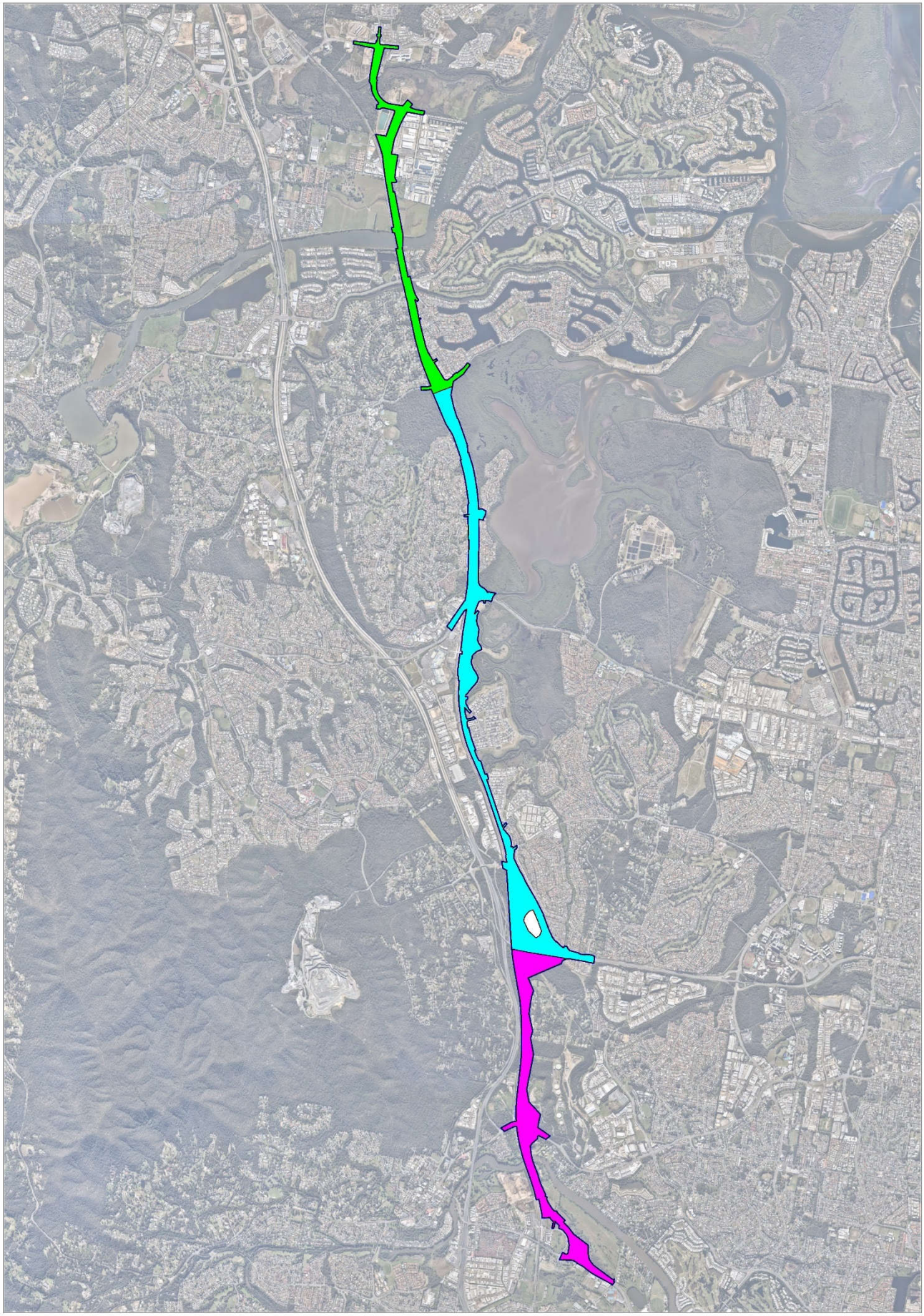
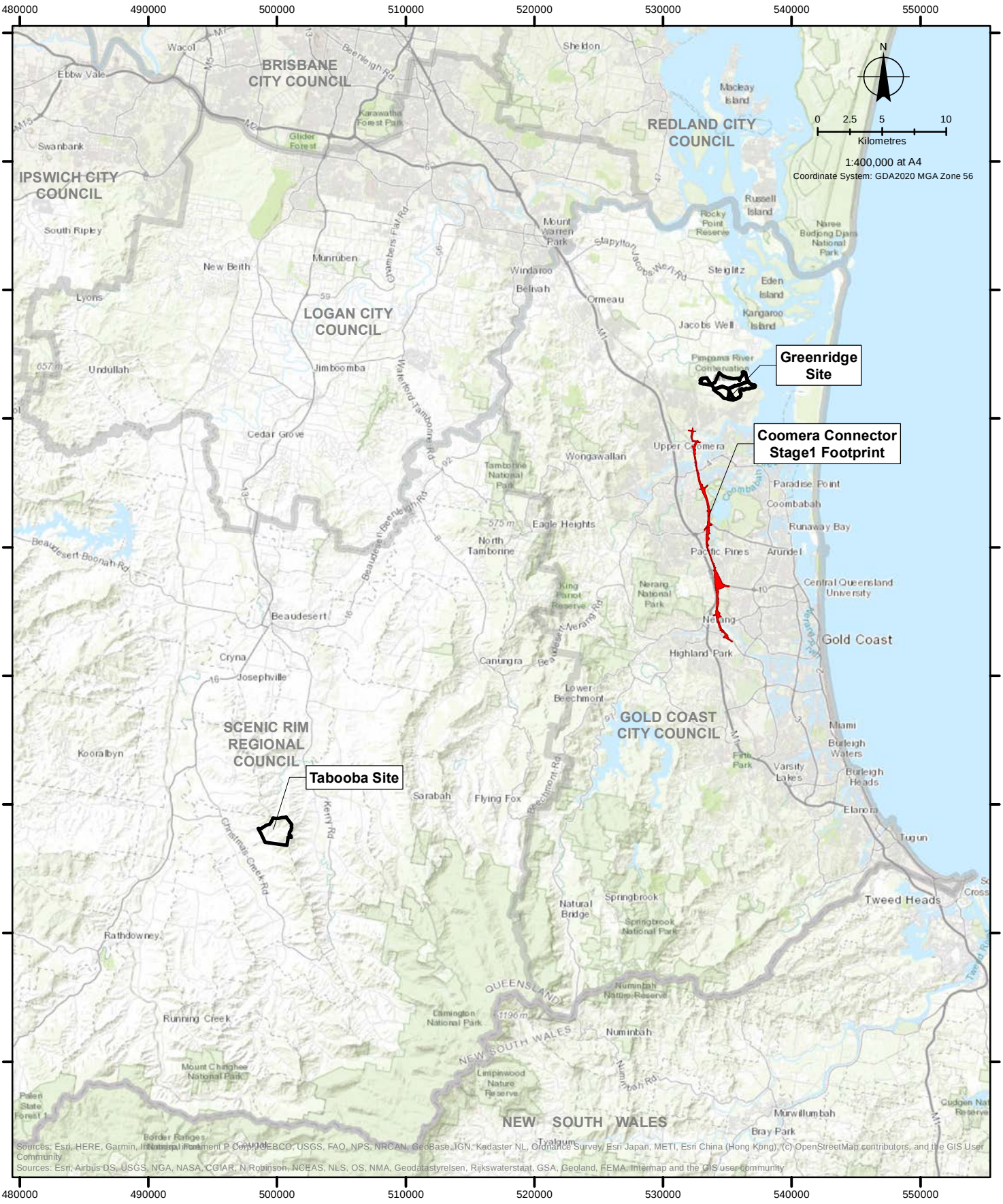


Figure 1.2 Proposed Action Footprint





Offset sites

Impact site

LGA boundaries

Drawn By: KM Reviewed by: PJ Date: 5/08/2022

Figure: 1.3

Title: Locality Map

Project: Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646

Client: Queensland Department of Transport and Main Roads

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Table 1.1 provides and impact and offset summary of the key headline commitments from the Offset Strategy for Coastal Swamp Oak TEC.

Table 1.1. Offset Assessment Guide Summary for Coastal Swamp Oak TEC (Endangered) for offset areas on Greenridge

EPBC status	Impact area (ha)	Impact site quality (/10)	Impact quantum	Offset area (ha)	Offset start quality (/10)	Quality without offset (/10)	Quality with offset (/10)	Offset quantum and % of liability provided
Coastal Swamp Oak TEC								
END	15.9*	8	12.72	Remnant RE12.1.1 AU1 Greenridge 14.2ha	8	7	9	17.47%
				Regrowth RE 12.1.1 AU2 Greenridge 5.16ha	7	7	9	5.67%
				Non-remnant RE12.1.1 AU3 Greenridge 22.15ha	3	3	6	34.98%
				Remnant RE12.3.20 AU4 Greenridge 22.78ha	8	7	9	28.02%
				Regrowth RE12.3.20 AU5 Greenridge 2.58ha	7	7	9	2.84%
				Non-remnant RE 12.3.20 AU6 Greenridge 10.83	2	2	9	40.11%
Total ha of offset at Greenridge				**77.7 ha**				**129.09%**

*includes functional loss of 0.928ha

Table 1.2 provides an impact and offset summary of the key headline commitments from the Offset Strategy for Koala.

Table 1.2. Offset Assessment Guide Summary for Koala (Endangered – Vulnerable at the time of controlled action decision) for offset areas on Tabooba and Greenridge

EPBC status	Impact area (ha)	Impact site quality (/10)	Impact quantum	Offset area (ha)	Offset start quality (/10)	Quality without offset (/10)	Quality with offset (/10)	Offset quantum and % of liability provided
Koala *Phascolarctos cinereus*								
VUL	73.81	7	51.67	Remnant RE12.8.16 AU1 Tabooba 49.84ha	8	8	9	8.78%
				Adv Regrowth RE12.8.16 AU2 Tabooba 145.02ha	6	6	8	48.46%
				Young Regrowth RE12.8.16 AU3 Tabooba 48.1ha	4	3	7	30.73%
				Remnant RE12.8.14 AU4 Tabooba 50.62ha	8	8	8	0.75%
				Adv Regrowth RE12.8.14 AU5 Tabooba 19.8ha	7	6	8	6.62%
				Remnant RE12.3.20 AU4 Greenridge 28.7ha	8	8	8	0.43%
				Regrowth RE12.3.20 AU5 Greenridge 4.77ha	7	7	9	1.57%
				Non-remnant AU6 Greenridge 11.88ha	4	4	7	5.63%
Total ha of Koala offset at Tabooba and Greenridge				**358.69ha**				**102.97%**

Table 1.3 provides an impact and offset summary of the key headline commitments from the Offset Strategy for Grey-headed Flying-fox.

Table 1.3. Offset Assessment Guide Summary for Grey-headed Flying-fox (Vulnerable) for offset areas on Tabooba and Greenridge

EPBC status	Impact area (ha)	Impact site quality (/10)	Impact quantum	Offset area (ha)	Offset start quality (/10)	Quality without offset (/10)	Quality with offset (/10)	Offset quantum and % of liability provided
Grey-headed Flying-fox *Pteropus poliocephalus*								
VUL	68.76	7	48.13	Remnant RE12.8.16 AU1 Tabooba 49.84ha	6	6	6	0.6%
				Adv Regrowth RE12.8.16 AU2 Tabooba 145.02ha	5	4	7	76.58%
				Young Regrowth RE12.8.16 AU3 Tabooba 48.1ha	5	1	6	40.98%
				Remnant RE12.8.14 AU4 Tabooba 50.62ha	6	6	7	9.38%
				Adv Regrowth RE12.8.14 AU5 Tabooba 19.8ha	5	5	6	3.63%
				Remnant RE12.3.20 AU4 Greenridge 28.7ha	6	6	7	5.32%
				Regrowth RE12.3.20 AU5 Greenridge 4.77ha	6	6	6	0.06%
				Non-remnant AU6 Greenridge 11.88ha	2	2	7	10.08%
Total ha of Grey-headed Flying-fox offset at Tabooba and Greenridge				**358.69ha**				**146.63%**

1.4 LEGISLATIVE FRAMEWORK

1.4.1 EPBC Act Assessment

The EPBC Act is the Commonwealth Government's principal piece of environmental legislation and is administered by DCCEEW. The EPBC Act was enacted to protect MNES, which include threatened flora and fauna species, TECs, migratory species as well as other protected matters. The Act includes EPBC categories of threats for threatened flora and fauna, identifies key threatening processes to their survival and provides for the preparation of recovery plans for threatened flora and fauna.

Approval is required under the EPBC Act for any action (development) that has the potential to have, will have or is likely to have significant impact/s on MNES.

The approval process for the proposed action is the preparation and submission of the PER providing information about the actions and its relevant impacts. The information is to be sufficient to allow the Minister to make an informed decision on whether or not to approve, under Part 9 of the EPBC Act, the taking of the action for the purposes of each controlling provision.

This Offset Strategy provides the required details of the proposed offsets for inclusion in the PER.

1.4.2 EPBC Offsets Policy and Compliance

Under the EPBC Offsets Policy, environmental offsets are actions taken to counterbalance significant residual impacts on MNES. Offsets are used as a last resort and only considered after all avoidance and mitigation measures have been considered and where significant residual

impacts remain. The policy allows for offsets for MNES to be located in the same area if the habitat/TEC accommodates the protected matters. For example, the habitats for Koala and Grey-headed Flying-fox coincide and so the two matters can be located in the same offset area.

The EPBC Offsets Policy provides guidance on the role of offsets in environmental impact assessments and how DCCEEW considers the suitability of a proposed offset package (SEWPaC, 2012). The EPBC Offsets Policy has five key outcomes:

- ensuring the use of offsets are efficient, effective, timely, transparent and scientifically robust
- providing all stakeholders with greater certainty on how offsets are determined and provided
- delivering improved environmental outcomes
- outlining the appropriate nature and scale of offsets
- providing guidance on acceptable offsets and their delivery.

The EPBC Offsets Policy also sets out eight key overarching principles that must be applied in determining the suitability of offsets. These principles and the section of the Strategy where they are addressed, are summarised below in Table 1.4.

Table 1.4. Offset Policy principles addressed in the Strategy

Offset Policy No.	Policy requirement	Offset Strategy Compliance
1.	Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law	Based on desktop analysis and field surveys, the offset properties described in this strategy have been assessed and selected based on their suitability to deliver conservation gains for each of the matters being offset. Habitat quality assessments have been undertaken in both impact and offset areas, with data used in the EPBC Impact Assessment table (**Section 10.1**) to ensure the offset will maintain or improve the viability of the protected matters.
2.	Be built around direct offsets but can include other compensatory measures	Offsets are direct offsets for each matter and are detailed in Section 10.0.
3.	Be in proportion to the level of statutory protection that applies to the protected matter	The Offset Assessment Guide has been applied to Coastal Swamp Oak TEC, Koala and Grey-headed Flying-fox, taking into account their listing status.
4.	Be of a size and scale proportionate to the residual impacts on the protected matter	In accordance with the Offset Assessment Guide: • 15.928ha of Coastal Swamp Oak impact would be offset with 67.62ha of Coastal Swamp Oak habitat at Greenridge. • 73.8ha of Koala habitat impact would be offset with 26.6ha of Koala habitat at Greenridge and 245.93ha of Koala habitat at Tabooba. • 68.76ha of Grey-headed Flying-fox impact would be offset with 26.6ha of Grey-headed Flying-fox habitat at Greenridge and 245.93ha of Grey-headed Flying-fox habitat at Tabooba.
5.	Effectively account for and manage the risks of the offset not succeeding	The Risk Analyses for the proposed offset properties (Section 11.1 for Greenridge and Section 11.2 for Tabooba) have identified potential risks and describe mitigation measures and triggers for further management actions. These will be outlined further in the relevant Offset Area Management Plan (OAMP), as well as detailing monitoring, reporting and compliance requirements.

Offset Policy No.	Policy requirement	Offset Strategy Compliance
6.	Be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs	The EPBC Offsets Policy takes precedence in relation to MNES and the Queensland Government cannot impose an offset condition in relation to the same or substantially the same impact, if DCCEEW has assessed an activity as a controlled action and decided that an offset is, or is not, required. The proposed action has the potential to result in significant residual impacts to MSES that are not also MNES and it is intended that the proposed offset sites will also fully acquit the Queensland offset requirements for these MSES. The Tabooba offset areas are zoned for rural land uses and the Greenridge offset areas are zoned for rural and residential land uses. Both properties are current used for rural land uses (specifically cattle grazing) and neither has been used previously under any conservation or environmental activity/initiative.
7.	Be efficient, effective, timely, transparent, scientifically robust and reasonable	The offsets will be secured by being declared as areas of high conservation value under s19F of the *Vegetation Management Act 1999* (Qld) (VM Act). Once registered on the titles of the properties, the offset areas will be mapped as category A areas on the property map of assessable vegetation (PMAV). An area mapped as category A on a PMAV is described as an '*area subject to compliance notices, offsets and voluntary declarations*'. Once approved under the EPBC Act, the OAMPs will be attached to the declared area forms, further ensuring compliance of the plans. The offset areas will be secured within four months of approval of the OAMP, and TMR will notify DCCEEW within five business days of the mechanism to legally secure the environmental offsets having been executed. TMR will apply for Voluntary Declarations (VDECs) for the offsets as soon as the OAMPs are approved. This process usually takes around three months to complete, and TMR commits to legally securing the offsets within six months of approval of the OAMPs. A VDEC will require the Declared Area Management Plans to be implemented until the completion criteria have been achieved. The areas will then be protected from clearing under the VM Act, NC Act and EPBC Act as remnant vegetation and habitat for protected species. The proposed Greenridge and Tabooba offsets will meet the requirements of the EPBC Offsets Policy by being offsets on private land owned by TMR. As such, the offset areas will be actively monitored, have compliance enforced and require any change in the legal status to have Ministerial or statutory approval. The estimated habitat quality and stocking rate gains applied to the offset assessments are set out and discussed in Section 10.0.
8.	Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	The proposed governance arrangements for all offset areas will be detailed in the relevant OAMPs (Section 11.3)

1.4.3 Queensland approvals status

The proposed action must gain approvals, permits, licences and authorities applicable to the following Queensland legislation:

- *Biosecurity Act 2014*
- *Coastal Protection and Management Act 1995*
- *Environmental Protection Act 1994*
- *Fisheries Act 1994*
- *Nature Conservation Act 1992*
- *Planning Regulation 2017*
- *Water Act 2000.*

As part of the proposed action, TMR is currently progressing Queensland approval applications for the northern section (Shipper Drive to Helensvale Road). The proposed action requires Queensland approval for Operational Works, that is Tidal Works or Works within a Coastal Management District (CMD) including prescribed tidal works; clearing of marine plants; waterway barrier works (both temporary and permanent) works within a coastal management district. TMR have lodged two (2) state approval applications for Operational Works (Tidal Works) for the Coomera River bridge and Coomera overflow; and Saltwater Creek bridge. Additional approvals will be required for Helensvale Road bridge as part of the northern section of the proposed action. TMR will lodge similar approval applications in the near future for the central and southern sections of the proposed action consistent with chapter 3 of the PER.

2.0 OFFSET STRATEGY – 2020/8646

2.1 CONSERVATION ADVICES, RECOVERY PLANS AND THREAT ABATEMENT PLANS

Table 2.1 sets out the relevant Conservation Advices, Recovery Plans and Threat Abatement Plans and describes how this Offset Strategy addresses each.

The Offset Strategy has responded to the current approved conservation advices and recovery plans for Coastal Swamp Oak TEC, Koala and Grey-headed Flying-fox at the time of the preparation of the Offset Strategy (September 2022).

Table 2.1. Conservation Advices, Recovery Plans and Threat Abatement Plans

Document name	Where and how the plan addresses the documents
Conservation advice (incorporating listing advice) for the Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community (DoEE 2018).	For offsets, the Conservation Advice sets out the following management actions: • manage and protect offset areas in perpetuity in areas dedicated for conservation purposes - avoid risks that reduce may their size, condition and ecological function in the future (Section 11.3); • select offset sites as close as possible to the impact site, to allow for local and regional variation in the ecological community, but also consider future sea-level rise and coastal erosion (Section 4.0); • increase the area and improve ecological function of existing patches, for example by enhancing landscape connectivity, habitat diversity and condition (Section 12.1.1); • focus on the restoration of good and moderate quality patches of the ecological community to achieve high quality condition (Section 10.2); • extend protection to otherwise unprotected sites (e.g. sites that are currently too small or degraded to meet the condition thresholds for national protection, but can reasonably be restored to a better, more intact condition) (Section 10.2); and, • monitor offset areas and the outcomes they deliver over the long-term, to manage them adaptively and improve understanding of the best ways to manage offsets to delivery biodiversity benefits (Section 12.1.1).
National Recovery Plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) (DAWE 2022a).	The goal of the national Recovery Plan for the Koala (Qld, NSW and ACT) is to stop the trend of decline in population size of the listed Koala, by having resilient, connected and genetically healthy metapopulations across its range, and to increase the extent, quality and connectivity of habitat occupied. In particular, Objective 1 states: The area of occupancy and estimated size of populations that are either: a) suspected to be declining, or predicted to decline are instead stabilised then increased, or b) suspected and predicted to be stable are maintained or increased. In south-east Queensland, Koala populations are declining due to habitat clearing, degradation and fragmentation, urban development, and the subsequent indirect impacts such as vehicle collision and dog attacks (Rhodes *et al.* 2015). The proposed offsets address the objective of the National Recovery Plan for the Koala stated above by protecting and restoring Koala vegetation in landscapes that are at threat of further clearing, degradation and fragmentation by pastoral land-use (Section 5.1.2). Tabooba creek flood zones and lower hill slopes are cleared for cattle grazing purposes, and adjoining regrowth and remnant vegetation is subject to land management practices designed to improve forage for cattle. Restoration and management of regrowth and remnant vegetation on the property as a Koala offset, in particular the introduction of burning practices to improve ecological condition, control of invasive Lantana and removal of wild dogs, will provide opportunity for natural levels of canopy tree recruitment, reconnection of vegetated hillslopes to valuable riparian habitat within the property and safer movement opportunities for Koalas. The property currently contains Koala.

Document name	Where and how the plan addresses the documents
	Greenridge has until recently been under management for grazing (**Section 6.3**). Management of vegetation for Koala (and other species), offsets including the control of invasive weeds and removal of wild dogs and foxes, will improve the value of the habitat for Koalas.
Conservation Advice for *Phascolarctos cinereus* (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory (DAWE 2022b).	This offset strategy contributes to the on-ground strategies declared in the Conservation Advice for Koala (Qld, NSW and ACT), in particular Strategy 5: Strategic habitat restoration. Specifically, Tabooba offset area was selected due to its current and potential establishment of vegetation species that are significant to Koala (**Section 5.1.4**). The dominant tree species present are significant for Koala, there is good potential for restoration, with advanced and young regrowth of preferred tree species and it is adjacent to regulated remnant vegetation that forms a significant corridor in the landscape with state mapping indicating a contiguous area of regulated remnant vegetation at least 1,400 ha in area). Greenridge offset area supports known primary and secondary Koala forage species and is located in close proximity to conservation lands under management for Koala (**Section 6.5**).
National Recovery Plan for the Grey-headed Flying-fox *Pteropus poliocephalus* (DAWE 2021).	The National Recovery Plan for the Grey-headed Flying-fox details nine objectives with associated priority actions, of which this offset strategy contributes to: - Recovery Objective 1: Identify, protect and increase native foraging habitat that is critical to the survival of the Grey-headed Flying-fox (Section 9.0); and - Priority Action 1.4: Increase the extent and viability of foraging habitat for the Grey-headed Flying-fox that is productive during winter and spring (Section 9.0). The proposed offset sites were selected due to their current and potential Grey-heading Flying-fox foraging habitats, and particularly those that provide important winter and spring forage (**Section 5.1.5 and Section 6.6**). The proposed Greenridge and Tabooba offset properties include vegetation that is significant Grey-headed Flying-fox foraging habitat, particularly during winter and spring. On-site surveys have confirmed that the remnant vegetation of Greenridge incorporates *Eucalyptus tereticornis* and *Melaleuca quinquenervia* and the remnant and regrowth vegetation of Tabooba is dominated by *Eucalyptus tereticornis*, *E. melliodora* and/or *E. crebra,* which have been identified in the National Recovery Plan as important winter and spring foraging species.

3.0 PROPOSED ACTION IMPACT AREA

3.1 IMPACT AREA DESCRIPTION

The majority of the impact area is directly adjacent to the existing Gold Coast Heavy Rail Line between Coomera and Nerang. The proposed action corridor, while generally undisturbed, has significant weed infestation and has been cleared previously in other areas, particularly in the northern sections of the proposed action corridor. The proposed action corridor also occurs amongst low-, medium-, high-density or peri-urban residential and supporting services, council parks and recreational areas, light industrial or agriculture (see chapter 5 of the PER).

The impact footprint crosses five waterways (from north to south): Oakey Creek, Coomera River, Saltwater Creek, Coombabah Creek and the Nerang River. Minor artificial and natural drainage lines are also present. Due to the proximity of the footprint to the coast, there is limited elevational change.

Detailed information on the impact area's land-use and proximity to the Moreton Bay Ramsar Wetland are provided in chapter 5 of the PER.

The proposed action footprint of 282.8 ha includes 77.29 ha of mapped remnant and regrowth vegetation within 11 REs (Table 3.1). As per the VM Act, three REs are classified as Of concern and three are listed as Endangered. Three REs are present that potentially represent threatened ecological communities. The REs listed in Table 3.1 are present in the existing Queensland mapping and were subsequently ground-truthed.

The remainder of the vegetation within the footprint is generally cleared or immature regrowth, with varying degrees of exotic vegetation encroachment. All habitat types regardless of VM Act status were included in the assessment for Koala, Grey-headed Flying-fox and Coastal Swamp Oak TEC.

Table 3.1. The remnant and regrowth REs mapped within the proposed action footprint (i.e. not ground-truthed).

Area (ha)	RE	Short Description	Qld VM Act Status / representative of TEC
17.47	12.1.1	*Casuarina glauca* woodland on margins of marine clay plains	Of concern / potential Coastal Swamp Oak Forest TEC
0.67	Mixed 12.1.1 12.1.3	 *Casuarina glauca* woodland on margins of marine clay plains Mangrove shrubland to low closed forest on marine clay plains and estuaries	 Of concern / potential Coastal Swamp Oak Forest TEC Least concern
0.72	12.1.2	Saltpan vegetation including grassland, herbland and sedgeland on marine clay plains	Least concern / potential Subtropical and Temperate Coastal Saltmarsh TEC
0.48	12.1.3	Mangrove shrubland to low closed forest on marine clay plains and estuaries	Least concern
0.62	Mixed 12.3.6	 *Melaleuca quinquenervia* +/- *Eucalyptus tereticornis*, *Lophostemon suaveolens*, *Corymbia intermedia* open forest on coastal alluvial plains	 Least concern
	12.3.20	*Melaleuca quinquenervia*, *Casuarina glauca* +/- *Eucalyptus tereticornis, E. siderophloia, M. styphelioides* open forest on low coastal alluvial plains	Endangered / potential Coastal Swamp Oak Forest TEC and Coastal Swamp Sclerophyll Forest TEC
3.21	12.3.11	*Eucalyptus tereticornis* +/- *Eucalyptus siderophloia, Corymbia intermedia* open forest on alluvial plains usually near coast	Of concern

Area (ha)	RE	Short Description	Qld VM Act Status / representative of TEC
1.92	12.3.20	*Melaleuca quinquenervia*, *Casuarina glauca* +/- *Eucalyptus tereticornis, E. siderophloia, M. styphelioides* open forest on low coastal alluvial plains	Endangered / potential Coastal Swamp Oak Forest TEC and Coastal Swamp Sclerophyll Forest TEC*
0.23	12.11.5	*Corymbia citriodora* subsp. *variegata* woodland to open forest +/- *Eucalyptus siderophloia/E. crebra, E. carnea, E. acmenoides, E. propinqua* on metamorphics +/- interbedded volcanics	Least concern
13.61	12.11.23	*Eucalyptus pilularis* open forest on coastal metamorphics and interbedded volcanics	Endangered
10.59	12.11.24	*Eucalyptus carnea* or *E. tindaliae, Corymbia intermedia* +/- *E. siderophloia* or *E. crebra woodland* on metamorphics +/- interbedded volcanics	Least concern
27.77	Mixed		
	12.11.24	*Eucalyptus carnea* or *E. tindaliae, Corymbia intermedia +/- E. siderophloia* or *E. crebra* woodland on metamorphics +/- interbedded volcanics	Least concern
	12.11.25	*Corymbia henryi* and/or *Eucalyptus fibrosa* subsp. *fibrosa* +/- *E. crebra*, *E. carnea*, *E. tindaliae* woodland on metamorphics +/- interbedded volcanics	Of concern
	12.11.27	*Eucalyptus racemosa* subsp. *racemosa* and/or *E. seeana* and *Corymbia intermedia* woodland on metamorphics +/- interbedded volcanics	Endangered

3.1.1 MNES Offset Requirements

Chapters 4 and 5 of the PER detail the potential and known MNES present at and/or in proximity to the proposed action corridor, as well as the desktop analysis and field surveys employed to determine their presence or likelihood for MNES to occur. Significant residual impact is predicted for a TEC and two MNES fauna species as a result of the proposed action and are the subject of this Offset Strategy. These are:

- Coastal Swamp Oak *Casuarina glauca* TEC (EPBC Act Endangered).
- Koala *Phascolarctos cinereus* (EPBC Act endangered – vulnerable at the time of controlled action decision); and
- Grey-headed Flying-fox *Pteropus poliocephalus* (EPBC Act Vulnerable).

3.1.2 Impact Site Field Assessment Methodology

Field assessments were undertaken by Planit Consulting between 2019-2021 as well as Endeavour Veterinary Ecology in 2021 and 2022 specifically for Koala. Details on the methodology and guidelines followed are summarised as follows.

For Coastal Swamp Oak TEC, Koala and Grey-headed Flying-fox:

- Habitat quality assessments were performed in accordance with the *Guide to determining terrestrial habitat quality: A toolkit for assessing land-based offsets under the Queensland Environmental Offsets Policy Version 1.3* (State of Queensland 2020) Guide to determining terrestrial habitat quality (version 1.3: Feb 2020) - Methods for assessing habitat quality under the Queensland Environmental Offsets Policy (des.qld.gov.au);
- BioCondition assessments were used to determine the habitat quality, as per *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland* Version 2.2 (Eyre

et al. 2015) BioCondition: A condition assessment framework for terrestrial biodiversity in Queensland (www.qld.gov.au) applying Benchmarks Version 3.2; and

- Determining survey sites and impact assessment units was undertaken as per *Method for the establishment and survey of reference sites for BioCondition, Version 2.0* (Eyre, *et al.* 2011) (PDF) Methodology for the Establishment and Survey of Reference Sites for BioCondition (researchgate.net).

For Koala and Grey-headed Flying-fox:

- Additional details on habitat parameters relevant to threatened fauna species were evaluated as per the earlier guideline *Guide to determining terrestrial habitat quality: A toolkit for assessing land-based offsets under the Queensland Environmental Offsets Policy* (State of Queensland 2014).

3.1.3 Identification of Assessment Units for Habitat Quality Surveys

Assessment Units for Coastal Swamp Oak TEC were as follows:

ASSESSMENT UNIT 1 (IAU1): The confirmed primarily Condition Category A (Critical Habitat) Swamp Oak EEC hydraulically and vegetatively connected with the expansive wetlands of Coombabah. Within the proposed action corridor, the AU occupies 11.75 hectares.

ASSESSMENT UNIT 2 (IAU2): The confirmed Condition Category A (Critical Habitat) Swamp Oak EEC hydraulically connected with the tidal wetlands of Oakey Creek and the Coomera River. This IAU is small and fragmented by Shipper Drive and surrounding farmland. Within the proposed action corridor the AU occupies 0.4667 hectares.

ASSESSMENT UNIT 3 (IAU3): Includes the remaining Condition Category B and Swamp Oak EEC hydraulically connected with the expansive wetlands of Coombabah. This IAU is separated from IAU 1 due to being fragmented/separated from the larger patches of Swamp Oak EEC and/or being substantially infested with non-native flora species in the shrub and ground strata. Within the proposed action corridor the AU occupies 2.798 hectares.

The EPBC Act Referral for the proposed action utilised a now outdated habitat mapping model for calculating the area of Koala and Grey-headed Flying-fox habitat located within the impact area. In association with the habitat assessment exercise the extents of Koala and Grey-headed Flying-fox were refined as follows:

REMNANT RE: 12.11.24 ASSESSMENT UNIT 1 (IAU1): This assessment unit is reflective of one of the characteristic Eucalypt Forests/Woodlands of the eastern Gold Coast and characterized by a variety of Stringybarks, Pink Bloodwood, Grey Ironbark and other less abundant coastal eucalypts on metamorphosed sedimentary rock of moderate fertility. Within the proposed action corridor, the AU occupies 27.9ha for Koala and 23.32ha for Grey-headed Flying-fox in nine mostly remnant patches ranging from 0.3ha to 9.6ha.

REMNANT RE: 12.11.25 ASSESSMENT UNIT 2 (IAU2): This assessment unit occurs in similar coastal areas to AU1 but tends to occupy hilltops and slopes on poorer quality soils where the Large-leaved Spotted Gum and Large-leaved Ironbark (in some cases Narrow-leaved Red Ironbark) dominate over Stringybarks and Bloodwoods. As they tend to occur within the same range within the eastern Gold Coast AU1 and AU2 are strongly ecotonal and tend to form heterogeneous polygons. Within the proposed action corridor, the AU occupies 20.56ha for Koala and 20.09ha for Grey-headed Flying-fox in eleven mostly remnant patches ranging from 0.28ha to 6.8ha.

REMNANT RE: 12.11.23 ASSESSMENT UNIT 3 (IAU3): This assessment unit is another variety of coastal Eucalypt Forest/Woodlands tending toward a simple rather than complex arrangement due to its dominance of a single species being Blackbutt. Other eucalypt species tend to always occur but in vastly lower relative abundance. Within the proposed action corridor, the AU occupies 15.31ha for Koala and Grey-headed Flying-fox in nine mostly remnant patches ranging from 0.12ha to 4.85ha.

REGROWTH/REMNANT RE: 12.3.11/20 ASSESSMENT UNIT 4 (IAU4): This assessment unit occurs on quaternary alluvial deposits and may include palustrine swamp although such is scarce within the investigated area. Canopy trees are occupied by Blue Gums, Grey Ironbarks and Pink Bloodwoods with areas closer to tidal wetlands containing less Ironbark and Bloodwood and tending to incorporate Swamp Oak before transitioning to Swamp Oak Forest proper which is abundant in the locality. This type of habitat has been extensively cleared and fragmented within the eastern Gold Coast to make way for farming (historical) and urban development (current) as it primarily occurs on very flat topography. Within the proposed action corridor, the AU occupies 10.04ha for Koala and Grey-headed Flying-fox in eight mostly regrowth or unmapped non-remnant patches ranging from 0.07 ha to 3.3ha.

Table 3.2 provides a summary of the impact assessment units.

Table 3.2. Proposed action corridor impact assessment units

Impact Assessment Unit	Vegetation Management Status	Regional Ecosystem	Direct Impact Area Hectares	Number of BioCondition Sites
Coastal Swamp Oak TEC				
IAU1	Remnant	12.1.1	11.75	2
IAU2	Remnant	12.1.1	0.4667	2
IAU3	Remnant/Regrowth	12.1.1	2.798	2
Koala				
IAU1	Remnant	12.11.24	27.9	2
IAU2	Remnant	12.11.15	20.56	2
IAU3	Remnant	12.11.23	15.31	2
IAU4	Remnant/Regrowth	12.3.11/20	10.04	3
Grey-headed Flying-fox				
IAU1	Remnant	12.11.24	23.32	2
IAU2	Remnant	12.11.15	20.09	2
IAU3	Remnant	12.11.23	15.31	2
IAU4	Remnant/Regrowth	12.3.11/20	10.04	3

3.1.4 Methodology for Habitat Quality Scoring

MNES to be impacted by the proposed action were subject to habitat quality assessment in accordance with SOQ (2020) *'Guide to determining terrestrial habitat quality: A toolkit for assessing land-based offsets under the Queensland Environmental Offsets Policy Version 1.3.*' Habitat quality was assessed using a combination of indicators that measure the overall viability of the site and its capacity to support a prescribed environmental matter. The method for assessing habitat quality is designed to be simple and repeatable. The process starts with a desktop assessment to assess the landscape-scale attributes of the impact or offset site. An on-ground assessment is then undertaken at the impact site, which results in a score of habitat quality for each matter area (SOQ 2020). The methodology implemented in performing the habitat quality assessments is contained within Eyre *et al.* (2015) - *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2.*

The DSEWPC (2012) document 'how to use the offsets assessment guide' states that '*it is important to note that the assessment of quality for threatened species habitat and ecological communities is not simply a scoring of vegetation 'pristineness*'. Rather, there are three components that contribute to the calculation of habitat quality:

Site condition: This is the condition of a site in relation to the ecological requirements of a threatened species or ecological community. This includes considerations such as vegetation condition and structure, the diversity of habitat species present, and the number of relevant habitat features.

Site context: This is the relative importance of a site in terms of its position in the landscape, taking into account the connectivity needs of a threatened species or ecological community. This includes considerations such as movement patterns of the species, the proximity of the site in relation to other areas of suitable habitat, and the role of the site in relation to the overall population or extent of a species or community.

Species stocking rate: This is the usage and/or density of a species at a particular site. The principle acknowledges that a particular site may have a high value for a particular threatened species, despite appearing to have poor condition and/or context. It includes considerations such as survey data for a site in regards to a particular species population or, in the case of a threatened ecological community this may be a number of different populations. It also includes consideration of the role of the site population in regards to the overall species population viability or community extent.

These components contribute to the final habitat quality score; however, the weighting given to each component is dependent on the ecological requirements of the impacted species or ecological community.

The approaches to developing habitat quality and stocking rate scores for the Coastal Swamp Oak TEC, Koala and Grey-headed Flying-fox are described in detail in the PER and are summarised in the Sections 3.1.5- 3.1.7 below.

3.1.5 Impact Area Habitat Quality Scoring for Coastal Swamp Oak TEC

Habitat quality at an impact or offset matter area is assessed in accordance with the Queensland Herbarium's BioCondition Assessment Manual method for assessing site-based attributes. In the BioCondition Assessment Manual, site-based attributes are scored relative to a 'benchmark', which is a document containing site-based attribute measurements for vegetation within a particular regional ecosystem in an undisturbed state with most of its natural values intact. The Queensland Herbarium has developed BioCondition benchmarks for regional ecosystems across Queensland. This assessment results in a habitat quality score out of 10 for the entire matter area. A maximum score of 10 represents a fully-intact regional ecosystem' (SQO, 2020: 11).

To obtain the habitat quality scores against the issued benchmark for Regional Ecosystem 12.1.1 the weightings documented within the Biocondition Manual (Eyre *et al.* 2015) for fragmented subregions were utilised as shown in the table below and the resulting scores are summarised in Section 3.2.1.

	Attribute	Weighting (%)
Site-based condition attributes	Large trees	15
	Tree canopy height	5
	Recruitment of canopy species	5
	Tree canopy cover (%)	5
	Shrub layer cover (%)	5
	Coarse woody debris	5
	Native plant species richness for four lifeforms	20
	Non-native plant cover	10
	Native perennial grass cover (%)	5
	Litter cover	5
Landscape attributes (fragmented subregions[3])	Size of patch	10
	Context	5
	Connectivity	5
OR Landscape attributes (intact subregions)	Distance to permanent water	20
TOTAL		100

3.1.6 Impact Area Habitat Quality and Stocking Rate Scoring for Koala

Site condition and site context values for Koala were determined using the methods outlined in Section 3.1.4 and were equally weighted at 30% each of the overall habitat scores assigned.

Site Condition scoring followed the method described in the BioCondition Assessment Manual (Eyre *et al.* 2015) for the assessment of site-based attributes. In association with this assessment under the EPBC Act policy guidelines, an additional two attributes (quality and availability of food and foraging habitat, and quality and availability of shelter) were included as follows, each with a maximum score of 10 and in total comprising 20% of the site condition score. The site information utilised to assess these additional two specific Koala habitat attributes were sourced from the BioCondition assessments performed and the flora surveys to date which included >100 field assessment sites.

Quality and availability of food and foraging habitat:

ATTRIBUTE	SCORE	DESCRIPTION
QUALITY AND AVAILABILITY OF FOOD AND FORAGING HABITAT	1 LOW	Minimum of one eucalypt species present (including species from the genera *Eucalyptus, Corymbia, Angophora* and *Lophostemon*) that is known from the RE but does not include at least one preferred koala food tree known from within the region AND <50% of the RE benchmark for attributes number of large trees
	5 MODERATE	Minimum of one eucalypt species present (including species from the genera *Eucalyptus, Corymbia, Angophora* and *Lophostemon*) that are known from the RE AND includes at least one preferred koala food tree known known from within the region AND >50% of the RE benchmark for attributes number of large trees OR koala food tree species known to support koalas within the region that alone accounts for >50% of the canopy
	10 HIGH	Minimum of two eucalypt species present (including species from the genera *Eucalyptus, Corymbia, Angophora* and *Lophostemon*) that are known from the RE AND includes at least two preferred koala food trees known from within the region AND >70% of the RE benchmark for attributes number of large trees OR koala food tree species known to support koalas within the region that alone accounts for >70% of the canopy

Quality and availability of shelter:

ATTRIBUTE	SCORE	DESCRIPTION/JUSTIFICATION
QUALITY AND AVAILABILITY OF SHELTER	1 LOW	Minimum of one eucalypt species present (including species from the genera *Eucalyptus, Corymbia, Angophora* and *Lophostemon*) that is known from the RE, with limited sheltering or dispersal habitat potential for the species. <30% of the RE benchmark for attributes number of large trees and/or canopy cover and/or canopy height and/or is non-remnant vegetation
	5 MODERATE	Minimum of one eucalypt species present (including species from the genera *Eucalyptus, Corymbia, Angophora* and *Lophostemon*) that is known from the RE, and provides known habitat features for the species including large trees likely to support shelter and/or dispersal habitat for koalas. AND >50% of the RE benchmark for at least two of the three following attributes: – number of large trees – canopy cover – canopy height.
	10 HIGH	Minimum of two eucalypt species present (including species from the genera *Eucalyptus, Corymbia, Angophora* and *Lophostemon*) that is known from the RE, and provides known habitat features for the species including large trees likely to support shelter and/or dispersal habitat for koala AND >70% of the RE benchmark for at least two of the three following attributes: – number of large trees – canopy cover – canopy height.

Scoring for site context (30%) included the three BioCondition (Eyre et al. 2015) landscape-scale attributes: Patch size, Connectivity and Context.

Advice from DCCEEW was that these context-related measures should be specific to Koala, and include breeding, foraging and dispersal habitat. The method described below has been applied to context scoring for both the impact and offset areas.

Statutory documentation for Koala indicates that local information must be used when determining Koala habitat. For this reason, either Queensland state reporting or scientific publications that describe Koala food and shelter habitat in the south-east Queensland (SEQ) region were used to collate information and classify Koala habitat.

REs were classified as Koala habitat primarily based on the report: Spatial Modelling for Koalas in South East Queensland v2.0 (DES, 2021). In particular, REs ranked as High and Medium koala suitability were automatically incorporated as Koala habitat, and REs ranked as Low suitability were examined to determine whether dominant vegetation included known food trees of Koala in SEQ (as per Callaghan 2011, and the Coomera and North Stradbroke Island sites in Melzer *et al*. 2014). REs that did not fit these criteria were excluded as Koala habitat. Koala habitat was then classified as either:

- Koala food and shelter habitat – remnant and regrowth vegetation with Koala suitable REs, or
- Koala dispersal habitat – non-remnant/cleared vegetation with the state pre-clear mapping indicating suitable Koala suitable REs.

For all classifications, the ground-truthed vegetation mapping was used within the offset properties, and the Queensland state mapping outside of offset properties.

Scoring of the GIS analysis results is consistent with the BioCondition context scoring categories as follows:

Patch size:

Description	Score
<5 ha Koala breeding/foraging/dispersal habitat	0
≥5-25 ha Koala breeding/foraging/dispersal habitat	2
≥25-100 ha Koala breeding/foraging/dispersal habitat	5
101-200 ha Koala breeding/foraging/dispersal habitat	7
≥200 ha Koala breeding/foraging/dispersal habitat	10

Connectivity:

Category	Description	Score
Low	The assessment unit is not connected using any of the below descriptions.	0
Medium	The assessment unit: • is connected with adjacent Koala breeding/foraging habitat along >10% to <50% of its perimeter **OR** • is connected with adjacent Koala breeding/foraging habitat along <10% of its perimeter **AND** is connected with adjacent Koala dispersal habitat >25% of its perimeter.	2
High	The assessment unit: • is connected with adjacent Koala breeding/foraging habitat along 50% to 75% of its perimeter.	4
Very High	The assessment unit: • is connected with adjacent Koala breeding/foraging habitat along >75% of its perimeter **OR** • includes >500 ha Koala breeding/foraging habitat.	5

Context:

Category	Description	Score
Low	• <10% Koala breeding/foraging habitat **AND** <30% Koala dispersal habitat vegetation	0
Medium	The assessment unit: • >10% to 30% Koala breeding/foraging habitat **AND** <30% Koala dispersal habitat **OR** • <10% Koala breeding/foraging habitat **AND** ≥30% Koala dispersal habitat.	2
High	The assessment unit: • ≥30% to 75% Koala breeding/foraging habitat **OR** • ≥10% to 30% Koala breeding/foraging habitat **AND** ≥30% Koala dispersal habitat.	4
Very High	The assessment unit: • ≥75% Koala breeding/foraging habitat	5

In addition to patch size, connectivity and context, scores were prescribed for ecological corridors, role of site location to overall QLD population, species mobility capacity, and absence of threats. See scoring tables as follows.

Ecological corridors

5 Ecological corridors	Score	0	4	6
	Description	Not within	Sharing a common boundary	Within (whole or part)

Role of site location to species overall population in the state

ATTRIBUTE	SCORE	DESCRIPTION
ROLE OF SITE LOCATION TO SPECIES OVERALL POPULATION IN THE STATE	1: LOW	Not or unlikely to be critical to species' survival
	4: MODERATE	Likely to be critical to species' survival
	5: HIGH	Critical to species survival

Species Mobility Capacity

ATTRIBUTE	SCORE	DESCRIPTION
SPECIES MOBILITY CAPACITY	1 Severely restricted (76–100% reduction)	The site is functionally isolated from other appropriate habitat for the species, with much of the landscape considered a barrier to species mobility, including natural barriers (e.g. mountain ranges, unsuitable habitats, major rivers/water bodies) and/or artificial barriers (e.g. such as roads, rail, mines), or developments that create treeless areas more than 2 km wide. The site is small compared with the known habitat known or likely to support the species. The site is generally representative of one likely to only support a residual population, with little opportunity for dispersal from source metapopulations.
	4 Highly restricted (51–75% reduction)	The site is likely isolated to regular movement of the species into or out of habitat contiguous to the site, resulting in the site only likely to support a residual population or, at best, a sink population, with very irregular dispersal from nearby populations.
	7 Moderately restricted (26–50% reduction)	The site is representative of a stepping stone in the landscape between other patches of appropriate habitat for the species, with potential regular movement of the species into or out of habitat contiguous to the site, OR Given the presence of appropriate habitat, the site is large enough to likely support a self-sustaining population either representative of a source metapopulation, or a nearby satellite population.
	10 Minor restriction (0–25% reduction)	Movement by the species into and out of the site is not limited by barriers, or the site is sufficiently large to support a known source population of a likely or known metapopulation in the landscape.

The EPBC Koala Conservation Advice (DoE, 2015) identifies four main threats to the continued survival of the Koala:

- fragmentation of habitat;
- vehicle strike;
- disease; and
- predation by dogs.

These threats were used to inform the following table for scoring absence of threats at the impact site.

ATTRIBUTE	SCORE	DESCRIPTION
ABSENCE OF THREATS	1 VERY LOW	Known presence of wild/domestic dogs on site and within adjacent properties and evidence of predation commonly known, documented or observed Public vehicle access to site and/or proximate areas with evidence of death through vehicle strike commonly observed, documented or likely. High to moderate levels of koala disease (i.e. Chlamydiosis) is known, observed or documented from the site or adjoining interconnected habitats
	5 LOW	Known presence of wild/domestic dogs on site and within adjacent properties and evidence of predation occasionally known, documented or observed Public vehicle access to site and/or proximate areas with evidence of death through vehicle strike occasionally observed, documented or likely. Moderate levels of koala disease (i.e. Chlamydiosis) is known, observed or documented from the site or adjoining interconnected habitats
	10 MEDIUM	Known presence of wild/domestic dogs on site and within adjacent properties and limited or low evidence of predation known, documented or observed Public vehicle access to site and/or proximate areas with evidence of death through vehicle strike sporadically observed or documented. Low levels of koala disease (i.e. Chlamydiosis) is known, observed or documented from the site or adjoining interconnected habitats
	15 HIGH	No known or observed evidence of predation from wild/domestic dogs. Few roadways in proximate areas and/or reduced speed limits in place and/or driver awareness and/or signs to identify species habitat and/or exclusion fencing to prevent koalas accessing road and no evidence of vehicle strike via observation or documentation No evidence koala disease (i.e. Chlamydiosis) from the site or adjoining interconnected habitats

The impact area stocking rate scoring method applied to the impact area had components that were not suitable to measure threatening factors of the proposed offset sites across the Assessment Units. An alternative threat scoring matrix (Table 8.9) was developed, highlighting

relevant threats to the species and corresponding threat levels which was then applied to both the impact and offset sites to ensure consistency in scoring methodology.

The remaining 40% was ascribed to species stocking rate for Koala.

Queensland's *Guide to determining terrestrial habitat quality V1.3* identifies the need to consider three characteristics when determining species stocking rate in relation to the Koala:

- What is the presence of the species on the site? (i.e. confirmed / modelled).
- What is the density of species known to utilise the site?
- What is the role of the site population in regards to the overall species population?

For the impact site, baseline Koala activity levels were determined by utilising the Koala (Scat) Spot Assessment Technique (Phillips *et al.* 2011) and Strip Transect (Dique *et al.* 2003). Data obtained from these surveys were scored through a comparison to benchmarks of measures obtained from the available published scientific literature for koala populations within the region of the impact site.

Koala stocking rate attributes scoring:

KOALA STOCKING RATE ATTRIBUTES	Maximum score benchmark (weighting %)
Spot Assessment Technique Surveys	10
Strip-Transect Surveys	10
Stocking Rate Score: Koala Habitat / 20	20
OVERALL WEIGHTING TOWARD HABITAT SCORE	40%

Due to steep terrain and unfavourable weather which resulted in access issues at the Tabooba offset site, strip transect surveys were unable to be undertaken during field visits and therefore the above scoring table applied at the impact site could not be utilised as a consistent measure of stocking rate between the impact and offset sites. An alternative assessment of species stocking rate (shown below) was applied to the offset sites, utilising drone survey data to determine Koala density per hectare. This same assessment was applied to the impact site to ensure consistency in methodology with the most current Koala density per AU estimated based on the latest (August 2022) Koala monitoring data supplied by EVE, where the locations of all Koalas north of the Smith Street interchange were recorded on a single day – replicating the accuracy of drone surveys. Koala density was then measured as occurrence of Koalas within each AU at the time of survey. The resulting density estimates were scored as a percentage of the benchmark population density (0.23/ha) from the Coombabah/Parkwood Population Study (Biolink 2017).

Species Stocking Rate (SSR)					
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0	5	10	
		No	Yes - adjacent	Yes - on site	
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15
		Not habitat	Dispersal	Foraging	Breeding
Approximate density (per ha)	Score	0	10	20	30
		Not habitat	1-50%	51-85%	86-100%
Role/importance of species population on site*	Score (Total from supplementary table below)	0	5	10	15
			5 - 15	20 - 35	40 - 45
Total SRR score (/ 70) **SRR Score (out of 4)**					

*SSR Supplementary Table			
*Key source population for breeding	Score	0	10
		No	Yes/ Possibly
*Key source population for dispersal	Score	0	5
		No	Yes/ Possibly
*Necessary for maintaining genetic diversity	Score	0	15
		No	Yes/ Possibly
*Near the limit of the species range	Score	0	15
		No	Yes

The resulting scores for all attributes are summarised in Section 3.2.2.

3.1.7 Impact Area Habitat Quality and Stocking Rate Scoring for Grey-headed Flying-fox

Site condition and site context values for Grey-headed Flying-fox were determined using the methods outlined in Section 3.1.4. Site condition was weighted at 40%, site context at 30%, and species stocking rate at 30% of the overall habitat scores assigned.

An additional three attributes, together contributing a maximum of 50 points towards the total site condition score out of 130, were included in the site condition assessment to quantify quality and availability of Grey-headed Flying-fox food and foraging habitat:

- Foraging habitat tree species flower scores (score out of 10)
- Foraging habitat tree species richness (score out of 20), and
- Significant foraging habitat tree species richness (score out of 20).

Foraging habitat tree flower scores:

Eby and Law (2008) identified that temporal and spatial flowering patterns and productivity of Grey-headed Flying-fox diet species are significant components of the assessment of the relative importance of feeding habitat. They consider that a high-quality diet species is one that:

- has the potential to be highly productive,
- is annually reliable in its productivity (reducing searching behaviour and the likelihood of food shortages), and
- is productive for lengthy periods (reducing the likelihood of food shortages) (Eby and Law 2008)

In association with the impact site habitat assessment, the ‘flower score’ attribute was assessed by cross referencing the flower scores documented within Eby and Law (2008) against the tree species richness data collected during the biocondition field assessments. The individual scores for the recorded Grey-headed Flying-fox foraging tree species were summed and then divided by the total number of tree species (Grey-headed Flying-fox diet/foraging trees and all other trees) recorded to determine an average score for the assessment site.

The average score was then compared to the flower scores ranges within the referenced publication (Eby and Law, 2018) which were utilised as the benchmark as shown in the following table.

ATTRIBUTE SCORE	DESCRIPTION
2	0.01-0.25 flower score per Eby and Law (2008)
5	0.26-0.50 flower score per Eby and Law (2008)
8	0.51-0.75 flower score per Eby and Law (2008)
10	0.76-1.0 flower score per Eby and Law (2008)

Foraging habitat tree species richness:

Grey-headed Flying-fox foraging/diet tree species are documented within Eby and Law (2008), Eby *et al.* (2019) and DAWE (2021). In association with the biocondition assessments performed, this condition attribute was determined by a count of the number of assigned diet/foraging tree species described within the referenced scientific literature for the Grey-headed Flying-fox with scores apportioned as shown in the following table.

ATTRIBUTE SCORE	DESCRIPTION
0	0 GHFF foraging tree species
5	1-2 GHFF foraging tree species
10	3-4 GHFF foraging tree species
15	5-6 GHFF foraging tree species
20	>6 GHFF foraging tree species

Significant foraging habitat tree species richness:

Eby and Law (2008) nominate tree species as being 'significant food plants' for the Grey-headed Flying-fox where the calculated flower score is greater than 0.65. The flower score calculation is briefly described below as sourced from the referenced scientific documentation:

*Wt p*r [flower score] = (productivity)0.7 * (reliability)0.3*

Productivity and reliability describe different aspects of flowering in a tree species. The two scores were combined to create a single value which could be used to score the overall characteristics of individual species within vegetation types. Productivity was weighted more highly than reliability in the calculation because Grey-headed Flying-fox are mobile over large areas enabling them to access rich, but unreliable resources (Eby and Law 2008).

Tree Flowering Productivity is a function of the maximum abundance of resource available to Grey-headed Flying-foxes from an individual tree, and the spatial synchrony of flowering of the tree species in the local area (Eby and Law 2008).

Tree Flowering reliability: Australian trees vary substantially in the consistency with which they flower from year to year, and the reliability of a plant moderates its productivity through time (over many years). Reliability is a measure of the frequency of substantial flowering events. It is a function of annual frequency and the proportion of flowering events that produce significant resources for Grey-headed Flying-fox. Diet species that flower reliably are likely to be of particular importance at times when many other species fail to flower for environmental reasons (Eby and Law 2008).

In association with the biocondition assessments performed, this condition attribute was determined by a count of the number of assigned significant diet/foraging trees described within the referenced scientific literature for the Grey-headed Flying-fox.

As identified within SHG (2020), Eby and Law (2008) do not assign a flowering score (and therefore a determination of significance) to *Eucalyptus crebra* which was recorded on the site. As this species has been identified as a significant winter flowering food species (by DAWE, 2021) it has automatically been assigned as a significant Grey-headed Flying-fox foraging trees species in association with this habitat assessment. Scores apportioned on the basis of flowering productivity are shown in the table below.

ATTRIBUTE SCORE	DESCRIPTION
0	0 significant GHFF foraging tree species
5	1-2 significant GHFF foraging tree species
10	3-4 significant GHFF foraging tree species
15	5-6 significant GHFF foraging tree species
20	>6 significant GHFF foraging tree species

Site context attributes were amended from the standard measures to include distance to flying-fox camps to determine the role of the site location to overall Queensland Grey-headed Flying-fox population, with scores as indicated in the following table.

ATTRIBUTE SCORE	DESCRIPTION
0	0 active level 3 Grey-headed Flying-fox camp within a 20 km radius
2	1 active level 3 Grey-headed Flying-fox camp within a 20 km radius
4	2 active level 3 Grey-headed Flying-fox camp within a 20 km radius
6	3 active level 3 Grey-headed Flying-fox camp within a 20 km radius
8	4 active level 3 Grey-headed Flying-fox camp within a 20 km radius
10	> 4 active level 3 Grey-headed Flying-fox camp within a 20 km radius

The threat assessment conducted by Planit (2021) considered:

- Habitat loss
- Camp disturbance
- Mortality in commercial fruit crops
- Heat stress
- Entanglement in netting and barbed wire fencing
- Climate change
- Bushfires
- Electrocution on power lines
- Public misunderstanding of disease risk

Attribute scoring applied for threats is shown in the table below.

ATTRIBUTE SCORE	DESCRIPTION
2	Very High: The threat is likely to be pervasive in its scope, affecting the species' habitat or the species' local population across all or most (80-100%) of its occurrence or population within the area
4	High: The threat is likely to be widespread in its scope, affecting the species' habitat or the species' local population across a majority (60-79%) of its occurrence or population within the area
6	Medium: The threat is likely to be restricted in its scope, affecting the species' habitat or the species' local population across some (40-59%) of its occurrence or population within the area.
8	Low: The threat is likely to be narrow in its scope, affecting the species' habitat or the species' local population across small proportion (20-39%) of its occurrence or population within the area.
10	Very Low: The threat is likely to be very narrow in its scope, affecting the species' habitat or the species' local population across a negligible proportion (1-19%) of its occurrence or population within the area.

This scoring method was found to have subjective elements and limited ability to measure threatening factors across AUs at the offset sites. An alternative threat scoring matrix (Table 9.7) highlighting relevant threats to the species and corresponding threat level was applied at the offset

sites and was used to re-score the impact site to ensure consistency in scoring methodology across the impact and offset habitat quality assessments.

The remaining 30% of the total score was ascribed to species stocking rate for Grey-headed Flying-fox.

No nationally important camps were found to occur within and/or adjacent the proposed action corridor although one nationally important camp is present within 20km (DSEWPC, 2012; DAWE, 2021 – see chapter 5 of the PER). As such the species stocking rate component of the habitat assessment provided an additional measure of potential foraging habitat (in addition to the site condition component) for the Grey-headed Flying-fox.

Four attributes were assessed in association with the stocking rate component of the Grey-headed Flying-fox habitat assessment:

- Abundance of large trees
- Abundance of Grey-headed Flying-fox Foraging canopy trees
- Abundance of significant Grey-headed Flying-fox foraging canopy trees
- Timing of biological shortages for tree species

Attribute scoring for each is provided in the following tables.

Abundance of large trees:

ATTRIBUTE SCORE	DESCRIPTION
0	No large trees present
2	1-25% of Large Tree Benchmark for relevant RE
4	26-50% of Large Tree Benchmark for relevant RE
6	51-75% of Large Tree Benchmark for relevant RE
8	76-100% of Large Tree Benchmark for relevant RE
10	>100% of Large Tree Benchmark for relevant RE

Abundance of Grey-headed Flying-fox foraging canopy trees:

ATTRIBUTE SCORE	DESCRIPTION
0	No GHFF Foraging Trees Present
2	1-25% of GHFF Foraging Tree Abundance Benchmark for relevant RE
4	>25-50% of GHFF Foraging Tree Abundance Benchmark for relevant RE
6	>50-75% of GHFF Foraging Tree Abundance Benchmark for relevant RE
8	>75-100% of GHFF Foraging Tree Abundance Benchmark for relevant RE
10	>100% of GHFF Foraging Tree Abundance Benchmark for relevant RE

Abundance of significant foraging canopy species:

ATTRIBUTE SCORE	DESCRIPTION
0	No GHFF Significant Foraging Trees Present
2	1-25% of GHFF Significant Foraging Tree Abundance Benchmark for relevant RE
4	>25-50% of GHFF Significant Foraging Tree Abundance Benchmark for relevant RE
6	>50-75% of GHFF Significant Foraging Tree Abundance Benchmark for relevant RE
8	>75-100% of GHFF Significant Foraging Tree Abundance Benchmark for relevant RE
10	>100% of GHFF Significant Foraging Tree Abundance Benchmark for relevant RE

Biological shortages:

ATTRIBUTE SCORE	DESCRIPTION
3	Presence of flowering resources during food shortages biological period
1.5	Presence of flowering resources during pregnancy and birth biological period
1.5	Presence of flowering resources during lactation biological period
1.5	Presence of flowering resources during mating and conception biological period
1.5	Presence of flowering resources during migration paths biological period
1	Presence of flowering resources during fruit industries biological period
10 [total]	COMBINE ALL SCORES

The contribution of each attribute to the Stocking Rate score is shown in the table below.

GHFF STOCKING RATE ATTRIBUTES	Maximum score benchmark (weighting %)
Abundance of Large Trees	10
Abundance of GHFF Foraging Canopy Trees	10
Abundance of Significant GHFF Foraging Canopy Trees	10
Timing of GHFF Biological Resources	10
Stocking Rate Score: GHFF Habitat / 40	40
OVERALL WEIGHTING TOWARD HABITAT SCORE	30%

Field data collection at the offset sites did not record abundance of foraging canopy trees and significant foraging trees as separate records, and after considering the limited input of these attributes to the overall impact site habitat quality score it was decided to remove them from the impact and offset scoring to ensure consistency in assessment methodology. An adjusted scoring table for stocking rate accounting for this change is provided below.

GHFF STOCKING RATE ATTRIBUTES	Maximum score benchmark (weighting %)
Abundance of Large Trees	10
Timing of GHFF Biological Resources	10
Stocking Rate Score: GHFF Habitat / 20	20
OVERALL WEIGHTING TOWARD HABITAT SCORE	30%

The resulting scores for all attributes are summarised in Section 3.2.3.

3.2 IMPACT ASSESSMENT TABLES

3.2.1 Coastal Swamp Oak TEC Assessment Table

COASTAL SWAMP OAK TEC **HABITAT QUALITY SCORE = 8.33** **ROUNDS TO 8/10**

Assessment Unit - Regional Ecosystem	IAU1 - RE 12.1.1 Remnant									IAU2 - RE 12.1.1 Remnant									IAU3 - RE 12.1.1 Remnant/Regrowth								
Site Reference	Benchmark	SO5 Category A			SE-SO6 Category A			Average % benchmark	Average Score	Benchmark	SO17 Category A			SO18 Category A			Average % benchmark	Average Score	Benchmark	SO3 Category B			SO9 Category C			Average % benchmark	Average Score
	12.1.1	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.1.1	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.1.1	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition																											
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5	100	100	100.0	5	100	100.0	5	100.0	5	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	1	2	200.0	5	1	100.0	5	150.0	5	1	1	100.0	5	1	100.0	5	100.0	5	1	4	400.0	5	4	400.0	5	400.0	5
Native plant species richness - shrubs	1	1	100.0	5	1	100.0	5	100.0	5	1	2	200.0	5	2	200.0	5	200.0	5	1	1	100.0	5	1	100.0	5	100.0	5
Native plant species richness - grasses	2	1	50.0	2.5	3	150.0	5	100.0	5	2	1	50.0	2.5	1	50.0	2.5	50.0	2.5	2	2	100.0	5	2	100.0	5	100.0	5
Native plant species richness - forbs	3	8	266.7	5	6	200.0	5	233.3	5	3	6	200.0	5	3	100.0	5	150.0	5	3	5	166.7	5	2	66.7	2.5	116.7	5
Tree canopy height	12	13.8	115.0	5	13.8	115.0	5	115.0	5	12	15.1	125.8	5	13.4	111.7	5	118.8	5	12	11.8	98.3	5	14.6	121.7	5	110.0	5
Tree subcanopy height	7	6.7	95.7	5	6.8	97.1	5	96.4	5	7	6.8	97.1	5	5.8	82.9	5	90.0	5	7	5.5	78.6	5	7.1	101.4	5	90.0	5
Tree canopy height (average of emergent, canopy, sub-canopy)	9.5	10.25	107.9	5	10	108.4	5	108.2	5	9.5	10.95	115.3	5	9.6	101.1	5	108.2	5	9.5	8.65	91.1	5	10.85	114.2	5	102.6	5
Tree canopy cover (EDL)	67	68	101.5	5	70.4	105.1	5	103.3	5	67	45	67.2	5	62.6	93.4	5	80.3	5	67	87.6	130.7	5	60	89.6	5	110.1	5
Subcanopy cover	23	17.6	76.5	5	19.8	86.1	5	81.3	5	23	32.4	140.9	5	14.4	62.6	5	101.7	5	23	12.2	53.0	5	50	217.4	3	135.2	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	42.8	95.1	5	45	100.2	5	97.7	5	45	38.7	86.0	5	38.5	85.6	5	85.8	5	45	49.9	110.9	5	55	122.2	5	116.6	5
Shrub canopy cover	5	4.4	88.0	5	2.8	56.0	5	72.0	5	5	10	200.0	5	15.4	308.0	3	254.0	3	5	0	0.0	0	0	0.0	0	0.0	0
Native grass cover	85	9	10.6	1	41	48.2	1	29.4	1	85	79	92.9	5	92.6	108.9	5	100.9	5	85	37	43.5	1	4	4.7	0	24.1	1
Organic litter	5	48	960.0	3	51	1020.0	3	990.0	3	5	25	500.0	3	5.4	108.0	5	304.0	3	5	48	960.0	3	67	1340.0	3	1150.0	3
Total large trees per hectare	92	55	59.8	10	50	54.3	10	57.1	10	92	85	92.4	10	30	32.6	5	62.5	10	92	95	103.3	15	50	54.3	10	78.8	10
Coarse woody debris (m/ha)	360	200	55.6	5	185	51.4	5	53.5	5	360	140	38.9	2	395	109.7	5	74.3	5	360	136	37.8	2	216	60.0	5	48.9	2
Non-native plant cover	0	4		10	2		10	3.0	10	0	2		10	2		10	2	10	0	30		3	75		0	52.5	0
Site Condition Score				66.5			69		69.0				67.5			65.5		68.5				59			50.5		51.0
MAX Site Condition Score				*80*			*80*		*80*				*80*			*80*		*80*				*80*			*80*		*80*
Site Context				Score			Score		Average Score				Score			Score		Average Score				Score			Score		Average Score
Size of patch (ha)				10			10		10				5			5		5				0			10		5
Connectivity				5			5		5				2			2		2				2			5		4
Context				4			4		4				4			4		4				4			4		4
Site Context Score				19			19		19.0				11			11		11				6			19		13
MAX Site Context Score				*20*			*20*		*20*				*20*			*20*		*20*				*20*			*20*		*20*
Total habitat quality score /100				**85.50**			**88.00**		**88.00**				**78.50**			**76.50**		**79.50**				**65.00**			**69.50**		**64.00**
MAX Habitat Quality Score				*100*			*100*		*100*				*100*			*100*		*100*				*100*			*100*		*100*

Final habitat quality score (weighted)	**IAU1**	**IAU2**	**IAU3**	**Final**
Habitat Quality Score (measured /100)	88.00	79.50	64.00	77.17
Habitat Quallity Score (max)	100	100	100	100
Assessment Unit area (ha)	11.75	0.4667	2.798	15.01
Assessment Unit Habitat Quality Score /10	8.80	7.95	6.40	7.72
Size Weighting	0.78	0.03	0.19	
Weighted Habitat Quality Score	***6.89***	***0.25***	***1.19***	***8.33***

Physical impact = 15.01 ha and an additional functional loss impact = 0.918 ha. Total impact = 15.928 ha

From the Offset Assessment Guide, quantum of impact for Coastal Swamp Oak TEC = 15.928 x 0.8 = 12.74 ha

3.2.2 Koala Impact Assessment Table

KOALA | **HABITAT QUALITY SCORE = 7.42** | **ROUNDS TO 7/10**

Assessment Unit - Regional Ecosystem	IAU-1 RE12.11.24 Remnant									IAU-2 RE12.11.25 Remnant										IAU-3 RE12.11.23 Remnant										IAU-4 RE 12.3.11/20 Remnant									
Site Reference	Benchmark	Plot 1			Plot 2			Average % benchmark	Average Score	Benchmark	Plot 3			Plot 4			Average % benchmark	Average Score		Benchmark	Plot 5			Plot 6			Average % benchmark	Average Score		Benchmark	Plot 7			Benchmark	Plot 8			Benchmark	Plot 9			Average % benchmark	Average Score
	12.11.24	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.11.25	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score				12.11.23	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score				12.3.11	Raw Data	% Benchmark	Score	12.3.20	Raw Data	% Benchmark	Score	12.3.11	Raw Data	% Benchmark	Score		
Site Condition																																									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	100.0	5	100.0	5	100	75	75.0	3	100	100.0	5	87.5	5		100	100	100.0	5	100	100.0	5	100.0	5		100	33	33.0	3	100	100	100.0	5	100	100	100.0	5	77.7	5
Native plant species richness - trees	10	8	80.0	2.5	6	60.0	2.5	70.0	2.5	7	13	185.7	5	7	100.0	5	142.9	5		8	9	112.5	5	7	87.5	2.5	100.0	5		7	2	28.6	2.5	4	10	250.0	5	7	10	142.9	5	140.5	5
Native plant species richness - shrubs	8	6	75.0	2.5	5	62.5	2.5	68.8	2.5	8	5	62.5	2.5	6	75.0	2.5	68.8	2.5		12	3	25.0	2.5	4	33.3	2.5	29.2	2.5		7	0	0.0	0	4	5	125.0	5	7	7	100.0	5	75.0	2.5
Native plant species richness - grasses	9	3	33.3	2.5	3	33.3	2.5	33.3	2.5	9	4	44.4	2.5	3	33.3	2.5	38.9	2.5		5	4	80.0	5	4	80.0	2.5	80.0	2.5		12	0	0.0	0	2	2	100.0	5	12	3	25.0	2.5	41.7	2.5
Native plant species richness - forbs	17	7	41.2	2.5	8	47.1	2.5	44.1	2.5	13	10	76.9	2.5	9	69.2	2.5	73.1	2.5		15	6	40.0	2.5	5	33.3	2.5	36.7	2.5		25	3	12.0	0	8	4	50.0	2.5	25	8	32.0	2.5	31.3	2.5
Tree canopy height	26	22	84.6	5	22.0	84.6	5	84.6	5	22	20	90.9	5	22	100.0	5	95.5	5		29	21	72.4	5	24	82.8	5	77.6	5		23	18	78.3	5	16	16	100.0	5	23	22	95.7	5	91.3	5
Tree subcanopy height	10	10	100.0	5	10.0	100.0	5	100.0	5	9	10	111.1	5	8	88.9	5	100.0	5		10	7	70.0	5	12	120.0	5	95.0	5		8	8	100.0	5	8	10	125.0	5	8	12	150.0	5	125.0	5
Tree canopy height (average of emergent, canopy, sub-canopy)	18	16.0	88.9	5	16.0	88.9	5	88.9	5	15.5	15.0	96.8	5	15	96.8	5	96.8	5		19.5	14	71.8	5	18	92.3	5	82.1	5		15.5	13	83.9	5	12	13	108.3	5	15.5	17	109.7	5	100.6	5
Tree canopy cover (EDL)	72	55	76.4	5	66.3	92.1	5	84.2	5	40	36.4	91.0	5	45.9	114.8	5	102.9	5		63	55.8	88.6	5	39.5	62.7	5	75.6	5		56	18	32.1	2	70	13	18.6	2	56	51.5	92.0	5	47.6	2
Subcanopy cover	43	11	25.6	2	16.3	37.9	2	31.7	2	5	52.3	1046.0	3	32	640.0	3	843.0	3		8	6	75.0	5	10	125.0	5	100.0	5		33	8	24.2	2	20	83	415.0	3	33	36	109.1	5	182.8	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	57.5	33	57.4	5	41.3	71.8	5	64.6	5	22.5	44.4	197.1	5	39.0	173.1	5	185.1	5		35.5	30.9	87.0	5	24.75	69.7	5	78.4	5		44.5	13	29.2	2	45	48	106.7	5	44.5	43.75	98.3	5	78.1	5
Shrub canopy cover	7	6.9	98.6	5	6.6	94.3	5	96.4	5	4	15.8	395.0	3	16.7	417.5	3	406.3	3		12	15	125.0	5	9.5	79.2	5	102.1	5		20	0	0.0	0	15	7.8	52.0	5	20	12.5	62.5	5	38.2	3
Native grass cover	39	4.2	10.8	1	6.6	16.9	1	13.8	1	20	16.4	82.0	3	2.2	11.0	1	46.5	1		21	6.4	30.5	1	11.4	54.3	3	42.4	1		44	0	0.0	0	20	5.0	25.0	1	44	31.2	70.9	3	32.0	1
Organic litter	45	95.8	212.9	3	93.4	207.6	3	210.2	3	65	83.6	128.6	5	95.4	146.8	5	137.7	5		56	81.2	145.0	5	75	133.9	5	139.5	5		37	12	32.4	3	30	77	256.7	3	37	36.4	98.4	5	129.2	5
Number of large trees (ha)	33	11	33.3	5	30.0	90.9	10	62.1	10	23	38	165.2	15	62	269.6	15	217.4	15		14	38	271.4	15	24	171.4	15	221.4	15		30	2	6.7	5	165	31	18.8	5	30	16	53.3	10	26.3	5
Coarse woody debris (m/ha)	546	541	99.1	5	470.0	86.1	5	92.6	5	100	470	470.0	2	1260	1260.0	2	865.0	2		480	855	178.1	5	1270	264.6	2	221.4	2		555	20	3.6	0	890	200.0	22.5	2	555	60	10.8	2	12.3	2
Non-native plant cover	0	3		10	5.0		5	4.0	10	0	2		10	1		10	1.5	10		0	10		5	2		10	6.0	5		0	95		0	0	10		5	0	25		5	43.3	3
Quality and availability of food and foraging habitat: Koala				5			5		5				10			10		10.0					5			10	7.5					1				1				5		2.3
Quality and availability of shelter: Koala				10			10		10				10			10		10.0					10			10	10					1				1				10		4
Site Condition Score				69			69		74				83.5			83.5		83.50					81			85	78					22.5				55.5				75		52.8
MAX Site Condition Score				*100*			*100*		*100*				*100*			*100*		*100*					*100*			*100*	*100*					*100*				*100*				*100*		*100*
Site Condition Score - out of 3				**2.07**			**2.07**		**2.22**				**2.51**			**2.51**		**2.51**					**2.43**			**2.34**	**2.34**					**0.68**				**1.67**				**2.25**		**1.59**
Site Context			Value	Score		Value	Score	Average	Average Score			Value	Score		Value	Score	Average	Average score				Value	Score		Value	Score	Average	Average Score				Value	Score			Value	Score			Value	Score	Average	Average Score
Size of patch (ha)																																											
Koala habitat (foraging/breeding/dispersal)			49	5		13.24	2	31.1	5			443.88	10		28.07	5	236.0	10				28.07	5		443.88	10	235.98	10				74.45		5		70.44	5			70.44	5	71.78	5
Connectivity																																											
Foraging/breeding habitat			0.0			6.63		3.3				14.95			48.23		31.6					21.79			30.84		26.31					0.00				0.00				0.00		0.00	
Dispersal habitat			100.0	2		93.37	2	96.7	2			85.03	2		22.16	2	53.6	2				49.69	2		69.16	2	59.42	2				100.00		2		100.00	2			94.64	2	98.21	2
Context																																											
Foraging/breeding habitat			4.27			1.56		2.9				23.25			20.95		22.1					19.58			30.91		25.25					2.70				3.18				12.75		6.21	
Dispersal habitat			57.85	2		58.84	2	58.3	2			71.54	4		69.47	4	70.5	4				70.87	4		61.22	4	66.05	4				38.85		2		72.86	2			79.60	4	63.77	2
Ecological Corridors				6			6		6				6			6		6					6			6	6						4				4			6		4.0
Role of site location to species overall population in the state				5			5		5				5			5		5					5			5	5						5				5			5		5.0
Absence of threats *				5			5		5				5			5		5					5			5	5						0				1			4		0.0
Species mobility capacity				7			7		7				10			10		10					10			10	10						4				10			10		7.0
Site Context Score				32			29		30.5				42			37		39.5					37			42	39.5					13				29				36		26
MAX Site Context Score				*56*			*56*		*56*				*56*			*56*		*56*					*56*			*56*	*56*					*56*				*56*				*56*		*56*
Site Context Score - out of 3				**1.71**			**1.55**		**1.63**				**2.25**			**1.98**		**2.12**					**1.98**			**2.25**	**2.12**					**0.70**				**1.55**				**1.93**		**1.39**

	IAU-1 RE12.11.24 Remnant									IAU-2 RE12.11.25 Remnant										IAU-3 RE12.11.23 Remnant										IAU-4 RE 12.3.11/20 Remnant									
	Koala density	Plot 1			Plot 2			Average Score		Koala density	Plot 3			Plot 4			Average Score			Koala density	Plot 5			Plot 6			Average Score			Koala density	Plot 7			Plot 8			Plot 9			Average Score	
Species Stocking Rate (SSR) **	0.23/ha			Score			Score			0.23/ha			Score			Score				0.23/ha			Score			Score				0.23/ha			Score			Score			Score		
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10		10				10			10		10					10			10	10					10				10				10		10
Species usage of the site (habitat type & evidenced usage)				15			15		15				15			15		15					15			15	15					15				15				15		15
Approximate density (per ha)	1.25			30			30		30	0.46			30			30		30		0.23			30			30	30		1.39			30				30				30		30
Role/importance of species population on site				5			5		5				5			5		5		5			5			5	5					5				5				5		5
Total SRR score (out of 70)				60			60		60				60			60		55					60			60	60					60				60				60		60
Max SRR Score				*70*			*70*		*70*				*70*			*70*		*70*					*70*			*70*	*70*					*70*				*70*				*70*		*70*
SRR Score (out of 4)				**3.43**			**3.43**		**3.43**				**3.43**			**3.43**		**3.14**					**3.43**			**3.43**	**3.43**					**3.43**				**3.43**				**3.43**		**3.43**

Final habitat quality score (weighted)	IAU-1 RE12.11.24 Remnant	IAU-2 RE12.11.25 Remnant	IAU-3 RE12.11.23 Remnant	IAU-4 RE 12.3.11/20 Remnant	Final
Site Condition score (out of 3)	2.22	2.51	2.34	1.59	*2.16*
Site Context Score (out of 3)	1.63	2.12	2.12	1.39	*1.81*
Species Stocking Rate Score (out of 4)	3.43	3.14	3.43	3.43	*3.36*
Habitat Quality score (out of 10)	*7.28*	*7.76*	*7.88*	*6.41*	*7.33*
Impact Assessment Unit area (ha)	27.9	20.56	15.31	10.04	*73.81*
Total impact area (ha) for this MNES	73.81	73.81	73.81	73.81	
Size Weighting	0.378	0.279	0.207	0.136	
Weighted Habitat Quality Score	***2.75***	***2.16***	***1.64***	***0.87***	***7.42***

From the Offset Assessment Guide, quantum of impact for Koala = 73.81 ha x 0.7 = 51.67 ha

* Absence of threats re-scored using BAAM threat scoring table applied at offset sites

** Stocking rate scoring amended from original impact habitat quality assessment to match offset scoring method

3.2.3 Grey-headed Flying-fox Impact Assessment Table

GREY-HEADED FLYING-FOX **HABITAT QUALITY SCORE = 7.38** **ROUNDS TO 7/10**

Assessment Unit - Regional Ecosystem	IAU-1 RE12.11.24 Remnant									IAU-2 RE12.11.25 Remnant									IAU-3 RE12.11.23 Remnant									IAU-4 RE 12.3.11/20 Remnant														
Site Reference	Benchmark	Plot 1			Plot 2			Average % benchmark	Average Score	Benchmark	Plot 3			Plot 4			Average % benchmark	Average Score	Benchmark	Plot 5			Plot 6			Average % benchmark	Average Score	Benchmark	Plot 7			Benchmark	Plot 8			Benchmark	Plot 9			Average % benchmark	Average Score
	12.11.24	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.11.25	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.11.23	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.3.11	Raw Data	% Benchmark	Score	12.3.20	Raw Data	% Benchmark	Score	12.3.11	Raw Data	% Benchmark	Score		
Site Condition																																									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	100.0	5	100.0	5	100	75	75.0	3	100	100.0	5	87.5	5	100	100	100.0	5	100	100.0	5	100.0	5	100	33	33.0	3	100	100	100.0	5	100	100	100.0	5	77.7	5
Native plant species richness - trees	10	8	80.0	2.5	6	60.0	2.5	70.0	2.5	7	13	185.7	5	7	100.0	5	142.9	5	8	9	112.5	5	7	87.5	2.5	100.0	5	7	2	28.6	2.5	4	10	250.0	5	7	10	142.9	5	140.5	5
Native plant species richness - shrubs	8	6	75.0	2.5	5	62.5	2.5	68.8	2.5	8	5	62.5	2.5	6	75.0	2.5	68.8	2.5	12	3	25.0	2.5	4	33.3	2.5	29.2	2.5	7	0	0.0	0	4	5	125.0	5	7	7	100.0	5	75.0	2.5
Native plant species richness - grasses	9	3	33.3	2.5	3	33.3	2.5	33.3	2.5	9	4	44.4	2.5	3	33.3	2.5	38.9	2.5	5	4	80.0	5	4	80.0	2.5	80.0	2.5	12	0	0.0	0	2	2	100.0	5	12	3	25.0	2.5	41.7	2.5
Native plant species richness - forbs	17	7	41.2	2.5	8	47.1	2.5	44.1	2.5	13	10	76.9	2.5	9	69.2	2.5	73.1	2.5	15	6	40.0	2.5	5	33.3	2.5	36.7	2.5	25	3	12.0	0	8	4	50.0	2.5	25	8	32.0	2.5	31.3	2.5
Tree canopy height	26	22	84.6	5	22.0	84.6	5	84.6	5	22	20	90.9	5	22	100.0	5	95.5	5	29	21	72.4	5	24	82.8	5	77.6	5	23	18	78.3	5	16	16	100.0	5	23	22	95.7	5	91.3	5
Tree subcanopy height	10	10	100.0	5	10.0	100.0	5	100.0	5	9	10	111.1	5	8	88.9	5	100.0	5	10	7	70.0	5	12	120.0	5	95.0	5	8	8	100.0	5	8	10	125.0	5	8	12	150.0	5	125.0	5
Tree canopy height (average of emergent, canopy, sub-canopy)	18	16.0	88.9	5	16.0	88.9	5	88.9	5	15.5	15.0	96.8	5	15	96.8	5	96.8	5	19.5	14	71.8	5	18	92.3	5	82.1	5	15.5	13	83.9	5	12	13	108.3	5	15.5	17	109.7	5	100.6	5
Tree canopy cover (EDL)	72	55	76.4	5	66.3	92.1	5	84.2	5	40	36.4	91.0	5	45.9	114.8	5	102.9	5	63	55.8	88.6	5	39.5	62.7	5	75.6	5	56	18	32.1	2	70	13	18.6	2	56	51.5	92.0	5	47.6	2
Subcanopy cover	43	11	25.6	2	16.3	37.9	2	31.7	2	5	52.3	1046.0	3	32	640.0	3	843.0	3	8	6	75.0	5	10	125.0	5	100.0	5	33	8	24.2	2	20	83	415.0	3	33	36	109.1	5	182.8	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	57.5	33	57.4	5	41.3	71.8	5	64.6	5	22.5	44.4	197.1	5	39.0	173.1	5	185.1	5	35.5	30.9	87.0	5	24.75	69.7	5	78.4	5	44.5	13	29.2	2	45	48	106.7	5	44.5	43.75	98.3	5	78.1	5
Shrub canopy cover	7	6.9	98.6	5	6.6	94.3	5	96.4	5	4	15.8	395.0	3	16.7	417.5	3	406.3	3	12	15	125.0	5	9.5	79.2	5	102.1	5	20	0	0.0	0	15	7.8	52.0	5	20	12.5	62.5	5	38.2	3
Native grass cover	39	4.2	10.8	1	6.6	16.9	1	13.8	1	20	16.4	82.0	3	2.2	11.0	1	46.5	1	21	6.4	30.5	1	11.4	54.3	3	42.4	1	44	0	0.0	0	20	5.0	25.0	1	44	31.2	70.9	3	32.0	1
Organic litter	45	95.8	212.9	3	93.4	207.6	3	210.2	3	65	83.6	128.6	5	95.4	146.8	5	137.7	5	56	81.2	145.0	5	75	133.9	5	139.5	5	37	12	32.4	3	30	77	256.7	3	37	36.4	98.4	5	129.2	5
Number of large trees (ha)	33	11	33.3	5	30.0	90.9	10	62.1	10	23	38	165.2	15	62	269.6	15	217.4	15	14	38	271.4	15	24	171.4	15	221.4	15	30	2	6.7	5	165	31	18.8	5	30	16	53.3	10	26.3	5
Coarse woody debris (m/ha)	546	541	99.1	5	470.0	86.1	5	92.6	5	100	470	470.0	2	1260	1260.0	2	865.0	2	480	855	178.1	5	1270	264.6	2	221.4	2	555	20	3.6	0	890	200.0	22.5	2	555	60	10.8	2	12.3	2
Non-native plant cover	0	3		10	5.0		5	4.0	10	0	2		10	1		10	1.5	10	0	10		5	2		10	6.0	5	0	95		0	0	10		5	0	25		5	43.3	3
			Value	Score		Value	Score	Average	Average Score			Value	Score		Value	Score	Average	Average Score			Value	Score		Value	Score	Average	Average Score			Value	Score			Value	Score		Value	Score	Average	Average Score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.5	5		0.57	8	0.54	8			0.46	5		0.57	8	0.52	8.0			0.48	5		0.48	5	0.48	5			0.85	10			0.52	8		0.38	5	0.58	8
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			6	15		6	15	6.0	15			9	20		6	15	7.5	20.0			7	20		4	10	5.5	15			2	5			7	20		4	10	4.3	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			4	10		4	10	4.0	10			6	15		4	10	5.0	15			4	10		3	10	3.5	10			2	5			4	10		3	10	3.0	10.0
Site Condition Score				84			87		92				103.5			96.5		106.50				101			90		90.5				40.5				91.5			85		74.5
MAX Site Condition Score				*130*			*130*		*130*				*130*			*130*		*130*				*130*			*130*		*130*				*130*				*130*			*130*		*130*
Site Condition Score - out of 4				**2.58**			**2.68**		**2.83**				**3.18**			**2.97**		**3.28**				**3.11**			**2.77**		**2.78**				**1.25**				**2.82**			**2.62**		**2.29**
Site Context			Value	Score		Value	Score	Average	Average Score			Value	Score		Value	Score	Average	Average Score			Value	Score		Value	Score	Average	Average Score			Value	Score			Value	Score		Value	Score	Average	Average Score
Size of patch (ha)				10			10		10				2			2		2				2			2		2				0				0			7		2.33
Connectivity																																									
No. active GHFF camps within 20km			15	10		13	10	14.0	10			18	10		19	10	18.5	10			19	10		18	10	18.5	10			11	10			10	10		18	10	13.0	10
Context																																									
% GHFF foraging habitat within 20 km			25.51	2		23.95	2	24.7	2			24.29	2		25.28	4	24.8	2			25.48	4		25.41	4	25.4	2			23.5	2			23.91	2		25.58	4	24.3	2
Ecological Corridors				6			6		6				6			6		6				6			6		6				0				0			6		2
Role of site location to species overall population in the state																																									
No. of active ≥ level three GHFF camps within a 20km			2	4		1	2	1.5	3			5	10		5	10	5.0	10			5	10		5	10	5.0	10			1	2			1	2		4.0	8	2	4
Absence of threats *				5.5			5.5		5				5.5			5.5		5				5.5			5.5		5				2.5				3.5			5		5
Site Context Score				37.5			35.5		36.5				35.5			37.5		36.5				37.5			37.5		37.5				16.5				17.5			40		25
MAX Site Context Score				*56*			*56*		*56*				*56*			*56*		*56*				*56*			*56*		*56*				*56*				*56*			*56*		*56*
Site Context Score - out of 3				**2.01**			**1.90**		**1.96**				**1.90**			**2.01**		**1.96**				**2.01**			**2.01**		**2.01**				**0.88**				**0.94**			**2.14**		**1.32**

Species Stocking Rate (SSR) **	IAU-1 RE12.11.24 Remnant							Average	Average Score	IAU-2 RE12.11.25 Remnant							Average	Average Score	IAU-3 RE12.11.23 Remnant							Average	Average Score	IAU-4 RE 12.3.11/20 Remnant													Average	Average Score
	Benchmark	Plot 1			Plot 2					Benchmark	Plot 3			Plot 4					Benchmark	Plot 5			Plot 6					Benchmark	Plot 7			Benchmark	Plot 8			Benchmark	Plot 9				
	12.11.24	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.11.25	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.11.23	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.3.11	Raw Data	% Benchmark	Score	12.3.20	Raw Data	% Benchmark	Score	12.3.11	Raw Data	% Benchmark	Score		
Abundance of large trees	33	11	33.3	4	30.0	90.9	8	62.1	6	23	38	165.2	10	62	269.6	10	217.4	10	14	38	271.4	10	24	171.4	8	221.4	10	30	2	6.7	2	165	31	18.8	2	30	16	53.3	6	26.3	4
Timing of GHFF Biological Resources				10			10		10				10			10		10				10			10		10				6.25				10			10		8.75
Total SRR score (out of 20)				14			18		16				20			20		20				20			18		20				8				12			16		13
Max SRR Score				*20*			*20*		*20*				*20*			*20*		*20*				*20*			*20*		*20*				*20*				*20*			*20*		*20*
SRR Score (out of 3)				**2.10**			**2.70**		**2.40**				**3.00**			**3.00**		**3.00**				**3.00**			**2.70**		**3.00**				**1.24**				**1.80**			**2.40**		**1.91**

Final habitat quality score (weighted)	IAU-1 RE12.11.24 Remnant	IAU-2 RE12.11.25 Remnant	IAU-3 RE12.11.23 Remnant	IAU-4 RE 12.3.11/20 Remnant	Final
Site Condition score (out of 3)	2.83	3.28	2.78	2.29	*2.80*
Site Context Score (out of 3)	1.96	1.96	2.01	1.32	*1.81*
Species Stocking Rate Score (out of 4)	2.40	3.00	3.00	1.91	*2.58*
Habitat Quality score (out of 10)	*7.19*	*8.23*	*7.79*	*5.53*	*7.18*
Impact Assessment Unit area (ha)	23.32	20.09	15.31	10.04	*68.76*
Total impact area (ha) for this MNES	68.76	68.76	68.76	68.76	
Size Weighting	0.339	0.292	0.223	0.146	
Weighted Habitat Quality Score	***2.44***	***2.41***	***1.74***	***0.81***	***7.38***

From the Offset Assessment Guide, quantum of impact for Grey-headed Flying-fox = 68.76 ha x 0.7 = 48.13 ha

** Absence of threats re-scored using BAAM threat scoring table applied at offset sites

** Stocking rate scoring adjusted to match offset scoring method - excludes abundance of foraging canopy trees and abundance of significant canopy foraging trees originally included in impact site HQA

4.0 OFFSET SITE SELECTION

4.1 TYPE AND SCALE OF OFFSETS

A total of 15.93ha of Coastal Swamp Oak TEC (including 0.918ha of functional loss), 73.81ha of Koala habitat and 68.76 ha of Grey-headed Flying-fox habitat will be subject to significant residual impact as a result of the proposed action (chapter 6 of the PER). Koala and Grey-headed Flying-fox habitat is synonymous within the impact area; however, 5.05ha of habitat will be subject to isolation that will prevent Koala access but will not affect access by Grey-headed Flying-fox, hence the impact area difference.

Where residual significant impacts remain after consideration of avoidance and mitigation measures, an environmental offset will be required to compensate for the impacts in accordance with the EPBC Offsets Policy. Offsets must be specific to the MNES being impacted and must improve or maintain the viability of the MNES.

4.2 OFFSET IDENTIFICATION

4.2.1 Identification of Suitable Regions for Offset Properties

As the proposed action is situated within the Gold Coast City Council LGA, this area was explored initially for sites suitable for offsetting Koala and Grey-headed Flying-fox habitat. Offset opportunities were sought as close as possible to the proposed action corridor. Specifically, desktop analysis investigated 44 Queensland government owned properties in these two LGAs, as well as 59 Gold Coast City Council properties and four large private properties. Potential properties for evaluation were identified through Queensland or local government owned land as well as properties available (or upcoming) for sale. For Koala, contiguous areas that were suitable for the species (e.g. without movement boundaries or next to threatening processes such as major roads, etc.) were particularly difficult to identify. Prior to June 2022, the properties that were identified were made up of a patch work of properties that were unlinked. For this reason, properties within the adjacent Scenic Rim Regional Council LGA were investigated. The Scenic Rim Regional Council LGA is immediately adjacent to the west of the Gold Coast City Council LGA and includes semi-rural and rural properties of larger size than available close to the coast.

Potential properties were subject to preliminary field investigation to test their suitability for the offsets by ground-truthing the accuracy of existing RE mapping where remnant and regrowth vegetation occurred, and to determine the canopy species composition of new regrowth in previously cleared areas.

Potential offset properties/habitat were identified using the following criteria:

- Properties located within the same bioregion as the impact area and as close to the impact area as possible.
- Land in private ownership but not under conservation, or properties for sale on the open market.
- Land supporting habitats suitable for both Koala and Grey-headed Flying-fox.
- The presence of past records of Koala and Grey-headed Flying-fox within or near the property.
- Properties positioned in the landscape such that habitat restoration would provide a conservation outcome for the species (e.g. connecting and/or supplementing existing Koala habitats, and within 20km of a nationally significant Grey-headed Flying-fox roost).
- Land supporting habitats that are not protected under state legislation from clearing or other uses not compatible with conservation of the protected matters.
- Land supporting habitats that have been significantly cleared or degraded, and where habitat restoration would achieve a conservation outcome for the protected matters.

- Properties of a size that would accommodate a significant proportion of the required offsets for Koala and Grey-headed Flying-fox to facilitate focused application of offset management actions.

RE mapping describes the dominant canopy species present within each map unit and provides a tool for determining where suitable forage tree species for both Koala and Grey-headed Flying-fox form the dominant canopy vegetation.

Each potential property was assessed against the presence or potential presence of REs of either high or moderate value for both species.

Following investigation of multiple properties, TMR purchased a 390.25 ha cattle property at Farringdon Road, Tabooba in April 2022. Tabooba was assessed as being a suitable offset property for Koala and Grey-headed Flying-fox offsets and was subject to detailed assessment.

Greenridge is a large (407 ha) property at Pimpama within the Gold Coast City LGA, which had been identified as a suitable property for Koala, Grey-headed Flying-fox and Coastal Swamp Oak TEC offsets; however, the property was not available for purchase in 2021. Greenridge subsequently became available for sale in 2022 and TMR purchased Greenridge in July 2022.

4.2.2 Potential Offsite Site Selection and Assessment

Outline of Desktop Methodology

Initial evaluation of properties suitable for implementing the necessary offsets was undertaken by assessing:

- The presence of remnant, regrowth or non-remnant vegetation mapping as per Queensland state mapping dataset *Queensland vegetation regional ecosystem map, version 12.0*;
- The presence of suitable REs for the target offset within the same dataset;
- For non-remnant areas, the pre-clearing REs were used (dataset for *Vegetation management pre-clear regional ecosystem map, version 12.0*);
- The area of each suitable RE type and status (e.g. remnant, regrowth or non-remnant) and whether this would satisfy the offset area needs; and
- Using Google satellite imagery base maps to consider potential landscape threats and connectivity (e.g. Koala movement barriers)
- If the property was determined to be potentially suitable as an offset, field surveys were conducted to verify the vegetation and REs present, with habitat quality assessments undertaken if found to be suitable.

Desktop Assessment for Coastal Swamp Oak TEC

Properties supporting remnant, regrowth or preclear regional ecosystems representative of the TEC in Queensland (REs 12.1.1 and RE 12.3.20) were identified where the REs occurred in sufficient quantity to meet the potential offset requirement.

Desktop Assessment for Koala and Grey-headed Flying-fox

Suitable habitat for both Koala and Grey-headed Flying-fox was determined based on identifying areas with significant and key food sources for both species.

In particular, for Koala, suitable habitat was considered to be:

- REs that are ranked as either ‘Medium’ or ‘High’ suitability in the report *Spatial modelling for koalas in South East Queensland v2.0* (DES, 2021);

- REs with ≥50% dominant or subdominant tree species described in the *Draft National Recovery Plan for the Koala* (DAWE, 2021a) as important in the north (i.e. in Queensland); or
- REs with ≥50% dominant or subdominant tree species listed in scientific publications as Koala habitat in areas between central Queensland to central New South Wales, including:
  - *Ranking and mapping koala habitat quality for conservation planning on the basis of indirect evidence of tree species use: A case study of Noosa Shire, south-eastern Queensland* (Callaghan *et al.,* 2011),
  - *Tree use, diet and home range of the koala* (Phascolarctos cinereus) *at Blair Athol, central Queensland* (Ellis *et al*., 2002),
  - *The habitat and diet of koalas* (Phascolarctos cinereus) *in Queensland* (Melzer et al., 2014),
  - *Tree use by koalas* (Phascolarctos cinereus) *after fire in remnant coastal rainforest* (Matthews et al., 2007).

For Grey-headed Flying-fox, suitable habitat was considered to be:

- REs with ≥50% dominant or subdominant vegetation species that are listed in *Ranking the feeding habitats of GHFF for conservation management* (Eby and Law, 2008) as significant flowering or fruiting species; or
- REs with ≥50% dominant or subdominant vegetation species that are listed in the *National Recovery Plan for the Grey-headed Flying-fox* (DAWE, 2021) as important winter and spring food trees.

The list of REs that were determined to be suitable habitat for Koala and Grey-headed Flying-fox were examined to identify those that were common to both species. REs were then used to spatially map areas within the investigation LGAs for use to identify suitable properties, as well as to determine the hectares within these properties that have the potential for use as an offset.

5.0 PROPOSED OFFSET PROPERTY – TABOOBA

5.1 OFFSET SITE DESCRIPTION

Tabooba is located at 226 Farringdon Road, in the locality of Tabooba, approximately 16km south of the town of Beaudesert in the Scenic Rim Regional Council LGA (see Figure 1.3) and 37km south-west of the southern extent of the proposed action. Tabooba covers 390.25 ha in total and is comprised of four lots:

- Lot 3 on RP32561 (152.69 ha)
- Lot 174 on W311810 (64.88 ha)
- Lot 296 on W312231 (43.04 ha)
- Lot 85 on W311299 (129.64 ha).

Tabooba is located on the western and southern slopes of the Jinbroken Range which separates the Albert and Logan River valleys (Figure 5.1). Formed of Albert Basalt, the range borders the property to the north and east, reaching its highest point at 453m on the north-eastern property boundary at the location known as 'Kerry'.

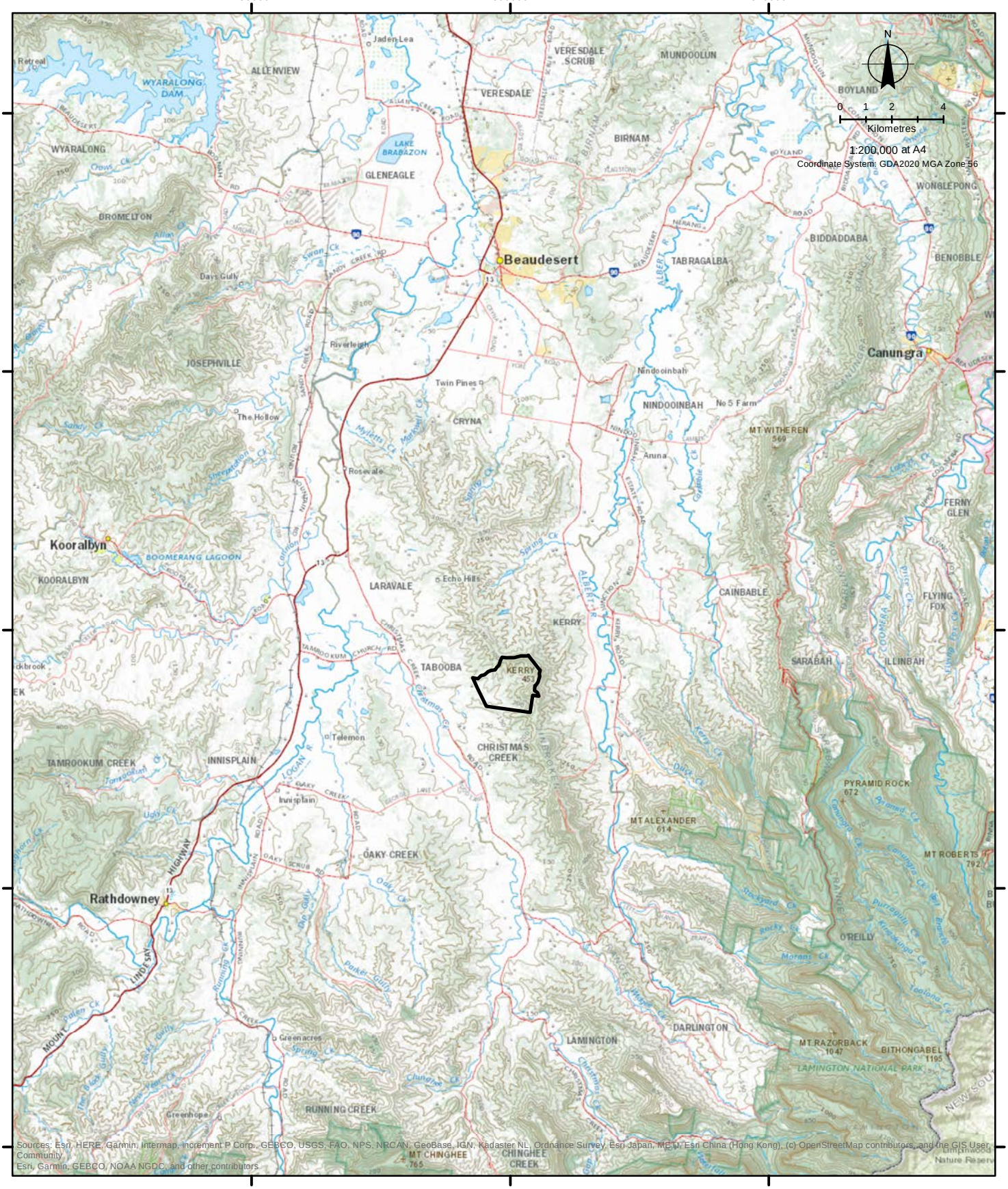
Where Tabooba includes habitat of the Jinbroken Range to the east, remnant vegetation exists on both the offset property and adjoining properties. This forms a corridor of intact vegetation along the range to the north and south. The Scenic Rim Regional Council Biodiversity Strategy 2015-2025 (Image 5.1) indicates that Tabooba is within existing 'core-node' habitat and landscape linkages along Jinbroken Range and connecting to the south with 'core' habitat.

5.1.1 Topography and Climate

Within Tabooba, ridges and incised valleys fall steeply from the elevated crest of the range, grading to foothills, lower colluvial slopes and eventually to narrow alluvial zones bordering two main creeklines which flow westwards through the property, merging at the western boundary before joining Christmas Creek. These features are highlighted in the hillshades of Image 5.2. The average slope from the range ridgeline to the lower foothills is 25-30%.

Queensland Government (2017) describes basalt as permeable, with the potential to form aquifers which store and transmit groundwater through its structure, fractures and weathered zones, with discharge of groundwater common around the contact between basalt and less permeable underlying geologies. This is a common phenomenon on the property where groundwater seepage occurs in many locations, primarily in the weeks and months following rainfall (pers. comm. Ian Johnson, previous owner). Additionally, there are also several permanent springs and creeklines on the property, which could provide valuable water for Koala forage during extended dry periods. Soils derived from basalt are considered to be moderately fertile soils on lower slopes and highly fertile soils on alluvial plains (DNRME, 2017).

The closest weather station to Tabooba is Beaudesert Drumley St Station (040983), 17.7km to the north. The weather station has been operational since 2006. Mean annual rainfall is 921.8 mm/year, with the majority falling between December to March. The mean maximum temperature is 27°C, ranging from 31.4°C in January to 21.7 °C in July and August. The highest maximum temperatures were above 40°C in the months from November to February (BoM, 2022).



Tabooba site

Figure:	**5.1**
Title:	**Topographic Map**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

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Document Location: D:\Projects\BAAM\BAAM 2022-009 Coomera Connector Offsets\Output\0101-030-0002-A (CCOffset_Topo).mxdDate: 5/08/2022 10:08:02 AM

Image 5.1. Location of the Tabooba property in the Scenic Rim Regional Council Biodiversity Strategy (2015-2025) core habitat and corridors (Farringdon Road property added in black outline).

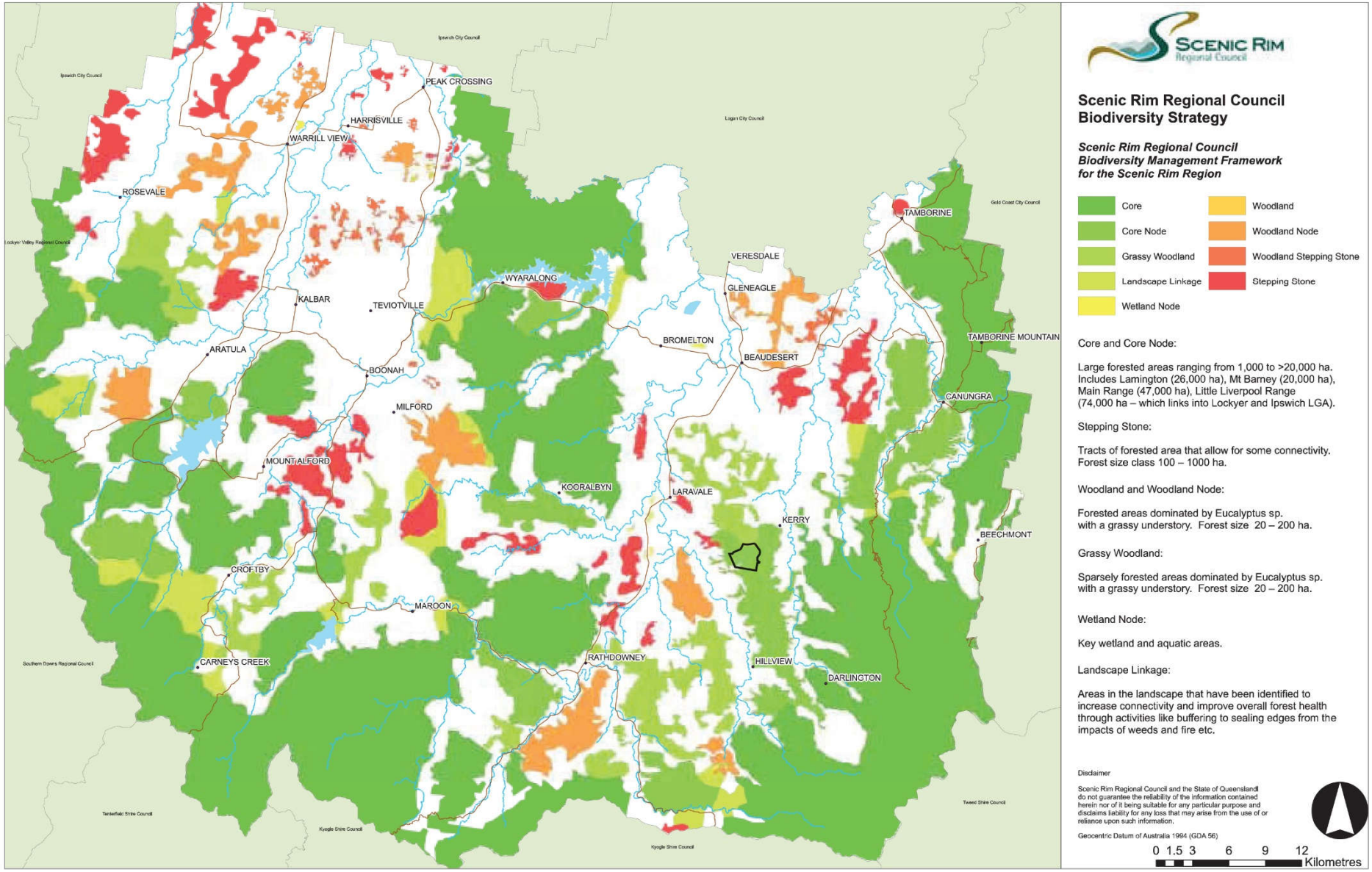
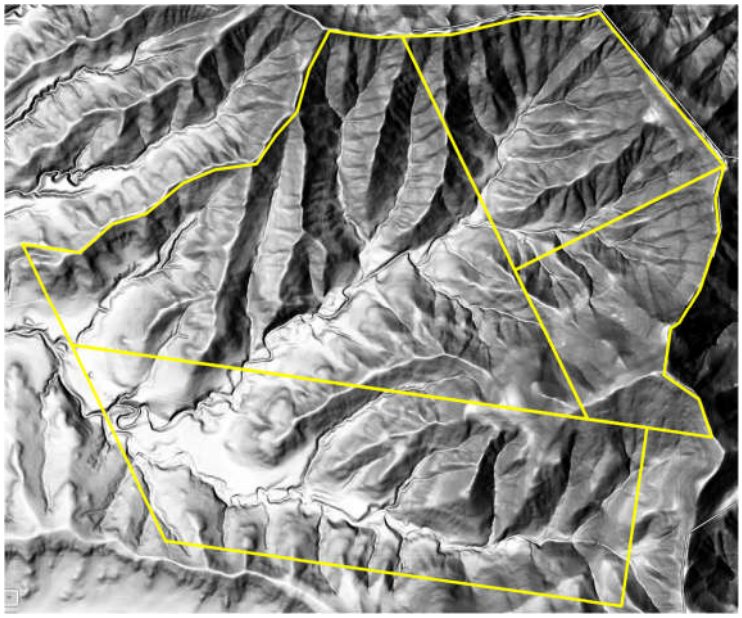


Image 5.2. Hillshade (source: Qld Globe)



5.1.2 Management History

The most recent landholder had managed Tabooba for cattle grazing for a period of approximately 30 years, prior to the purchase by TMR in 2022. Land management practices included maintaining cleared pastures on creek flood zones, stick-raking valleys and slopes in the higher country to remove tree regrowth (Photos 5.1-5.4) and sowing of exotic, high-yield pasture grasses such as Rhodes grass in the cleared areas.

Fire has been used as a tool to reduce fuel loads and decrease risk of wildfire, control regrowth vegetation, and maintain a grassy understorey for cattle grazing beneath the woodland vegetation on higher slopes. Cool, mosaic pattern burning has been carried out since the 1980s. Cattle have not been fenced from watercourses and evidence of erosion and weed proliferation is apparent in watercourses on the lower slopes and alluvial plains (Photos 5.5-5.7). Weed infestation is present throughout the site, including around the base of Koala food trees, which may prevent Koala access.

Photo 5.1. Photo showing clearing of lower slopes and removal of understorey and encouragement of pasture growth on steeper slopes

Photo 5.2. Evidence of 'stick raking' which clears out regrowth was apparent throughout the property

Photo 5.3. Evidence of 'stick-raking'

Photo 5.4. Evidence of tree-killing by application of Tordon (Picloram) was observed

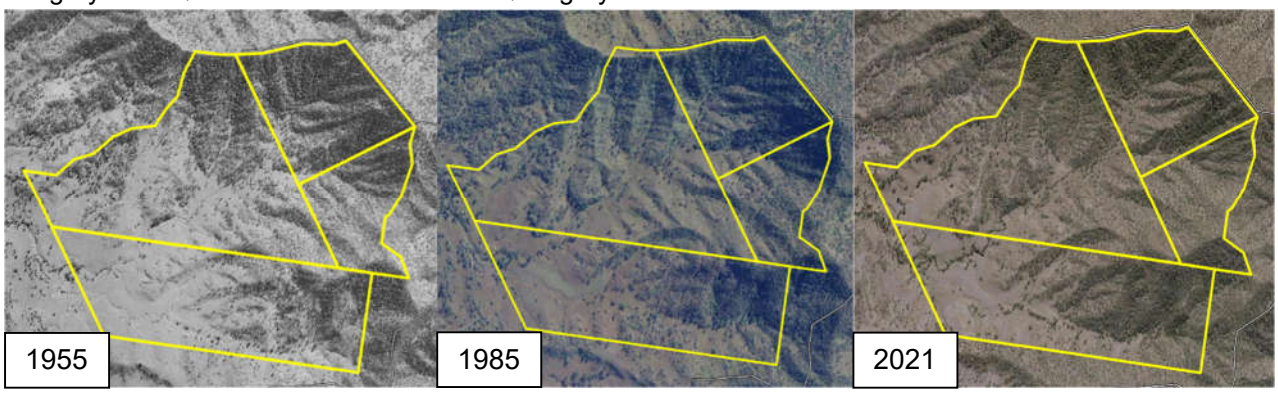
Photo 5.5. Weed proliferation was apparent in most drainage lines and gullies

Photo 5.6. Weed proliferation in drainage line

Photo 5.7. Weed proliferation in drainage line

Aerial imagery is available for the property from 1955 (see Image 5.3) and shows extensive clearing of creekline vegetation and lower valleys and on hillslopes to increase the carrying capacity for livestock grazing. There has been a change in the extent of clearing since that time where regrowth vegetation cover has increased on many of the lower ridges, although this vegetation is cleared every circa seven years to maintain grazing value. However, risk of loss of remnant and regrowth vegetation for offset calculation purposes is 0.7% (rounded to 1%), in line with published data for remnant vegetation loss in Scenic Rim LGA since 1997 (https://www.data.qld.gov.au/dataset/soe2020-extent-and-rate-of-change-of-remnant-native-vegetation). The potential for a continued cycle of habitat degradation within the regrowth vegetation types under cattle grazing use is accounted for in assessment of the habitats without the offset.

Image 5.3. Change in vegetation clearing and regrowth on Tabooba in 1955, 1985 and 2021.
Imagery from Queensland Government's QImagery online database.



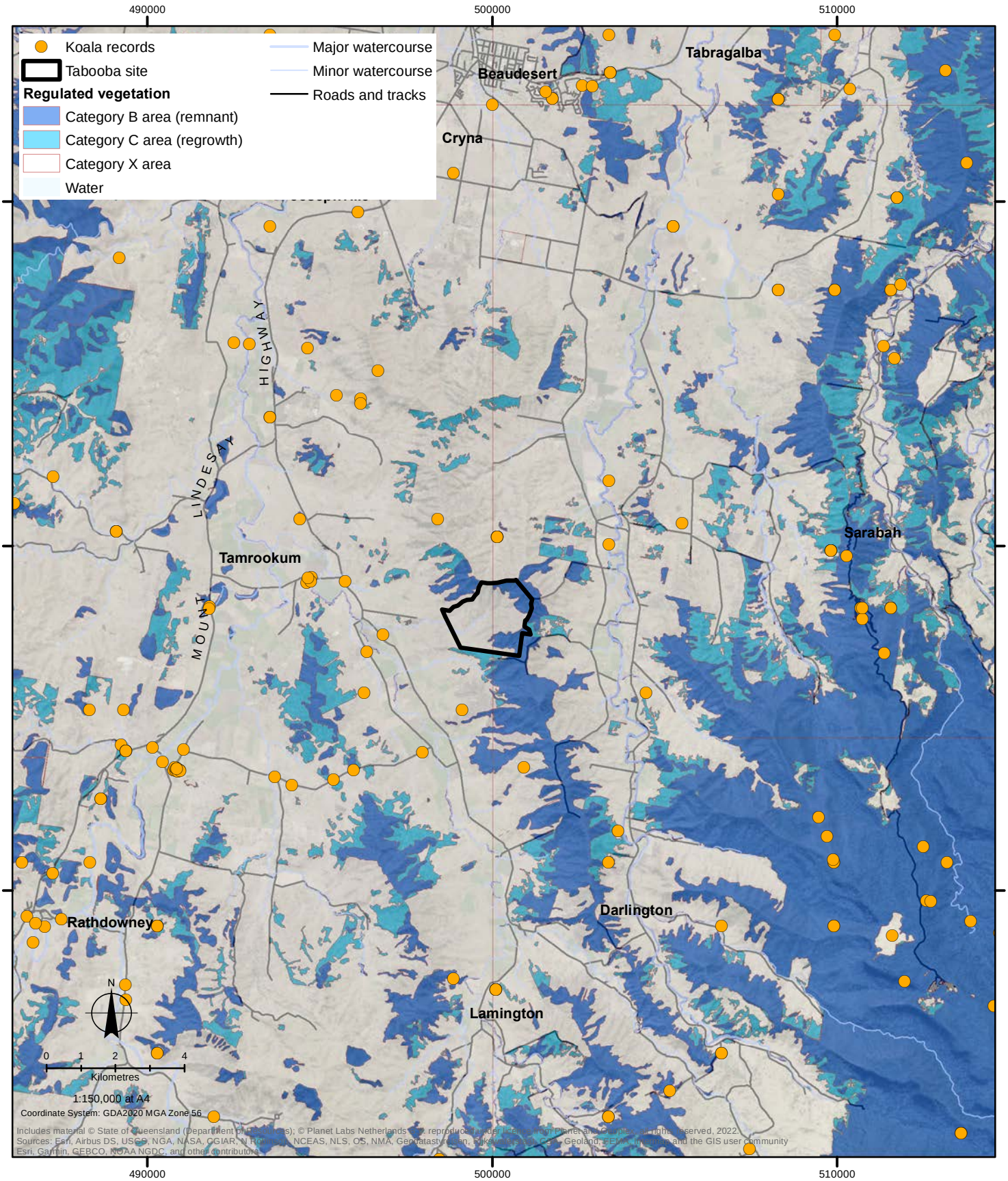
5.1.3 Vegetation

Queensland Regulated Vegetation mapping for Tabooba includes only remnant vegetation as shown in Figure 5.2, with the remainder of the property mapped as 'Category X' and therefore generally exempt from clearing regulations under the VM Act. Table 5.1 provides the areas of mapped and unmapped vegetation, using the State pre-clear RE mapping to attribute cleared land and regrowth vegetation to REs.

Table 5.1. Queensland state government mapping of vegetation types found at Tabooba as per the *Vegetation Management Act* Map spatial layer, version 12.0

REs	Cleared/Non-remnant (ha)* 'Category X'	Remnant (ha)
12.8.14 (least concern)	86.71	30.43
12.8.16 (of concern)	130.06	70.22
12.8.3 (least concern)	28.90	0
12.8.4 (least concern)	43.35	0

* Based on Pre-clear mapping; Note, polygons with multiple REs have their area divided by the proportion of each RE provided, to give an estimated area for each RE.



Data sources:
Koala records
Atlas of Living Australia 2022
Vegetation management regulated vegetation management map - v 5.07
Published 04/05/2022
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM Reviewed by: PJ Date: 5/08/2022

Figure: 5.2
Title: Tabooba Regulated Vegetation Mapping and Koala Records in the Landscape

Project: Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646

Client: Queensland Department of Transport and Main Roads

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Document Location: D:\Projects\BAAM\BAAM 2022-009 Coomera Connector Offsets\Output\0101-030-0003-A (CCOffset_Tabooba_Koala RegVeg).mxdDate: 5/08/2022 10:16:45 AM

Site inspection and field surveys have confirmed that the remnant REs present are:

- RE 12.8.14 *Eucalyptus eugenioides, E. biturbinata, E. melliodora* +/- *E. tereticornis, Corymbia intermedia* open forest on Cainozoic igneous rocks - dominated on the property by *E. melliodora, E. tereticornis* and *C. intermedia.*
- RE 12.8.16 *Eucalyptus crebra* +/- *E. melliodora, E. tereticornis* woodland on Cainozoic igneous rocks - which on the property includes all species.

Further details of the survey results are provided in Section 5.2.

5.1.4 Suitability for Koala

The Atlas of Living Australia (ALA) provides publicly available location data for species, including those records held by the Queensland Government. Figure 5.2 shows the locations of these Koala records in the landscape over the Queensland Government's Regulated Vegetation Mapping. There are multiple Koala records from the region, present within mapped remnant and regrowth vegetation, and throughout the lands mapped as 'Category X' which are generally exempt from regulation under the VM Act. Category X incorporates cleared, regrowth and sometimes remnant vegetation that was not mapped as remnant or regrowth vegetation in 2016 when the Queensland Government allowed landholders to "lock in" unmapped vegetation as Category X to avoid a rush to clear remnant vegetation prior to changes to the VM Act.

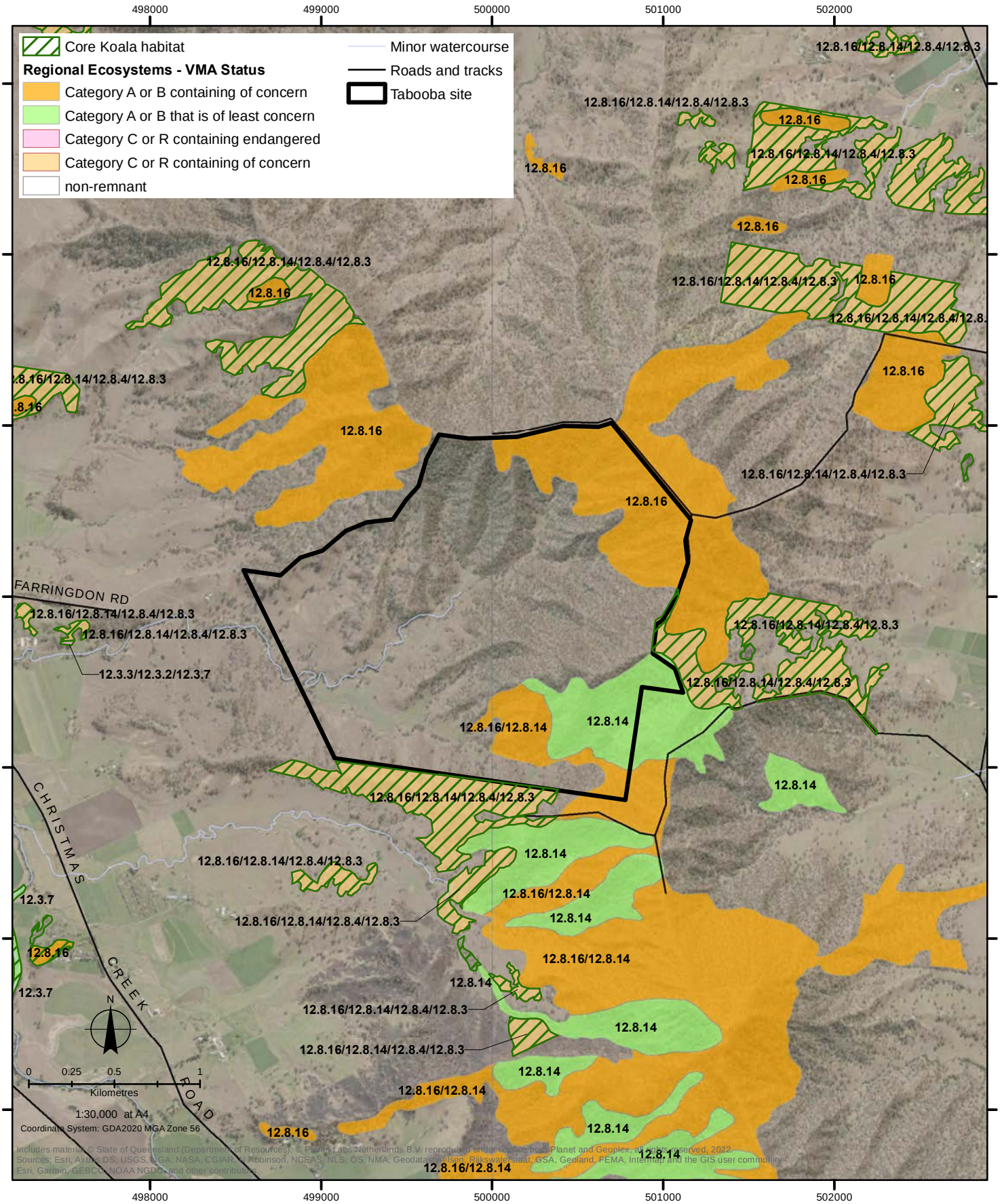
The Scenic Rim Regional Council Biodiversity Strategy 2015-2025 (Image 5.4) shows the location of Tabooba in relation to existing habitats and landscape linkages. Tabooba lies within an area mapped as a 'Core Node', taking in much of the vegetation of the Jinbroken Range and connecting to the south with Core habitat termed by Scenic Rim Regional Council as the 'Lamington Core'.

Existing RE mapping for Tabooba is shown on Figure 5.3, indicating the presence of remnant REs 12.8.16 and 12.8.14 on the high ridges and slopes within and adjacent to Tabooba. It is bordered to the east and south by habitat mapped by the Queensland Government as 'Core' Koala habitat over the REs mapped as 12.8.16/12.8.14/12.8.4/12.8.3. REs 12.8.4 and 12.8.3 are both notophyll vine forest REs and these habitats are not considered to represent important Koala habitat.

RE 12.8.16 is described as sparse *Eucalyptus crebra,* generally with *E. melliodora and E. tereticornis* +/- *E. albens* grassy woodland. Occurs on dry hillslopes on Cainozoic igneous rocks, especially basalt. A 'special value' of the RE from the RE description is that it is known to provide suitable habitat for Koalas (Queensland Government https://apps.des.qld.gov.au/regional-ecosystems/details/?re=12.8.16). Consideration of the dominant canopy species indicates the RE has high value for Koala (DAWE 2022a, DES 2020).

RE 12.8.14 is described as mid-dense *Eucalyptus eugenioides*, *E. biturbinata*, *E. melliodora* +/- *E. tereticornis, Corymbia intermedia, E. crebra* open forest. *Allocasuarina torulosa* is a common understorey species. Localised occurrences of *Eucalyptus laevopinea, E. quadrangulata* and *E. banksii* may occur. Occurs on Cainozoic igneous rocks, especially basalt. A 'special value' of the RE in the RE description is that it is known to provide suitable habitat for Koalas (Queensland Government https://apps.des.qld.gov.au/regional-ecosystems/details/?re=12.8.14). Consideration of the dominant canopy species indicates the RE has moderate value for Koala (DAWE 2022a, DES 2020).

Tabooba is well-located to provide valuable Koala habitat on the ranges, lower slopes and the wetter and more fertile lower slopes and flood zones of the creeks, which are currently cleared and are similarly cleared in the surrounding landscape where beef cattle production dominates land use. Riparian habitats provide important refuge for Koalas during times of drought (Reed and Lunney 1990), facilitate local movement (Davies *et al*. 2013), and are important for long distance dispersal (McAlpine et al. 2006a and b; Norman *et al.* 2019), with Koala persistence within riparian areas supported by the presence of intact non-riparian habitat (Smith *et al.* 2013).



Data sources:
MSES - wildlife habitat - koala habitat areas - core
Published 08/09/2021
Vegetation management regional ecosystem map - v12.00
Published 04/05/2022
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM Reviewed by: PJ Date: 5/08/2022

Figure:	5.3
Title:	Tabooba Current RE and Koala Habitat Mapping
Project:	Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646
Client:	Queensland Department of Transport and Main Roads

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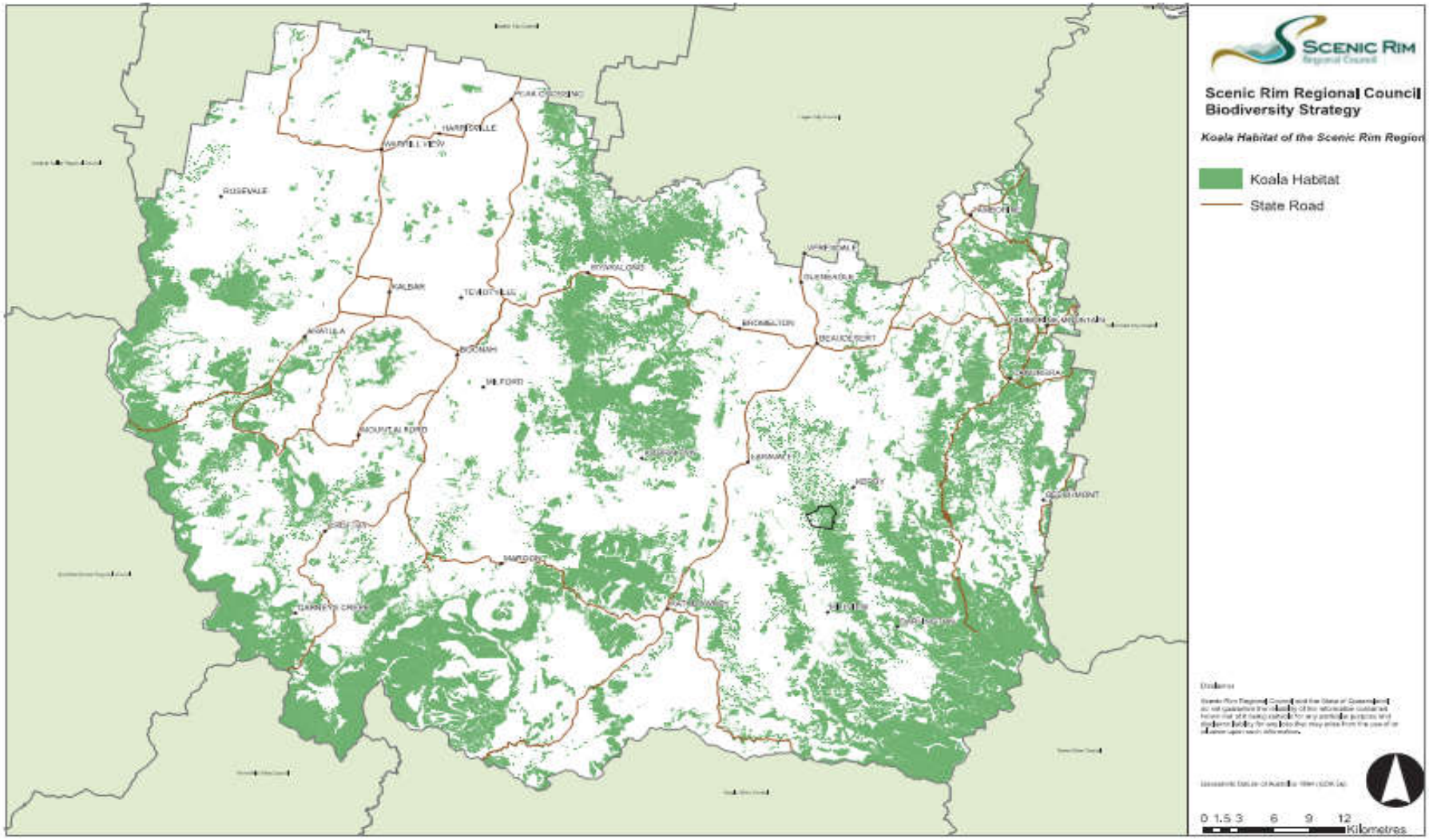
Document Location: D:\Projects\BAAM\BAAM 2022-009 Coomera Connector Offsets\Output\0101-030-0004-A (CCOffset_Koala RE and Hab).mxdDate: 5/08/2022 10:27:32 AM

Image 5.4. Location of Farringdon Road, Tabooba in the Scenic Rim Regional Council Biodiversity Strategy (2015-2025) Koala Habitat of the Scenic Rim (Farringdon Road property added in black outline).



At present the riparian habitats of Tabooba are largely degraded by impenetrable weed growth (Photos 5.5-5.7) and are not bordered by non-riparian habitat due to clearing of lower hill slopes and the creek flood zones for grazing purposes. Lower hillslopes and ranges of Tabooba are heavily infested with Lantana and are susceptible to uncontrolled fire. Restoring and maintaining Koala habitat connectivity between the riparian and ridgeline habitats of Tabooba would have significant benefits by enabling Koalas to safely inhabit and move between the range of altitudinal habitats for feeding and breeding purposes and to seek refuge during periods of climatic extremes.

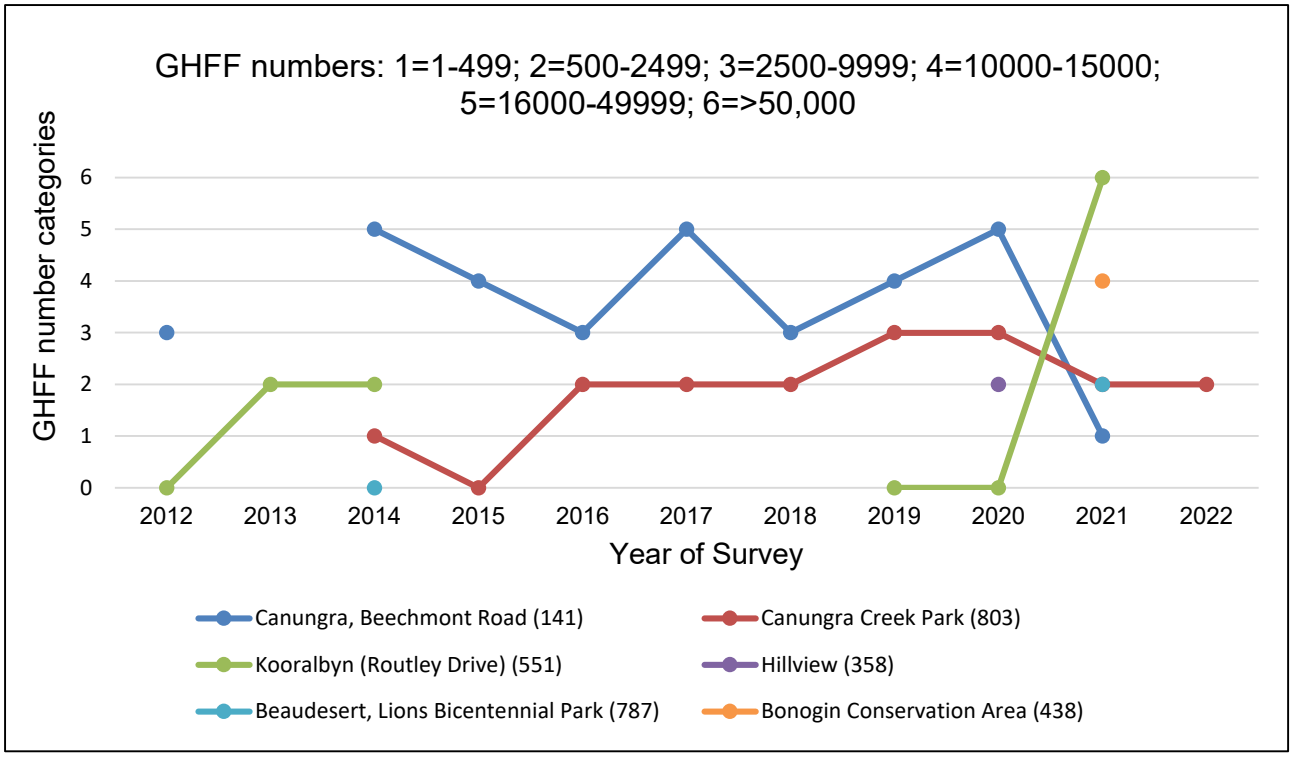
5.1.5 Suitability for Grey-headed Flying-fox

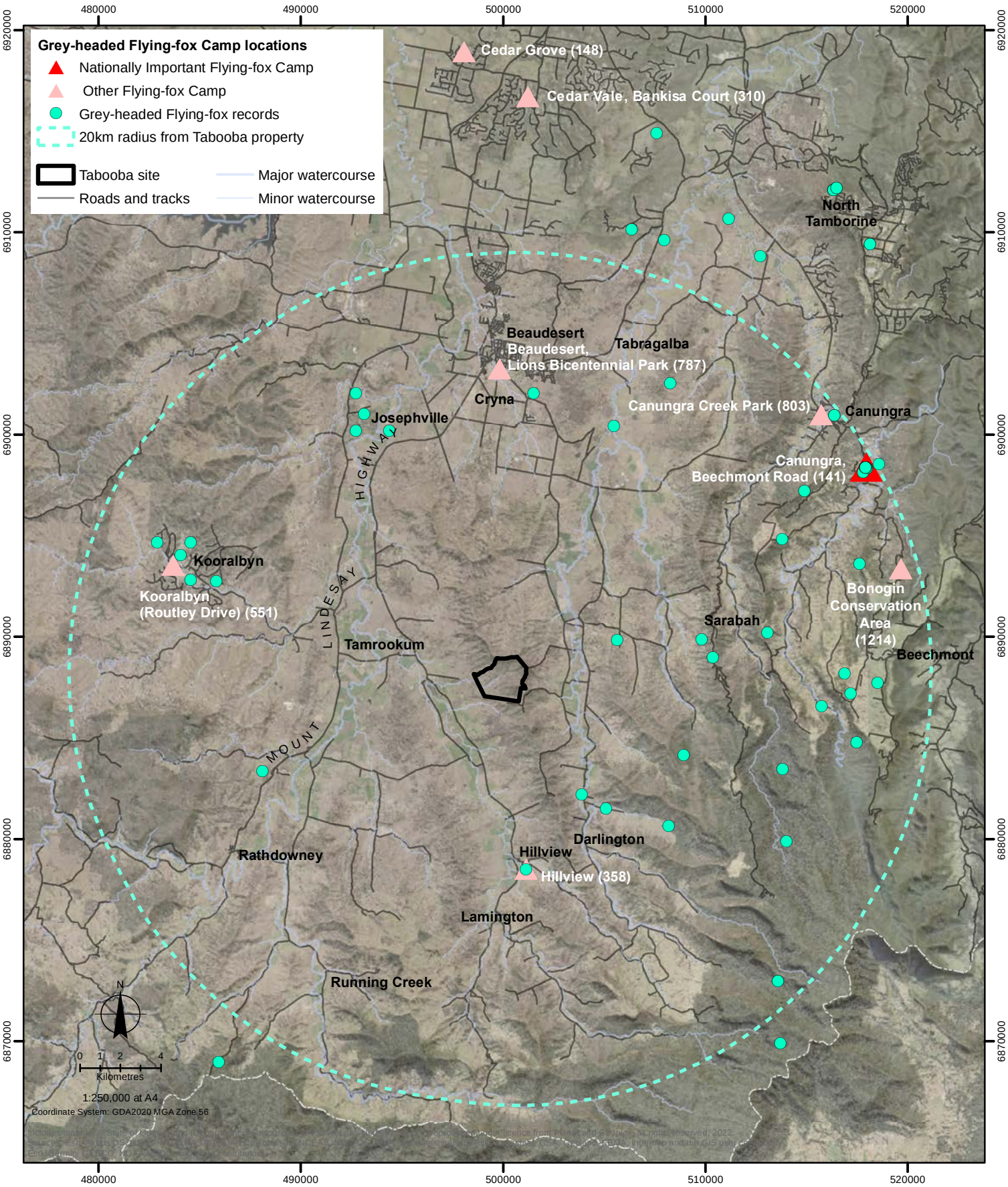
The REs on Tabooba and in the surrounding landscape are dominated by vegetation species that are important habitat for Grey-headed Flying-fox, such as *Eucalyptus tereticornis* and *E. crebra.*

There are 39 records of Grey-headed Flying-fox in the Atlas of Living Australian and Queensland WildNet databases within 20km of the property (Figure 5.4). These records are not anticipated to be the full representation of the species distribution in the landscape, due to: (1) Grey-headed Flying-fox is listed as common in Queensland and has therefore not historically been targeted for survey, (2) the species is active nocturnally (often in extensive and inaccessible woodlands and forests in response to flowering events), and (3) Grey-headed Flying-fox can be difficult to distinguish from Black Flying-fox for untrained observers.

Within 20km of Tabooba there are six flying-fox camps in which Grey-headed Flying-fox has been recorded (see Figure 5.4). The Canungra, Beechmont Road camp located 19.5km to the north east of Tabooba is identified as a 'nationally important flying-fox camp', defined as a camp that has contained ≥10,000 Grey-headed Flying-foxes in more than one year in the last 10 years, or has been occupied by more than 2,500 Grey-headed Flying-foxes permanently or seasonally every year for the last 10 years. The Beechmont Road camp has records of 16,000-49,000 Grey-headed Flying-fox present on three occasions in the last 10 years. The Kooralbyn Routely Drive camp is located 15.7km to the north west of Tabooba, and while six surveys between 2012 and 2020 twice recorded 500-2,499 Grey-headed Flying-fox, there were >50,000 Grey-headed Flying-fox present at the camp during a survey in November 2021. Grey-headed Flying-fox numbers at the camps within 20km of the boundary of the site are shown on Figure 5.5.

Figure 5.5. Grey-headed Flying-fox number from camps within 20km of the property (source: National flying-fox monitoring viewer.





Data sources:
Grey-headed Flying-fox records
Atlas of Living Australia 2022
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM Reviewed by: PJ Date: 5/08/2022

Figure:	5.4
Title:	Tabooba Grey-headed Flying-fox Records and Camps in the Landscape
Project:	Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646
Client:	Queensland Department of Transport and Main Roads

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At night, Grey-headed Flying-foxes typically feed on blossoms and fleshy fruits within 20km of their roosts (although they can travel as much as 50km), feeding in remnant forest, patches of vegetation on cleared land and urbanised areas (Roberts *et al.* 2012). Habitats of Tabooba are within the typical foraging distance of the six camps shown on Figure 5.4. Consideration of the dominant canopy species within the two REs present on Tabooba indicates RE 12.8.16 has high value for Grey-headed Flying-fox and RE 12.8.14 has moderate value for Grey-headed Flying-fox (DAWE 2021, Eby and Law 2008).

5.2 FIELD SURVEYS

Field surveys were undertaken at Tabooba to assess its suitability for use as an offset for Koala and Grey-headed Flying fox. A full report of these surveys, including survey methodologies is provided in Appendix 2.

5.2.1 Habitat Quality Assessment – Assessment Units

To assess the suitability of Tabooba for Koala and Grey-headed Flying-fox offsets, habitat assessment and BioCondition surveys were undertaken in May 2022 to compare with the habitat quality identified in the proposed action corridor. This applied the methods of the *Guide to Determining Terrestrial Habitat Quality – Version 1.3* (Queensland Government 2020) in line with the habitat assessments undertaken in the proposed action corridor for Koala (Planit 2021a) and Grey-headed Flying-fox (Planit 2021b), as well as per *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland* (Eyre et al., 2015); and *Method for the establishment and survey of reference sites for BioCondition, Version 2.0* (Eyre, et al. 2011) using the most recent Queensland Herbarium Biocondition Benchmarks (Appendix 1).

Additional assessment has been undertaken for Koalas and Grey-headed Flying-fox as described below, and the results have been applied in accordance with *How to use the offsets assessment guide* (DSEWPC, 2012), taking into account site condition, site context and species stocking rate to contribute to the calculation of habitat quality using the EPBC Act *Offsets assessment guide*.

The site vegetation mapping was ground-truthed, compared to satellite imagery and then adjusted accordingly (Figure 5.6). Due to the different ages of regrowth on the property, regrowth vegetation was divided into the following categories:

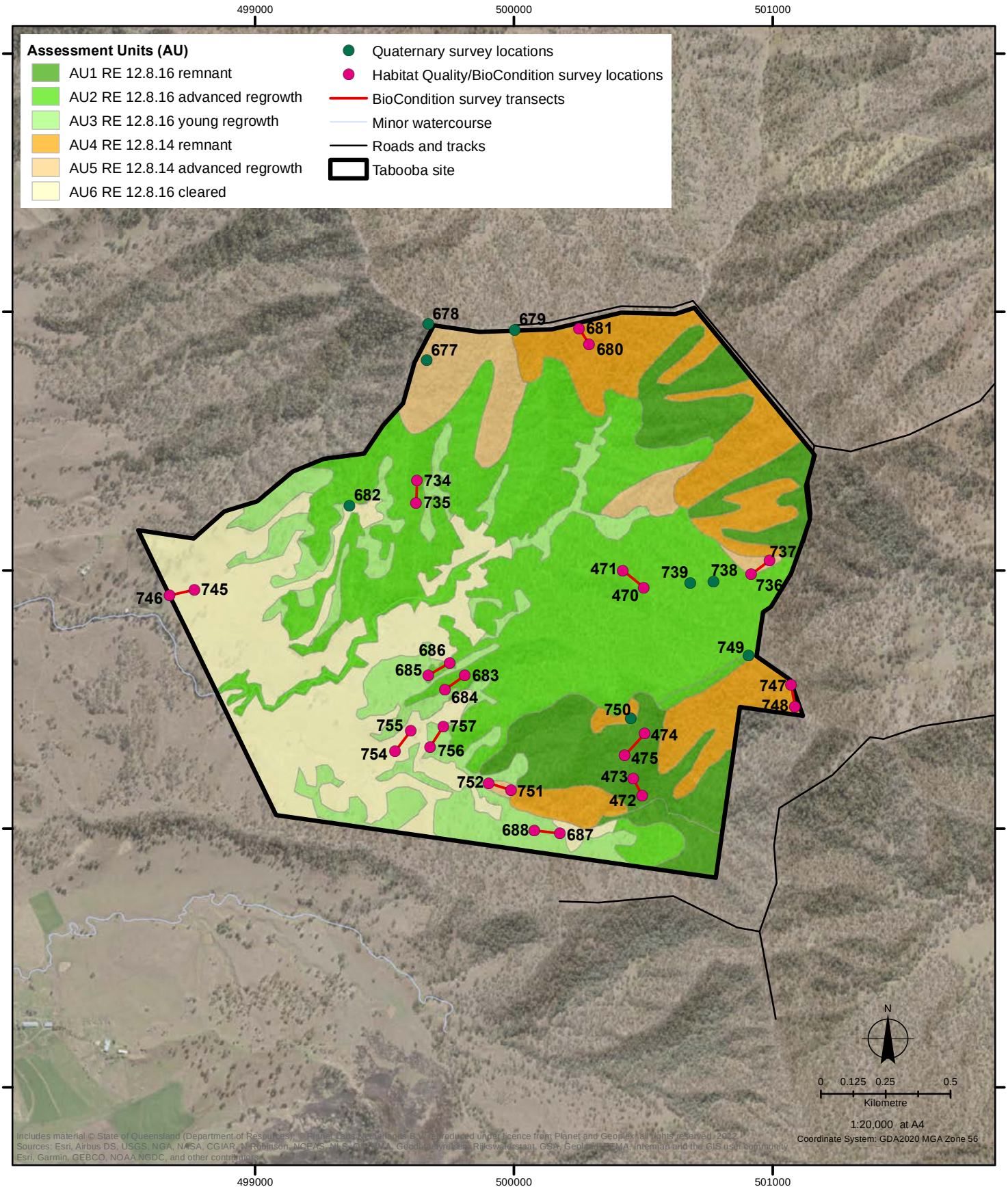
- Advanced Regrowth: areas supporting a continuous canopy in aerial imagery that was indistinguishable from areas mapped as remnant; and
- Young Regrowth: areas supporting a broken canopy with scattered taller trees, but generally dominated by scattered smaller trees as evident in satellite imagery.

This information was also used to determine the number of transects in each assessment unit (AU; which is the vegetation type and condition) to fulfill the recommendations provided in the BioCondition Framework. This was achieved on four of the vegetation classifications; however, significantly wet weather conditions and terrain challenges prevented an additional survey being undertaken on two classifications (Table 5.2). Results of the Habitat Quality/BioCondition transects are provided in the field assessment report at Appendix 2.

Table 5.2. Ground-truthed vegetation types and condition at Tabooba, with recommended and completed Assessment Units and transects

Description	Area (ha)*	Suggested transects	Transects completed
AU1 RE 12.8.16 remnant	49.84	≥2	2
AU2 RE 12.8.16 advanced regrowth	144.84	4	4
AU3 RE 12.8.16 young regrowth	43.59	≥2	2
AU4 RE 12.8.14 remnant	50.66	3	2
AU5 RE 12.8.14 advanced regrowth	19.81	≥2	2
AU6 Cleared (preclear 12.8.16)	81.44	3	2

* Hectares as per state government mapping.



Data sources:
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM Reviewed by: PJ Date: 30/09/2022

Figure:	**5.6**
Title:	**Tabooba Assessment Units, Quaternary and Habitat Quality Survey Locations**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

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The AUs are described as:

AU1 REMNANT RE 12.8.16: 49.831 ha. Remnant *Eucalyptus crebra*, *E tereticornis* +/- *Angophora subvelutina* open forest.

AU2 ADVANCED REGROWTH RE 12.8.16: 144.823 ha. Advanced regrowth of open forest dominated by *Eucalyptus tereticornis* subsp. *basaltica, E. crebra* +/- *Corymbia tessellaris, C. intermedia.* Occasional relictual trees present.

AU3 YOUNG REGROWTH RE 12.8.16: 48.105 ha. Young regrowth open forest with occasional emergent relictual trees. Dominant species include *Eucalyptus crebra, E. tereticornis* and *C. tessellaris*.

AU4 REMNANT RE 12.8.14: 50.666 ha. Remnant open forest dominated by *Eucalyptus melliodora, Eucalyptus tereticornis* subsp. *basaltica*, *E. eugeniodes*, *Angophora subvelutina* and *C. intermedia*.

AU5 ADVANCED REGROWTH RE 12.8.14: 19.815 ha. Advanced regrowth of *Eucalyptus eugeniodes, E. tereticornis* subsp *basaltica, Eucalyptus melanophloia* open forest.

CLEARED PADDOCK FORMERLY OF RE 12.8.16: 76.925 ha. Cleared paddocks with lone trees. Queensland Herbarium Pre-clear RE mapping indicates it would have supported RE 12.8.16.

5.2.2 Habitat Quality Assessment - Koala Surveys

Koala were surveyed at Tabooba in both March and May 2022 by Spot Assessment Technique (SAT; as per Phillips and Callaghan, 2011) to determine localised levels of habitat use by Koala, and thermal-imaging drone surveys to gather baseline Koala density data in areas that were difficult and/or impossible to survey by foot.

Koala SAT surveys, including searching for individuals in trees and scats within 1m of the base of suitable forage trees, were undertaken in accessible locations on the property on 17 March 2022 and 6-7 May 2022 (Figure 5.7). The nine SAT surveys encompassed 279 Koala food trees of *Angophora leiocarpa*, *Eucalyptus crebra, E. tereticornis, E. melliodora, Lophostemon confertus, Corymbia intermedia* and *C. tessellaris*. These surveys were undertaken predominantly within advanced and young regrowth vegetation, as remnant vegetation on the steeper slopes was relatively inaccessible due to very wet conditions and with dense lantana and/or too steep to survey safely. There was only one site where a SAT survey could be undertaken in riparian vegetation as the channel was relatively shallow and erosion had reduced the amount of weed cover.

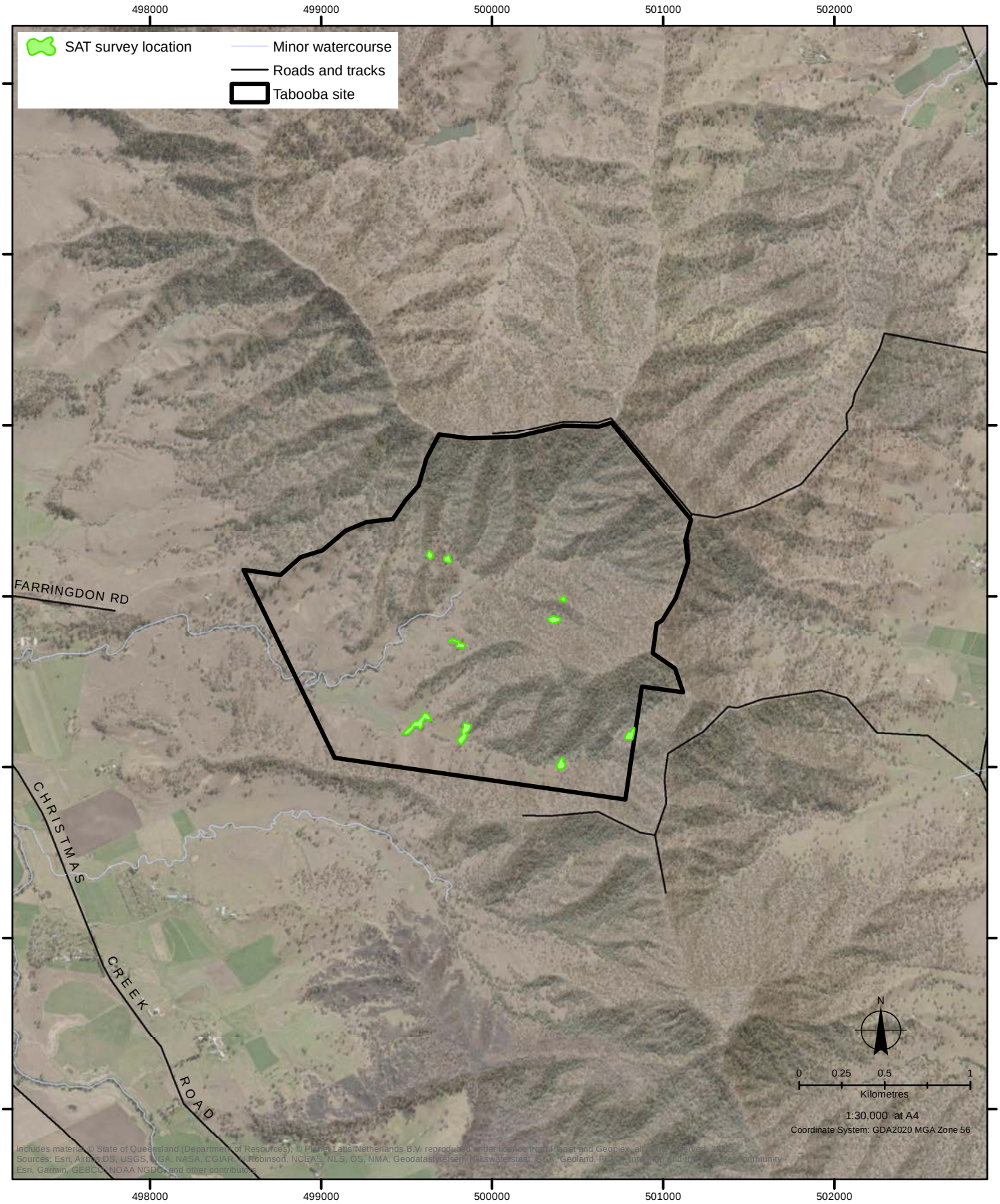
Conditions for observing scats were not ideal due to a prolonged wet season, resulting in scats being washed away on steep slopes and riparian areas, degrading quickly in warm and wet conditions, or being lost in the dense grass and/or weed cover. Additionally, weather and terrain challenges prevented access to areas where Koala were identified in the drone surveys.

As such, results from SAT surveys indicated that the surveyed habitat is categorised as ‘low-use’ (with <22.52% scat evidence; Table 5.3).

Table 5.3. SAT survey results at Farringdon Road

SAT Site ID	Assessment Unit	No of trees with scats	Activity level*	Activity category*
SAT A	AU2	0	0	Low use
SAT B	AU2	0	0	Low use
SAT C	AU2/AU3/AU6	0	0	Low use
SAT D	AU2	0	0	Low use
SAT E	AU2/AU3	4 (in AU2)	13%	Low use
SAT F	AU2	0	0	Low use
SAT G	AU2/AU3/AU6	0	0	Low use
SAT H	AU1	2	6%	Low use
SAT I	AU3	0	0	Low use

*Philips and Callaghan (2011)



Data sources:
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

Figure:	**5.7**
Title:	**Tabooba SAT Survey Locations**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

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Document Location: D:\Projects\BAAM\BAAM 2022-009 Coomera Connector Offsets\Output\0101-030-0007-A (CCOffset_Tabooba_Koala SAT Survey).mxdDate: 5/08/2022 11:01:18 AM

The results are likely to be a significant underestimation of the Koala activity level on the property, due to the challenges with applying this survey method in such steep and complex terrain. Phillips and Callaghan (2011) suggest that low Koala activity is expected in the west of the species' East Coast range in areas receiving less than 600 mm annual rainfall. The local area receives over 900 mm annual rainfall and should therefore fall into the Phillips and Callaghan (2011) category of East Coast medium-high Koala activity.

Records of Koala evidence locations during SAT surveys are shown on Figure 5.9.

The trees at which Koala evidence was detected both within the property and on adjacent land were as expected for the species. In particular, Koala and/or scats were found at *Eucalyptus tereticornis*, *E. crebra* and *Corymbia intermedia*. These two *Eucalyptus* species were found to be the dominant canopy species in remnant and regrowth areas of the property. Other Koala habitat species recorded on the property include *E. eugenioides*, *E. melliodora*, *C. tessellaris*, *Angophora subvelutina* and *Allocasuarina torulosa*, which have been described as suitable food and/or shelter trees for Koala in south-east Queensland (White, 1999; Yongentob et al., 2021).

Two reports detailing the March (EVE 2022a) and May (EVE 2022b) thermal Koala surveys over Tabooba are provided in Appendix 2 (as Appendices 2 and 3 of the field report).

For the March survey, the drone covered an area of approximately 200 ha (Figure 5.8) and detected two Koalas (Koala locations shown on Figure 5.9). The area droned was limited by the need to keep line of sight of the drone and more importantly, the inability to access areas due to the very wet conditions. One individual was recorded just outside of the property boundary in the northwest within mapped remnant RE 12.8.16, and the other in the north-western quarter of the property within AU2 (RE 12.8.16 advanced regrowth). Allowing for a detection probability of 90%, EVE (2022a) estimated the property probably supports four or five Koalas (a density of 0.01-0.013 Koalas/ha.

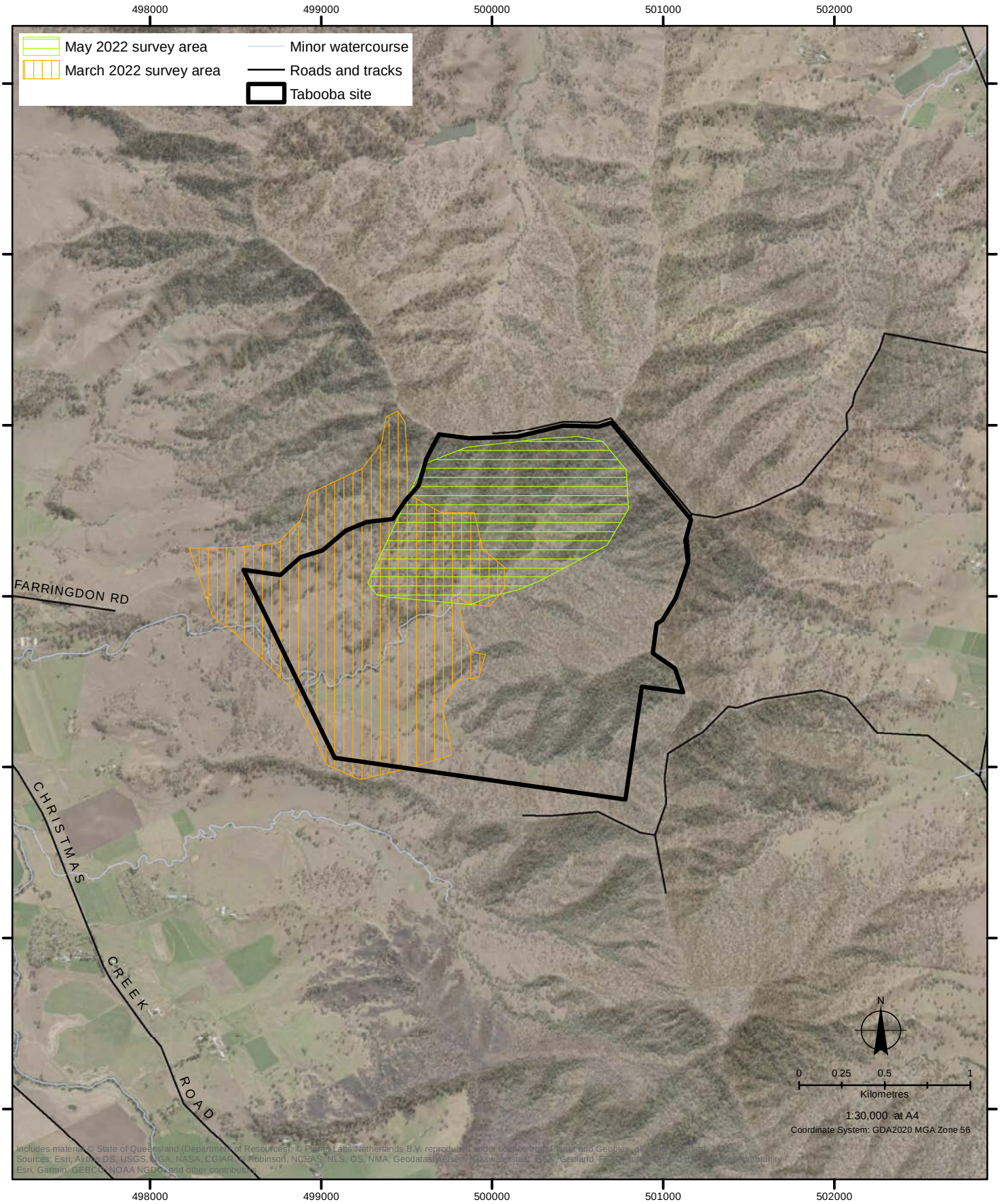
For the May survey, the drone was able to be operated from further inside the property, reaching higher into the range and covering an area of approximately 107 ha of habitat (Figure 5.8). Eight Koalas were detected (locations shown on Figure 5.9), mostly on the mid-upper slopes of the range in the following AUs:

- two Koalas in AU1 RE12.8.16 remnant
- two Koalas in AU2 RE12.8.16 advanced regrowth
- three Koalas in AU4 RE12.8.14 remnant
- one Koala in AU5 RE12.8.14 advanced regrowth.

Allowing for a detection probability of 90%, EVE (2022b) calculated a population density of 0.08 Koalas/ha based on the May survey event.

EVE (2022b) noted that the presence of such an abundance of koalas on the mid-upper slopes of the ridge was somewhat unexpected given that more nutrient-rich geology undoubtedly occurs on the lower slopes and flats. However, the lower slopes and flats are largely cleared and are managed for beef cattle production.

When conditions improve for deploying the drone further into the property, it is intended to survey habitats further to the east to refine Koala density estimates.



Data sources:
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Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

Figure:	**5.8**
Title:	**Tabooba Thermal Koala Survey Areas**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

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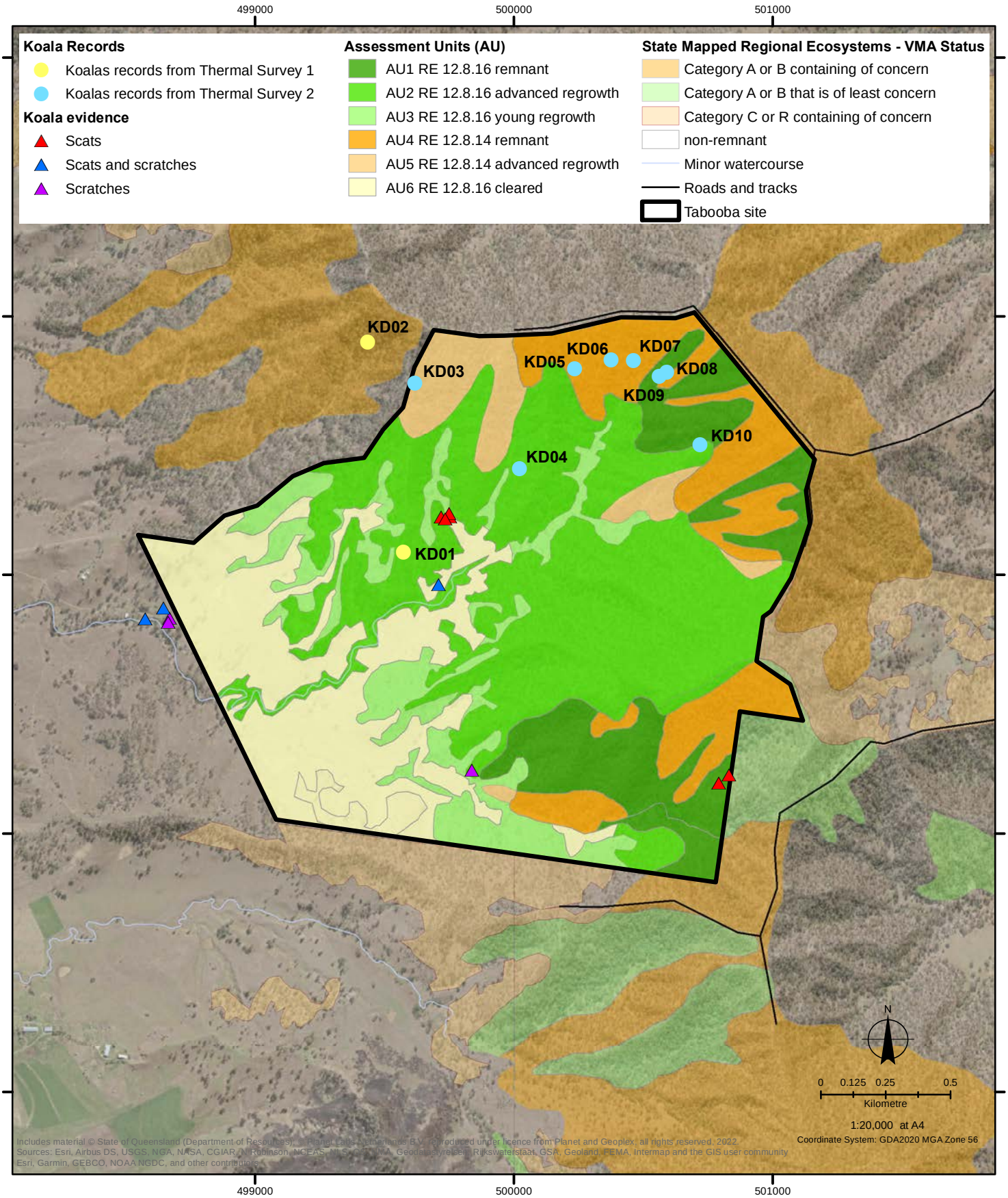

Data sources:
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Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

Figure:	**5.9**
Title:	**Tabooba Thermal Survey Koala Records, SAT Survey Scat Records and other Koala Evidence**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

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5.2.3 Habitat Assessment - Grey-headed Flying-fox

No surveys targeting Grey-headed Flying-fox were conducted at Tabooba as there were no flowering events at the time of surveys. However, the property is dominated by preferred forage species of Grey-headed Flying-fox, including the winter-flowering *Eucalyptus tereticornis* and *E. crebra*, which are critical resources for the species (National Recovery Plan for the Grey-headed Flying-fox *Pteropus poliocephalus* DAWE, 2021).

Both REs present on Tabooba rank as high-moderate value foraging habitat for Grey-headed Flying-fox (see Section 5.1.5). The Recovery Plan describes vegetation communities containing (amongst other species) *Eucalyptus crebra, E. tereticornis* and *E. melliodora* as important resources for Grey-headed Flying-fox on coastal lowlands of Southern Queensland as they flower reliably over the winter and spring period. While the property is not located within the coastal lowlands of southern Queensland, Eby and Law (2008) state that productive areas for winter flowering are concentrated in South East Queensland and northern New South Wales where flowering occurs in small remnants in coastal floodplains, coastal dunes and inland slopes, and during spring the extent of productive habitat increases in northern regions, expanding from the coastal lowlands into the coastal ranges and valleys.

Grey-headed Flying-fox forage species, as identified by Eby and Law (2008) and the Recovery Plan, within the AUs of the property are listed in Table 5.4 with an indication of the known flowering times of each species. Flowering times for most species were given by Eby and Law (2008) with the exception of *E. crebra*, where the southeast Queensland flowering season is given as June-July and August-September within the 'Implementation of the national Flying-Fox monitoring program' report (Rural Industries Research and Development Corporation 2015); and *E. tereticornis* subsp. *basaltica* which has been recorded flowering from May to November (EUCLID 2022).

Table 5.4. Recorded flowering times for Grey-headed Flying-fox forage species

Species	D-J	F-M	A-M	J-J	A-S	O-N
Corymbia intermedia						
Corymbia tessellaris						
Eucalyptus crebra						
Eucalyptus melanophloia						
Eucalyptus melliodora						
Eucalyptus tereticornis subsp. *basaltica*						
Eucalyptus tereticornis subsp. *tereticornis*						
Lophostemon confertus						

The presence of critical forage species and distance to a nationally important Grey-headed Flying-fox camp (within 20km) indicates Tabooba supports habitat critical to the survival of Grey-headed Flying-fox. Protection of existing habitats from clearing, restoration of cleared habitats, weed management to improve canopy recruitment in remnant and advanced regrowth, and improved fire management to reduce the risk of wildfire would ensure available habitat within the property is increased and habitat condition is improved.

6.0 PROPOSED OFFSET PROPERTY - GREENRIDGE

6.1 OFFSET SITE DESCRIPTION

Greenridge is located at 108 Green Meadows Road, Pimpama, approximately 3.5 km northeast of the northern extent of the proposed action (Figure 1.3). Greenridge covers 407 ha in total and is comprised of 12 lots:

- Lot 121 on RP903491 (28.43 ha)
- Lot 15 on SP145312 (62 ha)
- Lot 6 on RP50178 (60.57 ha)
- Lot 7 on RP50178 (26.69 ha)
- Lot 8 on RP50178 (37.69 ha)
- Lot 11 on RP50178 (15.68 ha)
- Lot 12 on RP50178 (16.28 ha)
- Lot 13 on RP50178 (54.6 ha)
- Lot 14 on RP50178 (19.98 ha)
- Lot 15 on RP50178 (40.65 ha)
- Lot 16 on RP50178 (14.37 ha)
- Lot 71 on W31402 (30.35 ha).

6.1.1 Locality Features, Topography and Climate

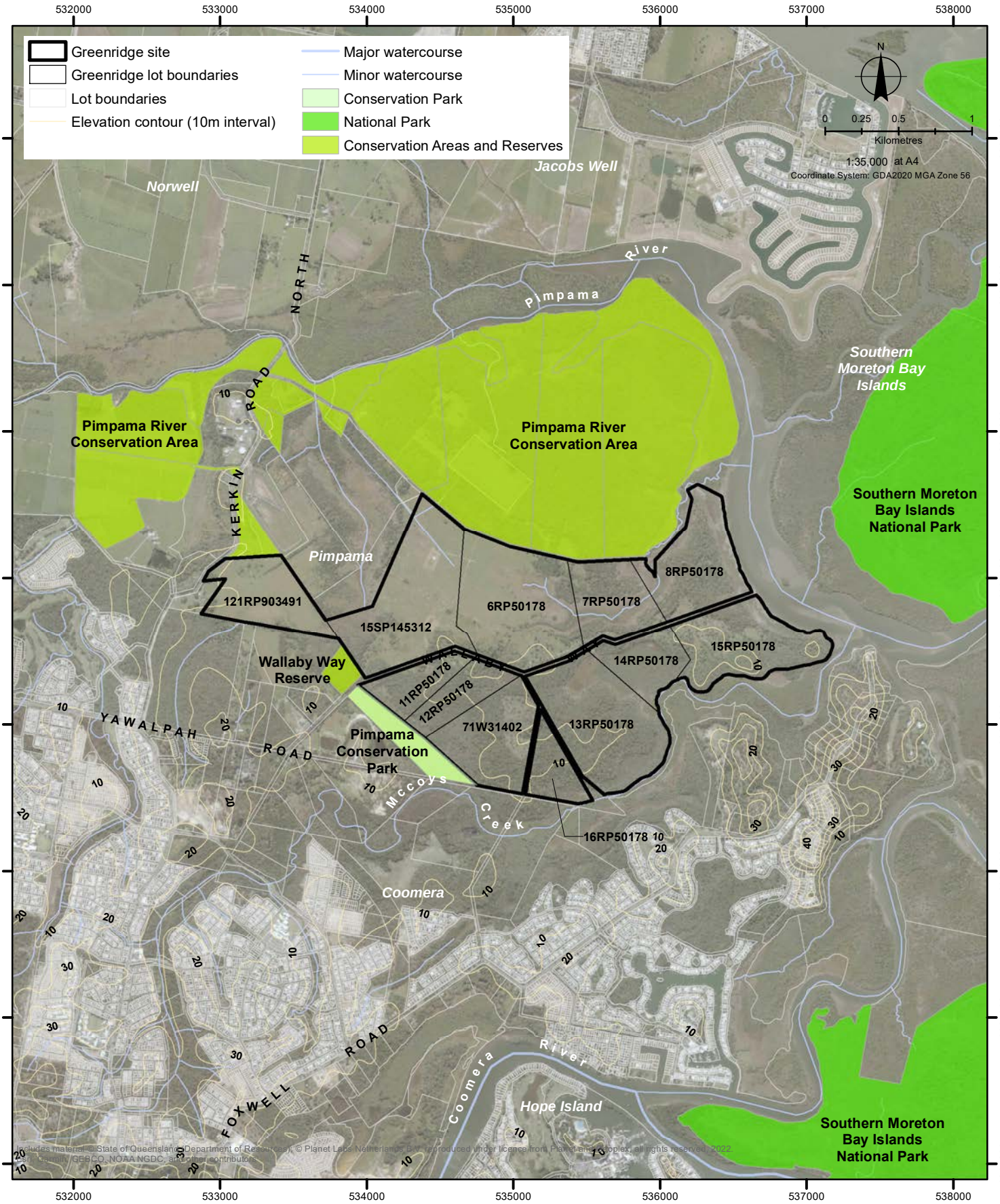
Greenridge is situated at the southern-most extent of a broader >100 km^2 area of agricultural land that exists between the Logan River in the north and McCoys Creek in the south. Agricultural land uses in the broader area are dominated by sugar cane production. Also present are extractive industries, including sand mining and hard rock quarrying, along with aquaculture enterprises and facilities for boating. This area is bound to the west by the Pacific Motorway (M1), which is adjoined by industrial and residential development. The eastern boundary is the southern extent of Moreton Bay including the Moreton Bay Ramsar Wetland, and there are patches of remnant vegetation along the coastline and associated with inlets, rivers and creeks. New residential developments are beginning to emerge along the coastline. Much of the area is less than 10 m above sea level.

Figure 6.1 shows the location of Greenridge between McCoys Creek in the south and the Gold Coast City Council owned Pimpama River Conservation Area in the north (protected by Gold Coast City Council for the purpose of Koala offset). Its eastern boundary is formed by the Pimpama River and lands associated with a Gold Coast City Council sewage treatment plant and a nature reserve are located to the west.

The central to southern portions of Greenridge contains small ridges and hills up to 20 m above sea level and composed of sandy clays to stony lithosols derived from Neranleigh-Fernvale beds with colluvial deposits at the base of slopes. These higher areas are characterised by open eucalypt woodland supporting Koala and Grey-headed Flying-fox habitat. The north-east and north-west of Greenridge consist predominately of alluvial plains supporting a network of shallow alluvial channels draining into the Pimpama River and McCoys Creek. This area is comprised of poorly drained clays to sandy clays, derived from river alluvial, beach and estuarine sediments and supports a mosaic of aquatic and terrestrial vegetation types typical of low-lying coastal areas.

A considerable portion of Greenridge has been cleared in the past for agricultural purposes.

The closest weather station to Greenridge is the Gold Coast Seaway Station (040764), approximately 15 km away, which has been operational since 1987. At this station mean annual rainfall is 1303.3 mm/year and mean monthly rainfall is as shown in Image 6.1. Mean maximum temperature is 25.3˚C, ranging from 28.8˚C in January to 21.3˚C in July. The highest maximum temperatures were above 30˚C in the months from December to February.



Data sources:
Cadastral data - Queensland - by area of interest, Published 30/05/2022
Elevation contours - 10 metre interval, Published 26/08/2019
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
MSES - Protected area - estates, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources)

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

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Figure:	**6.1**
Title:	**Greenridge Site Locality Features**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

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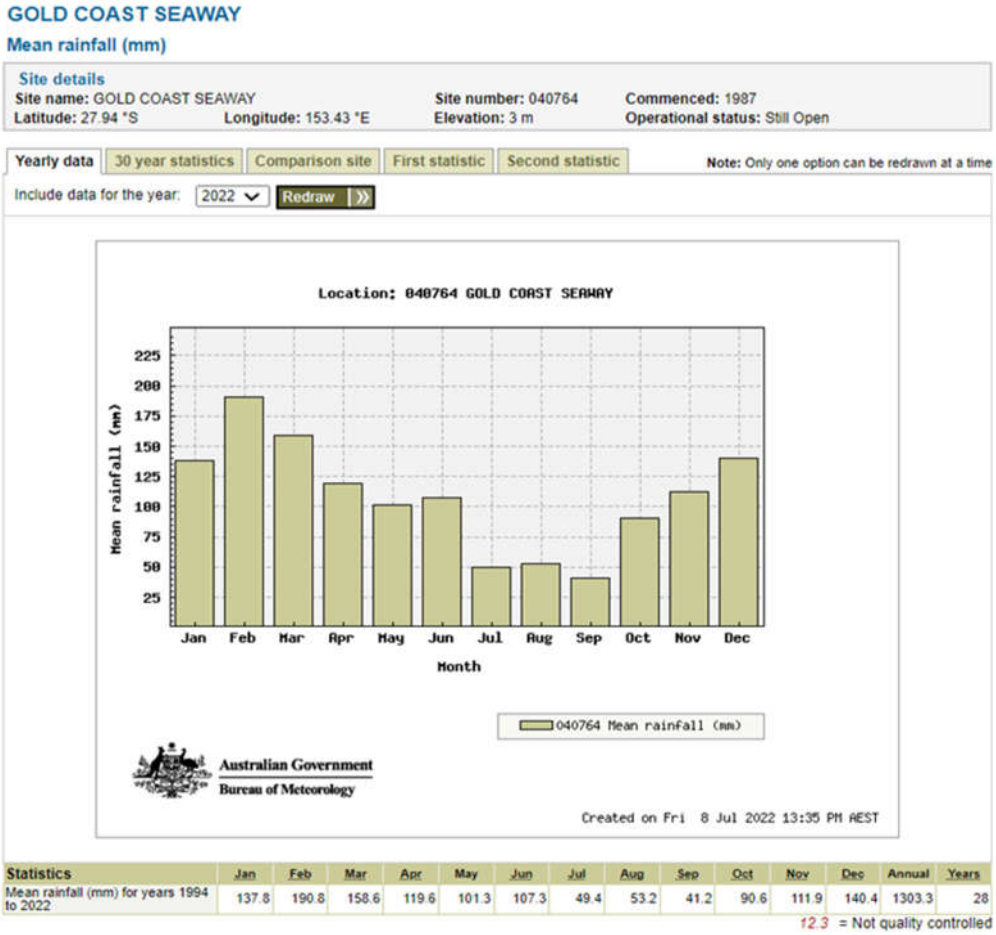
Image 6.1. Gold Coast Seaway Station Mean Maximum Monthly Rainfall Totals



6.1.2 Management History

The earliest available aerial imagery (from 1955) indicates the north-western portion of Greenridge was historically cleared of vegetation to facilitate sugarcane farming (Image 6.2). Broad-scale and selective vegetation clearance continued into the central and southeastern portion of Greenridge for cattle-grazing and establishment of small-scale slash pine plantations as shown in the 1971 aerial photograph (Image 6.3). Sugar-cane production appears to have ceased between 1978 and 1985. By 1989 (Image 6.4) Greenridge was being managed primarily for cattle grazing and slash pine plantation, as well as for recreational use by light aircraft. All vegetation on Greenridge was either cleared or substantially thinned and cattle grazing has been the predominant use to recent times.

In addition to historical broadscale clearing causing major changes to the landscape, areas once mapped as marine-influenced RE 12.1.1 have been significantly altered due to the suppression of tidal inundation from the installation of tidal gates at Kerkins Road and Green Meadows Road (Photo 6.1). The tidal gates close at high tide and open (drain) at low tide. This has led to a greater retention of freshwater runoff and establishment of an artificial freshwater wetland habitat within the western portion of Greenridge (Photo 6.2).

Though most recently used for cattle grazing, Greenridge does not exhibit any signs of recent cattle usage. Pasture dominated by the exotic South African Pigeon Grass *Setaria sphacelata* is heavily overgrown and infested with Fireweed *Senecio madagascariensis* (toxic to livestock) indicative of little pastural management. Fencing has also been removed from areas once restricting cattle access to saltmarsh and mangrove communities in the central to southern portions of Greenridge.

Image 6.2. 1955 aerial photography (source: QImagery)

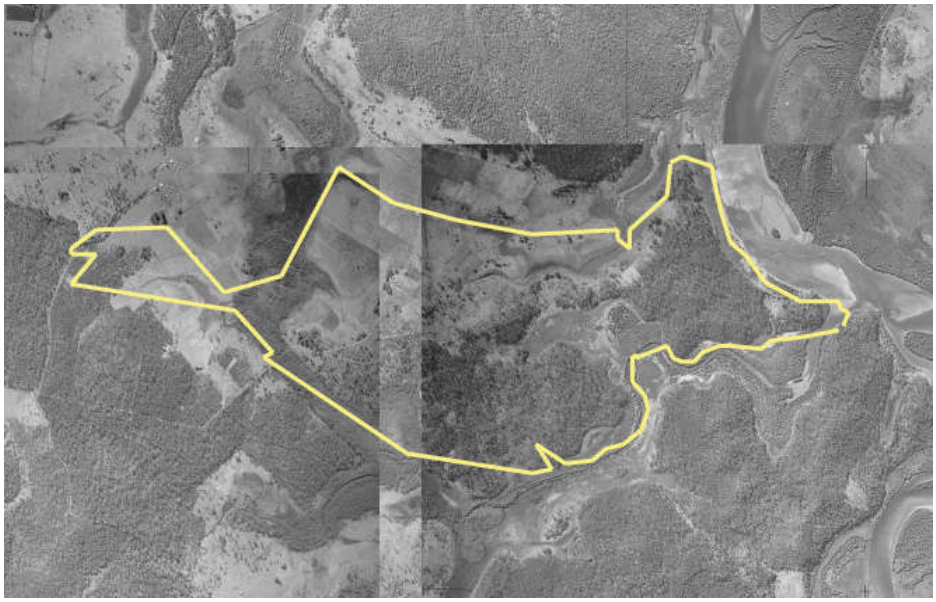


Image 6.3. 1971 aerial photography (source: QImagery)

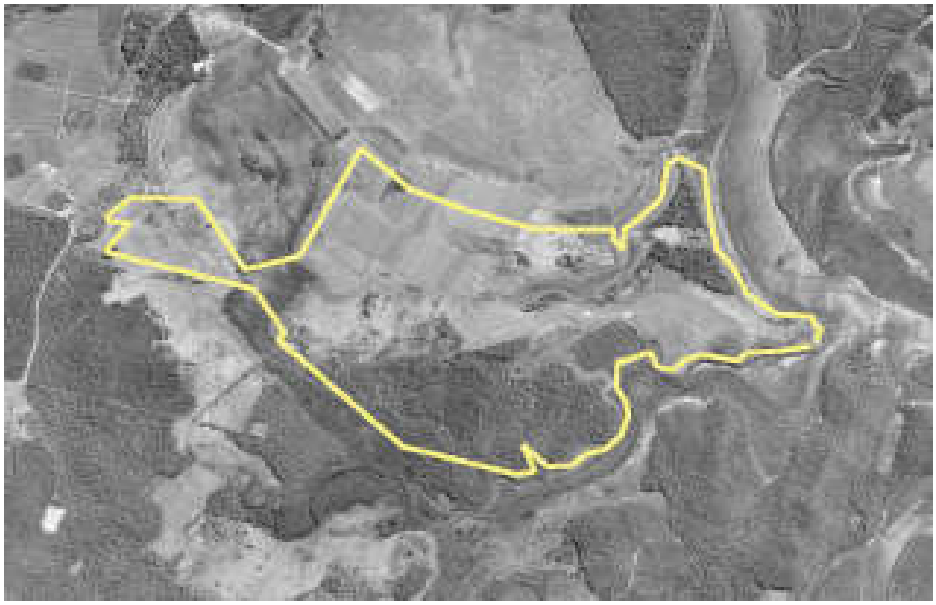


Image 6.4. 1989 aerial photography (source: QImagery)

Photo 6.1: Tidal gate located on Green Meadows Road

Photo 6.2: Artificial freshwater wetland in RE12.1.1

Historical logging/thinning in forested areas of Greenridge is evident with large stumps remaining in place of removed trees. Weed proliferation is apparent throughout Greenridge with sporadic infestations of dense Lantana and Groundsel cover. It is unknown what, if any, fire management practices were historically employed on Greenridge; however, it appears that there has been no recent management to prevent wildfire, or any other vegetation management measures implemented in recent years.

In addition to significant pest plant proliferation in parts of Greenridge, signs of invasive fauna - specifically Feral Pigs and European Foxes - were observed during ecological surveys, evidenced by characteristic diggings and tracks. Pig diggings appeared to be concentrated beneath *Casuarina glauca* as illustrated in Photos 6.3-6.5. *Casuarina glauca* is known to fix atmospheric nitrogen in root nodules through actinorhizal associations with *Frankia* spp. bacteria (Hammerton 2001). As the evidence of pig diggings throughout Greenridge was concentrated in areas of *Casuarina glauca* it is possible that feral pigs search out the nitrogen and amino acid-rich nodules, in addition to fruiting bodies produced by mycorrhizal fungi, as valuable protein resources as is common for browsing and grazing animals in forested habitats (Maser *et al.*

2008). Insufficient information is available to determine whether any pest-animal management has historically been carried out on Greenridge, but increased numbers of Feral Pigs on the Gold Coast have been reported in recent years attributed to higher rainfall in the region and are thought to be breeding in vegetation along the Pimpama River (Sheehan and Forbes 2021).

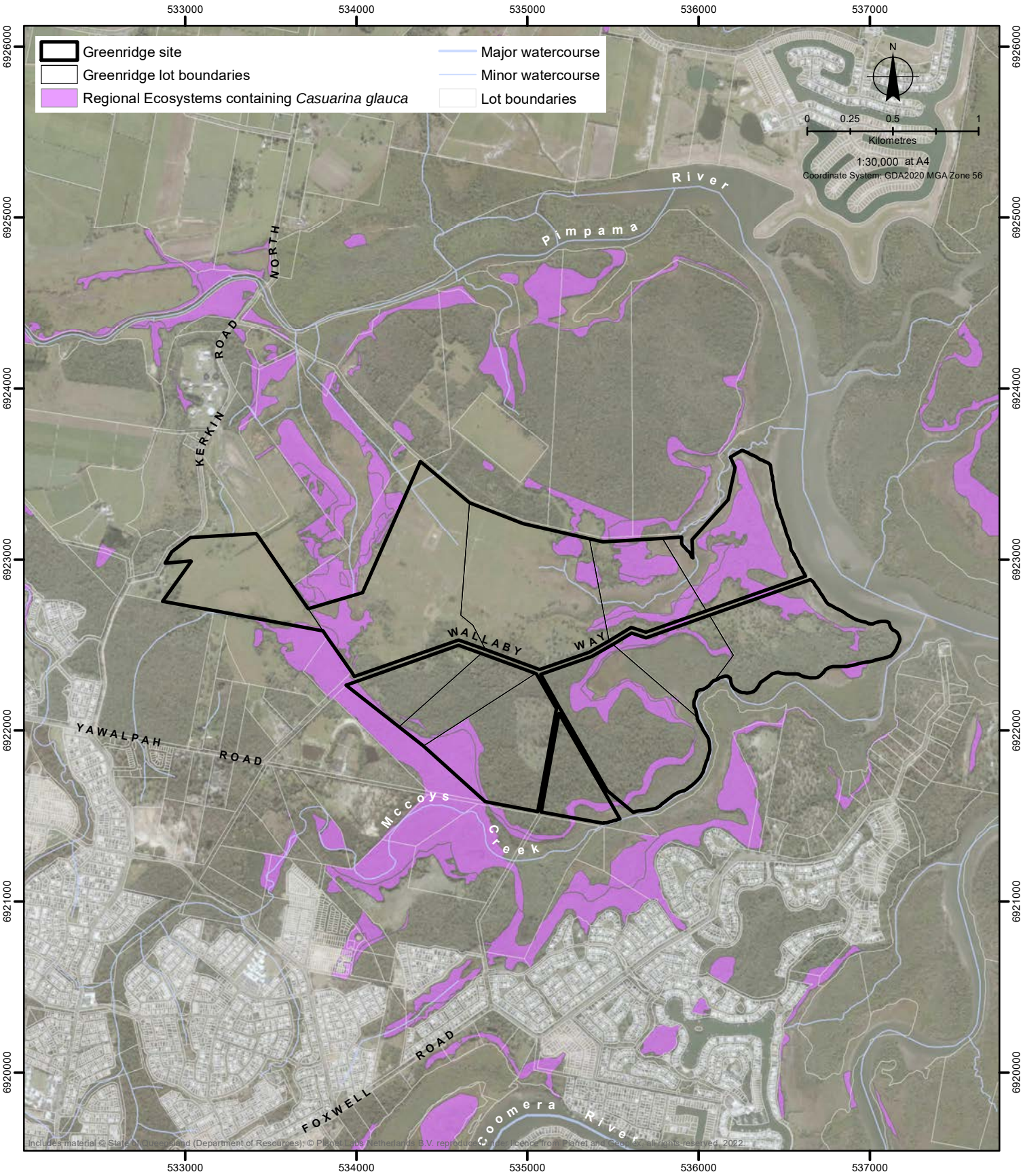
Photos 6.3-6.5: Feral pig diggings beneath and surrounding *Casuarina glauca*

6.1.3 Coastal Swamp Oak in the Landscape

In South East Queensland, *Casuarina glauca* occurs in almost monospecific stands as woodland on the margins of marine clays pans (RE 12.1.1) and in an open forest mosaic with *Melaleuca quinquenervia*, with or without *Eucalyptus tereticornis* and *E siderophloia*, on low coastal alluvial plains (RE 12.3.20). Clearing for agricultural and urban purposes on the coastal plain has significantly reduced the area of these communities on the western shores of Moreton Bay.

Accurate representation of the distribution of the TEC is difficult to determine as patches of RE 12.1.1 are often too small to map at the State mapping scale, and its occurrence within RE 12.3.20 can only be determined by field verification.

Local distribution of these REs from State mapping for Greenridge and surrounds is shown on Figure 6.2.



Data sources:
Cadastral data - Queensland - by area of interest, Published 30/05/2022
Vegetation management regional ecosystem map - v12.00, Published 04/05/2022
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources)

Figure:	**6.2**
Title:	**Greenridge Local Occurrence of REs containing *Casuarina glauca***
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

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6.1.4 Koalas in the Landscape

Koala records and activity levels

The Atlas of Living Australia (ALA) provides publicly available location data for species, including those records held by the Queensland Government. Figure 6.3 shows the locations of ALA Koala records within 10 km of Greenridge. Koala records in the locality have been numerous over the years of data collection, including within areas where habitat has since been cleared for residential and other developments – particularly within the area between the Coomera River and McCoys Creek. Koalas in this location are now largely confined to residual bushland patches and narrow habitat corridors through residential areas. There is some habitat connection from this area to Greenridge via mostly freehold land, and Greenridge provides an opportunity for a viable connection of habitats between the Coomera River and the Pimpama River Conservation Area.

EVE (2020) carried out a Comprehensive Koala Survey for the Coomera Connector Stage 1. The study identified the Pimpama River Conservation Area and the Pimpama Conservation Park as suitable recipient locations for Koala translocation and also addressed the suitability of Greenridge for this purpose. The report recommended capture, tagging and longitudinal monitoring (for at least 6 months) of resident Koalas and risks in the location, including chlamydial disease and wild dog predation. This work is currently ongoing and discussed in chapter 5 of the PER.

Planit Consulting prepared the plan, provided here as Image 6.5, to advise TMR of the Koala activity results of previous studies on Greenridge and surrounds. These studies include Koala sightings from the EVE (2020) study, as well as publicly available Koala records and sightings, including Koala hospital data. The results of 2007, 2017 and 2020 SAT surveys are also shown. 2017 SAT surveys indicated high-medium Koala activity for all terrestrial habitats in Greenridge.

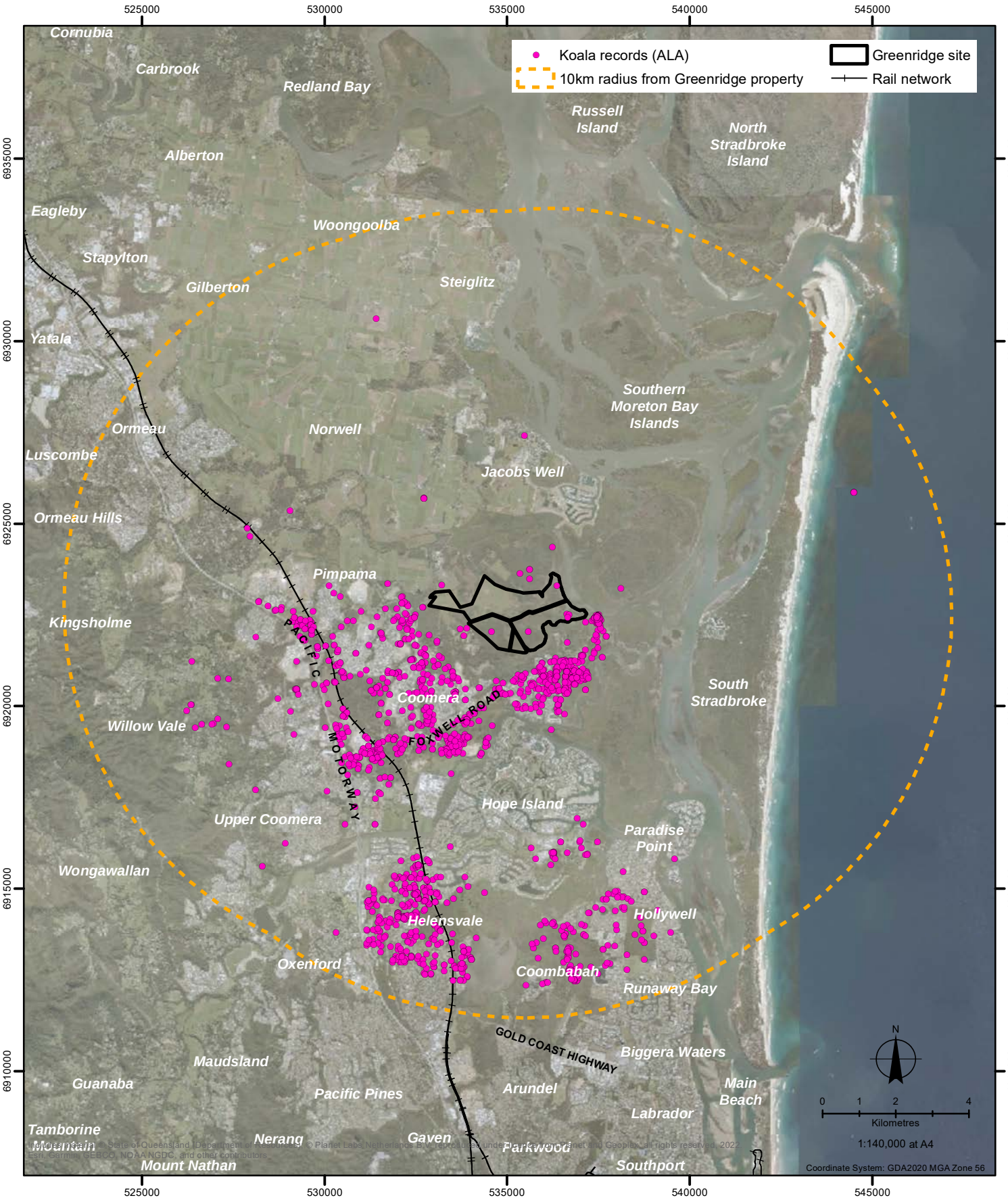
Habitat suitability and connectivity

Existing RE mapping for Greenridge is shown on Figure 6.4, indicating the presence of remnant REs 12.11.23, 12.3.20, and 12.3.5. 'Core' Koala habitat is mapped over these REs on Greenridge, which adjoins other areas of Core Koala Habitat external to the Greenridge boundary to the north and south west. The southern portion of Greenridge intercepts a mapped 'Statewide biodiversity corridor' and the north-eastern tip of Greenridge adjoins the 'Statewide riparian corridor' associated with the Pimpama River.

RE 12.11.23 is described as *Eucalyptus pilularis* open forest on coastal metamorphics and interbedded volcanics. Other canopy species include *E. microcorys, Corymbia intermedia, Angophora woodsiana, E. tindaliae and E. carnea.* Occurs on low coastal Paleozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. A 'special value' of the RE from the RE description is that it is known to provide suitable habitat for Koalas (Queensland Government https://apps.des.qld.gov.au/regional-ecosystems/details/?re=12.11.23). Consideration of the dominant canopy species indicates the RE has high value for Koala (DES 2021).

RE 12.3.20 is described as *Melaleuca quinquenervia, Casuarina glauca* +/- *Eucalyptus tereticornis*, *E. siderophloia*, *M. styphelioides* open forest on low coastal alluvial plains. Occurs on lowest terraces of Quaternary alluvial plains in coastal areas. A 'special value' of the RE in the RE description is that it is known to provide suitable habitat for Koalas (Qld Government https://apps.des.qld.gov.au/regional-ecosystems/details/?re=12.3.20). Consideration of the dominant canopy species indicates the RE has medium value for Koala (DES 2021).

RE 12.3.5 is described as *Melaleuca quinquenervia* open forest on coastal alluvium. Other tree species that may be present as scattered individuals or clumps include *Lophostemon suaveolens*, *Eucalyptus robusta, E. tereticornis, E. bancroftii, E. latisinensis, Corymbia intermedia*, *Melaleuca salicina, Livistona australis, Casuarina glauca,* and *Endiandra sieberi.* Occurs on Quaternary alluvium in coastal areas. A 'special value' of the RE in the RE description is that it is known to provide suitable habitat for Koalas (Qld Government https://apps.des.qld.gov.au/regional-ecosystems/details/?re=12.3.5). Consideration of the dominant canopy species indicates the RE has medium value for Koala (DES 2021).



Data sources:
Koala records
ALA
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources) 2022

Figure:	**6.3**
Title:	**Greenridge ALA Koala Records**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

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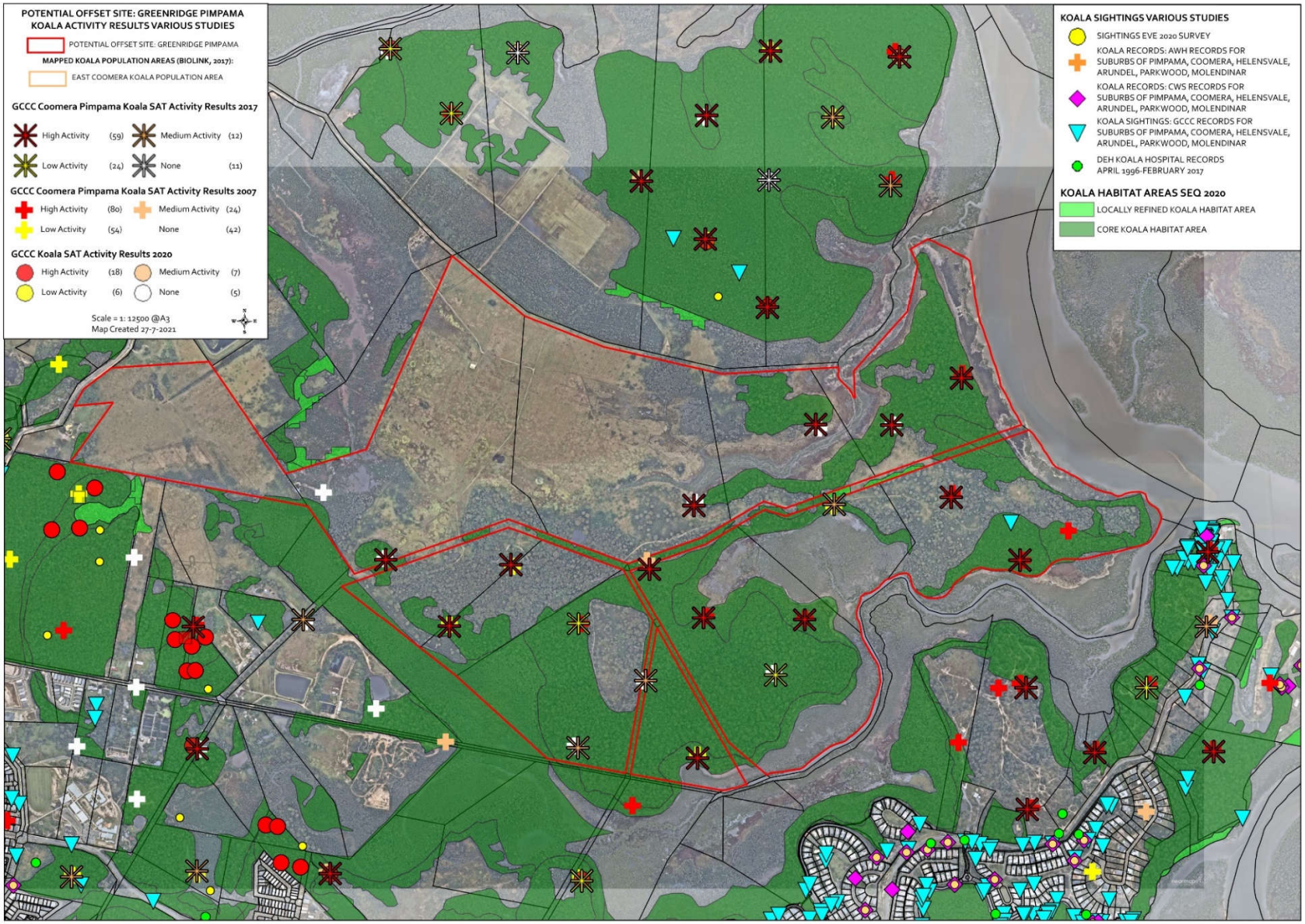
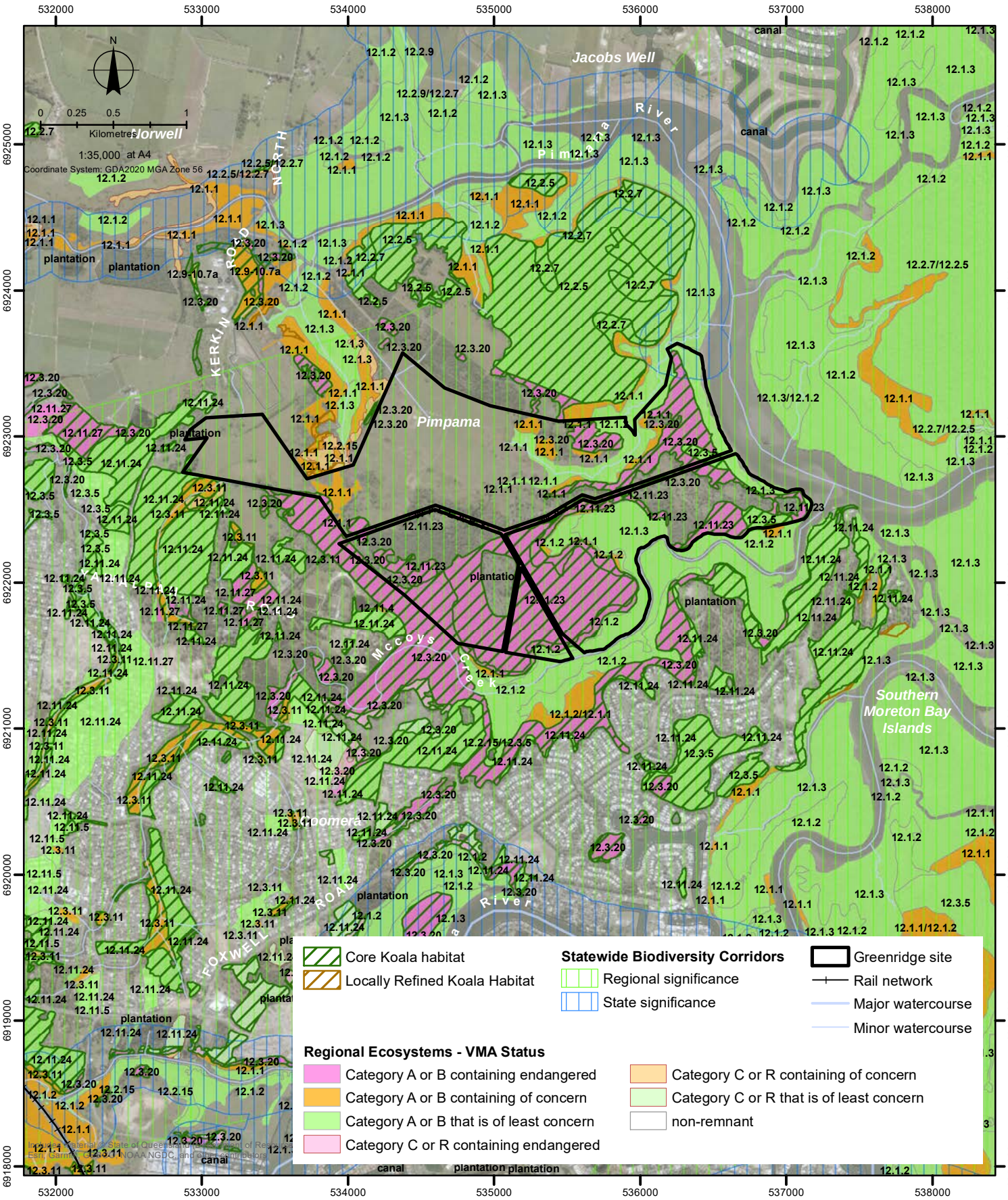
Image 6.5. Results of Previous Koala Surveys within and surrounding Greenridge





Data sources:
MSES - wildlife habitat - koala habitat areas - core and
MSES - wildlife habitat - koala habitat area - locally refined, Published 08/09/2021
Queensland Statewide Corridor Buffers - v1.6, Published 10/09/2020
Vegetation management regional ecosystem map - v12.00, Published 04/05/2022
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources) 2022

Figure:	**6.4**
Title:	**Greenridge Current RE and Koala Habitat Mapping**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

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The ecological values of portions of Greenridge are recognised in the Gold Coast City Plan (Figure 6.5), where the eastern half of Greenridge is zoned for Conservation values and forms part of a broader conservation node. The eventual inclusion of an additional 150 ha of currently 'Rural' zoned land on Greenridge into this conservation node in the form of offsets for Koalas and other matters would increase available habitat for Koalas. For the entire site, including those locations currently supporting remnant and regrowth vegetation, management as offset habitat would implement long-term measures to reduce threats to Koalas, such as controlling European Foxes and wild dogs and managing Lantana where it is a barrier to Koala movement and a risk for uncontrolled bushfire.

Movement of Koalas between Greenridge and the adjacent state-mapped 'Core' Koala habitat in the 355 ha Pimpama River Conservation Area (PRCA) to the north (Figure 6.1) is known anecdotally from previous camera trap surveys. A tributary of the Pimpama River which separates vegetated eastern and central portions of Greenridge from the PRCA, confines Koala movement between these areas to the terrestrial habitats in the western portion of Greenridge. At present, the cleared paddocks in the western portion are mostly treeless and support long pasture grasses and dense *Setaria sphacelate*, which may discourage Koala movement though these areas and expose Koalas to high risk of predation. The western boundary of Greenridge is adjacent to the 14 ha Pimpama Conservation Park, the 5ha Wallaby Way Reserve, partly treed land zoned for rural uses and a local government sewerage treatment facility, which are ultimately connected to the PRCA and likely form the predominant passage between Greenridge and the PRCA for Koalas.

Future restoration of Koala habitat in cleared portions of Greenridge would significantly improve connectivity between exiting remnant habitat and the PRCA.

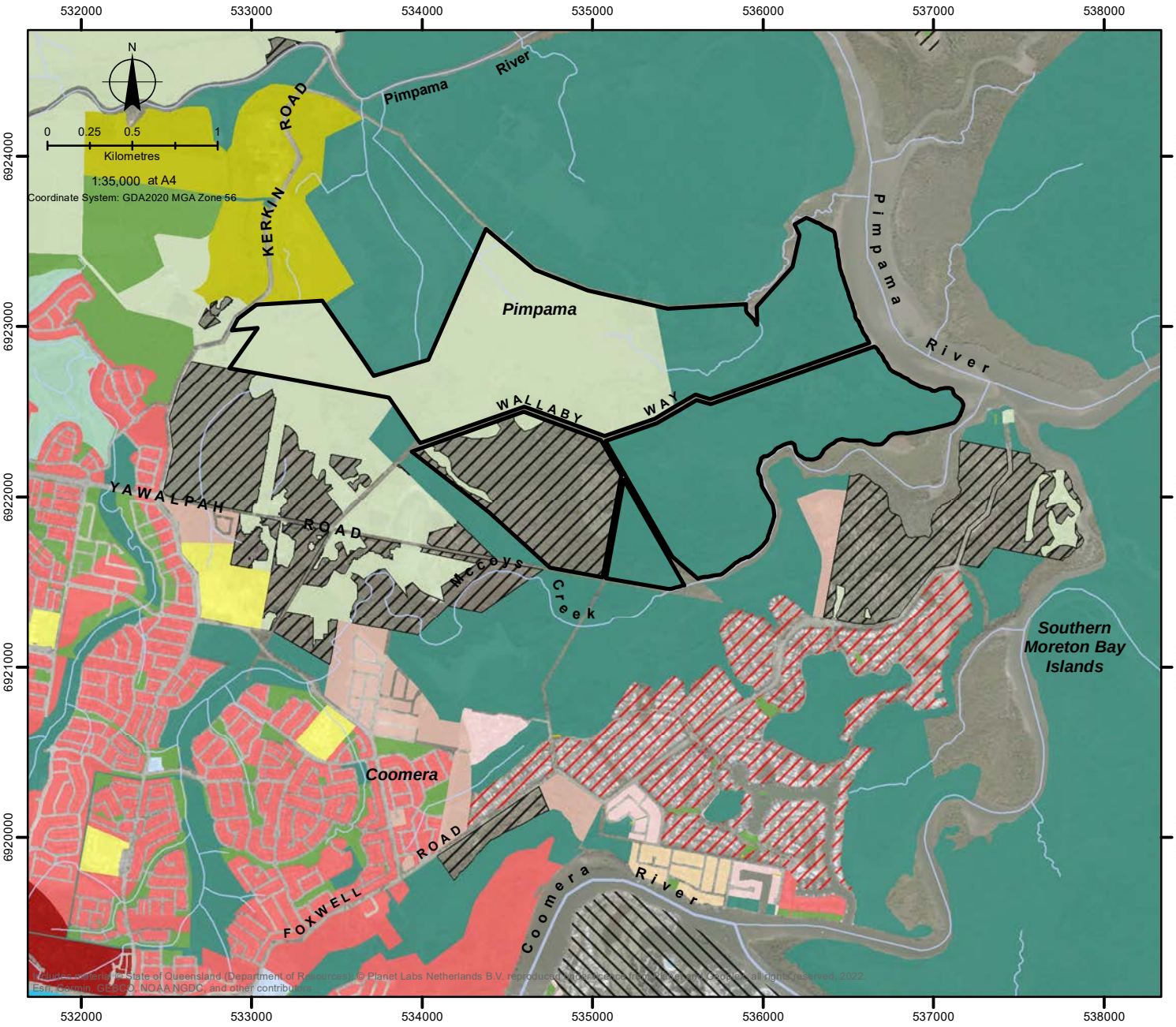
McCoys Creek on the southern boundary of Greenridge supports dense mangroves and expanses of saltmarsh vegetation that would restrict Koala movement to the south.

6.1.5 Grey-headed Flying-fox in the Landscape

ALA database records for Grey-headed Flying-fox in the landscape are shown on Figure 2.6, along with the locations of known flying-fox camps supporting Grey-headed Flying-fox as indicated in data sourced from DCCEEW's National Flying-fox Monitoring Viewer.

The number of Grey-headed Flying-fox records shown on Figure 6.6 is not expected to represent the full distribution of the species in the landscape as they are active nocturnally, often in extensive and inaccessible woodlands and forests in response to flowering events.

At night, Grey-headed Flying-foxes typically feed on blossoms and fleshy fruits within 20 km of their roosts (although they can travel as much as 50 km), feeding in remnant forest, patches of vegetation on cleared land and urbanised areas (Roberts *et al*., 2012). Habitats of Greenridge are within the typical foraging distance of the 21 camps shown on Figure 6.6, which includes the Nationally Important Flying-fox camp at Carrara, Edelsten Court, which is just outside of the 20 km radius of Greenridge. Figure 6.7 shows the number of Grey-headed Flying-foxes recorded at these camps over the past five years. The most active camps have been Beenleigh, Logan Street (10,000-15,000 recorded in 2022), Tamborine National Park (500-9,999 recorded on four survey years from 2018 to 2022) and Nerang, Gilston Road (500-9,999 recorded each year from 2018 to 2022). The camp at Chiba Reserve at Coombaba has also had Grey-headed Flying-fox consistently present in the past five years.



Gold Coast City Council - City Plan Zones

- Low density residential
- Low density residential, Calypso Bay precinct
- Low density residential, Large lot precinct
- Medium density residential
- High density residential
- Neighbourhood centre
- Sport and recreation
- Open space
- Conservation
- Community facilities
- Emerging community
- Innovation
- Rural
- Rural, Rural landscape and environment precinct
- Rural residential, Rural residential landscape and environment precinct
- Special purpose
- Special purpose, Special development areas precinct
- Township

- Greenridge site
- Major watercourse
- Minor watercourse

Data sources:
City of Gold Coast Plan v8
Gold Coast City Council
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources) 2022

Figure:	**6.5**
Title:	**Greenridge Gold Coast City Plan Land Uses**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

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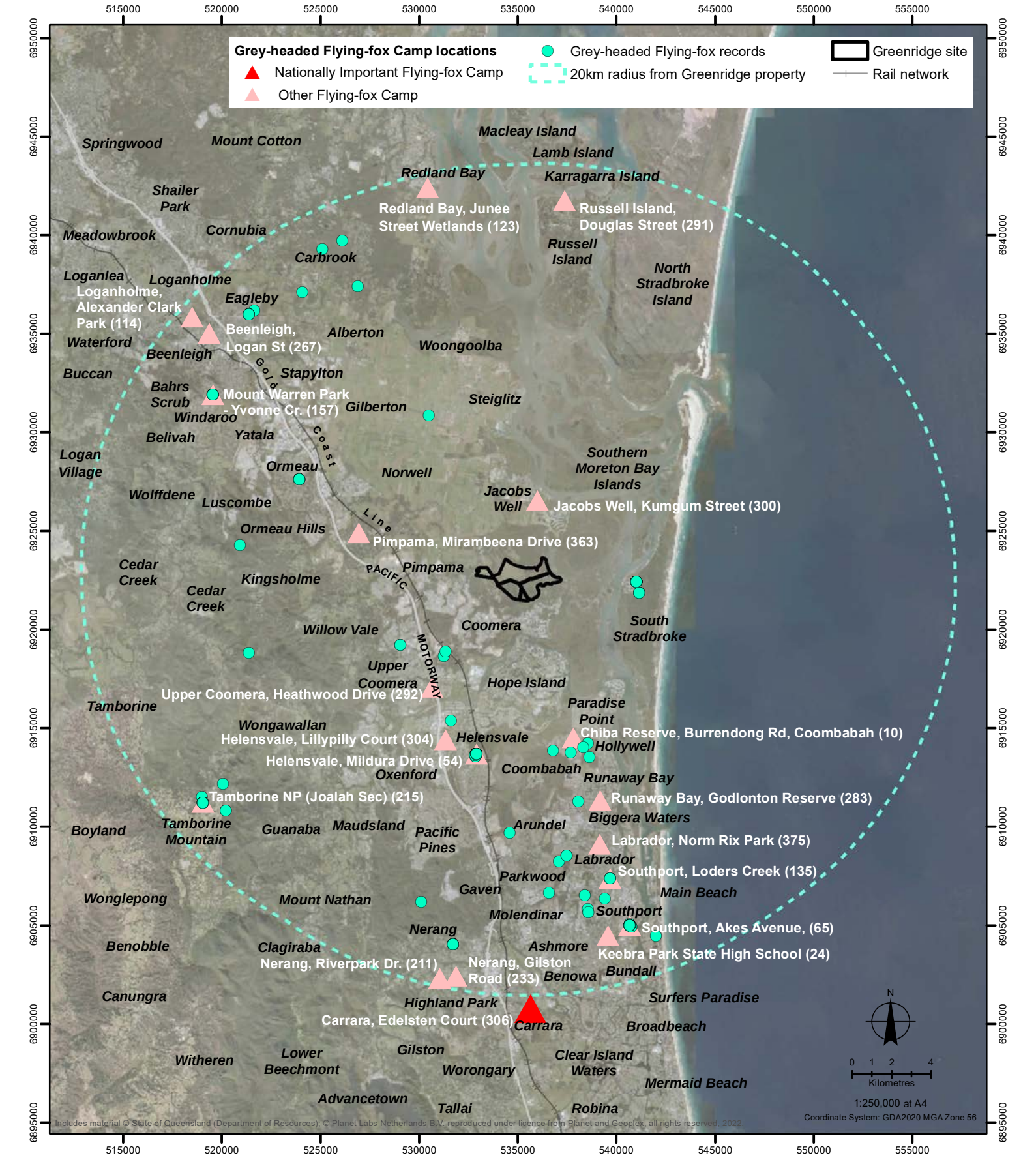

Data sources:
Grey-headed Flying-fox records
Atlas of Living Australia 2022
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources) 2022

Figure:	**6.6**
Title:	**Greenridge Grey-headed Flying-fox ALA records and camp locations**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

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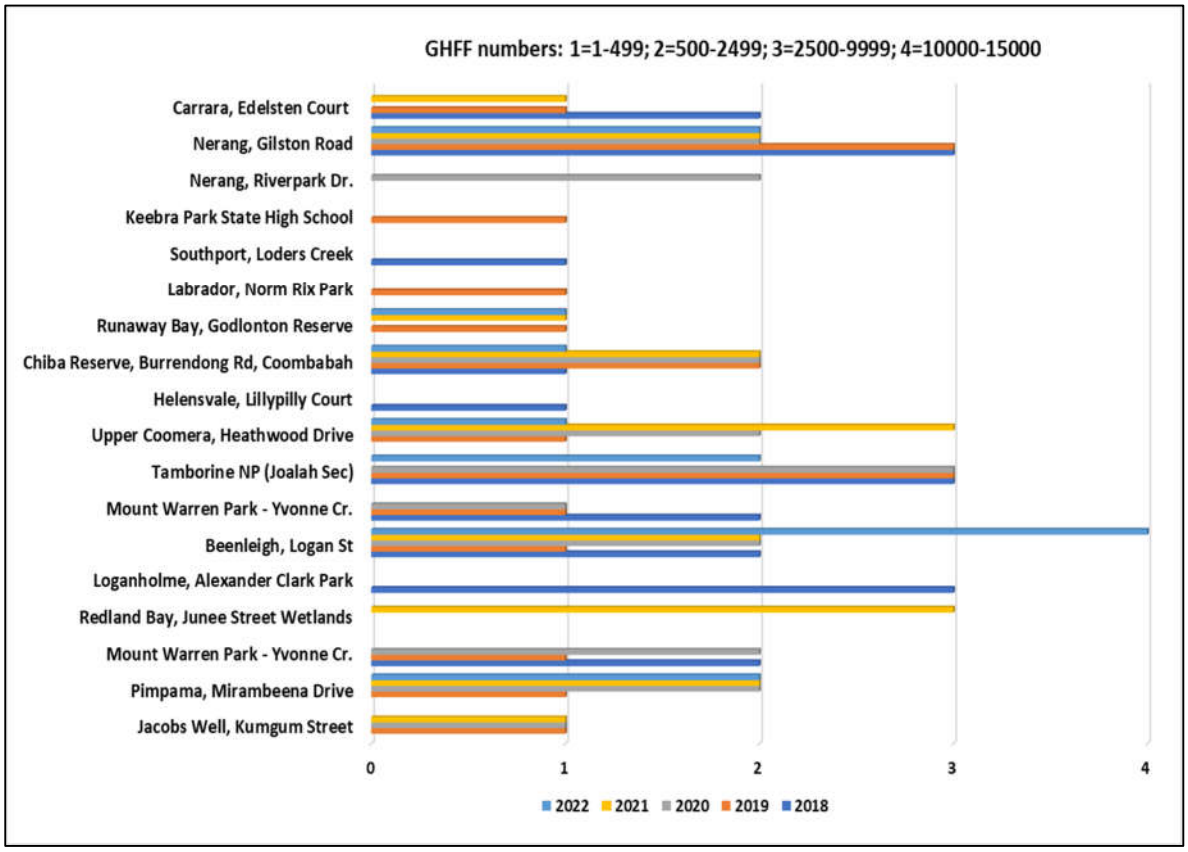
Document Location: D:\Projects\BAAM\BAAM 2022-009 Coomera Connector Offsets\Output\0101-030-0016-A (CCOffset Greenridge_GHFF Records).mxdDate: 5/08/2022 11:38:27 AM

Figure 6.7. Grey-headed Flying-fox numbers from camps within 20 km of Greenridge.



Consideration of the dominant canopy species within the REs present (Figure 2.4) indicates REs 12.3.5, 12.3.20 and 12.11.23 have high value for Grey-headed Flying-fox, attributed to the dominance of winter-flowering canopy species (DAWE 2021, Eby and Law 2008).

During a Koala survey of Greenridge conducted by ddwfauna for Titanium Enterprises Pty Ltd in 2006, Grey-headed Flying-foxes were reported to be widespread throughout vegetated areas and were observed feeding on *E. tereticornis* and *M. quinquenervia*.

6.2 FIELD SURVEYS

Field surveys were undertaken at Greenridge to assess its suitability for use as an offset for Coastal Swamp Oak TEC, Koala and Grey-headed Flying fox. A full report of these surveys, including survey methodologies is provided in Appendix 3.

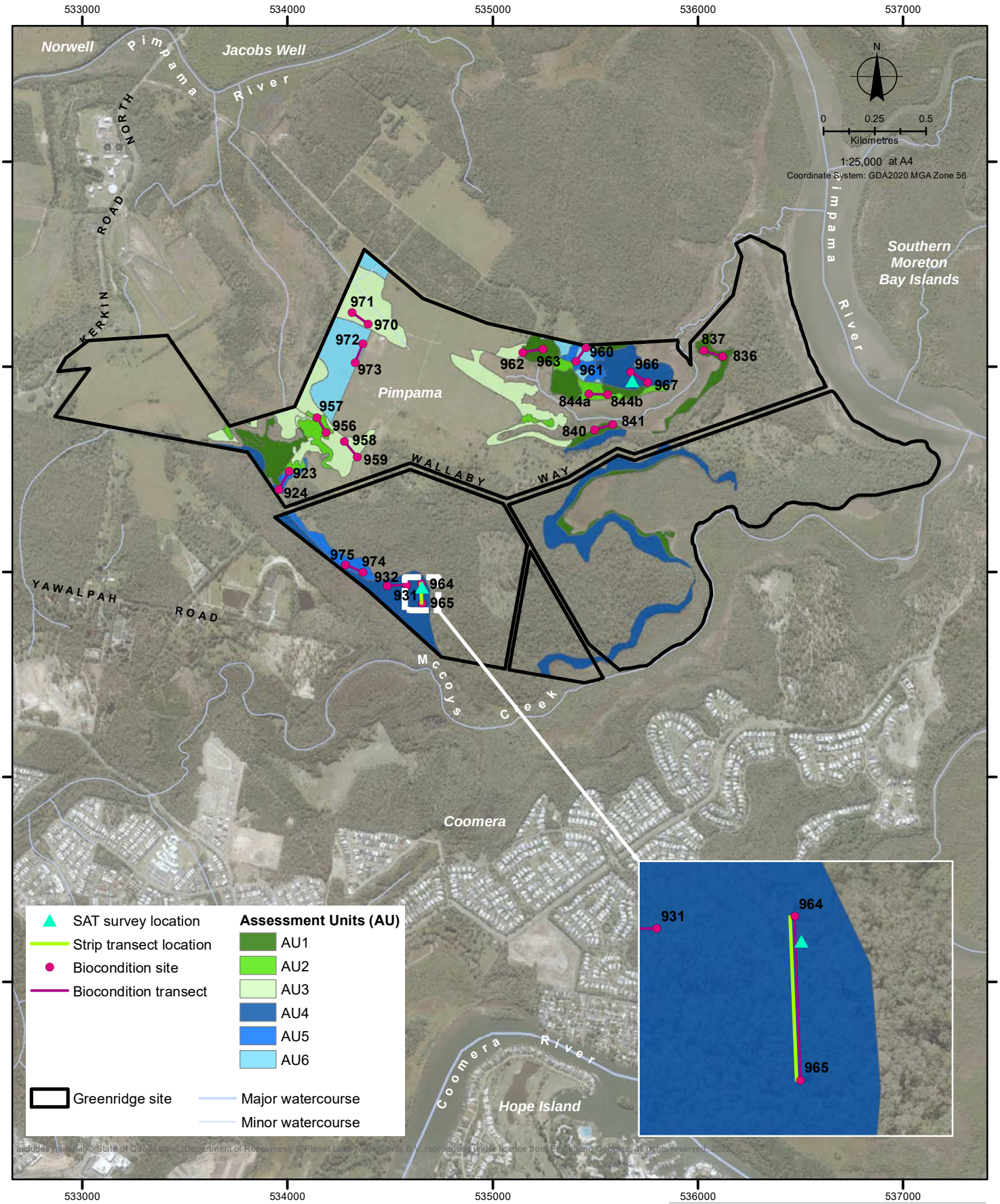
6.2.1 Habitat Quality Assessment – Assessment Units

In accordance with the methods of the *Guide to Determining Terrestrial Habitat Quality – Version 1.3* (the guide) Greenridge was mapped into like Assessment Units (AUs), differentiated based on:

- RE type; and
- Vegetation condition (remnant, advanced regrowth, young regrowth or cleared).

Ground-truthing of a number of polygons of the RE types supporting *Casuarina glauca* was undertaken through applying the quaternary survey method of Neldner *et al.* (2017). Field observations and the use of historical aerial photography contributed to delineation of the regrowth vegetation.

A brief description of each AU is provided below, AU mapping results and field survey locations are shown in Figure 6.8.



Data sources:
Vegetation management regional ecosystem map - v12.00, Published 04/05/2022
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources) 2022

Figure:	**6.8**
Title:	**Greenridge AU Mapping Results and Survey Locations**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 29/09/2022**

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Document Location: D:\Projects\BAAM\BAAM 2022-009 Coomera Connector Offsets\Output\0101-030-0017-D (CCOffset Greenridge_AU mapping and survey locations).mxdDate: 29/09/2022 8:24:25 PM

AU1 REMNANT RE 12.1.1: 14.2ha. Remnant *Casuarina glauca* open forest. Wholly analogous with the Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and Southeast Queensland Threatened Ecological Community.

AU2 REGROWTH RE 12.1.1: 5.16ha. Regrowth *Casuarina glauca* open forest.

AU3 NON-REMNANT RE 12.1.1**:** 22.15ha. Non-remnant *Casuarina glauca* open forest (presently grassland).

AU4 REMNANT RE 12.3.20: 12.9 ha. Remnant *Casuarina glauca, Eucalyptus tereticornis* and *Melaleuca quinquenervia* open forest. Where dominated by *Casuarina glauca* the community is analogous with the Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and Southeast Queensland Threatened Ecological Community.

AU5 REGROWTH RE 12.3.20: 4.77ha. Regrowth Casuarina glauca, Eucalyptus tereticornis and *Melaleuca quinquenervia* open forest.

AU6 NON-REMNANT RE1 2.3.20: 11.88ha. Non-remnant Casuarina glauca, Eucalyptus tereticornis and Melaleuca *quinquenervia* open forest (presently grassland).

The guide suggests the number of Habitat Quality/BioCondition transect surveys that should be undertaken within each AU to represent the condition of each AU (Table 6.1). Table 6.2 provides a breakdown of AUs for Greenridge as shown in Figure 4.1, their total areas and the number of BioCondition transect surveys undertaken within each.

Table 6.1 Sampling sites relative to AU size

AU size (ha)	Suggested no. of sampling sites
0-50	At least 2
50-100	Three
100-500	Four
500-1000	Five
>1000	Six

Table 6.2 AU Areas and BioCondition Transects completed

AU description	Area (ha)	Suggested transects	Transects completed
AU1 RE 12.1.1 remnant	14.22	≥2	3
AU 2 RE 12.1.1 regrowth	5.17	≥2	2
AU3 RE 12.1.1 non rem (preclear)	21.84	≥2	1
AU4 RE 12.3.20 remnant	26.61	≥2	2
AU5 RE 12.3.20 regrowth	4.77	≥2	2
AU6 RE 12.3.20 non rem (preclear)	11.88	≥2	2

Results of the Habitat Quality/BioCondition transects are provided in the field assessment report at Appendix 3.

Additional data were collected during field surveys to inform habitat quality scoring parameters for MNES not captured using the standard BioCondition method. These included the following based on the relevant MNES:

1. *Casuarina glauca* canopy cover

   Using the same method described below for Koala tree canopy cover, the proportion of *Casuarina glauca* cover for some transects was also recorded to assist in identifying patches of Coastal Swamp Oak that would qualify as the TEC.

2. Koala tree canopy cover

   When assessing the quality of food and foraging habitat for koala using the scoring method applied in the Impact Area Assessment prepared by Planit (2021a), it was necessary to record the proportion of canopy cover comprised of koala food tree species known to support koalas within the region.

   Gold Coast City Council identify the following species as diet species for Koala in the region (from: https://www.goldcoast.qld.gov.au/Council-region/About-our-city/Environment-sustainability/About-our-environment/Native-animals/Koalas)

   Preferred koala food trees:

   - forest red gum or Queensland blue gum (*Eucalyptus tereticornis*)
   - tallowwood (*E. microcorys*)
   - swamp mahogany (*E. robusta*)
   - grey gums (*E. propinqua and E. biturbinata*).

   Important local supplementary food sources:

   - narrow-leaved red gum (*E. seeana*)
   - white stringybark (*E. tindaliae*)
   - red mahogany (*E. resinifera*)
   - brush box (*Lophostemon confertus*)
   - broad-leaved paperbark (*Melaleuca quinquenervia*).

   The City of Gold Coast Koala Conservation Plan states that many other species are known to be utilised by Koala. An in-situ monitoring program at East Coomera during 2007-2014 identified Koalas using more than 40 tree species including those of the genera *Eucalyptus*, *Corymbia, Melaleuca, Lophostemon* and *Angophora*; however, it is unclear which species, if any, are utilised solely for shelter as opposed to constituting diet (Gold Coast City Council 2018). Based on the REs recorded on Greenridge that are known to provide suitable habitat for Koalas and are dominated by recognised Koala food trees, species from any of the above genera have been counted as potential Koala food trees for the purposes of this assessment.

   Standard BioCondition surveys record canopy cover by measuring the vertical projection of canopy intercepting a 100m transect line (Eyre *et al.* 2015). To capture the proportion of the canopy comprised of Koala food trees, these species were distinguished separately from other canopy species when recording canopy cover over the 100m transect. Distances of the Koala tree canopies over the 100m transect were summed and then calculated as a proportion of the total canopy cover (Koala tree cover plus non-Koala tree cover, less any overlaps).

6.2.2 Habitat Quality Assessment - Koala SAT and Strip Transect Surveys

Surveys after the Spot Assessment Technique (SAT) of Phillips and Callaghan (2011) and Strip Transects in general accordance with Dique *et al.* (2003) were undertaken to measure localised levels of habitat use by Koalas to gather baseline Koala density data. The full report from the surveys is provided as Appendix 3.

Seven SAT surveys and eight Strip Transect surveys were carried out on Greenridge on 30 June, 1 July, 27 July and 3 August 2022. The results of two of each survey type, undertaken on 27 July and 3 August (locations shown on Figure 6.8), are reported as these were the only sites relevant to a proposed action Koala offset Assessment Unit 4 (remnant RE 12.3.20). An additional SAT survey was carried out in the eastern portion of Greenridge in State-mapped RE 12.3.20; however, the mapped RE 12.3.20 at this location was subsequently determined to represent a heterogenous polygon comprised of three separate REs (including 12.3.20) and the survey results at that location were therefore not considered representative of a homogenous polygon of remnant RE 12.3.20.

No Koala scats were recorded from the three SAT surveys undertaken within AU4 and no Koalas were recorded from the three Strip Transects undertaken within AU4.

6.2.3 Habitat Quality Assessment - Thermal Imaging Drone Surveys

A thermal-imaging drone Koala survey by Endeavour Veterinary Ecology (EVE 2022) is provided in Appendix 3 (as Appendix 1 of the field report). This survey contributes significantly to understanding Koala distribution and density on Greenridge.

Thermal-imaging drone surveys of the Pimpama River Conservation Area and Greenridge were conducted by EVE over 13 nights from 2 December 2021 to 10 February 2022, with six of those nights focused on Greenridge.

All areas of Koala habitat were surveyed, except for two small areas on Greenridge (approximately 9.5 ha in total) where site terrain made it difficult to maintain visual line of sight of the drone (a Civil Aviation Safety Authority requirement). The area was divided into six discrete search polygons and each area was systematically searched in an 'up-and-back' lawn-mower pattern using a Matrice 300 RTK (M300) with H20T camera (dual optical and thermal). Thermal heat signatures suggestive of Koalas were investigated to positively identify the origin of the heat source. Where a Koala was identified, the location of the Koala was determined using a laser rangefinder and the GPS coordinates recorded in a spreadsheet and a reference screen shot of the Koala with the coordinates was saved. Coordinates and drone flight paths were plotted on Google Earth and any obvious duplicate detections were deleted. Image 6.6 shows the drone survey flight paths for the survey period. Image 6.7 shows the thermal Koala survey records from the survey.

Image 6.6. Thermal Koala survey flight paths (EVE 2022)

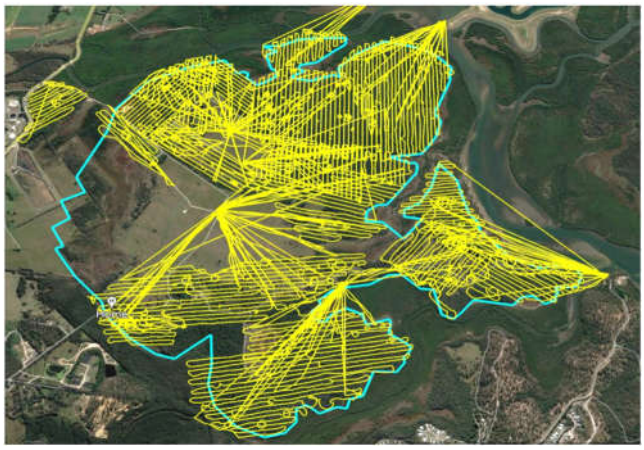


Image 6.7. Thermal Koala survey records (EVE 2022)

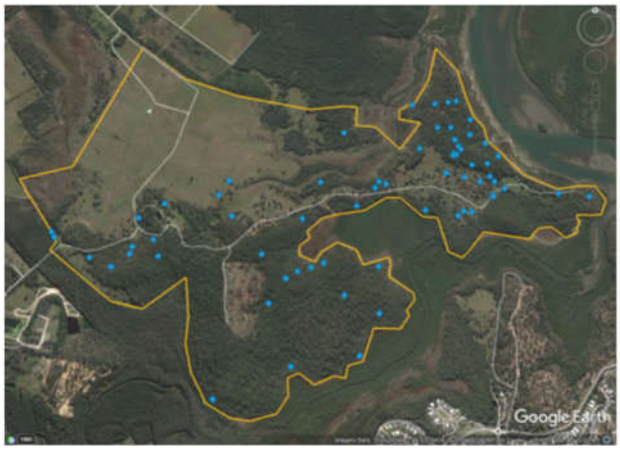
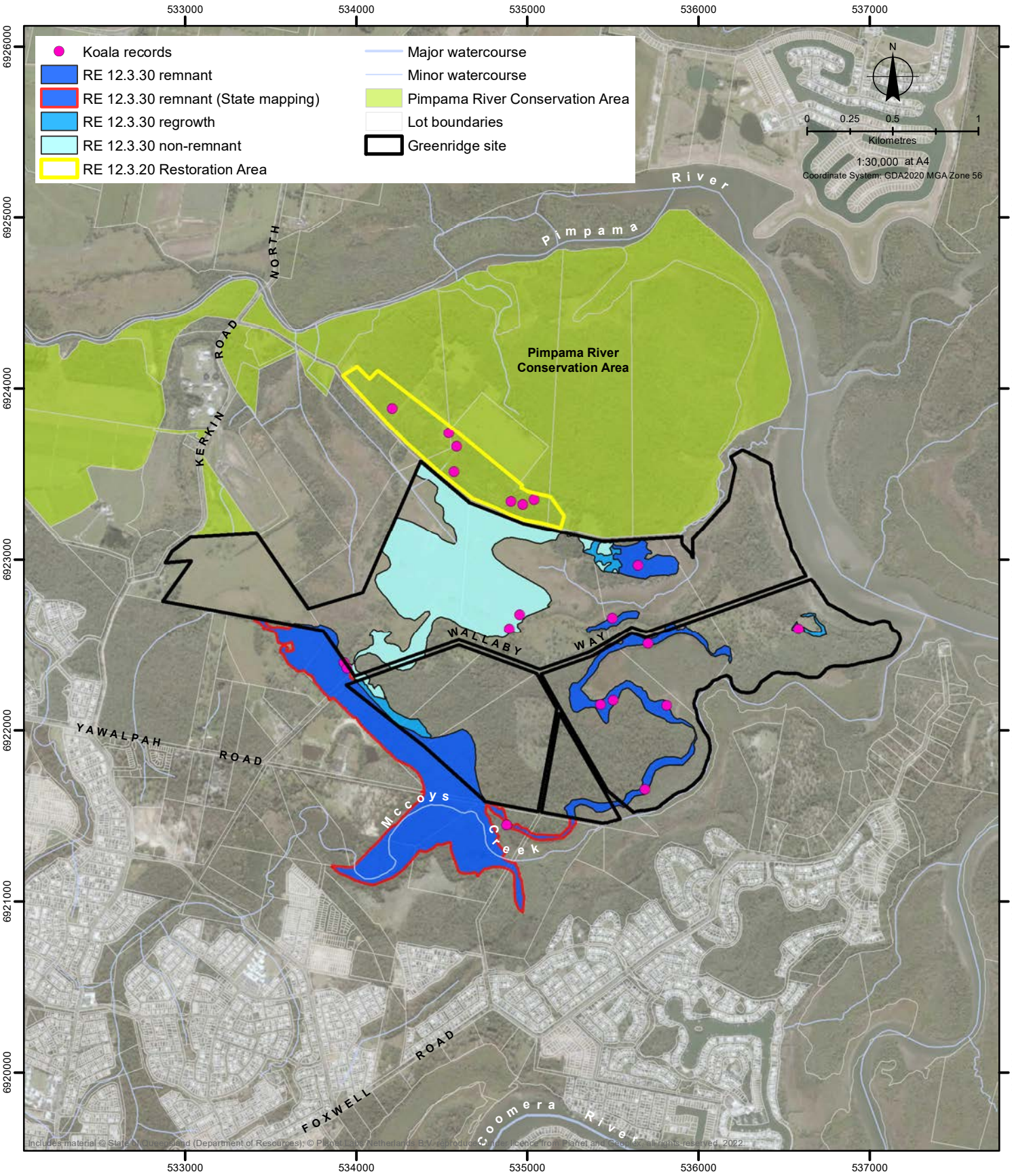


Figure 6.9 shows the Koala records from the thermal imaging surveys in relation to the relevant mapped vegetation (RE 12.3.20 remnant, regrowth and non-remnant) for Greenridge.

In addition, Figure 6.9 figure shows seven Koala records within the adjacent Pimpama River Conservation Area revegetation plots from the same survey event. Revegetation at this location has been undertaken to restore the pre-clear regional ecosystems with planting in accordance with the RE descriptions. Five of the records are within the preclear RE 12.3.20 restoration area, and two are within the preclear RE 12.2.5 restoration area.



Data sources:
Cadastral data - Queensland - by area of interest, Published 30/05/2022
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources)

Figure:	**6.9**
Title:	**Thermal Image Survey Koala Records for RE 12.3.20**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 29/09/2022**

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6.2.4 Habitat Assessment - Grey-headed Flying-fox Surveys

No flying-fox camps were recorded on site, and none have been known from Greenridge previously.

Grey-headed Flying-fox surveys were not undertaken on Greenridge as the REs present are known to be of high value to the species, Greenridge is within 20km of 20 flying-fox camps used by Grey-headed Flying-fox and the species has been recorded from Greenridge previously, foraging on *Melaleuca quinquenervia* and *Eucalyptus tereticornis* (ddwfauna 2006). During Koala surveys in 2022, the EVE Koala survey team noted heavy flying-fox use of flowering Eucalypts on site (pers comm. Deidre de Villiers). Grey-headed Flying-fox is expected to forage on site regularly during Eucalyptus and Melaleuca flowering events.

7.0 METHODOLOGY FOR COASTAL SWAMP OAK TEC HABITAT QUALITY SCORING

Habitat quality at an impact or offset matter area is assessed in accordance with the Queensland Herbarium's BioCondition Assessment Manual method for assessing site-based attributes. In the BioCondition Assessment Manual, site-based attributes are scored relative to a 'benchmark', which is a document containing site-based attribute measurements for vegetation within a particular regional ecosystem in an undisturbed state with most of its natural values intact. The Queensland Herbarium has developed BioCondition benchmarks for regional ecosystems across Queensland. This assessment results in a habitat quality score out of 10 for the entire matter area. A maximum score of 10 represents a fully-intact regional ecosystem' (SQO, 2020: 11).

To obtain the habitat quality scores against the issued benchmark for Regional Ecosystem 12.1.1 and 12.3.20 the weightings documented within the Biocondition Manual (Eyre *et al.* 2015) for fragmented subregions were utilised as shown in the table below and the resulting scores are summarised in Section 3.2.1.

	Attribute	Weighting (%)
Site-based condition attributes	Large trees	15
	Tree canopy height	5
	Recruitment of canopy species	5
	Tree canopy cover (%)	5
	Shrub layer cover (%)	5
	Coarse woody debris	5
	Native plant species richness for four lifeforms	20
	Non-native plant cover	10
	Native perennial grass cover (%)	5
	Litter cover	5
Landscape attributes (fragmented subregions[3])	Size of patch	10
	Context	5
	Connectivity	5
OR Landscape attributes (intact subregions)	Distance to permanent water	20
TOTAL		100

8.0 METHODOLOGY FOR KOALA HABITAT QUALITY SCORING

Site Condition and Site Context scoring each have a 30% weighting and Species Stocking Rate has a 40% weighting. The scoring for individual attributes of each are described in the following sections.

8.1 KOALA: SITE CONDITION

Site Condition scoring for Koala was undertaken individually for Tabooba and Greenridge by applying the scores set out in the Guide to Determining Terrestrial Habitat Quality, based on the BioCondition survey results, and including Quality and Availability of Food and Foraging habitat and Quality and Availability of Shelter as described in Sections 5.3.2 and 5.3.3.

8.2 KOALA SITE CONDITION: QUALITY AND AVAILABILITY OF KOALA FOOD AND FORAGING HABITAT

Site condition (30% weighting) scoring shown in Table 8.1 takes into account the following information:

- REs that are ranked as either 'Medium' or 'High' suitability in the report *Spatial modelling for koalas in South East Queensland v2.0* (DES, 2021);
- REs with ≥50% dominant or subdominant tree species described in the *Draft National Recovery Plan for the Koala* (DAWE, 2021a) as important in the north (i.e. in Queensland); or
- REs with ≥50% dominant or subdominant tree species listed in scientific publications as Koala habitat in areas between central Queensland to central New South Wales, including:
  - *Ranking and mapping koala habitat quality for conservation planning on the basis of indirect evidence of tree species use: A case study of Noosa Shire, south-eastern Queensland* (Callaghan *et al.,* 2011),
  - *Tree use, diet and home range of the Koala* (Phascolarctos cinereus) *at Blair Athol, central Queensland* (Ellis *et al*., 2002),
  - *The habitat and diet of Koalas* (Phascolarctos cinereus) *in Queensland* (Melzer *et al.* 2014),
  - *Tree use by Koalas* (Phascolarctos cinereus) *after fire in remnant coastal rainforest* (Matthews et al., 2007).

According to these resources, RE 12.3.20 at Greenridge ranks as 'highly suitable' for Koalas. In particular, Melzer *et al.* (2014) list *Melaleuca quinquenervia* (as well as *Eucalyptus robusta* and *Lophostemon* spp.) as a preferred food tree for Koalas at Coomera and Rhodes *et al.* 2015) list open forests and woodlands dominated by *Melaleuca quinquenervia* (Swamp Paperbark) in seasonally inundated lowland coastal areas and swamps (land zones 3, 2, 1) as 'High suitability' for Koalas.

Additional information for Tabooba included:

- Rhodes *et al.* (2015) describe the REs that are present on Tabooba as 'high suitability' for Koalas where they occur within the coastal South East Queensland LGAs. Their modelling study to estimate Koala densities in coastal South East Queensland did not include habitats of the Scenic Rim Regional Council LGA; however, the description of this 'highly suitable' Koala habitat, and specifically the underlying basalt geology, fits well with the REs of the property:

  Moist to dry eucalypt open-forests to woodlands mainly on basalt areas (land zone 8). BVG 11a Moist to dry open forests to woodlands dominated by Eucalyptus orgadophila (mountain coolibah). Some areas dominated by E. tereticornis (blue gum), E. melliodora (yellow box), E. albens (white box), E. crebra (narrow-leaved red ironbark) or E. melanophloia (silver leaved ironbark). (land zones 8, 11, 4, [3]).

- Yongentob *et al.* (2021) list *Eucalyptus crebra*, *E. tereticornis* and *E. eugenioides* as locally important Koala trees in South East Queensland, with *Corymbia intermedia C. tessellaris* and *A. torulosa* listed as ancillary habitat trees.
- White (1999) conducted a study of the ecology of the Koala in rural South East Queensland at Mutdapilly Research Station in the Scenic Rim Regional Council LGA, 50km northwest of the proposed offset property. The two main vegetation types in the fragmented 845ha study area of alluvial flats, low hills and surrounding farms were mixed stands, dominated by either *Eucalyptus crebra* or *E. tereticornis*, with *E. melanophloia, E. tessellaris* and *E. intermedia*, and pure stands of *E. tereticornis*. During the study which involved collaring 122 Koalas over two summer periods and two winter periods, 90% of Koala observations were made in *E. tereticornis* and *E. crebra*. Of the 1793 observations of Koalas in *E. tereticornis* and *E. crebra* an average of 58.3% were made in *E. crebra* and an average of 41.75% were made in *E. tereticornis*. There was some differential use of the two tree species by male and female Koalas during breeding and non-breeding seasons, and the results are skewed by the availability of each species in the various study areas (White 1999); however, they indicate that both tree species are important for Koalas in the region during their lifecycle.

During the SAT surveys at Tabooba, Koala scats were recorded beneath *Eucalyptus tereticornis (subsp. basaltica* on the ridge slopes)*, E. crebra* and *Corymbia intermedia*. *E. tereticornis* subsp. *basaltica* and *C. crebra* were found to be dominant canopy species in remnant and regrowth REs 12.8.16 and 12.8.14. Similarly, all drone survey detections of Koala were from REs 12.8.16 and 12.8.14. Other canopy species present in smaller numbers are *E. eugenioides*, *E. melliodora*, *Corymbia tessellaris* and *Angophora subvelutina*. *Allocasuarina torulosa* occurred as a subcanopy species within remnant and advanced regrowth REs 12.8.16 and 12.8.14.

The field results and literature indicate Tabooba supports vegetation types dominated by tree species that are important for Koalas in the South East Queensland region. As the canopy of both of the REs present are dominated by *E. tereticornis* and *E. crebra*, with the exception of cleared areas, all sites had at least one (and in all cases, at least two) eucalypt species present that are known important Koala food trees in the region.

For both properties, differentiation between ‘high’, ‘moderate’ and ‘low’ scores for quality of food is made based on the number of large trees present in comparison with the benchmark for the specific REs. For RE12.8.16 the large tree dbh size is 42cm, for RE 12.8.14 the large tree dbh size is 44cm, and for RE 12.3.20 the large tree dbh size is 30cm. While Koalas are known to feed on trees of all sizes that can support their weight (Yongentob *et al.* 2021), they generally prefer trees in the larger size classes of 25-30 cm diameter-at-breast-height (dbh) and above (Phillips and Wallis 2016). The scoring for the quality and availability of Koala food and foraging habitat therefore included a category quantifying the abundance of large trees relative to the benchmark (Table 8.1).

Table 8.1. Scoring for quality and availability of Koala food and foraging habitat

Score	Description
2 (low)	Minimum of one eucalypt species present (including species from the genera Eucalyptus, Corymbia, Angophora and Lophostemon) that is known from the RE AND <30% of the RE benchmark for attribute ‘number of large trees’.
5 (moderate)	Minimum of one eucalypt species present (including species from the genera Eucalyptus, Corymbia, Angophora and Lophostemon) that are known from the RE AND includes at least one preferred Koala food tree known from within the region AND <50% of the RE benchmark for attribute ‘number of large trees’. AND Koala food tree species known to support Koalas within the region are the dominant canopy species.

Score	Description
10 (high)	Minimum of two eucalypt species present (including species from the genera Eucalyptus, Corymbia, Angophora and Lophostemon) that are known from the RE AND includes at least two preferred Koala food trees known from within the region AND >50% of the RE benchmark for attributes 'number of large trees'. AND Koala food tree species known to support Koalas within the region are the dominant canopy species.

8.3 KOALA SITE CONDITION: QUALITY AND AVAILABILITY OF KOALA SHELTER

Larger, tall trees and high canopy cover in ecosystems supporting known Koala food species are important factors for measuring the quality of shelter for Koalas while resting, feeding and dispersing. Briscoe *et al.* (2014) found that large trees may be important in some landscapes for thermoregulation due to their effects on local microclimates, greater canopy cover and larger thermal mass (cited in Yongentob *et al.* 2021), and studies have indicated that smaller trees are often preferred for feeding at night and larger trees for resting during the day (Yongentob *et al.* 2021).

Scoring for 'high', 'medium' and 'low' quality and availability of shelter is shown in Table 8.2 and relies on combinations of ecosystem measurements providing scaled levels of two or more attributes that are important for quality and availability of shelter.

Table 8.2. Scoring for Quality and Availability of Shelter for Koalas

Score	Description
1 (low)	Minimum of one eucalypt species present (including species from the genera Eucalyptus, Corymbia, Angophora and Lophostemon), with limited sheltering or dispersal habitat for the species. AND <30% of the RE benchmarks for attributes 'number of large trees' and/or 'canopy cover' and/or 'canopy height' and/or is non-remnant (cleared).
5 (moderate)	Minimum of one eucalypt species present (including species from the genera Eucalyptus, Corymbia, Angophora and Lophostemon) that is known from the RE, and provides known habitat features for the species including large trees likely to support shelter and/or dispersal habitat for Koalas AND >50% of the RE benchmark for at least two of the three following attributes: - number of large trees - canopy cover - canopy height
10 (high)	Minimum of two eucalypt species present (including species from the genera Eucalyptus, Corymbia, Angophora and Lophostemon) that are known from the RE, and provides known habitat features for the species including large trees likely to support shelter and/or dispersal habitat for Koalas AND >70% of the RE benchmark for at least two of the three following attributes: - number of large trees - canopy cover - canopy height

8.4 KOALA SITE CONTEXT: PATCH SIZE, CONNECTIVITY, CONTEXT AND ECOLOGICAL CORRIDORS

Statutory documentation for Koala indicates that local information must be used when determining Koala habitat. For this reason, either Queensland state reporting or scientific publications that describe Koala food and shelter habitat in the south-east Queensland (SEQ) region were used to

collate information and classify Koala habitat to apply to Patch Size, Connectivity and Context analyses.

REs were classified as Koala habitat primarily based on the report: Spatial Modelling for Koalas in South East Queensland v2.0 (DES, 2021). In particular, REs ranked as High and Medium koala suitability were automatically incorporated as Koala habitat, and REs ranked as Low suitability were examined to determine whether dominant vegetation included known food trees of Koala in SEQ (as per Callaghan 2011, and the Coomera and North Stradbroke Island sites in Melzer *et al*. 2014). REs that did not fit these criteria were excluded as Koala habitat. Koala habitat was then classified as either:

- Koala food and shelter habitat – remnant and regrowth vegetation with Koala suitable REs, or
- Koala dispersal habitat – non-remnant/cleared vegetation with the state pre-clear mapping indicating suitable Koala suitable REs.

For all classifications, the ground-truthed vegetation mapping was used within the offset properties, and the Queensland state mapping outside of offset properties. Major roadways, rail lines and waterways were treated as breaks for Patch Size and Connectivity, and industrial developments and intensive cropping areas (such as sugar cane fields) were not included in the Patch Size and Connectivity analyses.

Scoring of the GIS analysis results is consistent with the BioCondition context scoring shown in the following tables.

Table 8.3. Scoring of Patch Size for Koala

Description	Score
<5 ha Koala breeding/foraging/dispersal habitat	0
≥5-25 ha Koala breeding/foraging/dispersal habitat	2
≥25-100 ha Koala breeding/foraging/dispersal habitat	5
101-200 ha Koala breeding/foraging/dispersal habitat	7
≥200 ha Koala breeding/foraging/dispersal habitat	10

Table 8.4. Scoring of Connectivity for Koala

Category	Description	Score
Low	The assessment unit is not connected using any of the below descriptions.	0
Medium	The assessment unit: • is connected with adjacent Koala breeding/foraging habitat along >10% to <50% of its perimeter **OR** • is connected with adjacent Koala breeding/foraging habitat along <10% of its perimeter **AND** is connected with adjacent Koala dispersal habitat >25% of its perimeter.	2
High	The assessment unit: • is connected with adjacent Koala breeding/foraging habitat along 50% to 75% of its perimeter.	4
Very High	The assessment unit: • is connected with adjacent Koala breeding/foraging habitat along >75% of its perimeter **OR** • includes >500 ha Koala breeding/foraging habitat.	5

Table 8.5. Scoring of Context for Koala

Category	Description	Score
Low	• <10% Koala breeding/foraging habitat **AND** <30% Koala dispersal habitat vegetation	0
Medium	The assessment unit: • >10% to 30% Koala breeding/foraging habitat **AND** <30% Koala dispersal habitat **OR** • <10% Koala breeding/foraging habitat **AND** ≥30% Koala dispersal habitat.	2
High	The assessment unit: • ≥30% to 75% Koala breeding/foraging habitat **OR** • ≥10% to 30% Koala breeding/foraging habitat **AND** ≥30% Koala dispersal habitat.	4
Very High	The assessment unit: • ≥75% Koala breeding/foraging habitat	5

Table 8.6. Ecological Corridors scoring

Score	0	4	6
Description	Not within	Sharing a common boundary	Within (whole or part)

8.5 KOALA SITE CONTEXT: ROLE OF SITE LOCATION TO SPECIES OVERALL POPULATION IN THE STATE

The score is based on the observed role of the site in relation to the overall population of the species in Queensland, with account taken of the species' use of the site and the effect that damage to or removal of the site would have to the likelihood of the species' overall population survival as shown in Table 8.7.

Table 8.7. Role of site location scoring for Koalas

Score	Description
1 (Low)	Not or unlikely to be critical to species' survival.
4 (Moderate)	Likely to be critical to species' survival.
5 (High)	Critical to species survival.

8.6 KOALA SITE CONTEXT: ABSENCE OF THREATS

Threats to Koalas were assessed for the proposed action corridor based on the four main threats to the continued survival of Koala from the EPBC Koala Conservation Advice (DOE 2015). These threats are fragmentation of habitat, vehicle strike, disease and predation by dogs. The National Recovery Plan for the Koala (DAWE 2022a) identifies direct threats as climate change, land use change and natural systems modification, mortality from dogs and vehicles, and disease, with ecological threatening processes of habitat loss and fragmentation, habitat degradation, genetic effects and genetic effects and disease.

Threats to Koalas relevant to the offset properties are:

- At Tabooba, clearing and thinning of vegetation to facilitate cattle grazing is an ongoing threat to Koalas through direct impacts during clearing (death, injury and stress) and through removal of habitat that may form part of the home range of some individuals. Clearing also impacts habitat connectivity and exposes Koalas to threats on the ground when moving between habitat patches. At Greenridge, clearing and thinning in the past has impacted habitat quality and there are cleared areas present that are inhospitable to Koalas and restrict Koala movement to and from the property.

- Sowing of pasture grasses in cleared/thinned areas at Tabooba reduces opportunity for canopy tree germination.
- Burning of remnant and regrowth vegetation is undertaken at Tabooba to remove understorey and weeds and to encourage grass growth for cattle grazing. There is no burning regime currently in place at Greenridge, which can impact recruitment of the ecological dominant layer (EDL), which is of particular significance to Koala. Lantana commonly grows densely under the canopy of individual trees and can increase the intensity of fires causing tree damage or death. It can also reduce the successful extent of germination following fires. Burning for cattle grazing is not undertaken to achieve good ecological outcomes and wildfire is a considerable risk, particularly on the steeper slopes of the range and can threaten Koala populations through immediate mortality and injury, and via altered habitat that reduces food availability and increased exposure to predators (Lunney *et al.* 2007; Phillips *et al.* 2021; Zylstra 2019, cited in DAWE 2022a). Wildfire risk also increases in the absence of appropriate burning regimes.
- Cattle grazing at Tabooba affects habitat quality through trampling, suppression of canopy tree recruitment and degradation of riparian vegetation.
- Predation by dogs. Wild dogs are currently present on Tabooba and have been recorded in the past at Greenridge. The previous property owner at Tabooba has indicated three separate packs are sighted regularly - ranging in size from 2-3 dogs to 5-7 dogs - and are known to hunt wallabies, most often in the creeklines where it is more difficult for wallabies to escape (pers. comm Ian Johnson). Mortality from dogs is a recognised threat to Koalas.
- Disease is a ubiquitous issue in the South East Queensland Koala population and Queensland Government Koala Hospital records from 2018 and 2019 within 20km of Tabooba show 23 records of sick Koalas (either wasted, or wasted with conjunctivitis and/or cystitis). The data for the same period within 20km of Greenridge show approximately 95 records of sick Koalas. 'High to moderate' levels of Koala disease (i.e. Chlamydiosis) is known, observed or documented from the Koala population at the PRCA adjacent to Greenridge (pers. comm. D. de Villiers) and the habitat connection between these two properties allow a conclusion that the same levels of disease are present at Greenridge.
- Threats from vehicle traffic are common to all AUs on Tabooba. The closest major road is Mt Lindsay Highway, approximately 6.5 km to the west. The Queensland Government Traffic Analysis and Reporting System provides the results of traffic counting surveys for a 19.29km stretch of the Mt Lindsay Highway relevant to Tabooba (Appendix 4), reporting annual average daily traffic (AADT) of 2,000-2,500 vehicles for 2018 and 2019 (prior to a decrease traffic in 2020, presumably due to COVID-19). Figure 8.1 shows the locations of reported Koala vehicle hits for the Scenic Rim Regional Council LGA for 2018 and 2019 (the two most recent years of data available from the Queensland Government Koala Hospital records) showing two hits on the Mt Lindsay Highway near Rathdowney, the closest approximately 13km from Tabooba. Other vehicle hits recorded within 20km of Tabooba are from Lamington National Park Road at Canungra (approximately 17km from the property), and Bina Burra Road (approximately 18km from Tabooba). There are no major roads present across the Jimbroken Range which connects habitat of Tabooba to the Albert River Riparian Corridor to the east or the Regional Corridor and adjoining State Corridor to the south (see Figure 8.2). All habitats of Tabooba and surrounds can be considered low risk for vehicle strike.

  In 2018 and 2019 (the two most recent years of data available) there were five vehicle hits west of the M1 between the Pimpama and Coomera Rivers where Greenridge is located (Figure 8.3). The lands surrounding Greenridge are generally in conservation or rural use and traffic volumes are low; however, new residential development north of the Coomera River will bring more vehicle traffic and Koala - vehicle hits in this location are likely to increase. With the presence of McCoys Creek between Greenridge and the majority of roadways associated with the development, threat from vehicle strike has been assessed as moderate for the Greenridge AUs.

Climate change is predicted to impact Koalas through an increase in the frequency of extreme drought and heatwaves (DAWE 2022b), with Queensland expected to experience a median 79% decline in Koala habitat by 2070. It is difficult to factor climate change into the threat assessment; however, the following information for the proposed offset properties indicates that under offset management, both may become particularly important refuges for Koalas during heatwave and/or drought conditions.

Tabooba experiences a mean average rainfall of 921.8 mm/year, with a mean maximum temperate of 27ºC, although temperatures above 40ºC are recorded during the months of November to February. Phillips and Callaghan (2011) suggest that low Koala activity is expected in the west of the species' East Coast range in areas receiving less than 600 mm annual rainfall. The local area receives over 900 mm annual rainfall and therefore falls into the Phillips and Callaghan (2011) category of East Coast medium-high Koala activity.

Tabooba is well-situated to provide refuge for Koalas during extreme cold and extreme heat. The peak of the Jimbroken Range forms the northern boundary of Tabooba and is oriented in an east-west direction, giving the slopes a southerly aspect and shelter from the western sun as well as opportunity for Koalas to cross into habitats across the northern boundary to slopes with a northerly aspect.

In a case study of Koalas in South West Queensland, Seabrook *et al.* (2011) found that Koala populations contracted to riparian habitats during drought, and concluded that habitat fragmentation preventing Koalas from moving between habitats represented a threat to populations. The riparian habitats of Tabooba are degraded and not well connected to remnant vegetation as the habitats of the lower slopes and creek flood zones are cleared for cattle grazing.

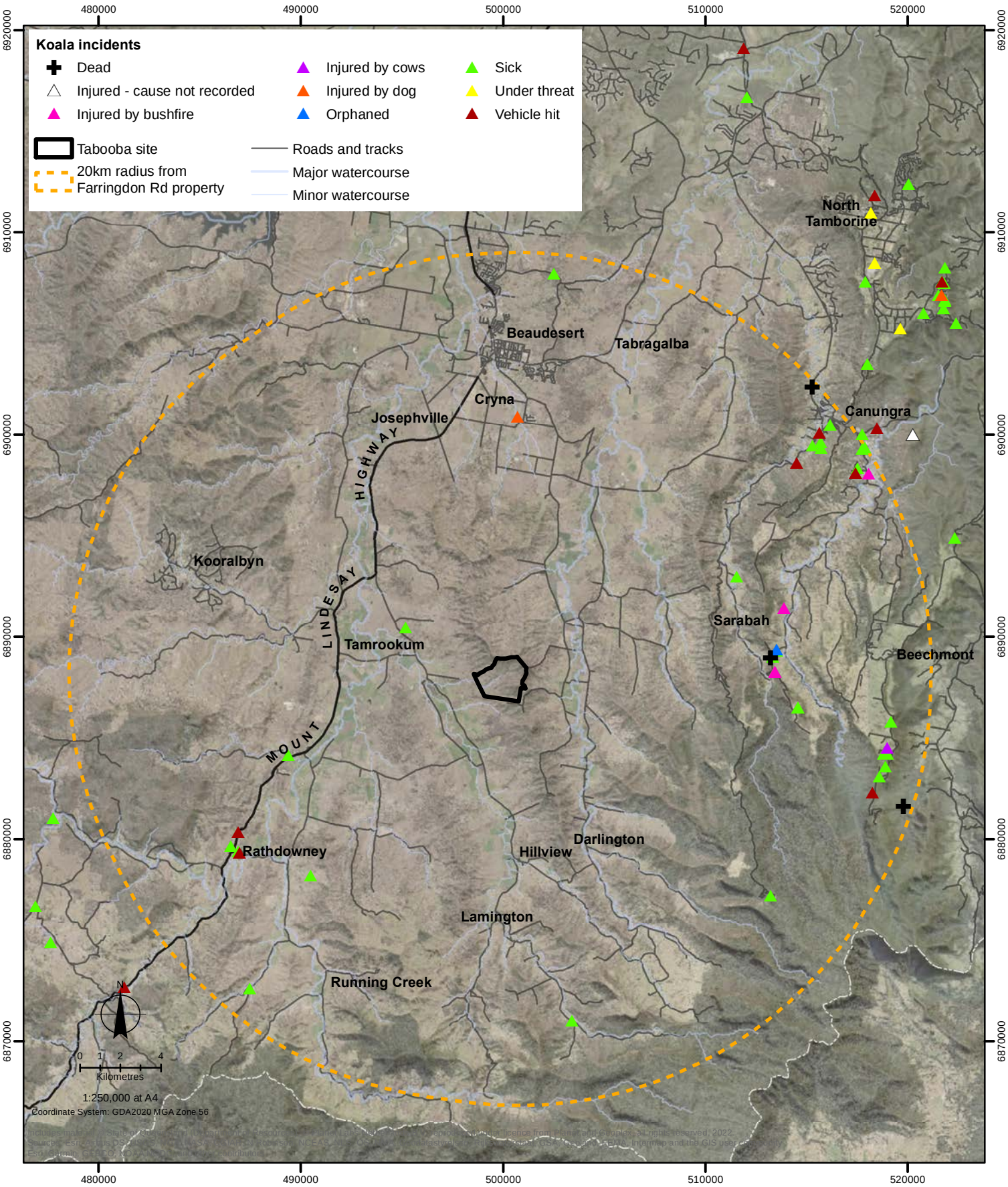
The local area for Greenridge experiences a mean average rainfall of 1303.3 mm/year with a mean maximum temperature of 25.3ºC, although temperatures above 30ºC are recorded in the months from December to February. With a maritime influenced climate and high moisture availability in low, poorly-drained areas where *Melaleuca quinquenervia* is a preferred Koala food tree, Greenridge has some resilience to the impacts of heat and drought that may otherwise impact Koalas.

Absence of threats attributes applied to scoring the assessment units are set out in Table 8.8. Note that the sub-scoring is organised to take account of those attributes that are shared between score categories. For example, habitat may be protected but have significant unmanaged invasive plants and/or animals, in which case it would receive a sub-score of '3' for habitat protection and a sub-score of '0' for threats from invasive plants and/or animals.

Table 8.8. Absence of threats scoring for Koalas

Score	Description	Sub-score
0 Very low	Known presence of wild/domestic dogs on site and within adjacent properties and evidence of predation **commonly known or considered likely**	0
	Public vehicle access to site and/or proximate areas with evidence of death through vehicle strike **commonly** observed, documented or likely	0
	Habitat is **not protected** through legislation **and/or is likely to be cleared** for development or agricultural land use	0
	Significant habitat degradation from invasive plants and/or non-native animals (e.g. cattle, feral pigs) is observed	0
	High to moderate levels of Koala disease (i.e. Chlamydiosis) is known, observed or documented from the site or adjoining interconnected habitats	0

Score	Description	Sub-score
5 Low	Known presence of wild/domestic dogs on site and within adjacent properties and evidence of predation **occasionally known** or **considered possible**	1
	Public vehicle access to site and/or proximate areas with evidence of death through vehicle strike **occasionally** observed, documented or likely	1
	Habitat is **not protected** through legislation and/or **may be cleared** for agricultural land use	1
	Moderate habitat degradation from invasive plants and/or non-native animals (e.g. cattle, feral pigs) is observed	1
	Moderate levels of Koala disease (i.e. Chlamydiosis) is known, observed or documented from the site or adjoining interconnected habitats	1
10 Medium	Known presence of wild/domestic dogs on site and within adjacent properties and evidence of predation **limited or low or considered unlikely**	2
	Public vehicle access to site and/or proximate areas with evidence of death through vehicle strike **sporadically** observed, documented or likely	2
	Habitat is **not protected** through legislation but is **reasonably unlikely** to be substantially cleared for development or agricultural land use	2
	Minor habitat degradation from invasive plants and/or non-native animals (e.g. cattle, feral pigs) is observed	2
	Low levels of Koala disease (i.e. Chlamydiosis) is known, observed or documented from the site or adjoining interconnected habitats	2
15 High	**No known** or observed evidence of predation from wild/domestic dogs and/or Known presence of wild/domestic dogs on site and within adjacent properties and **wild dog management measures in place**	3
	Few roadways in proximate areas and/or **reduced speed limits** in place and/or **awareness** and/or **signs** to identify species habitat and/or **exclusion fencing** to prevent Koalas accessing road and/or **no evidence of vehicle strike** via observation or documentation	3
	Habitat is protected via legally binding mechanisms for an offset and/or National Park and/or Nature Refuge and/or Planning Regulations	3
	Habitat degradation from invasive plants and/or non-native animals is **not observed and/or is actively managed**	3
	No evidence of Koala disease (i.e. Chlamydiosis) is known, observed or documented from the site or adjoining interconnected habitats and/or a **disease control program** is implemented	3
	TOTAL	**/15**



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Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM Reviewed by: PJ Date: 5/08/2022

Figure:	8.1
Title:	Tabooba Koala Hospital Incidents within 20km for 2018 & 2019
Project:	Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646
Client:	Queensland Department of Transport and Main Roads

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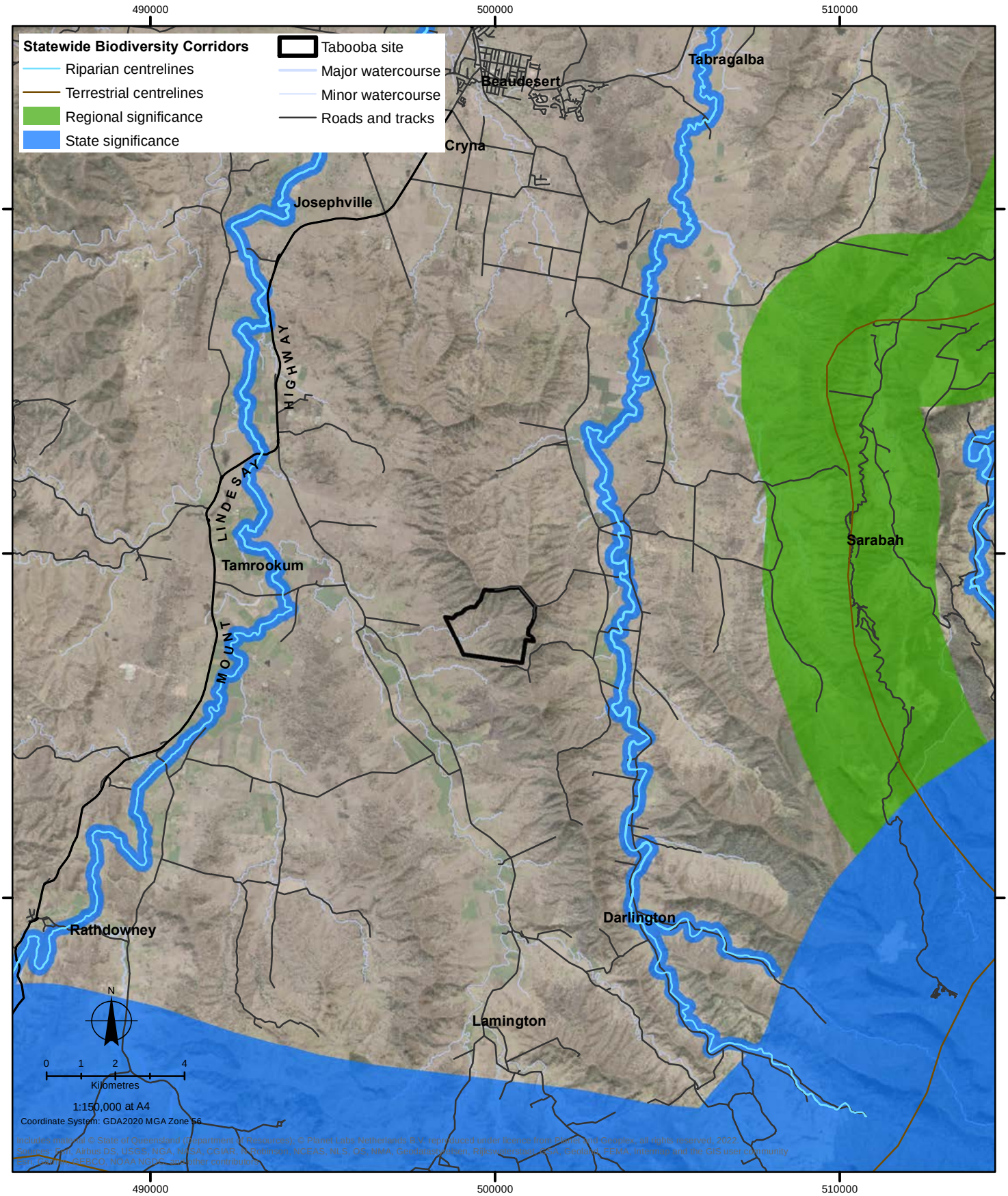

Data sources:
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Published 10/09/2020
State of Queensland (Department of Environment and Science), 2020
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM Reviewed by: PJ Date: 5/08/2022

Figure:	8.2
Title:	Tabooba State and Regional Biodiversity Corridors and Road Network
Project:	Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646
Client:	Queensland Department of Transport and Main Roads

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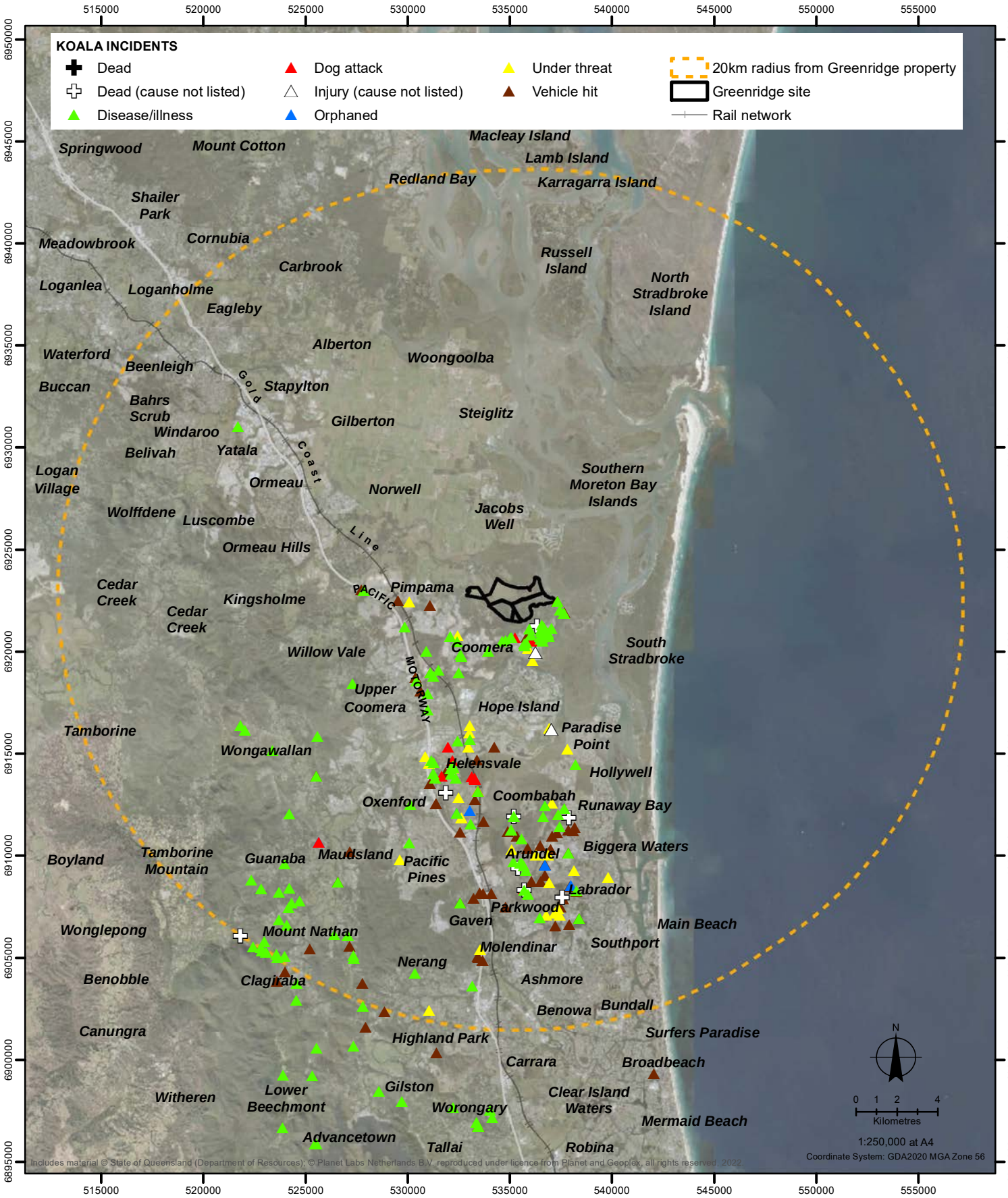

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Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources) 2022

Figure:	**8.3**
Title:	**Greenridge Koala Hospital Incidents within 20 km for 2018 & 2019**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

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8.7 KOALA SITE CONTEXT: SPECIES MOBILITY CAPACITY

This attribute is measured in consideration of the presence and severity of factors that would contribute to a reduction in the mobility of the species. For example, when a barrier to movement is created within or between habitats that is likely to result in a long-term reduction in genetic fitness or access to important resources. Mobility capacity for Koalas/ha been determined in relation to the presence of remnant and regrowth vegetation within 15km of the surveyed locations, with scoring shown in Table 8.9.

Table 8.9. Species mobility capacity scoring

Score	Description
1 Severely restricted (>90% reduction)	The site is functionally isolated from other appropriate habitat for the species, with much of the landscape considered a barrier to species mobility. The site is small compared with the known habitat known or likely to support the species. The site is generally representative of one likely to only support a residual population, with little opportunity for dispersal from source metapopulations.
4 Highly restricted (>70-90% reduction)	The site is likely isolated to regular movement of the species into or out of habitat contiguous to the site, resulting in the site only likely to support a residual population or, at best, a sink population, with very irregular dispersal from nearby populations.
7 Moderately restricted (>25-70% reduction)	The site is representative of a stepping stone in the landscape between other patches of appropriate habitat for the species, with potential regular movement of the species into or out of habitat contiguous to the site, OR Given the presence of appropriate habitat, the site is large enough to likely support a self-sustaining population either representative of a source metapopulation, or a nearby satellite population.
10 Minor restriction (0-25% reduction)	Movement by the species into and out of the site is not limited by barriers, or the site is sufficiently large to support a known source population of a likely or known metapopulation in the landscape.

8.8 KOALA SPECIES STOCKING RATE

The assessment of species stocking rate has been undertaken in accordance with the modified Habitat Quality Spreadsheet for Queensland, provided by DAWE in 2021. Scoring is shown in Table 8.10.

Table 8.10. Species stocking rate scoring

Species Stocking Rate (SSR)					
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0	5	10	
		No	Yes - adjacent	Yes - on site	
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15
		Not habitat	Dispersal	Foraging	Breeding
Approximate density (per ha)	Score	0	10	20	30
		Not habitat	1-50%	51-85%	86-100%
Role/importance of species population on site*	Score (Total from supplementary table below)	0	5	10	15
			5 - 15	20 - 35	40 - 45
Total SRR score (/ 70) **SRR Score (out of 4)**					

*SSR Supplementary Table			
*Key source population for breeding	Score	0	10
		No	Yes/ Possibly
*Key source population for dispersal	Score	0	5
		No	Yes/ Possibly
*Necessary for maintaining genetic diversity	Score	0	15
		No	Yes/ Possibly
*Near the limit of the species range	Score	0	15
		No	Yes

8.9 KOALA SPECIES STOCKING RATE: KOALA PRESENCE

All AUs scored the maximum possible 10 points as Koala records have been made within Tabooba and Greenridge, and in habitats within and/or adjacent to the AUs.

8.10 KOALA SPECIES STOCKING RATE: KOALA USAGE

AUs within which Koalas or Koala evidence has been recorded at Tabooba and Greenridge were scored as foraging habitat (a score of 20 out of a possible 30). There was no evidence of breeding at Tabooba, although surveys were limited due to access issues and were not undertaken during the breeding season. No young were recorded from the thermal surveys from either property, which included spot-lit imagery of each Koala.

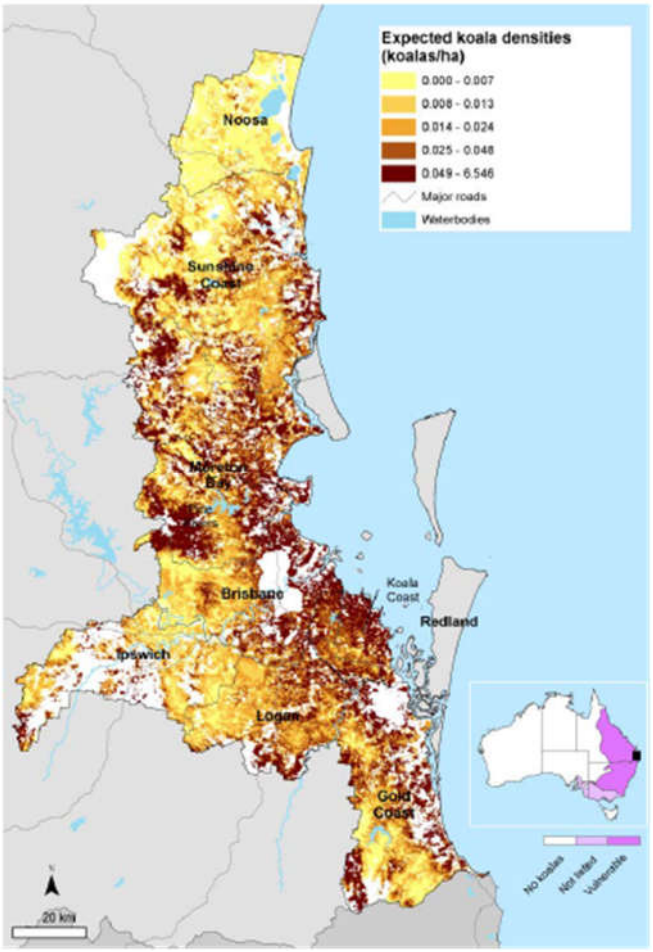
8.11 KOALA SPECIES STOCKING RATE: APPROXIMATE KOALA DENSITY

8.11.1 Tabooba

There is scant information relating to Koala densities in the habitats of the Scenic Rim Regional Council LGA. A relevant reference is a study by Dissanayake *et al.* (2021) where Koala densities for South East Queensland were estimated using a predictive model based on Koala sightings from 1997 to 2013. The area in which Tabooba is located was modelled as supporting 0-0.05 Koalas/ha. As the drone survey at Tabooba has recorded higher Koala density in remnant and regrowth vegetation, it is likely that in local region which has a sparse human population Koalas are sighted less often than in more populated regions and therefore the predicted Koala density range for this location was not well-informed.

The spatial model of Rhodes *et al.* (2015) in the eastern LGAs of the Koala Coast (excluding the Scenic Rim LGA) predicted the highest Koala densities occurring along the coastal regions of South East Queensland, but particularly in the central and southern coastal regions, with average densities across the region estimated as being relatively low at 0.04 koalas/ha and ranging from 0 to 6.54 Koalas/ha. Rhodes *et al.* (2015) noted an unexpected prediction for higher Koala densities in some of the western portions of the study area (see Image 8.1), although these were areas where surveys were not conducted and there was high uncertainly in the density estimates in these areas. The Rhodes *et al*. (2015) modelling was based on covariates that were chosen based on hypothesised links with Koala density that had an ability to be mapped across the entire study region. Notably, moist to dry eucalypt open-forests to woodlands mainly on basalt areas (land zone 8, BVG11a) described as moist to dry open forests to woodlands dominated by *Eucalyptus orgadophila* (mountain coolibah) with some areas dominated by *E. tereticornis* (blue gum), *E. melliodora* (yellow box), *E. albens* (white box), *E. crebra* (narrow-leaved red ironbark) or *E. melanophloia* (silver leaved ironbark) were designated as ‘high suitability’ for Koalas. These forests constitute the REs of Tabooba.

Image 8.1. Koala density modelling results of Rhodes et al. (2015)



Tabooba is located 18 km west of the Rhodes *et al.* (2015) predicted high density Koala habitat on the southwestern boundary of the Gold Coast LGA (see Image 8.1). Tabooba is underlain by the same geology as this area (the Lamington Group described as Olivine basalt) which is likely to have contributed to its modelled value due to its higher fertility basalt-derived soils.

Koala density estimates for Tabooba are based on the results of the second thermal Koala survey undertaken by EVE in May of 2022. The survey covered approximately 107 ha of Tabooba and recorded eight Koalas (see Section 5.7.3). With a detection probability of 90%, EVE (2022) reported a density of approximately 0.08 Koalas/ha in the surveyed area. The 90% detection rate is attributed to the survey being undertaken in tall open forest in cool conditions and with no nearby waterbodies, also factoring the capabilities of the particular thermal/optical cameras and spotlights deployed for this survey (pers comm. D. de Villiers).

The Koala record locations associated with the mapped AUs for the property are shown in Table 8.11 below.

Table 8.11. Estimated Koala densities for Tabooba AUs

AU	Description	Approx. area surveyed (ha)	Koalas detected	Koalas/ha (90% detection rate)
1	RE12.8.16 remnant	9	2	0.25
2	RE 12.8.16 Advanced Regrowth	53	2	0.04
3	RE 12.8.16 Young Regrowth	11	0	0
4	RE 12.8.14 Remnant	14.5	3	0.23
5	12.8.14 Advanced Regrowth	16	1	0.07
6	12.8.16 Cleared	5.5	0	0

Koala density was highest within the remnant vegetation areas, followed by advanced regrowth. No Koalas were recorded within young regrowth or in the predominantly cleared areas. The SAT survey results (see Section 6.7.2) indicate low use within all AUs surveyed, although conditions for SAT surveys were poor due to preceding heavy and consistent rainfall over several months and significant restrictions on site access due to track conditions, so those data are considered unreliable as a measure of habitat use. Given the unusual conditions experienced in South East Queensland during the summer and autumn of 2022, the thermal Koala survey provides the most reliable data for this strategy.

To inform Species Stocking Rate for Koalas at Tabooba, in the absence of a known Koala density from the region derivation of the score for approximate Koala density (per ha) for habitats at Tabooba can only be made in comparison with data from the site. The highest estimated Koala density was 0.25 Koalas/ha in remnant RE 12.8.16 and 0.23 Koalas/ha, which have been selected as the Koala density 'targets' for regrowth offset habitats.

The scoring applied to approximate density per hectare for each AU is:

0 = not present
10 = 1-50% of 0.25
20 = 51-85% of 0.25
30 = 86-100% of 0.25

8.11.2 Greenridge

The most applicable density data for Greenridge is derived from the thermal imaging drone survey undertaken by EVE (2022).

Applying the estimated detection rates of 0.65 and 0.85, the study concluded Greenridge supported a population of 80 to 105 Koalas (EVE 2022). The thermal imaging results were able to be validated with radio-tracking information. Lower detection rates for thermal imaging at Greenridge are attributed to the surveys being undertaken during warmer weather with interference by thermal washout from pooled water on the ground (pers comm. D. de Villiers).

When the drone records are overlaid on RE mapping for Greenridge within the surveyed area (including two records immediately outside the property boundary within remnant RE 12.3.20), nine of these Koalas were recorded within 23.71 ha of remnant RE 12.3.20. Corrected for an average 0.75 detection rate (75% of Koalas detected), remnant RE 12.3.20 supported approximately 0.4 Koalas per hectare at the time of survey. This is consistent with the findings of Biolink (2017) which reported Koala densities (from all REs) of 0.34/ha based on SAT search area and 0.47/ha based on Strip Transect search data for the East Coomera area.

Table 8.12. Estimated Koala densities for Greenridge AUs

AU	Description	Approx. area surveyed (ha)	Koalas detected	Koalas/ha (90% detection rate)
4	RE12.3.20 remnant	27.71	9	0.4
5	RE 12.3.20 regrowth	9.93	1	0.14
6	RE 12.3.20 non-remnant	14.67	2	0.17

The scoring applied to approximate density per hectare for AU4 is:

0 = not present
10= 1-50% of 0.4
20 = 51-85% of 0.4
30 = 86-100% of 0.4

8.12 KOALA SPECIES STOCKING RATE: ROLE/IMPORTANCE OF SITE

For role/importance of the Koala population on site, all AUs at Tabooba scored “0” from the SSR supplementary table as the site is not known to support a key source population for breeding, support a key source population for dispersal, or be necessary for maintaining genetic diversity, although as above, surveys were not undertaken during the breeding season. The site is not near the limit of the species range. As an offset area, it is likely that the site will gain in significance in supporting a source population for breeding and dispersal.

For Greenridge, the scores applied to the impact habitat are relevant in this location and the offset habitat was attributed with the highest score of 30.

9.0 METHODOLOGY FOR GREY-HEADED FLYING-FOX HABITAT QUALITY SCORING

Site Condition scoring has a 40% weighting and Site Context and Species Stocking Rate scoring have a 30% weighting in keeping with the scoring method applied to the impact site. The scoring for individual attributes of each are described in the following sections.

9.1.1 Grey-headed Flying-fox Site Condition: Quality and Availability of Forage

Site Condition scoring for Grey-headed Flying-fox was undertaken by applying the Guide to Determining Terrestrial Habitat Quality Version 1.3 (Queensland Government 2020); however, in keeping with the scoring method developed by Planit Consulting for Grey-headed Flying-fox for the proposed action corridor, the following three attributes addressing Quality and availability of habitat were added and are described in Sections 9.1.2-9.1.4:

- Foraging habitat tree species flower scores,
- Foraging habitat tree species richness, and
- Significant foraging habitat tree species richness.

The score allocated to each attribute are shown in Table 9.1.

Table 9.1. Scores for Quality and Availability of Grey-headed Flying-fox Habitat attributes

Attribute and methodology	Score	Description
Flower scores of suitable foraging habitat trees, as per Eby and Law (2008)	2 (low)	0.01-0.25 flower score
	5 (moderate)	0.26-0.50
	8 (high)	0.51-0.75
	10 (very high)	0.76-1.0
Foraging habitat tree species richness	0 (absent)	0 forage tree species
	5 (low)	1-2 forage tree species
	10 (moderate)	3-4 forage tree species
	15 (high)	5-6 forage tree species
	20 (very high)	>6 forage tree species
Significant foraging habitat tree species richness	0 (absent)	0 significant forage tree species
	5 (low)	1-2 significant forage tree species
	10 (moderate)	3-4 significant forage tree species
	15 (high)	5-6 significant forage tree species
	20 (very high)	>6 significant forage tree species

9.1.2 Grey-headed Flying-fox Site Condition: Foraging habitat tree species flower scores

When assessing the relative importance of feeding habitat, Eby and Law (2008) identify productivity, reliability, and duration as the three broad characteristics used in determining quality of Grey-headed Flying-fox diet species. The 'flower score' is a measure of these characteristics and is given as:

Wt p*r = (productivity) 0.7 * (reliability) 0.3

In this assessment, listed Grey-headed Flying-fox forage species flower scores in Eby and Law (2008) were cross-referenced against the tree species richness data collected during BioCondition field assessments to determine an overall flower score for each site. Flower scores for each site were calculated as the sum of individual flower scores of each forage tree species divided by the total number of recorded tree species. This averaged score was then compared to the benchmark flower score ranges listed in Table 9.1.

It should be noted that a flower score for *Eucalyptus crebra* is not provided in Eby and Law (2008); however, in the approved Offset Strategy for Mirvac Greater Flagstone Project Greenbank, Queensland (2020), the authors prescribe a conservative flower score of 0.65 and acknowledge its classification as an important winter foraging resource in the Draft National Recovery Plan for the Grey-headed Flying Fox which has since been upheld by the finalised National Recovery Plan (DAWE 2021). In the case of *Eucalyptus tereticornis* where a flower score range is given by Eby and Law (2008) due to variations in flowering phenology in South East Queensland, the highest value of 0.88 is applied at Greenridge whereas a single mid-range value of 0.65 is prescribed for *Eucalyptus tereticornis* at the Tabooba offset property given that this species would warrant significant forage species status for the area but is unlikely to be as productive as populations on coastal lowlands with longer flowering periods.

9.1.3 Grey-headed Flying-fox Site Condition: Foraging habitat tree species richness

Species richness data collected during field BioCondition assessments were used to identify the presence of tree species known to constitute the diet of Grey-headed Flying-fox as documented in Eby and Law (2008), Eby et al (2019) and DAWE (2021). A score between 0 and 20 was assigned for each site based on the matrix shown in Table 9.1 using the sum number of forage species recorded in both the canopy and sub-canopy.

9.1.4 Grey-headed Flying-fox Site Condition: Significant foraging habitat tree species richness

Eby and Law (2008) identify 'significant food plants' for Grey-headed Flying-fox as those which have a high level of productivity and reliability represented by a flower score ≥0.65. For this assessment, the number of species nominated as significant foraging resources under this approach were counted from the tree species richness data gathered from BioCondition field surveys and assessed for each site.

9.1.5 Grey-headed Flying-fox Site Context

The BioCondition Assessment manual describes the context of a site's surrounding landscape as having 'significant influence on the long-term viability of the habitat patch for biodiversity values' (Andren 1994 & Fahrig 1997, 2001 in Eyre *et al.* 2015). The South East Queensland region is recognised as a 'fragmented landscape' in the BioCondition manual and thus site context is assessed using the following three attributes and scoring method.

9.1.6 Grey-headed Flying-fox Site Context – Size of Patch

Scoring for size of patch is shown in Table 9.2.

Table 9.2. Scores for Size of Patch

Score	Description
0	<5 ha remnant AND/OR regrowth
2	≥5 – 25 ha remnant AND/OR regrowth
5	≥25 – 100 ha remnant OR ≥25 – 200 ha remnant and regrowth OR ≥25 – 200 ha regrowth
7	≥100 – 200 ha remnant OR >200 ha remnant and regrowth OR >200 ha regrowth
10	≥ 200 ha remnant

9.1.7 GHFF Site Context: Landscape

In accordance with the impact area, the Grey-headed Flying-fox Habitat Assessment prepared by Planit Consulting Pty Ltd (2021), a modified scoring method was used to assess landscape connectivity as a replacement to the terrestrial species based method described in the

BioCondition /Habitat Quality assessment manuals. Under this modified scoring method, the number of active (within the preceding 12 months) Grey-headed Flying-fox roost camps occurring within a 20km radius of each site was used to inform landscape connectivity using Grey-headed Flying-fox camp data obtained from:

- AUST. DAWE National Flying-fox monitoring viewer (online @ https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf)
- QLD DES Flying Fox Monitoring Data (online @ https://www.data.qld.gov.au/dataset/flying-fox-monitoring-program)

Site scores for landscape connectivity are provided in Table 9.3.

Table 9.3. Scores for Landscape connectivity

Score	Description
0	No active Grey-headed Flying-fox camps within a 20km radius
2	1 – 2 active Grey-headed Flying-fox camps within a 20km radius
4	2 – 4 active Grey-headed Flying-fox camps within a 20km radius
6	5 – 6 active Grey-headed Flying-fox camps within a 20km radius
8	7 – 8 active Grey-headed Flying-fox camps within a 20km radius

9.1.8 Grey-headed Flying-fox Site Context: Landscape Context

The assessment of landscape context has also been adjusted by Planit (2021) from the typical BioCondition/Habitat Quality assessment to more accurately reflect the needs of Grey-headed Flying-fox by identifying the percentage of potential Grey-headed Flying-fox habitat within a 20km radius of the centre of each habitat assessment transect as opposed to the proportion of native remnant and/or regrowth vegetation contained within a 1km radius.

Potential Grey-headed Flying-fox habitat was identified as areas of remnant and high value regrowth (HVR) from REs with:

- ≥50% dominant or subdominant vegetation species that are listed in *Ranking the feeding habitats of Grey-headed Flying-fox for conservation management* (Eby and Law, 2008) as significant flowering or fruiting species; or
- ≥50% dominant or subdominant vegetation species that are listed in the *National Recovery Plan for the Grey-headed Flying-fox* (DAWE, 2021) as important winter and spring food trees.

Site scores for landscape context were assigned in accordance with the values in Table 9.4.

Table 9.4. Scores for Landscape context

Score	Description
0	< 5% Grey-headed Flying-fox habitat within a 20km radius
2	6 – 25% Grey-headed Flying-fox habitat within a 20km radius
4	26 – 45% Grey-headed Flying-fox habitat within a 20km radius
6	46 – 65% Grey-headed Flying-fox habitat within a 20km radius
8	66 – 85% Grey-headed Flying-fox habitat within a 20km radius
10	>85% Grey-headed Flying-fox habitat within a 20km radius

9.1.9 Grey-headed Flying-fox Site Context: Ecological Corridors

The SOQ (2020) 'Guide to determining terrestrial habitat quality: A toolkit for assessing land-based offsets under the Queensland Environmental Offsets Policy Version 1.3.' recognises an 'ecological

corridor' as 'any riparian or terrestrial feature within the 'CORR_TYPE' attribute table of the 'Queensland biodiversity and vegetation offsets special features' map, which is available on QSpatial.'

This attribute was assessed by:

1. Determining the proximity of the site to a state, bioregional, regional or subregional corridor (terrestrial or riparian); and

2. Assessing whether the site is (a) not located within, (b) sharing a common boundary with, or (c) located within (in whole or in part) an ecological corridor and scored as 0, 4 or 6 respectively as indicated in Table 9.5.

Table 9.5. Scores for Ecological Corridors

Score	Description
0	The site is not within a state, bioregional, regional, or subregional corridor.
4	The site shares a common boundary with a state, bioregional, regional, or subregional corridor.
6	The site is within (whole or part) a state, bioregional, regional, or subregional corridor.

9.1.10 Grey-headed Flying-fox Site Context: Role of Site Location to Species Overall Population in the State

The Queensland Guide to Determining Terrestrial Habitat Quality (SoQ, 2014) states, *'this score should be based on the observed role of the site in relation to the overall population of the species in Queensland' and 'should take into account the species' use of the site and the effect that damage to or removal of the site would have to the likelihood of the species' overall population survival*.'

In the proposed action corridor assessment, Planit (2021) assess this attribute by analysing the number of active (within the preceding 12 months) level three (≥2,500 individuals) or greater Grey-headed Flying-fox roost camps within a 20km radius of each site. Numbers of Grey-headed Flying-fox at each roost camp within 20km of the habitat quality assessment sites were observed over multiple survey periods between 2021 and 2022 as recorded in the Queensland Department of Environment and Science Flying Fox Monitoring Data (online @ https://www.data.qld.gov.au/dataset/flying-fox-monitoring-program). The highest population numbers recorded across these monitoring periods were used to inform maximum camp level within the preceding 12 months. Those found to be level 3 or greater at any time in this period were counted within the 20km radius of each site with sites scored as shown in Table 9.6.

Table 9.6. Scores for Role of Site Location

Score	Description
0	0 active level 3 or higher Grey-headed Flying-fox camps within a 20km radius
2	1 active level 3 or higher Grey-headed Flying-fox camps within a 20km radius
4	2 active level 3 or higher Grey-headed Flying-fox camps within a 20km radius
6	3 active level 3 or higher Grey-headed Flying-fox camps within a 20km radius
8	4 active level 3 or higher camps within a 20km radius
10	>4 active level 3 or higher Grey-headed Flying-fox camps within a 20km radius

9.1.11 Grey-headed Flying-fox Site Context: Absence of Threats

The DAWE (2021) Grey-headed Flying-fox Recovery Plan identifies the main threats to the survival and recovery of the Grey-headed Flying-fox as:

- Habitat loss
- Camp disturbance
- Mortality in commercial fruit crops
- Heat stress
- Entanglement in netting and barbed wire fencing
- Climate change
- Bushfires
- Electrocution on power lines
- Public misunderstanding of disease risk

The potential for and impact of these threats were considered for each assessment unit based on current Grey-headed Flying-fox camp locations, vegetation category, existing infrastructure, land management practices, and surrounding landscape. Each site was then scored using the gathered information with scoring shown in Table 9.7. Note that the sub-scoring has been organised to take account of those attributes that are shared between score categories. For example, habitat may be protected but have non-native plant cover ≥40%, in which case it would receive a sub-score of '0' for non-native plant cover and a sub-score of '2' for habitat protection.

Table 9.7. Scores for Absence of threats

Score	Description	Sub-score
0 Very Low	Habitat is not protected through legislation and/or is likely to be cleared for development or agricultural land use	0
	Prescribed burning is not undertaken	0
	Non-native plant cover ≥40% and is not controlled to reduce habitat impacts such as suppression of EDL recruitment and hot fire risk	0
	Barbed wire fencing or powerlines are present throughout the area, potentially raising mortality and permanent injury risk from entanglement/electrocution	0
	Habitat is significantly degraded by non-native animals (i.e. cattle, feral pigs) and feral pigs are not managed	0
2.5 Low	Habitat is not protected through legislation and/or may be cleared for agricultural land use	0.5
	Prescribed burning is undertaken for pasture improvement only	0.5
	Non-native plant cover ≥20% and is not controlled to reduce habitat impacts such as suppression of canopy tree recruitment and hot fire risk	0.5
	Barbed wire fencing or powerlines are commonly present, raising mortality and permanent injury risk from entanglement/electrocution	0.5
	Habitat is moderately degraded by non-native animals (i.e. cattle, feral pigs) and feral pigs are not managed	0.5
5 Medium	Habitat is not protected through legislation but is reasonably unlikely to be substantially cleared for development or agricultural land use	1
	Prescribed burning is undertaken for pasture improvement and to reduce wildfire risk	1
	Non-native plant cover <20% and not controlled or is ≥20% and controlled to reduce habitat impacts such as suppression of canopy tree recruitment and hot fire risk	1
	Barbed wire fencing or powerlines are occasionally present and alternative wildlife-friendly fencing methods/under-ground powerlines are utilised to avoid mortality and permanent injury from entanglement/electrocution	1
	Habitat has minor degradation attributable to non-native animals (i.e. cattle, feral pigs) and feral pigs are not managed	1

Score	Description	Sub-score
10 Very high	Habitat is protected from clearing via legally binding mechanisms for an offset and/or National Park and/or Nature Refuge and/or Planning Regulations	2
	Prescribed burning is undertaken to reduce wildfire risk and favour canopy tree recruitment	2
	Non-native plant cover is <20% and controlled to reduce habitat impacts such as suppression of canopy tree recruitment and hot fire risk	2
	Barbed wire fencing or powerlines are absent or only alternative wildlife-friendly fencing methods and underground powerlines are utilised to avoid mortality and permanent injury from entanglement/electrocution	2
	Habitat has minor or no degradation attributable to non-native animals (i.e. cattle, feral pigs) and feral pigs are actively managed	2
	TOTAL	**/10**

9.1.12 Grey-headed Flying-fox Species Stocking Rate: Abundance of Large Trees

Planit (2021) identify abundance of large trees as a suitable indicator of potential stocking rate as Grey-headed Flying-fox are 'highly reliant on the flowers of myrtaceous tree species' and large trees are 'likely to exhibit higher flowering mass and provide more opportunities for a greater number of Grey-headed Flying-foxes than small trees.' Considering this, the large trees attribute for species stocking rate has been assessed based on the number of large trees per hectare for each site as determined using the BioCondition method (count of large trees as defined by the RE large tree DBH within the 100m x 50m plot multiplied by two) and scored relative to the percentage of the RE benchmark as given in Table 9.8.

Table 9.8. Scores for Abundance of Large Trees

Score	Description
0	No large trees present
2	1 – 25% of Large Tree Benchmark for relevant RE
4	26 – 50% of Large Tree Benchmark for relevant RE
6	51 – 75% of Large Tree Benchmark for relevant RE
8	76 – 100% of Large Tree Benchmark for relevant RE
10	>100% of Large Tree Benchmark for relevant RE

9.1.13 Grey-headed Flying-fox Species Stocking Rate: Biological Shortages

In assessing the quality of feeding habitats for Grey-headed Flying-fox, Eby and Law (2008) highlight the need to give attention to the biological needs of the species and allocate high ranks to feeding habitats which support animals during times of potential feeing shortages or increased energy requirements. Eby and Law (2008) nominate the following such conditions for consideration:

- periods of recurring food bottlenecks (food shortages)
- periods in the annual reproductive cycle associated with elevated energetic requirements (pregnancy, lactation, mating and conception
- periods of high rates of visitation to commercial fruit crops (exposing animals to lethal crop protection methods)
- migration pathways (Eby and Law, 2008).

Eby and Law (2008) summarise the timing of these biological considerations into bi-monthly intervals as shown in the table (Table 3.2 in Eby and Law 2008: 23) below.

Table 3.2. The timing of biological considerations for Grey-headed flying foxes, scored at bi-monthly intervals.

Issue	D-J	F-M	A-M	J-J	A-S	O-N
Food shortages				X	X	
Pregnancy (final trimester) & birth				x	X	X
Lactation	X	X				X
Mating and conception	x	X	X			
Migration paths	X	X	X	X	X	X
Fruit industries	X	X			X	X

In assessing potential stocking rate for Grey-headed Flying-fox, the flowering phenology of the available foraging resources at each site have been cross-referenced with these periods of biological shortages/increased energy requirements to determine presence of flowering resources during each period. Foraging resources included all Grey-headed Flying-fox forage species listed in the tree species richness data from both the canopy and subcanopy layers of each site. Where possible, flowering times listed in Table 4.5 of Eby and Law (2008) were used. In the case of *E. crebra* which was not listed, the flowering time was given as occurring during the June to July and August to September periods, consistent with the 'Implementation of the national Flying-Fox monitoring program' report from The Rural Industries Research and Development Corporation (2015); and the flowering period for *E. tereticornis* subsp. *basaltica* was given as occurring from May to November as recorded in EUCLID (2022).

In reference to the scoring applied as shown in Table 9.9, Planit (2021) explain that 'Each biological shortage consideration is assigned a 1.5 score contribution to the total benchmark score of ten for the attribute with the exception of the following:

- The food shortages component has received a slightly higher weighting in association with this habitat quality and availably assessment than the other biological considerations as these incidents are consistently associated with rapid weight loss in adults and substantial reductions in pre-weaning reproductive output. Evidence of repeated food shortages during winter and spring suggest inadequate productive foraging habitat currently exists in these seasons to sustain the current population (Eby and Law, 2008)
- A lower number of fruit industries as South East Queensland is considered to be a lower risk area for Grey-headed Flying-fox netting, trapping and/or shooting associated with crop protection. It is noted that less than 25% of the allocated Grey-headed Flying-fox take quota of 1280 animals was taken up state-wide over the 2020-2021 season (DES, 2021 online @ https://environment.des.qld.gov.au/wildlife/animals/living-with/bats/flying-foxes/damage-mitigation-permits#summary_of_dmps_issued_for)' (Planit 2021: 20)

Where the flowering seasons of a site's Grey-headed Flying-fox forage species collectively occur across relevant bimonthly period(s) (refer Eby and Law 2008 Table 3.2) a full score is given. If collective flowering of the forage species' occurs across a part of the relevant period, only a partial score is allocated for that period. These scores are then summed to obtain a total score out of ten for each site.

Table 9.9. Scores for Biological Shortage

Score	Description
3	Presence of flowering resources during food shortages biological period
1.5	Presence of flowering resources during pregnancy and birth biological period
1.5	Presence of flowering resources during lactation biological period
1.5	Presence of flowering resources during mating and conception biological period
1	Presence of flowering resources during migration paths biological period
10 (total)	Presence of flowering resources during fruit industries biological period

10.0 OFFSET ASSESSMENT

10.1 SUMMARY

The offset for the proposed action will be delivered using a combination of remnant, regrowth and non-remnant vegetation at Greenridge for Coastal Swamp Oak TEC. A portion of this vegetation is also high-quality habitat for Koala and Grey-headed Flying-fox and is included in the proposed offset delivery at Greenridge.

Remnant and regrowth vegetation at Tabooba is proposed to deliver the majority of the offset requirements for Koala and Grey-headed Flying-fox.

Accordingly, offset tables and the Offset Assessment Guides are provided for each matter in the following sections, addressing each Assessment Unit separately for start condition and predicted condition with and without the proposed offset.

The proposed offset areas are shown on:

- Figure 10.1 – Coastal Swamp Oak Offsets at Greenridge
- Figure 10.2 – Koala and Grey-headed Flying-fox Offsets at Greenridge
- Figure 10.3 – Koala and Grey-headed Flying-fox Offsets at Tabooba.

10.2 ECOLOGICAL BENEFIT

The time to ecological benefit is set at 10 years for remnant and advanced regrowth communities and 20 years for other regrowth and non-remnant communities, with 85% confidence that the goals for offset area habitat quality will be achieved. Periods of 10 years for remnant and 20 years for regrowth and non-remnant communities are required to realise the results of management actions that will improve habitat quality – of these actions, removal of invasive weeds and implementation of controlled burning to prevent damaging wildfire, encourage EDL recruitment and improve ground cover quality are predicted to raise the quality of the remnant and advanced regrowth ecosystems close to benchmark levels. The species stocking rate that has been used as the “With Offset” score is based on the current density of Koalas in the remnant vegetation areas and so their movement into the adjoining regrowth areas is a low risk as that vegetation recovers to remnant status.

Removal and ongoing control of Feral Pigs at Greenridge will allow recovery of the ground surface within the Coastal Swamp Oak TEC, contributing to the health and growth of existing trees that have been subject to significant root disturbance through pig digging, and allow ground cover, shrub layer and natural EDL recruitment to occur unhindered. The nominated non-remnant (cleared) patches of RE 12.1.1 at Greenridge will be planted with *Casuarina glauca*, which has a moderate-high growth rate. The species is commonly used overseas to stabilise soil and create windbreaks. A study by Goel and Behl (2005) recorded average height of plants in an 8-yr-old trial of *Casuarina glauca* of 1033.3 ± 270cm, which is 83% of the benchmark height for RE 12.1.1. Given the planting at Greenridge will be in ideal conditions for the species, growth rates are likely to be considerably higher as evidenced by the success of replanting *Casuarina glauca* in the adjacent Pimpama River Conservation Area.

Site context will be improved over 10 and 20 years through the management of threats and stocking rates will be improved by raising habitat quality and reducing threats to increase the value of habitats for Koala breeding and foraging purposes and for Grey-headed flying-fox forage. The role and importance of the Koala population at Tabooba is expected to increase as continuous habitats are fostered and reconnected, and healthy, breeding Koalas are able to safely inhabit ecosystems within a range of altitudinal and microclimatic environments that enable them to safely take advantage of nutrition and temperature variations within the landscape.

Within the remnant ecosystems, aging vegetation can lose productivity, and long-term fire exclusion can cause species to be lost. Conversely, severe fires can prevent young trees from

reaching maturity (Watson 2001). Weed proliferation, particularly Lantana, increases the intensity of wildfires and damages mature trees.

Under management of Tabooba for grazing over the coming 10-20 years and without the offset, the quality of the ecosystems for Koala and Grey-headed Flying-fox are unlikely to improve and some attributes may deteriorate where regrowth is subject to periodic clearing for cattle grazing; and the spread of Lantana reduces EDL recruitment and increases the risk and intensity of wildfire – reducing the potential for the evolution of large trees and benchmark understorey and groundcover conditions that favour ecosystem suitability and value for both species.

At Greenridge the most significant impacts on ecosystem health are the result of Feral Pig damage and weed invasion, along with maintenance of cleared and weed-infested paddocks adjacent to remnant and regrowth vegetation. The current level of Feral Pig activity would not be managed without the offset, which will be detrimental to the survival of canopy species within the Coastal Swamp Oak TEC – as well as suppressing shrub regrowth and ground species cover. Management of Greenridge for agricultural uses has introduced a range of non-native species, also present in the surrounding landscape, which will continue to infiltrate natural areas, impacting a range of habitat quality measures without management under the offset. Without fire management to benefit ecosystems, fire exclusion may affect the health of Coastal Swamp Oak communities which need disturbance to maintain structure https://apps.des.qld.gov.au/regional-ecosystems/details/?re=12.1.1 whereas the risk of severe wildfire increases as litter builds.

Non-remnant areas will be rehabilitated to reflect the pre-clear REs and are predicted to reach benchmark RE status and TEC status for Coastal Swamp Oak in 20 years under appropriate planning and management.

There are benefits of the offsets that are not measured through the offset assessment process. These are associated with knowledge gained and shared through long term monitoring of the Koala populations at both offset sites. Disease is known a significant threat to the survival of the species for example, Chlamydia. TMR is proactive in Koala disease prevention research and actions, which are put forward in the PER as indirect offsets at Greenridge and within the adjoining Pimpama River Conservation Area. In addition, consolidation of habitat managed for conservation purposes for Coastal Swamp Oak and Koala at Greenridge, and for Koala at Tabooba, provide larger areas of continuous habitat for these matters than are present in unmanaged, fragmented patches within the impact areas.

10.3 ASSESSMENT UNIT REPRESENTATION

Habitat quality transects were carried out in representative locations within each Assessment Unit to typify habitat condition at the time of survey and provide baseline data against which the quality of the habitat can be measured over time. An assessment unit is a defined area or group of areas within the matter area that is relatively homogenous in condition. The representative transects surveyed are considered to suitably represent the relatively homogonous conditions of the identified assessment units.

Sampling sites, at which site-based attributes were assessed, were established within each Assessment Unit. Selection of sampling sites and surveys was made in accordance with the *BioCondition Assessment Manual* Version 2.2 and the Queensland *Guide to determining terrestrial habitat quality* Version 1.3.

BioCondition is a condition assessment framework for Queensland that provides a measure of how well a terrestrial ecosystem is functioning for biodiversity values. It is a site-based, quantitative and therefore repeatable assessment procedure that can be used in any vegetative state and provides a numeric score that can be summarised as a condition rating, or functional through to dysfunctional condition for biodiversity. In BioCondition, 'condition' refers to the degree to which the attributes of a patch of vegetation differ from the attributes of the same vegetation in its reference state.

Habitat quality was assessed using a combination of indicators that measure the overall viability of the site and its capacity to support each prescribed environmental matter.

10.4 COASTAL SWAMP OAK TEC OFFSET ASSESSMENT

10.4.1 Offset Assessment Guide for Coastal Swamp Oak TEC

The proposed offset locations for Coastal Swamp Oak TEC are shown on Figure 10.1.

Results of the Offset Assessment Guide calculations for Swamp Oak TEC for each AU are summarised in Table 10.1 below and are provided individually in the following tables:

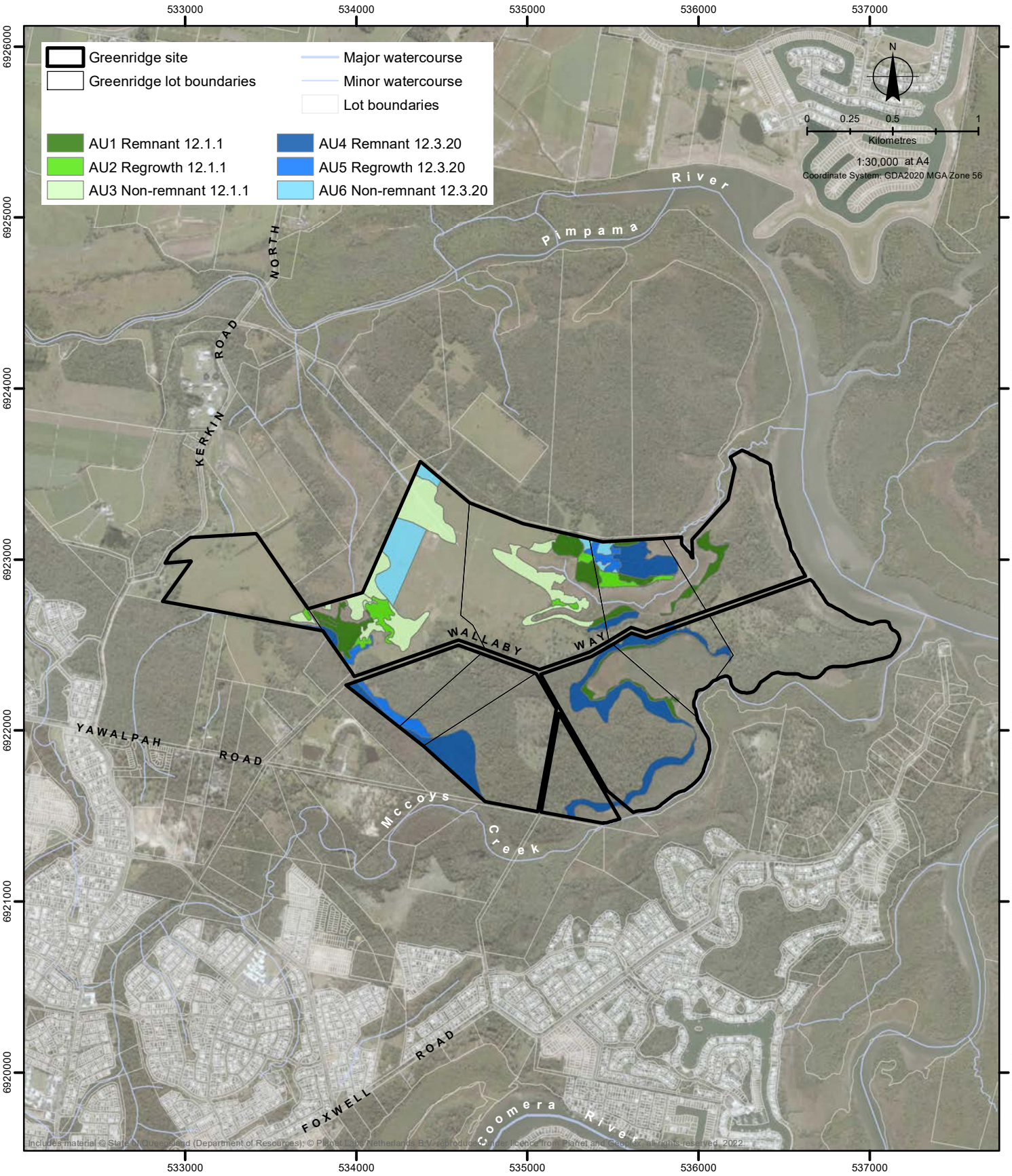
- Greenridge AU1 RE 12.1.1 remnant (Table 10.2)
- Greenridge AU2 RE 12.1.1 regrowth (Table 10.3)
- Greenridge AU3 RE 12.1.1 non-remnant (Table 10.4)
- Greenridge AU4 RE 12.3.20 remnant (Table 10.5)
- Greenridge AU5 RE 12.3.20 regrowth (Table 10.6)
- Greenridge AU6 RE 12.3.20 non-remnant (Table 10.7).

Table 10.1. Results of Offset Assessment Guide for CoastalSwamp Oak TEC

EPBC status	Impact area (ha)	Impact site quality (/10)	Impact quantum	Offset area (ha)	Offset start quality (/10)	Quality without offset (/10)	Quality with offset (/10)	Offset quantum and % of liability provided
Coastal Swamp Oak TEC								
END	15.9*	8	12.72	Remnant RE12.1.1 AU1 Greenridge 14.2ha	8	7	9	17.47%
				Regrowth RE 12.1.1 AU2 Greenridge 5.16ha	7	7	9	5.67%
				Non-remnant RE12.1.1 AU3 Greenridge 22.15ha	3	3	6	34.98%
				Remnant RE12.3.20 AU4 Greenridge 22.78ha	8	7	9	28.02%
				Regrowth RE12.3.20 AU5 Greenridge 2.58ha	7	7	9	2.84%
				Non-remnant RE 12.3.20 AU6 Greenridge 10.83	2	2	9	40.11%
Total ha of offset at Greenridge				77.7 ha				129.09%

The proposed 77.7ha of offsets for Coastal Swamp Oak TEC provide for 129.09% of the offset requirement in accordance with the Offset Assessment Guide.

Calculations of start, without offset and with offset habitat values specific to Coastal Swamp Oak TEC for each nominated offset area AU are referenced in Section 10.4.2.



Data sources:
Cadastral data - Queensland - by area of interest, Published 30/05/2022
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources)

Figure:	**10.1**
Title:	**Greenridge offsets for Coastal Swamp Oak TEC**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 29/09/2022**

BAAM ECOLOGICAL CONSULTANTS

TABLE 10.2 Greenridge AU1 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Coastal Swamp Oak TEC
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	1.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*	15.9	
			Quality *(Scale 0-10)*	8	
		Total quantum of impact *(Adjusted Hectares)*		12.72	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	No		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*			

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	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

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	12.72	Greenridge AU1	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	14.2	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.14	100%	0.14	0.11	Overall net present value	2.22	
				Time until ecological benefit	10	Start quality *(scale of 0-10)*	8	Future quality without offset *(scale of 0-10)*	7	Future quality with offset *(scale of 0-10)*	9	2.00	85%	1.70	1.51	% of impact offset	17.47%	
								Future area without offset	14.1	Future area with offset	14.2			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes							0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.3 Greenridge AU2 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Coastal Swamp Oak TEC
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	1.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*	15.9	
			Quality *(Scale 0-10)*	8	
		Total quantum of impact *(Adjusted Hectares)*		12.72	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	No		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*			

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	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

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	12.72	Greenridge AU2	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	5.16	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.05	100%	0.05	0.04	Overall net present value	0.72	
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	7	Future quality without offset *(scale of 0-10)*	7	Future quality with offset *(scale of 0-10)*	9	2.00	85%	1.70	1.34	% of impact offset	5.67%	
								Future area without offset	5.1	Future area with offset	5.2					Minimum (90%) direct offset requirement met?	FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0					Minimum (90%) direct offset requirement met?	FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes							0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.4 Greenridge AU3 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Coastal Swamp Oak TEC
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	1.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*	15.9	
			Quality *(Scale 0-10)*	8	
		Total quantum of impact *(Adjusted Hectares)*		12.72	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	No		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*			

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	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

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	12.72	Greenridge AU3	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	22.15	Risk of loss without offset *(%)*	0%	Risk of loss with offset *(%)*	0%	0.00	100%	0.00	0.00	Overall net present value	4.45	
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	3	Future quality without offset *(scale of 0-10)*	3	Future quality with offset *(scale of 0-10)*	6	3.00	85%	2.55	2.01	% of impact offset	34.98%	
								Future area without offset	22.2	Future area with offset	22.2			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes							0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.5 Greenridge AU4 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Coastal Swamp Oak TEC
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	1.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*	15.9	
			Quality *(Scale 0-10)*	8	
		Total quantum of impact *(Adjusted Hectares)*		12.72	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	No		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*			

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	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

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	12.72	Greenridge AU4	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	22.78	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.23	100%	0.23	0.18	Overall net present value	3.56	
				Time until ecological benefit	10	Start quality *(scale of 0-10)*	8	Future quality without offset *(scale of 0-10)*	7	Future quality with offset *(scale of 0-10)*	9	2.00	85%	1.70	1.51	% of impact offset	28.02%	
								Future area without offset	22.6	Future area with offset	22.8					Minimum (90%) direct offset requirement met?	FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0					Minimum (90%) direct offset requirement met?	FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes							0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.6 Greenridge AU5 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Coastal Swamp Oak TEC
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	1.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*	15.9	
			Quality *(Scale 0-10)*	8	
		Total quantum of impact *(Adjusted Hectares)*		12.72	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	No		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*			

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	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

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	12.72	Greenrdige AU5	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	2.583	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.03	100%	0.03	0.02	Overall net present value	0.36	
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	7	Future quality without offset *(scale of 0-10)*	7	Future quality with offset *(scale of 0-10)*	9	2.00	85%	1.70	1.34	% of impact offset	2.84%	
								Future area without offset	2.6	Future area with offset	2.6			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes							0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.7 Greenridge AU6 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Coastal Swamp Oak TEC
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	1.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*	15.9	
			Quality *(Scale 0-10)*	8	
		Total quantum of impact *(Adjusted Hectares)*		12.72	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	No		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*			

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	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

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	12.72	Greenridge AU6	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	10.83	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.11	100%	0.11	0.09	Overall net present value	5.10	
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	2	Future quality without offset *(scale of 0-10)*	2	Future quality with offset *(scale of 0-10)*	9	7.00	85%	5.95	4.69	% of impact offset	40.11%	
								Future area without offset	10.7	Future area with offset	10.8			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes							0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

10.4.2 Offset Assessment Tables for Coastal Swamp Oak TEC

All remnant and regrowth patches of nominated RE 12.1.1 have been ground-truthed as representing the TEC, and the non-remnant areas are mapped as preclear RE 12.1.1.

Five occurrences of remnant RE 12.3.20 (AU4) at Greenridge are proposed as part of the offset for this MNES. Field assessment has determined that each of these areas represents differing proportions of TEC (ranging from 50 to 100%). The represented proportions have been applied to the total nominated area of remnant RE 12.3.20 (28.7ha), reducing the total area available for the offset within the nominated remnant RE 12.3.20 patches to 22.78ha.

Three occurrences of regrowth RE 12.3.20 (AU5) at Greenridge are proposed to offset the TEC, and all have been ground-truthed. Two were assessed as 100% representative of the TEC and one was 10% representative of the TEC. The represented proportions have been applied to the total nominated area of regrowth 12.3.20 (4.77ha), reducing the total area available for the offset within the nominated regrowth RE 12.3.20 patches to 2.58ha.

For the non-remnant areas of RE 12.3.20 proposed for offsetting the TEC, all have been ground-truthed at 90-100% TEC. These proportions have been applied to the total area of non-remnant RE 12.3.20 (9.91ha), reducing the total area to be considered to provide the TEC offset to 9.06ha.

The offset assessment tables for Coastal Swamp Oak TEC within each AU are provided in Appendix 5 as follows:

- Greenridge AU1 RE 12.1.1 remnant start condition (Table A5.1), condition without offset (Table A5.2) and condition with offset (Table A5.3).
- Greenridge AU2 RE 12.1.1 regrowth start condition (Table A5.4), condition without offset (Table A5.6) and condition with offset (Table A5.7).
- Greenridge AU3 RE 12.1.1 non-remnant (cleared) start condition (Table A5.8), condition without offset (Table A5.9) and condition with offset (Table A5.10).
- Greenridge AU4 RE 12.3.20 remnant start condition (Table A5.11), condition without offset (Table A5.12) and condition with offset (Table A5.13).
- Greenridge AU5 RE 12.3.20 regrowth start condition (Table A5.14), condition without offset (Table A5.15) and condition with offset (Table A5.16).
- Greenridge AU6 RE 12.3.20 non-remnant start condition (Table A5.17), condition without offset (Table A5.18) and condition with offset (Table A5.19).

Those attributes that would change in the ‘without offset’ and ‘with offset’ scenarios are highlighted in the tables (green for improvement and orange for quality loss) and are discussed in Sections 10.2 and 10.5.

10.5 KOALA OFFSET ASSESSMENT

10.5.1 Offset Assessment Guide for Koala

The proposed offset locations for Koala are shown on Figures 10.2 (Greenridge) and 10.3 (Tabooba).

Results of the Offset Assessment Guide calculations for Koala for each AU are summarised in Table 10.8 below and are provided individually in the following tables:

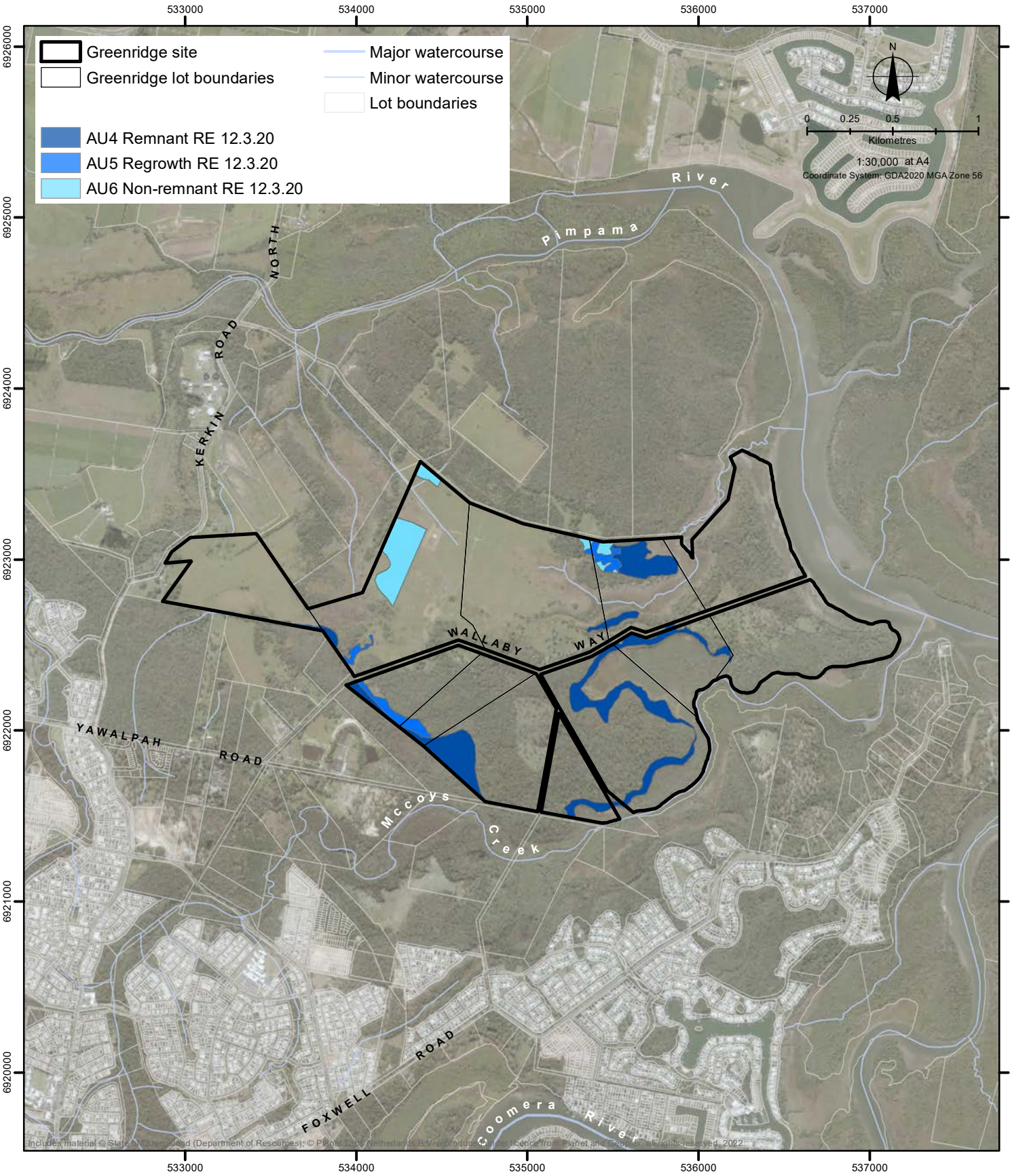
- Tabooba AU1 RE 12.8.16 remnant (Table 10.9)
- Tabooba AU2 RE 12.8.16 advanced regrowth (Table 10.10)
- Tabooba AU3 RE 12.8.16 young regrowth (Table 10.11)
- Tabooba AU4 RE 12.8.14 remnant (Table 10.12)
- Tabooba AU5 RE 12.8.14 advanced regrowth (Table 10.13)
- Greenridge AU4 RE 12.3.20 remnant (Table 10.14)
- Greenridge AU5 RE 12.3.20 regrowth (Table 10.15)
- Greenridge AU6 RE 12.3.20 non-remnant (Table 10.16).

Table 10.8 Results of Offsets Assessment Guide for Koala

EPBC status	Impact area (ha)	Impact site quality (/10)	Impact quantum	Offset area (ha)	Offset start quality (/10)	Quality without offset (/10)	Quality with offset (/10)	Offset quantum and % of liability provided
Koala *Phascolarctos cinereus*								
VUL	73.81	7	51.67	Remnant RE12.8.16 AU1 Tabooba 49.84ha	8	8	9	8.78%
				Adv Regrowth RE12.8.16 AU2 Tabooba 145.02ha	6	6	8	48.46%
				Young Regrowth RE12.8.16 AU3 Tabooba 48.1ha	4	3	7	30.73%
				Remnant RE12.8.14 AU4 Tabooba 50.62ha	8	8	8	0.75%
				Adv Regrowth RE12.8.14 AU5 Tabooba 19.8ha	7	6	8	6.62%
				Remnant RE12.3.20 AU4 Greenridge 28.7ha	8	8	8	0.43%
				Regrowth RE12.3.20 AU5 Greenridge 4.77ha	7	7	9	1.57%
				Non-remnant AU6 Greenridge 11.88ha	4	4	7	5.63%
Total ha of Koala offset at Tabooba and Greenridge				**358.69ha**				**102.97%**

The proposed 358.69ha of offsets for Koala provide for 102.97% of the offset requirement in accordance with the Offset Assessment Guide.

Calculations of start, without offset and with offset habitat values specific to Koala for each nominated offset area AU are referenced in Section 10.5.2.



Data sources:
Cadastral data - Queensland - by area of interest, Published 30/05/2022
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources)

Figure:	**10.2**
Title:	**Greenridge offsets for Koala and Grey-headed Flying-fox**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 30/09/2022**

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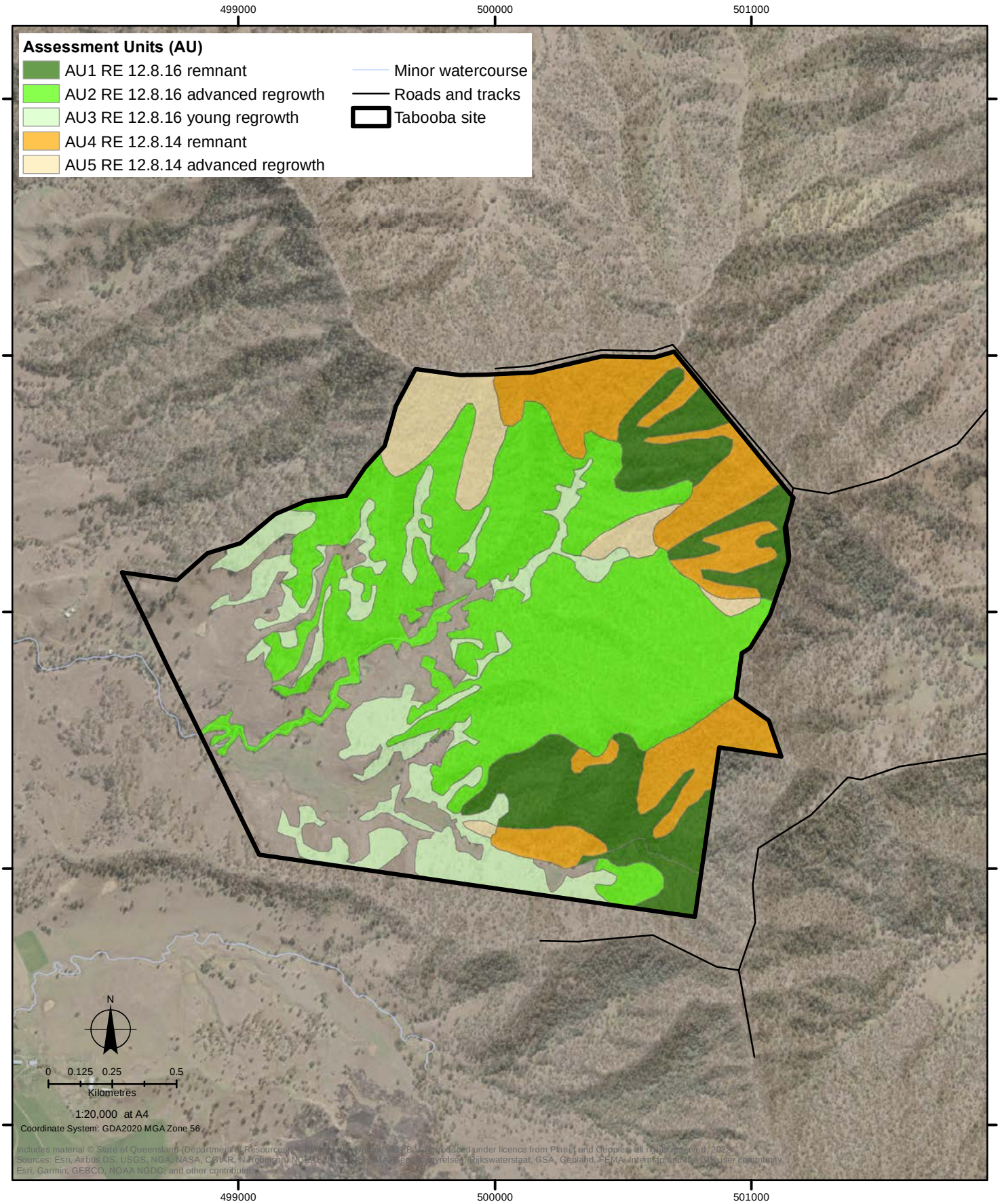

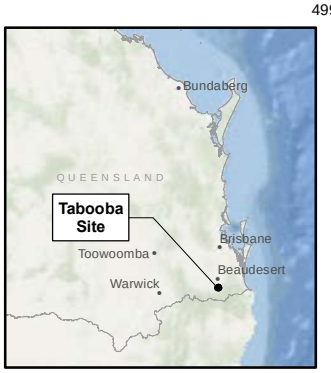

Data sources:
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM **Reviewed by: PJ** **Date: 30/09/2022**

Figure:	**10.3**
Title:	**Tabooba offsets for Koala and Grey-headed Flying-fox**
Project:	**Coomera Connector Stage 1 Offset Strategy – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

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TABLE 10.9 Tabooba AU1 OAG

Offsets Assessment Guide

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

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

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	73.81	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		51.67	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	No			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	51.67	Tabooba AU1	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	49.8	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.50	100%	0.50	0.48	Overall net present value	4.54	
				Time until ecological benefit	10	Start quality *(scale of 0-10)*	8	Future quality without offset *(scale of 0-10)*	8	Future quality with offset *(scale of 0-10)*	9	1.00	85%	0.85	0.83	% of impact offset	8.78%	
								Future area without offset	49.3	Future area with offset	49.8			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes	0.00						0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.10 Tabooba AU2 OAG

Offsets Assessment Guide

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

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

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	73.81	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		51.67	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	0.00		Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	51.67	Tabooba AU2	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	145.02	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	1.45	100%	1.45	1.39	Overall net present value	25.04	
				Time until ecological benefit	10	Start quality *(scale of 0-10)*	6	Future quality without offset *(scale of 0-10)*	6	Future quality with offset *(scale of 0-10)*	8	2.00	85%	1.70	1.67	% of impact offset	48.46%	
								Future area without offset	143.6	Future area with offset	145.0			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes	0.00						0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.11 Tabooba AU3 OAG

Offsets Assessment Guide

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

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

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	73.81	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		51.67	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	No			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	51.67	Tabooba AU3	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	48.1	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.48	100%	0.48	0.46	Overall net present value	15.88	
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	4	Future quality without offset *(scale of 0-10)*	3	Future quality with offset *(scale of 0-10)*	7	4.00	85%	3.40	3.27	% of impact offset	30.73%	
								Future area without offset	47.6	Future area with offset	48.1			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes	0.00						0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.12 Tabooba AU4 OAG

Offsets Assessment Guide

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

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

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	73.81	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		51.67	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	No			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	51.67	Tabooba AU4	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	50.62	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.51	100%	0.51	0.49	Overall net present value	0.39	
				Time until ecological benefit	10	Start quality *(scale of 0-10)*	8	Future quality without offset *(scale of 0-10)*	8	Future quality with offset *(scale of 0-10)*	8	0.00	85%	0.00	0.00	% of impact offset	0.75%	
								Future area without offset	50.1	Future area with offset	50.6			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	No							0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.13 Tabooba AU5 OAG

Offsets Assessment Guide

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

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

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	73.81	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		51.67	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	0.00		Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	51.67	Tabooba AU5	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	19.8	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.20	100%	0.20	0.19	Overall net present value	3.42	
				Time until ecological benefit	10	Start quality *(scale of 0-10)*	7	Future quality without offset *(scale of 0-10)*	6	Future quality with offset *(scale of 0-10)*	8	2.00	85%	1.70	1.67	% of impact offset	6.62%	
								Future area without offset	19.6	Future area with offset	19.8			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes	0.00						0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.14 Greenridge AU4 OAG

Offsets Assessment Guide

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

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

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	73.81	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		51.67	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	0.00		Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	51.67	Greenridge AU4	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	28.7	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.29	100%	0.29	0.28	Overall net present value	0.22	
				Time until ecological benefit	10	Start quality *(scale of 0-10)*	8	Future quality without offset *(scale of 0-10)*	8	Future quality with offset *(scale of 0-10)*	8	0.00	85%	0.00	0.00	% of impact offset	0.43%	
								Future area without offset	28.4	Future area with offset	28.7			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes	0.00						0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.15 Greenridge AU5 OAG

Offsets Assessment Guide

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

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

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	73.81	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		51.67	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	0.00		Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	51.67	Greenridge AU5	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	4.77	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.05	100%	0.05	0.05	Overall net present value	0.81	
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	7	Future quality without offset *(scale of 0-10)*	7	Future quality with offset *(scale of 0-10)*	9	2.00	85%	1.70	1.63	% of impact offset	1.57%	
								Future area without offset	4.7	Future area with offset	4.8			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes	0.00						0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.16 Greenridge AU6 OAG

Offsets Assessment Guide

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

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

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	73.81	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		51.67	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	0.00		Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	51.67	Greenridge AU6	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	11.88	Risk of loss without offset *(%)*	0%	Risk of loss with offset *(%)*	0%	0.00	100%	0.00	0.00	Overall net present value	2.91	
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	4	Future quality without offset *(scale of 0-10)*	4	Future quality with offset *(scale of 0-10)*	7	3.00	85%	2.55	2.45	% of impact offset	5.63%	
								Future area without offset	11.9	Future area with offset	11.9			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes	0.00						0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

10.5.2 Offset Assessment Tables for Koala

The offset assessment tables for Koala within each AU are provided in Appendix 6 as follows:

- Tabooba AU1 RE 12.8.16 remnant start condition (Table A6.1), condition without offset (Table A6.2) and condition with offset (Table A6.3).
- Tabooba AU2 RE 12.8.16 advanced regrowth start condition (Table A6.4), condition without offset (Table A6.5) and condition with offset (Table A6.6).
- Tabooba AU3 RE 12.8.16 young regrowth start condition (Table A6.7), condition without offset (Table A6.8) and condition with offset (Table A6.9).
- Tabooba AU4 RE 12.8.14 remnant start condition (Table A6.10), condition without offset (Table A6.11) and condition with offset (Table A6.12)
- Tabooba AU5 RE 12.8.14 advanced regrowth start condition (Table A6.13), condition without offset (Table A6.14) and condition with offset (Table A6.15).
- Greenridge AU4 RE 12.3.20 remnant start condition (Table A6.16), condition without offset (Table Ad.17), condition with offset (Table A6.18).
- Greenridge AU5 RE 12.3.20 regrowth start condition (Table A6.19), condition without offset (Table A6.20), condition with offset (Table A6.21).
- Greenridge AU6 RE 12.3.20 non-remnant start condition (Table A6.22), condition without offset (Table A6.23), condition with offset (Table A6.24).

Those attributes that would change in the ‘without offset’ and ‘with offset’ scenarios are highlighted in the tables (green for improvement and orange for quality loss) are discussed in Section 10.5.

10.6 GREY-HEADED FLYING-FOX OFFSET ASSESSMENT

10.6.1 Offset Assessment Guide for Grey-headed Flying-fox

The proposed offset locations for Grey-headed Flying-fox are shown on Figures 10.2 (Greenridge) and 10.3 (Tabooba).

Results of the Offset Assessment Guide calculations for Koala for each AU are summarised in Table 10.16 below and are provided individually in the following tables:

- Tabooba AU1 RE 12.8.16 remnant (Table 10.18)
- Tabooba AU2 RE 12.8.16 advanced regrowth (Table 10.19)
- Tabooba AU3 RE 12.8.16 young regrowth (Table 10.20)
- Tabooba AU4 RE 12.8.14 remnant (Table 10.21)
- Tabooba AU5 RE 12.8.14 advanced regrowth (Table 10.22)
- Greenridge AU4 RE 12.3.20 remnant (Table 10.23)
- Greenridge AU5 RE 12.3.20 regrowth (Table 10.24)
- Greenridge AU6 RE 12.3.20 non-remnant (Table 10.25).

Table 10.17 Results of Offsets Assessment Guide for Grey-headed Flying-fox

EPBC status	Impact area (ha)	Impact site quality (/10)	Impact quantum	Offset area (ha)	Offset start quality (/10)	Quality without offset (/10)	Quality with offset (/10)	Offset quantum and % of liability provided
Grey-headed Flying-fox *Pteropus poliocephalus*								
VUL	68.76	7	48.13	Remnant RE12.8.16 AU1 Tabooba 49.84ha	6	6	6	0.6%
				Adv Regrowth RE12.8.16 AU2 Tabooba 145.02ha	5	4	7	76.58%
				Young Regrowth RE12.8.16 AU3 Tabooba 48.1ha	5	1	6	40.98%
				Remnant RE12.8.14 AU4 Tabooba 50.62ha	6	6	7	9.38%
				Adv Regrowth RE12.8.14 AU5 Tabooba 19.8ha	5	5	6	3.63%
				Remnant RE12.3.20 AU4 Greenridge 28.7ha	6	6	7	5.32%
				Regrowth RE12.3.20 AU5 Greenridge 4.77ha	6	6	6	0.06%
				Non-remnant AU6 Greenridge 11.88ha	2	2	7	10.08%
Total ha of Grey-headed Flying-fox offset at Tabooba and Greenridge				**358.69ha**				**146.63%**

The proposed 358.69ha of offsets for Grey-headed Flying-fox provide for 146.63% of the offset requirement in accordance with the Offset Assessment Guide.

Calculations of start, without offset and with offset habitat values specific to Grey-headed Flying-fox for each nominated offset area AU are referenced in Section 10.6.2.

TABLE 10.18 Tabooba AU1 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Grey-headed flying-fox
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	68.76	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		48.13	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	No			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	48.13	Tabooba AU1	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	49.8	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.50	100%	0.50	0.48	Overall net present value	0.29	
				Time until ecological benefit	10	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	85%	0.00	0.00	% of impact offset	0.60%	
								Future area without offset	49.3	Future area with offset	49.8			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes	0.00						0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.19 Tabooba AU2 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Grey-headed flying-fox
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	68.76	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		48.13	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	0.00		Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	48.13	Tabooba AU2	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	145.02	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	1.45	100%	1.45	1.39	Overall net present value	36.86	
				Time until ecological benefit	10	Start quality *(scale of 0-10)*	5	Future quality without offset *(scale of 0-10)*	4	Future quality with offset *(scale of 0-10)*	7	3.00	85%	2.55	2.50	% of impact offset	76.58%	
								Future area without offset	143.6	Future area with offset	145.0			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes	0.00						0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.20 Tabooba AU3 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Grey-headed flying-fox
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	68.76	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		48.13	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	0.00		Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	48.13	Tabooba AU3	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	48.1	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.48	100%	0.48	0.46	Overall net present value	19.72	
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	5	Future quality without offset *(scale of 0-10)*	1	Future quality with offset *(scale of 0-10)*	6	5.00	85%	4.25	4.08	% of impact offset	40.98%	
								Future area without offset	47.6	Future area with offset	48.1			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes	0.00						0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.21 Tabooba AU4 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Grey-headed flying-fox
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	68.76	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		48.13	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	0.00		Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	48.13	Tabooba AU4	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	50.62	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.51	100%	0.51	0.49	Overall net present value	4.52	
				Time until ecological benefit	10	Start quality *(scale of 0-10)*	6	Future quality without offset *(scale of 0-10)*	6	Future quality with offset *(scale of 0-10)*	7	1.00	85%	0.85	0.83	% of impact offset	9.38%	
								Future area without offset	50.1	Future area with offset	50.6			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes	0.00						0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.22 Tabooba AU5 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Grey-headed flying-fox
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	68.76	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		48.13	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	Yes			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	0.00		Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	48.13	Tabooba AU5	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	19.8	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.20	100%	0.20	0.19	Overall net present value	1.75	
				Time until ecological benefit	10	Start quality *(scale of 0-10)*	5	Future quality without offset *(scale of 0-10)*	5	Future quality with offset *(scale of 0-10)*	6	1.00	85%	0.85	0.83	% of impact offset	3.63%	
								Future area without offset	19.6	Future area with offset	19.8			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes	0.00						0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.23 Greenridge AU4 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Grey-headed flying-fox
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	68.76	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		48.13	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees				
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	0.00		Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	48.13	Greenridge AU4	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	28.7	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.29	100%	0.29	0.28	Overall net present value	2.56	
				Time until ecological benefit	10	Start quality *(scale of 0-10)*	6	Future quality without offset *(scale of 0-10)*	6	Future quality with offset *(scale of 0-10)*	7	1.00	85%	0.85	0.83	% of impact offset	5.32%	
								Future area without offset	28.4	Future area with offset	28.7			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes							0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.24 Greenridge AU5 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Grey-headed flying-fox
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	68.76	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		48.13	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees				
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of community	Yes	0.00		Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00	
				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)*		0.00		0.00	0.00	% of impact offset	0.00%	
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*
Area of habitat	Yes	48.13	Greenridge AU5	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	4.77	Risk of loss without offset *(%)*	1%	Risk of loss with offset *(%)*	0%	0.05	100%	0.05	0.05	Overall net present value	0.03	
				Time until ecological benefit	20	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	85%	0.00	0.00	% of impact offset	0.06%	
								Future area without offset	4.7	Future area with offset	4.8			Minimum (90%) direct offset requirement met?			FALSE	

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Number of features e.g. Nest hollows, habitat trees	Yes							0.00		0.00	0.00	0.00%	FALSE	
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE	

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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)*
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE	
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE	
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE	

TABLE 10.25 Greenridge AU6 OAG

Offsets Assessment Guide

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

Matter of National Environmental Significance	
Name	Grey-headed flying-fox
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	Yes		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*		0.00	

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	68.76	
			Quality *(Scale 0-10)*	7	
		Total quantum of impact *(Adjusted Hectares)*		48.13	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees				
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
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

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result	
Area of community	Yes	0.00		Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00
				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)*		0.00		0.00	0.00	% of impact offset	0.00%
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result	
Area of habitat	Yes	48.13	Greenridge AU6	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	11.88	Risk of loss without offset *(%)*	0%	Risk of loss with offset *(%)*	0%	0.00	100%	0.00	0.00	Overall net present value	4.85
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	2	Future quality without offset *(scale of 0-10)*	2	Future quality with offset *(scale of 0-10)*	7	5.00	85%	4.25	4.08	% of impact offset	10.08%
								Future area without offset	11.9	Future area with offset	11.9			Minimum (90%) direct offset requirement met?			FALSE

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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?
Number of features e.g. Nest hollows, habitat trees	Yes							0.00		0.00	0.00	0.00%	FALSE
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	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?
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE
Number of individuals e.g. Individual plants/animals	No							0.00		0.00	0.00	0.00%	FALSE

10.6.2 Offset Assessment Tables for Grey-headed Flying-fox

The offset assessment tables for Grey-headed Flying-fox within each AU are provided in Appendix 7 as follows:

- Tabooba AU1 RE 12.8.16 remnant start condition (Table A7.1), condition without offset (Table A7.2) and condition with offset (Table A7.3).
- Tabooba AU2 RE 12.8.16 advanced regrowth start condition (Table A7.4), condition without offset (Table A7.5) and condition with offset (Table A7.6).
- Tabooba AU3 RE 12.8.16 young regrowth start condition (Table A7.7), condition without offset (Table A7.8) and condition with offset (Table A7.9).
- Tabooba AU4 RE 12.8.14 remnant start condition (Table A7.10), condition without offset (Table A7.11) and condition with offset (Table A7.12)
- Tabooba AU5 RE 12.8.14 advanced regrowth start condition (Table A7.13), condition without offset (Table A7.14) and condition with offset (Table A7.15).
- Greenridge AU4 RE 12.3.20 remnant start condition (Table A7.16), condition without offset (Table A7.17) and condition with offset (Table A7.18).
- Greenridge AU5 RE 12.3.20 regrowth start condition (Table A7.19), condition without offset (Table A7.20) and condition with offset (Table A7.21).
- Greenridge AU6 RE 12.3.20 non-remnant start condition (Table A7.22), condition without offset (Table A7.23) and condition with offset (Table A7.24).

Those attributes that would change in the ‘without offset’ and ‘with offset’ scenarios are highlighted in the tables (green for improvement and orange for quality loss are discussed in Section 10.5.

10.7 OFFSET OUTCOMES

10.7.1 Greenridge

As described in Section 6.1.2, Greenridge has been managed for sugarcane farming, livestock grazing and timber plantation for at least 150 years, although ecosystems in the eastern and southern portions of Greenridge have regrown and returned to remnant status following the end of sugarcane growing, which appears to have been in the 1980s. Site inspection has confirmed that various practices have been used to reduce woody vegetation for increased pasture production in the western and northern portion of the site. Though most recently used for cattle grazing, Greenridge does not exhibit any signs of recent cattle usage. Pasture dominated by the exotic South African Pigeon Grass *Setaria sphacelata* is heavily overgrown and infested with Fireweed *Senecio madagascariensis* (toxic to livestock) is indicative of little pastural management. Fencing has also been removed from areas once restricting cattle access to saltmarsh and mangrove communities in the central to southern portions of Greenridge. While an old pig trap is present, the damage caused to understorey vegetation through digging by Feral Pigs, particularly within the Coastal Swamp Oak communities, is significant and indicates there has been no recent Feral Pig control. Exclusion of fire from the ecosystems on site is also apparent, and can be detrimental in the longer term, particularly for Coastal Swamp Oak communities.

Under the area of high conservation value declaration (VDEC under the VMA) and Offset Area Management Plans (OAMP), management of weeds and feral animals will be instated, and allow the natural and anthropogenic regeneration of habitat. For example, discontinuing the repression of regrowth through slashing will allow the maturation of trees into foraging habitat for Koala and Grey-headed Flying-fox, and the return of Coastal Swamp Oak in non-remnant areas. As described in Section 5.1.2, facilitating non-remnant RE12.1.1 regrowth and planting Coastal Swamp Oak in non-remnant preclear RE 12.1.1 areas will eventually increase the extent of the TEC, but under the limited existing management Coastal Swamp Oak is under particular threat from Feral Pig activity. Additionally, the proposed increased management of weed species will facilitate native vegetation regeneration within all offset areas and promote increased movement and usage of the mature vegetation by Koala. Management of feral animals will also benefit Koala directly (through reduced dog predation), but also in improved regeneration of vegetation (with reduced herbivore pressure).

Specifically, from the habitat quality assessments that have occurred on Greenridge, it is anticipated that many site condition parameters in the Offset Assessment Tables (including quality and availability of suitable habitat) for both Koala and Grey-headed Flying-fox, and the condition and extent of the Coastal Swamp Oak TEC will improve with Greenridge being a declared area and offset. The site context parameter of threats is also anticipated to improve as the OAMP will include the provision of increased management of fire risk, cessation of clearing and feral animal predation (for Koalas specifically) and site disturbance from Feral Pigs (for all ecosystems, but particularly the Coastal Swamp Oak). As such, the management actions proposed for Greenridge are particularly aimed at producing a positive conservation outcome for the two target MNES fauna species and the TEC at Greenridge.

In terms of local and state regulations, cleared and some regrowth portions of Greenridge are categorised under state mapping as Category X, which is not regulated under the VM Act and therefore able to be cleared without state approvals.

Land use and management changes in the area around Greenridge demonstrate the capacity for considerable regeneration and regrowth to occur. For example, areas of the Pimpama River Conservation Area to the north of Greenridge are being successfully restored by Gold Coast City Council. The area shown in the centre of Image 10.1 below, immediately north of Greenridge, is RE 12.3.20 restoration in an area that historical imagery shows was completely clear of vegetation in 2004. This success indicates that non-remnant areas within Greenridge can achieve regrowth status within the proposed 10 year timeframe.

Image 10.1. Coastal Swamp Oak rehabilitation in the PRCA in 2021 (image: Qld Globe)

The very young regrowth currently in the non-remnant RE 12.1.1 areas of Greenridge lends the property to providing a rapid ecological benefit for the TEC, if the management practices of maintaining pasture cease. Additionally, natural regeneration can be accelerated with suitable weed management.

The National Standards for Ecological Restoration describe that spontaneous/natural regeneration is "*very often able to recover unaided after cessation of recent or relatively low levels of predation or competition of invasive species and cessation of degrading practices such as native vegetation clearing, over-grazing….or inappropriate fire regimes*" and that "animal species may be able to migrate back to the site if connectivity is in place, while plant species may recover through resprouting or germination from remnant soil seed banks or seed that naturally disperse from nearby sites" (SERA 2021). Natural regeneration also preserves the local genetics of vegetation and have a proven ability to establish in the conditions present.

The Offset Assessment Tables for the offset AUs "with offset" provide the guide for completion criteria for each Assessment Unit. The OAMP will specify interim completion targets and the completion criteria. It is expected that the time until ecological benefit will be achieved in about ten years, with ongoing management for the life of the proposed action.

The legally binding mechanism for the offset is specified in Section 11.3.

10.7.2 Tabooba

As described in Section 5.1.2, Tabooba has been managed for livestock grazing and timber harvesting for at least 150 years. Site inspection has confirmed that various practices have been used to reduce woody vegetation for increased pasture production, including clearing, stick-racking and burning of regrowth and pasture grass seeding. There is also limited control of weeds, which have proliferated in gullies, creeklines and around remnant trees on the property.

Under the area of high conservation value declaration (VDEC under the VMA) and OAMP, such deleterious practices will cease, and allow the regeneration of habitat. For example, discontinuing the clearing of regrowth will allow the maturation of trees into foraging habitat for Koala and Grey-headed Flying-fox. As described in Section 5.2.1 and Table 5.2, most regrowth vegetation at Tabooba supports key forage species for the target MNES fauna, but under pastoral management the regrowth is at risk of continued and expanded clearing. Additionally, the proposed increased management of weed species will facilitate native vegetation regeneration on the property and promote increased movement and usage of the mature vegetation by Koala. Management of feral animals will also benefit Koala directly (through reduced dog predation), but also in improved regeneration of vegetation (with reduced herbivore pressure).

Specifically, from the habitat quality assessments that have occurred on Tabooba and based on analysis of available sources, it is anticipated that most site condition parameters in the Offset Assessment Tables (including quality and availability of suitable habitat) for both Koala and Grey-headed Flying-fox will improve with Tabooba being a declared area and offset. The site context parameter of threats is also anticipated to improve as the OAMP will include the provision of increased management of fire risk, cessation of clearing and feral animal predation (for Koalas specifically). As such, the management actions proposed for Tabooba are particularly aimed at producing a positive conservation outcome for the two target fauna species at the proposed offset property.

In terms of local and state regulations, the majority of Tabooba is categorised under state mapping as Category X (including the regrowth vegetation), which is not regulated under the VM Act and therefore able to be cleared without state approvals. Similarly, the property has Rural Zoning under the Scenic Rim Regional Council planning scheme, which provides for rural uses and activities including maintaining the landscape for rural industry, cropping, intensive animal husbandry, etc. As such, there are limited provisions for the preservation of woody vegetation on the site under local obligations.

Land use and management changes in the area around Tabooba demonstrate the capacity for considerable regeneration and regrowth to occur. For example, in an area immediately to the south of Tabooba, satellite imagery in the 18 years between 1967 and 1985 show the region's ability to revegetate when limited clearing occurs (Image 10.1). This regeneration will not occur on Tabooba if the land management activities continue as they have in recent years (e.g. clearing and stick-raking of regrowth mentioned above).

The amount of advanced regrowth currently on Tabooba lends the property to providing a rapid ecological benefit if the management practices of stick-raking and clearing observed in other areas of the property cease. Additionally, natural regeneration can be accelerated with suitable weed management.

The National Standards for Ecological Restoration describe that spontaneous/natural regeneration is "*very often able to recover unaided after cessation of recent or relatively low levels of predation or competition of invasive species and cessation of degrading practices such as native vegetation clearing, over-grazing….or inappropriate fire regimes*" and that "animal species may be able to migrate back to the site if connectivity is in place, while plant species may recover through resprouting or germination from remnant soil seed banks or seed that naturally disperse from nearby sites" (SERA 2021). Natural regeneration also preserves the local genetics of vegetation and have a proven ability to establish in the conditions present.

Image 10.1 Aerial imagery of the property immediately to the south of Farringdon Road, showing vegetation regrowth capacity in an 18-year period. Imagery on the left is from 1967 and right is 1985.

The Offset Assessment Tables for the offset AUs “with offset” provide the guide for completion criteria for each Assessment Unit. The OAMP will specify interim completion targets and the completion criteria. It is expected that time until ecological benefit will be achieved over ten years, with ongoing management for the life of the proposed action.

The legally binding mechanism for the offset is specified in Section 11.3.

10.7.3 Summary of whole of offset scores for each matter

The following tables summarise the whole of offset habitat quality scores for the proposed offset areas ‘with offset’ for each matter against the impact area habitat quality scores.

Table 10.24 Coastal Swamp Oak TEC habitat quality score for the proposed offset area at completion quality vs the impact areas habitat quality score

Final habitat quality score (weighted)	Greenridge AU1	Greenridge AU2	Greenridge AU3	Greenridge AU4	Greenridge AU5	Greenridge AU6	Average/ Final	Impact area quality score
Habitat Quality Score (measured /100)	88.00	89.00	69.00	91.50	88.00	86.00	85.25	
Habitat Quality Score (max)	100	100	100	100	100	100	100	
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70	
Assessment Unit Habitat Quality Score /10	8.80	8.90	6.90	9.15	8.80	8.60	8.53	
Size Weighting	0.18	0.07	0.29	0.29	0.03	0.14		
Weighted Habitat Quality Score (rounded)	***1.61***	***0.59***	***1.97***	***2.68***	***0.29***	***1.20***	***8***	***8***

Table 10.25 Koala habitat quality score for the proposed offset areas at target quality vs the impact areas habitat quality score

Final habitat quality score (weighted)	Tabooba AU1	Tabooba AU2	Tabooba AU3	Tabooba AU4	Tabooba AU5	Greenridge AU4	Greenridge AU5	Greenridge AU6	Average/ Final	Impact area quality score
Site Condition score (out of 3)	2.63	2.55	2.33	2.34	2.70	2.70	2.40	2.70	2.50	
Site Context Score (out of 3)	2.25	2.20	2.17	2.20	1.77	1.77	2.65	1.93	2.16	
Species Stocking Rate Score (out of 4)	3.71	3.71	2.57	3.71	3.71	3.71	3.71	2.00	3.31	
Habitat Quality score (out of 10)	8.59	8.46	7.07	8.25	8.18	8.18	8.77	6.63	7.95	
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	28.7	28.7	4.77	11.88	358.69	
Total offset area (ha) for this MNES	358.69	358.69	358.69	358.69	358.69	358.69	358.69	358.69		
Size Weighting	0.14	0.40	0.13	0.14	0.08	0.08	0.01	0.03		
Weighted Habitat Quality Score (rounded)	***1.19***	***3.42***	***0.95***	***1.16***	***0.46***	***0.7***	***0.1***	***0.2***	***8***	***7***

Table 10.26 Grey-headed Flying-fox habitat quality score for the proposed offset areas at target quality vs the impact areas habitat quality score

Final habitat quality score (weighted)	Tabooba AU1	Tabooba AU2	Tabooba AU3	Tabooba AU4	Tabooba AU5	Greenridge AU4	Greenridge AU5	Greenridge AU6	Average/ Final	Impact area quality score
Site Condition score (out of 4)	2.69	2.77	2.63	2.46	2.55	2.69	2.62	2.92	2.67	
Site Context Score (out of 3)	1.50	1.50	1.50	1.82	1.82	2.04	2.25	2.14	1.82	
Species Stocking Rate Score (out of 3)	2.29	2.32	1.69	2.40	2.10	2.15	1.39	2.10	2.05	
Habitat Quality score (out of 10)	6.48	6.58	5.82	6.68	6.48	6.88	6.25	7.17	6.54	
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	358.69	
Total offset area (ha) for this MNES	358.69	358.69	358.69	358.69	358.69	358.69	358.69	358.69		
Size Weighting	0.14	0.40	0.13	0.14	0.06	0.08	0.01	0.03		
Weighted Habitat Quality Score (rounded)	***0.90***	***2.66***	***0.78***	***0.94***	***0.36***	***0.08***	***0.08***	***0.24***	***7***	***7***

11.0 RISK ANALYSIS

This strategy has considered the risks that may inhibit achieving the completion criteria for the offset site, including risks that may be wholly outside the proponent's control. The risks have been assessed against the Risk Matrix below, supplied by the DCCEEW. The risk analyses:

- Identify events and threats that will, may, or are likely to impact the attainment of the completion criteria
- Assess the likelihood and consequences of those events and threats eventuating, both before and after risk controls are applied, and assesses residual risk levels
- Identify levels of uncertainty in mitigating the risks, with appropriate trigger criteria for corrective actions should risks and threats eventuate. The proposed corrective actions will be detailed in full in the OAMP.

Risk Analysis for Greenridge is provided in Section 11.1 and Risk Analysis for Tabooba is provided in Section 11.2.

11.1 RISK ANALYSIS TABLE GREENRIDGE

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
***Force Majeure* Events**												
Drought	Extreme weather event, in the form of drought, causes habitat degradation and mortality of vegetation within the restoration area during the establishment period	Likely	High	High	Consider seasonal forecasts and areas of water availability (e.g. in/adjacent to the freshwater wetlands) prior to commencing any necessary replanting activities. Monitor onsite water availability to ensure an adequate supply is available for supplementary irrigation if required. Monitor restoration plantings for mortality.	Likely	Moderate	Medium	Tree and/or sapling mortality in rehabilitation/ restoration areas is <10%	Seasonal rainfall is predicted to be ≤25% of monthly averages over three months. Seedling and/or sapling mortality in rehabilitation/ restoration areas is >10%.	Undertake supplemental watering of rehabilitation/ restoration areas	Prior to undertaking any planting activities, examine monthly rainfall records and long-term forecasts. Monitor seedling and sapling mortality in rehabilitation/ restoration areas monthly. Monitor onsite wetland and creek levels monthly to inform available quantities for supplemental watering if required.
Heatwave	Extreme and extend hot periods threaten Koala survival	Likely	High	High	Include the planting of deep shade trees in the offset area.	Possible	Moderate	Medium	Deep shade trees are available in Koala habitat	Koalas are recorded as suffering heat stress	Undertake further supplemental planting of deep shade trees. Remove any heat stressed Koala's to a vet surgery or Koala hospital	Record the location and types of suitable deep shade trees on the property. Monitor Koala health during extended heatwave conditions.
Cyclones/ Severe tropical lows / Flooding	Extreme weather event, in the form of severe storms and/or flooding, causes habitat degradation	Likely	Moderate	Medium	Understand on-site flood areas ensure habitat restoration is suited to these areas. Improve all-weather access if flooding could potentially restrict management access.	Likely	Minor	Low	Key rehabilitation/ restoration areas are accessible following flooding or storms. Vegetation remains intact and healthy.	Tracks are not trafficable. Vegetation is impacted at minor to moderate levels. Erosion damage is present. There is an increase in the weed extent due to excessive rainfall and/or flooding.	Repair management tracks as soon as soon as it is safe to do so after the event. Replace rehabilitation/ restoration area vegetation damaged by storms and/or flood. Repair and stabilise locations where new erosion has emerged, or existing erosion has deteriorated. Increase weed management if required.	Establish and maintain flooding maps for the property by using available data and map flood levels following high rainfall events. Measure and map the extent of erosion following each wet season. Monitor seedling and sapling mortality in any rehabilitation/ restoration areas post event. Monitor weed cover as soon as it safe to do so after the extreme weather event to identify any new infestations that require control.
Catastrophic Bushfire	Catastrophic bushfire causes habitat degradation and loss of Koalas	Likely	Critical	Severe	Fire breaks reformed every 2 years and slashed every 2 months in winter and every 2 weeks in summer. Backburn 25% of the fire control lines each year. Undertake patch mosaic burning in accordance with fire management actions in the OAMP includes consultation with	Possible	Major	High	Dry Matter Yield <1200kg/ha at the end of the Dry Season (January)	Dry Matter Yield is >1200kg/ha at the end of the Dry Season (January)	Increase fire control line management. Introduce cattle grazing during the Dry Season to reduce the Dry Matter Yield to <1200kg/ha in January.	Monitor local fire recommendations and regional plans, particularly in comparison to the OAMP. Monthly inspection of fire breaks/fire control lines. Dry Matter Yield estimates[1] to be carried out fortnightly during grazing.

[1] Wide Bay and South East Queensland pasture photo standards

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
					neighbours, Council and the Rural Fire Brigade. Seek input from indigenous peoples where possible.							Dry Matter Yield estimates undertaken within each 'Assessment Unit' at the beginning of the Dry Season. Implement other methods as specified in the OAMP.
Standard Risks												
The offset failing (regardless of cause)	Failure to achieve completion criteria	Possible	High	Medium	Implement the management actions of the OAMP	Rare	High	Low	Interim completion criteria achieved	Failure to achieve the 5-yearly interim completion criteria	In the event of failure of the offset to achieve an interim or completion criteria, TMR will undertake an independent audit of the offset site to establish the reason. TMR will then work with DCCEEW to either extend the management period until the completion criteria are achieved or provide a replacement offset. Any replacement offset must be agreed with DCCEEW within 24 months of the complete failure of the offset becoming apparent.	Monitor and report on attainment of interim environmental performance targets
Erosion	Erosion causes increased weed infestation, reduced target vegetation recruitment and reduced habitat quality	Possible	Minor	Low	Install whoa-boys on roads to slow the overland flow of water if tracks are eroding. Undertake erosion mediation works in locations where vegetation is being undercut by water flow and where erosion features are increasing in size and impact.	Possible	Minor	Low	Fire control lines, rehabilitation areas and management tracks are accessible. Erosion mediation works are successful. No further erosion present on site.	Increased size of known erosion (depth and/or spread), or new erosion areas discovered	Repair and stabilise erosion features	Measure and map the extent of erosion following each wet season. Monthly inspections of the property, including fire control lines and management tracks. Inspections of the fire control lines and management tracks to be undertaken after a severe weather event.
Illegal timber harvesting/ collection	Illegal timber harvesting causes loss of trees and reduced habitat quality	Possible	Moderate	Medium	No timber harvesting approved. Suitable fencing and/or signage of property to prevent access (where possible) from unauthorised personnel.	Rare	Minor	Low	No timber harvesting undertaken in the offset area.	Evidence of illegal timber harvesting. Damage to fencing allowing access, or evidence of boat access from waterside.	Report illegal access to TMR, DCCEEW and police. Fence repair and increased prevention of access.	Monthly inspections of the property, including fence lines, coastline and management tracks.
Illegal access by the public causes habitat degradation and increases fire risk	Unauthorised access, especially from the coastal side, causes degradation of the offset area, and illegal campfires increases the bushfire risk	Likely	Moderate	Medium	Suitable fencing and/or signage of property to prevent access (where possible) from unauthorised personnel.	Possible	Minor	Low	No evidence unauthorised access, particularly relating to	Evidence of illegal access, campfires, and other recreational activities	Report illegal access to TMR, DCCEEW and police. Consider installation of a Caretaker on site to monitor access.	Monthly inspections of the property, including fence lines, coastline and management tracks.

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
									degradation or campfires		Fence repair and increased prevention of access.	
Unplanned clearing	Unplanned clearing causes loss of individual trees and reduced habitat quality	Possible	Moderate	Medium	Clearing of native vegetation in the offset area is only permitted under the OAMP where in would result in a benefit for Koala/GHFF fodder and Koala shelter trees.	Rare	Minor	Low	No unplanned clearing is carried out	Evidence of unplanned clearing	Investigate cause of unplanned clearing and advise DCCEEW of impacts to interim and completion criteria. Identify the chain of events that led to unplanned clearing and implement procedures to prevent future incidents.	Monthly inspections of the property, including fence lines and management tracks.
Unplanned or not controlled fire in offset area	Uncontrolled fire causes loss of biodiversity and habitat quality	Likely	Critical	Severe	Fire breaks reformed every 2 years and slashed every 2 months in winter and every 2 weeks in summer. Backburn 25% of the fire control lines each year. Undertake patch mosaic burning in accordance with a Fire Management Plan, which includes consultation with neighbours, Council and the Rural Fire Brigade. Seek input from indigenous peoples where possible.	Rare	Moderate	Low	Dry Matter Yield in each 'assessment unit' is <3000kg/ha at the beginning of the dry season (end of May). Dry Matter Yield is <1200kg/ha at the end of the dry season (January).	Fire breaks not sufficiently clear. Dry Matter Yield is >3000kg/ha at the beginning of the dry season (end of May).	Increased fire break inspection and maintenance. Further fuel reduction burns if required and safe to do so considering habitat recovery and fauna targets. If Dry Matter Yield is >3000kg/ha at the end of May and the soil is dry, introduce biomass reduction actions to reduce the Dry Matter Yield to <1200kg/ha in January.	Monitor local fire recommendations and regional plans, particularly in comparison to the OAMP. Monthly inspection of fire breaks/fire control lines. Dry Matter Yield estimate within each habitat 'assessment unit' using the Basalt figures at the beginning of the dry season (end of May) and at the end of the dry season (January). Dry Matter Yield estimates to be carried out fortnightly during biomass reduction actions. Implement other methods as specified in the Fire Management Plan.
Infestations of invasive weed species in the offset area.	New weed incursion causes loss of habitat quality	Likely	High	High	Control the spread of new infestation/s. Treat new infestation/s promptly to reduce the extent and spread of the infestation.	Possible	Moderate	Medium	No new infestations identified	New presence or increased spread of weeds	Consult with local NRM Catchment Group, Healthy Land and Water, Council and Queensland Department of Agriculture and Fisheries to determine the invasiveness of the weed and tested/ recommended control measures. Perform appropriate weed control.	Monthly inspections of the property, including fence lines and management tracks by a person suitably experienced to distinguish the presence of weed species. GPS the location and record the characteristics of the new weed infestation, photograph and collect a specimen for identification (if required). Map the extent of the infestation prior to and post control. Continue to monitor monthly. Quarterly inspections and annual offset implementation reports, and 5 yearly ecology surveys and reports.

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
Expansion of existing infestations of invasive weed species in the offset area	Weeds reduce habitat quality and provide challenges for new recruitment of canopy tree species	Highly likely	High	High	Undertake weed mapping for the property and reporting on the potential for individual weed species to isolate Koala resources and/or prevent or supress recruitment of canopy tree species. Target those species in management actions. Investigate biocontrol and other methods for Lantana management in consultation with Biosecurity Queensland.	Likely	Moderate	Medium	Reduction in the extent of target weeds Control or reduction of spread of non-target weeds.	Increase in the extent of target weeds	Increase management actions to control target weeds.	Update weed mapping annually to track target and other weed distribution/ extent.
Disease within the Koala population	The effects of chlamydia are apparent in the regional Koala population (cystitis, conjunctivitis, wasting). This disease can lead to infertility and death.	Highly likely	High	High	Koala health is monitored on Greenridge and the adjacent Pimpama River Conservation Area. Where disease is detected, Koalas will be included in Sunshine Coast University vaccine trials.	Likely	Moderate	Medium	Chlamydia is not prevalent in Koalas of the property.	Koalas are present that show signs of disease.	Remove infected individuals for treatment and vaccination, returning them to the property as soon as they are healthy.	Disease monitoring program to be developed with researchers.
Increased population of feral dogs in the offset area	Feral dogs are a major threat to Koala individuals and populations	Highly likely	High	High	Feral dog control via shooting or baiting	Possible	Minor	Low	Feral dog presence on site. Dog predation on Koalas detected.	More than four individuals sighted or evidence of presence is recorded (scats, remains)	Increased frequency of control measures	Monthly inspections of the property. Annual drone survey of feral dog presence.
Increased populations of Feral Pigs in the offset area	Feral pig damage under *Casuarina glauca* threatens the protection of existing TEC and TEC restoration	Highly likely	High	High	Feral pig control by shooting and/or trapping	Possible	Minor	Low	No/limited feral pig individuals or damage present on site	Pig sightings or damage are rarely recorded during routine monitoring	Increased frequency and/or methods of control measures	Monthly inspections of the property, particularly around *Casuarina glauca* forest. Annual drone survey of feral pig presence.
Increased population of feral animals in the offset area	Increased feral animals (e.g. deer, rabbit, hare, etc.) can cause habitat degradation and reduction in target vegetation recruitment	Possible	Moderate	Medium	Feral animal monitoring and control when required	Likely	Minor	Low	Number of individuals increases. Damage from feral animals on vegetation apparent.	Increased feral animal numbers or damage	Increased monitoring and management of feral animals	Monthly inspections of the property. Annual drone survey of feral pigs and deer presence.
Fencing inappropriate for the safety of Grey-headed Flying-fox	Continued use of barbed-wire fencing presents a threat of entanglement to Grey-headed Flying-fox	Possible	Minor	Low	Replace barbed wire fencing with standard wire fencing as fencing needs replacing	Possible	Minor	Low	Metres of fencing replaced	Recorded incidents of Grey-headed Flying-fox entanglement	Replace sections of barbed wire fencing where entanglement is recorded and risk is considered high for future incidents	Monthly inspections of the fence lines.

11.2 Risk Analysis Table Tabooba

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
***Force Majeure* Events**												
Drought	Extreme weather event, in the form of drought, causes habitat degradation and restoration challenges	Likely	High	High	Commence any necessary woodland rehabilitation/ restoration actions in locations where there is greatest spring-fed water availability (e.g. creek flood zones and lower slopes), building outwards from these areas to take advantage of improved microclimatic conditions (reduced solar radiation and wind, increased humidity) from increased tree cover. Distribute existing cleared, stacked timber within rehabilitation/restoration areas to increase soil moisture retention.	Likely	Moderate	Medium	Tree and/or sapling mortality in rehabilitation/ restoration areas is <10%	Rainfall is ≤25% of monthly averages over three months. Tree and/or sapling mortality in rehabilitation/ restoration areas is >10%.	Undertake supplemental watering of rehabilitation/ restoration areas	On a quarterly basis, examine monthly rainfall records and long-term forecasts. Monitor tree and sapling mortality in rehabilitation/ restoration areas monthly. Monitor onsite dam, spring and bore levels monthly to inform available quantities for supplemental watering if required.
Heatwave	Extreme and extend hot periods threaten Koala survival	Likely	High	High	Include the planting of deep shade trees in the offset area.	Possible	Moderate	Medium	Deep shade trees are available in Koala habitat	Koalas are recorded as suffering heat stress	Undertake further supplemental planting of deep shade trees	Record the location and types of suitable deep shade trees on the property. Monitor Koala health during extended heatwave conditions.
Cyclones/ Severe tropical lows / Flooding	Extreme weather event, in the form of severe storms and/or flooding, causes habitat degradation	Likely	Moderate	Medium	Understand on-site flood areas and select species for revegetation accordingly. Identify, map and measure locations with evidence of erosion and stabilise using standard erosion management techniques. Improve all-weather access if flooding could potentially restrict management access. Provide drainage (culverts) on access tracks where they are intersected by flows from spring water.	Likely	Minor	Low	All rehabilitation/ restoration areas are accessible following flooding or storms. Vegetation remains intact and healthy. There are no new erosion locations and existing erosion has not deteriorated.	Tracks are not trafficable. Vegetation is impacted at minor to moderate levels. Erosion damage is present. Weed establishment due to flooding is present.	Repair management tracks as soon as possible. Assess and replace rehabilitation/ restoration area vegetation damaged by storms and/or flood. Repair and stabilise locations where new erosion has emerged, or existing erosion has deteriorated. Increase weed management if required.	Establish and maintain flooding maps for the property by using available data and map flood levels following high rainfall events. Measure and map the extent of erosion following each wet season. Monitor tree and sapling mortality in any rehabilitation/ restoration areas post event. Monitor weed cover as per schedule to identify new infestations that require control measures.
Catastrophic Bushfire	Catastrophic bushfire causes habitat degradation and loss of biodiversity	Likely	Critical	Severe	Fire breaks reformed every 2 years and slashed every 2 months in winter and every 2 weeks in summer. Backburn 25% of the fire control lines each year. Undertake patch mosaic burning in accordance with fire management actions in the OAMP includes consultation with	Possible	Major	High	Dry Matter Yield <1200kg/ha at the end of the Dry Season (January)	Dry Matter Yield is >1200kg/ha at the end of the Dry Season (January)	Increase fire control line management. Introduce cattle grazing during the Dry Season to reduce the Dry Matter Yield to <1200kg/ha in January.	Monitor local fire recommendations and regional plans, particularly in comparison to the OAMP. Monthly inspection of fire breaks/fire control lines.

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
					neighbours, Council and the Rural Fire Brigade. Seek input from indigenous peoples where possible.							Dry Matter Yield estimates using the Basalt figures[2] to be carried out fortnightly during grazing. Dry Matter Yield estimates undertaken within each 'Assessment Unit' using the Basalt figures at the beginning of the Dry Season. Implement other methods as specified in the OAMP.
Standard Risks												
The offset failing (regardless of cause)	Failure to achieve completion criteria	Possible	High	Medium	Implement the management actions of the OAMP	Rare	High	Low	Interim completion criteria achieved	Failure to achieve the 5-yearly interim completion criteria	In the event of failure of the offset to achieve an interim or completion criteria, TMR will undertake an independent audit of the offset site to establish the reason. TMR will then work with DCCEEW to either extend the management period until the completion criteria are achieved or provide a replacement offset. Any replacement offset must be agreed with DCCEEW within 24 months of the complete failure of the offset becoming apparent.	Monitor and report on attainment of interim environmental performance targets
Erosion	Erosion causes increased weed infestation, reduced target vegetation recruitment and reduced habitat quality	Possible	Minor	Low	Install contour banks and/or whoa-boys on roads to slow the overland flow of water if tracks are eroding. Undertake erosion mediation works in locations where vegetation is being undercut by water flow and where erosion features are increasing in size and impact.	Possible	Minor	Low	Fire control lines, rehabilitation areas and management tracks are accessible. Erosion mediation works are successful. No further erosion present on site.	Increased size of known erosion (depth and/or spread), or new erosion areas discovered	Repair and stabilise erosion features	Measure and map the extent of erosion following each wet season. Monthly inspections of the property, including fire control lines and management tracks. Inspections of the fire control lines and management tracks to be undertaken after a severe weather event.
Illegal timber harvesting/ collection	Illegal timber harvesting causes loss of trees and reduced habitat quality	Possible	Moderate	Medium	No timber harvesting approved. Suitable fencing and signage of property to prevent access from unauthorised personnel.	Rare	Minor	Low	No timber harvesting undertaken in the offset area.	Evidence of illegal timber harvesting. Damage to fencing allowing access.	Report illegal access to TMR, DCCEEW and police. Fence repair and increased prevention of access.	Monthly inspections of the property, including fence lines and management tracks.

[2] Wide Bay and South East Queensland pasture photo standards

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
Unplanned clearing	Unplanned clearing causes loss of individual trees and reduced habitat quality	Possible	Moderate	Medium	Clearing of native vegetation in the offset area is only permitted under the OAMP where in would result in a benefit for Koala/GHFF fodder and Koala shelter trees.	Rare	Minor	Low	No unplanned clearing is carried out	Evidence of unplanned clearing	Investigate cause of unplanned clearing and advise DCCEEW of impacts to interim and completion criteria. Identify the chain of events that led to unplanned clearing and implement procedures to prevent future incidents.	Monthly inspections of the property, including fence lines and management tracks.
Unplanned or not controlled fire in offset area	Uncontrolled fire causes loss of biodiversity and habitat quality	Likely	Critical	Severe	Fire breaks reformed every 2 years and slashed every 2 months in winter and every 2 weeks in summer. Backburn 25% of the fire control lines each year. Undertake patch mosaic burning in accordance with a Fire Management Plan, which includes consultation with neighbours, Council and the Rural Fire Brigade. Seek input from indigenous peoples where possible.	Rare	Moderate	Low	Dry Matter Yield in each 'assessment unit' is <3000kg/ha at the beginning of the dry season (end of May). Dry Matter Yield is <1200kg/ha at the end of the dry season (January).	Fire breaks not sufficiently clear. Dry Matter Yield is >3000kg/ha at the beginning of the dry season (end of May).	Increased fire break inspection and maintenance. Further fuel reduction burns if required and safe to do so considering habitat recovery and fauna targets. If Dry Matter Yield is >3000kg/ha at the end of May and the soil is dry, introduce cattle grazing to reduce the Dry Matter Yield to <1200kg/ha in January.	Monitor local fire recommendations and regional plans, particularly in comparison to the OAMP. Monthly inspection of fire breaks/fire control lines. Dry Matter Yield estimate within each habitat 'assessment unit' using the Basalt figures at the beginning of the dry season (end of May) and at the end of the dry season (January). Dry Matter Yield estimates to be carried out fortnightly during grazing. Implement other methods as specified in the Fire Management Plan.
Infestations of invasive weed species in the offset area.	New weed incursion causes loss of habitat quality	Likely	High	High	Control the spread of new infestation/s. Treat new infestation/s promptly to reduce the extent and spread of the infestation.	Possible	Moderate	Medium	No new infestations identified	New presence or increased spread of weeds	Consult with local NRM Catchment Group, Healthy Land and Water, Council and Queensland Department of Agriculture and Fisheries to determine the invasiveness of the weed and tested/ recommended control measures. Perform appropriate weed control.	Monthly inspections of the property, including fence lines and management tracks by a person suitably experienced to distinguish the presence of weed species. GPS the location and record the characteristics of the new weed infestation, photograph and collect a specimen for identification (if required). Map the extent of the infestation prior to and post control. Continue to monitor monthly. Quarterly inspections and annual offset implementation reports, and 5 yearly ecology surveys and reports.

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
Expansion of existing infestations of invasive weed species in the offset area	Weeds reduce habitat quality and provide challenges for new recruitment of canopy tree species	Highly likely	High	High	Undertake weed mapping for the property and reporting on the potential for individual weed species to isolate Koala resources and/or prevent or supress recruitment of canopy tree species. Target those species in management actions. Investigate biocontrol and other methods for Lantana management in consultation with Biosecurity Queensland.	Likely	Moderate	Medium	Reduction in the extent of target weeds Control or reduction of spread of non-target weeds.	Increase in the extent of target weeds	Increase management actions to control target weeds.	Update weed mapping annually to track target and other weed distribution/ extent.
Disease within the Koala population	The effects of chlamydia are apparent in the regional Koala population (cystitis, conjunctivitis, wasting). This disease can lead to infertility and death.	Highly likely	High	High	TMR will replicate their current work in the Pimpama River Conservation Area where Koala health is monitored. Where disease is detected, Koalas will be included in Sunshine Coast University vaccine trials.	Likely	Moderate	Medium	Chlamydia is not prevalent in Koalas of the property.	The signs of Chlamydia are detected in >10% of Koalas present.	Remove infected individuals for treatment and vaccination, returning them to the property as soon as they are healthy.	Disease monitoring program to be developed with researchers.
Increased population of feral dogs in the offset area	Feral dogs are a major threat to Koala individuals and populations	Highly likely	High	High	Feral dog control via shooting or baiting	Possible	Minor	Low	Feral dog presence on site. Dog predation on Koalas detected.	More than four individuals sighted or evidence of presence is recorded (scats, remains)	Increased frequency of control measures	Monthly inspections of the property. Annual drone survey of feral dog presence.
Increased population of feral animals in the offset area	Increased feral animals (e.g. pig, deer, rabbit, hare, etc.) can cause habitat degradation and reduction in target vegetation recruitment	Possible	Moderate	Medium	Feral animal monitoring and control when required	Possible	Minor	Low	Number of individuals increases. Damage from feral animals on vegetation apparent.	Increased feral animal numbers or damage	Increased monitoring and management of feral animals	Monthly inspections of the property. Annual drone survey of feral pigs and deer presence.
Cattle injure Koalas	Koalas can be injured by cattle when crossing open ground	Possible	Minor	Low	Record any incidents and locations for assessment of potential fencing solutions. Implement fencing of cattle areas where practical.	Possible	Minor	Low	Koalas are not injured by cattle	Any Koala death caused by cattle	Where practical, fence cattle from areas where Koalas commonly cross open ground	Monitor Koala movement on the property to gain an understanding of where they might be vulnerable to cattle. Monthly inspections of the property to record Koala deaths and likely causes.
Fencing inappropriate for the safety of Grey-headed Flying-fox	Continued use of barbed-wire fencing presents a threat of entanglement to Grey-headed Flying-fox	Possible	Minor	Low	Replace barbed wire fencing with standard wire fencing as fencing needs replacing	Possible	Minor	Low	Meters of fencing replaced	Recorded incidents of Grey-headed Flying-fox entanglement	Replace sections of barbed wire fencing where entanglement is recorded and risk is considered high for future incidents	Monthly inspections of the fence lines.

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
Unauthorised or inappropriate grazing in offset area	Inappropriate grazing causes biodiversity loss, a reduction in habitat quality and reduction in target vegetation recruitment	Possible	High	Medium	Cattle grazing does not occur in the wet season. Cattle grazing undertaken from June to December (inclusive) if Dry Matter Yields exceed 3000kg/ha at the end of May.	Unlikely	Minor	Low	There is no cattle grazing in the wet season. Dry Matter Yield in each 'assessment unit' is <3000kg/ha at the beginning of the dry season (end of May).	If Dry Matter Yield is >3000kg/ha at the beginning of the dry season (end May) and the soil is dry, introduce cattle grazing	Cattle removed when Dry Matter Yield is within 20% of 1200kg/ha. and/or Cattle removed within 48 hours of the first 50 mm rainfall event after October.	Dry Matter Yield estimates using the Basalt figures. to be carried out fortnightly during grazing.

11.3 SECURITY MECHANISM

Each offset will be secured by being declared as an area of high conservation value under Section 19F of the VM Act. Once this has been registered on the title, the offset areas will be mapped as category A area on the property map of assessable vegetation (PMAV). An area mapped as category A on a PMAV is described as an 'area subject to compliance notices, offsets and voluntary declarations'.

Once approved under the EPBC Act, the OAMP will be attached to the declared area map, further ensuring compliance of the plan. The offset areas will be secured within four months of approval of the OAMP, and the approval holder will notify DCCEEW within five business days of the mechanism to legally secure the environmental offset having been executed.

Greenridge and Tabooba offsets will meet the requirements of the EPBC Act Offsets Policy by being offsets on private land. As such, the properties will be actively monitored, have compliance enforced and require any change in the legal status to have statutory approval.

Management and monitoring of the offset areas will be undertaken in accordance with commitments in the approved OAMPs. The OAMPs will include protection of the properties to clearing, overgrazing, mitigation of wildfire, feral animals and other threats to habitat restoration and protection. The OAMPs will include triggers for active vegetation rehabilitation, should the properties not be progressing as required. The voluntary declarations (VDECs) cannot protect the properties from mining or state coordinated projects.

The declared areas will remain in place as the legally securing mechanism for the offsets for the duration of the approval. The declared areas and approved OAMPs will ensure the offset completion criteria are attained, and then maintained for the period of the EPBC Act approval. Statutory protection of the offset areas is maintained under the VM Act, NC Act and EPBC Act (or subsequent legislation) and enforced by the various regulators.

As per Section 19L of the VM Act, a VDEC can only be removed by the Chief Executive if the declaration ceases to be of interest to the State, the management outcomes have been achieved, or a prescribed activity under another Act is to be carried out.

12.0 FUTURE STEPS

12.1.1 Offset Area Management Plan

The development of OAMPs for Greenridge and Tabooba offsets will occur following approval of this offset strategy, with management activities based on the proposed land uses, current condition and offset goals, as well as the risks identified in Sections 11.1 and 11.2.

This is anticipated to include:

- Limiting vegetation clearing to only those areas required for maintaining fences, fire breaks, road/track access and/or thinning of invasive native species that are impacting Koala or Grey-headed Flying-fox habitat targets;
- Monitoring and controlling feral animals that are likely to be detrimental to threatened fauna or the restoration of threatened fauna habitat (e.g. dogs, pigs, deer);
- Monitoring and controlling weeds, particularly those that inhibit fauna usage, dispersal or habitat restoration;
- Restoring Coastal Swamp Oak TEC in current non-remnant locations at Greenridge;
- Prohibiting alternate land use and activities during the period of the declared area (e.g. timber harvesting, cropping, etc.);

- Monitoring and managing livestock densities to ensure no degradation to present or recovering threatened fauna habitat; and
- Monitoring and managing fuel loads and fire risk;

12.1.2 Offset Monitoring and Reporting

The OAMPs will establish the ongoing monitoring and reporting requirements for the offset sites. Methods will be used that: (1) enable the comparison of monitoring data with baseline information collected to assess changes over time, (2) collect data on climatic conditions required for adaptive management, (3) directly measure these and routine management actions, and (4) provide data to evaluate offset completion criteria.

Methodology, analysis and reporting will be clearly defined, to ensure data and the subsequent findings, are comparable through time. Results will be used to inform operational management decisions in line with the intended conservation goals.

13.0 DECLARATION OF ACCURACY

I declare that to the best of my knowledge, all the information contained in, or accompanying this document is complete, current and correct.

I am duly authorised to sign this declaration on behalf of the proponent. I am aware that:

Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) where the person knows the information or document is false or misleading.

I acknowledge that the above offences are punishable on conviction by imprisonment, a fine or both.

Signed:

Full name (please print): Andrew Wheeler, Acting Regional Director, South Coast Region
Organisation (please print): Queensland Department of Transport and Main Roads
EPBC Referral Number: EPBC 2020/8646
EPBC Offset Strategy
Date:

The text of this declaration must not be altered in any way. It must be signed once a final draft has been agreed between the Department and the proponent as ready to go before the delegate for approval or refusal.

14.0 REFERENCES

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APPENDIX 1

BIOCONDITION BENCHMARKS (VERSION 3.2)

APPENDIX 1 BIOCONDITION BENCHMARKS (VERSON 3.2)

re_with_dec	max_score_exclude_landscape	recruitment	nn_plant_cover	tree_sp_richness	shrub_sp_richness	grass_sp_richness	forb_other_sp_richness	emergent_canopy_height	tree_canopy_height	tree_subcanopy_height	emergent_canopy_cover	tree_canopy_cover	tree_subcanopy_cover	Large tree threshold _Eucalypt	Large tree threshold_ Non eucalypt	tot_num_large_trees_euc_ha	tot_num_large_trees_non_euc_ha	shrub_canopy_cover	native_per_grass	litter_grd_cov	woody debris_length_ha	reliability
12.1.1	80	100	0	1	1	2	3	na	12	7	na	67	23	na	29	na	92	5	85	5	360	high
12.3.20	80	100	0	4	4	2	8	na	16	8	na	70	20	na	30	na	165	15	20	30	890	moderate
12.8.14	80	100	0	6	6	8	21	na	22	11	na	60	15	44	na	45	na	4	58	30	336	high
12.8.16	80	100	0	7	7	7	29	na	20	8	na	41	17	42	na	33	na	4	45	21	592	moderate

APPENDIX 2

TABOOBA FIELD ASSESSMENT RESULTS

TABOOBA OFFSET PROPERTY ASSESSMENT RESULTS

COOMERA CONNECTOR STAGE 1 - EPBC 2020/8646

Prepared for
Queensland Department of Transport and Main Road

Biodiversity Assessment and Management Pty Ltd
PO Box 1376
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Document Control Sheet

File Number: 0101-030b

Project Manager/s: Paulette Jones

Client: Queensland Department of Transport and Main Roads

Project Title: Tabooba Offset Property Assessment Results
Coomera Connector Stage 1 - EPBC 2020/8646

Project Author/s: Paulette Jones, Elizabeth Williams and David Francis

Project Summary: Report of field assessment undertaken to assess the suitability of the Tabooba property for Koala and Grey-headed Flying-fox as an offset for Stage 1 of the Coomera Connector Project Draft Preparation History:

Draft No.	Date draft completed	Reviewed by	Issued by
0101-030b Draft A	23/06/2022	Alan Key	Paulette Jones

Revision/ Checking History Track:

Version	Date of Issue	Checked by	Issued by
Version 0	26/06/2022	Alan Key	Paulette Jones
Version 1	27/07/2022	Alan Key	Paulette Jones
Version 2	29/09/2022	Jedd Appleton	Paulette Jones

Document Distribution:

Destination	Revision							
	1	Date Dispatched	2	Date Dispatched	3	Date Dispatched	4	Date Dispatched
Client Copy 1 - digital	A	23/06/2022	0	26/06/2022	1	27/07/2022	2	29/08/2022
PDF & Word document cloud backup	A	23/06/2022	0	26/06/2022	1	27/07/2022	2	29/08/2022

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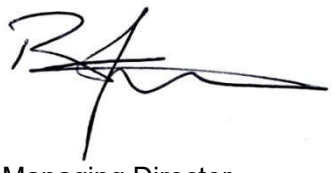

Managing Director

TABOOBA OFFSET PROPERTY

ASSESSMENT RESULTS

COOMERA CONNECTOR STAGE 1 – EPBC 2020/8646

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Table of Terms and Abbreviations

ALA	Atlas of Living Australia
AU	Assessment Unit
BAAM	Biodiversity Assessment and Management Pty Ltd
DAWE	Commonwealth Department of Agriculture, Water and Environment
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EVE	Endeavour Veterinary Ecology
LGA	Local Government Area
MNES	Matters of national environmental significance
PER	Public Environmental Report
RE	Regional Ecosystem
RPAS	Remotely Piloted Aircraft System
SAT	Spot Assessment Technique of Phillips and Callaghan (2011)
SRRC	Scenic Rim Regional Council
TMR	Queensland Department of Transport and Main Roads
VM Act	*Vegetation Management Act 1999*

1.0 INTRODUCTION

1.1 OFFSET MATTERS

Stage 1 of the Queensland Department of Transport and Main Roads (TMR) Coomera Connector proposed action is a new 16 km high-speed arterial road between Shipper Drive, Coomera and Nerang-Broadbeach Road, Nerang (the proposed action).

The proposed action was the subject of an EPBC Act referral in June 2020 (EPBC 2020/8646). The referral decision was that the proposed action is a controlled action due to likely significant impacts on:

- Ramsar wetlands;
- Listed threatened species and communities; and
- Listed migratory species.

The proposed action is to be assessed by Public Environment Report (PER).

The extent and quality of matters of national environmental significance (MNES) that would be impacted by the proposed action have been confirmed through detailed ecological surveys. The results of these surveys and subsequent impact assessment are provided in the PER. Following the application of all possible avoidance and mitigation measures, the PER identifies significant residual impact of the proposed action on 61.486 ha of Koala habitat, 56.442 ha of Grey-headed Flying-fox habitat, and 15.0131 ha of Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community and a small (>1ha) area of Subtropical and Temperate Coastal Saltmarsh ecological community from within the proposed action footprint.

As detailed in the PER, there is no Ramsar wetland present within the proposed action footprint and no significant impact is predicted for habitats of listed Migratory species and therefore no offsets are proposed for these matters.

1.2 PURPOSE OF THIS REPORT

Biodiversity Assessment and Management Pty Ltd was commissioned by TMR to assess a potential offset property to inform the Coomera Connector Stage 1 Offset Strategy. This report provides the results of surveys to determine the suitability of the property to provide offsets for proposed action impacts to Koala *Phascolarctos cinereus* (EPBC Act Vulnerable) and Grey-headed Flying-fox *Pteropus poliocephalus* (EPBC Act Vulnerable).

1.3 OFFSET SITE SELECTION

Relevant literature was reviewed to determine habitat types that are suitable for both Koala and Grey-headed Flying-fox. Grey-headed Flying-fox habitat includes rainforest, mangroves and cultivated areas in its foraging options, and both Grey-headed Flying-fox and Koala forage in open forests and woodlands dominated by eucalyptus species.

Potential offset properties/habitat were identified using the following criteria:

- Properties located within the same bioregion as the impact area and as close to the proposed action corridor as possible.
- Land in private ownership but not under conservation, or properties for sale on the open market.
- Land supporting habitats suitable for both Koala and Grey-headed Flying-fox.

- The presence of past records of Koala and Grey-headed Flying-fox within or near the property.
- Properties positioned in the landscape such that habitat restoration would provide a conservation outcome for the species (e.g. connecting and/or supplementing existing Koala habitats, and within 20 km of a nationally significant Grey-headed Flying-fox roost).
- Land supporting habitats that are not protected under state legislation from clearing or other uses not compatible with conservation of the protected matters.
- Land supporting habitats that have been significantly cleared or degraded, and where habitat restoration would achieve a conservation outcome for the protected matters.
- Properties of a size that would accommodate a significant proportion of the required offsets for Koala and Grey-headed Flying-fox to facilitate focused application of offset management actions.

Regional Ecosystem (RE) mapping describes the dominant canopy species present within each map unit and provides a tool for determining where suitable forage tree species for both Koala and Grey-headed Flying-fox form the dominant canopy vegetation. Suitable habitat for both Koala and Grey-headed Flying-fox was determined based on identifying areas with significant and key food sources for both species.

In particular, for Koala, suitable habitat was considered to be:

- REs that are ranked as either 'Medium' or 'High' suitability in the report *Spatial modelling for koalas in South East Queensland v2.0* (DES, 2021);
- REs with ≥50% dominant or subdominant tree species described in the *Draft National Recovery Plan for the Koala* (DAWE, 2021a) as important in the north (i.e. in Queensland); or
- REs with ≥50% dominant or subdominant tree species listed in scientific publications as Koala habitat in areas between central Queensland to central New South Wales, including:
  - *Ranking and mapping koala habitat quality for conservation planning on the basis of indirect evidence of tree species use: A case study of Noosa Shire, south-eastern Queensland* (Callaghan *et al.,* 2011),
  - *Tree use, diet and home range of the koala* (Phascolarctos cinereus) *at Blair Athol, central Queensland* (Ellis *et al*., 2002),
  - *The habitat and diet of koalas* (Phascolarctos cinereus) *in Queensland* (Melzer et al., 2014),
  - *Tree use by koalas* (Phascolarctos cinereus) *after fire in remnant coastal rainforest* (Matthews et al., 2007).

For Grey-headed Flying-fox, suitable habitat was considered to be:

- REs with ≥50% dominant or subdominant vegetation species that are listed in *Ranking the feeding habitats of GHFF for conservation management* (Eby and Law, 2008) as significant flowering or fruiting species; or
- REs with ≥50% dominant or subdominant vegetation species that are listed in the *National Recovery Plan for the Grey-headed Flying-fox* (DAWE, 2021) as important winter and spring food trees.

The REs determined to be suitable habitat for Koala and Grey-headed Flying-fox were examined to identify those that are common to both species. These REs were then used to spatially map vegetation and identify suitable properties, and the areas within properties that had potential to meet offset requirements.

Offset opportunities were sought as close as possible to the impact area; however, during this time there were no suitable, larger properties for sale within the Gold Coast local government area (LGA) and other options were small and too widely scattered and therefore would have provided a fragmented offset within a highly urbanised landscape. Opportunities were subsequently sought in the neighbouring Scenic Rim LGA where there were a range of well-situated properties for sale.

Potential properties were subject to preliminary field investigation to test their suitability for the offsets by ground-truthing the accuracy of existing RE mapping where remnant and regrowth vegetation occurred, and to determine the canopy species composition of new regrowth in previously cleared areas. The 390.25 ha cattle property at Farringdon Road, Tabooba ('the Tabooba property') was identified as a suitable offset property and has been subject to the detailed assessment reported herein.

1.4 PROPOSED OFFSET PROPERTY LOCATION

The property is located approximately 16 km south of the town of Beaudesert in the Scenic Rim LGA (Figure 1.1) and 37 km southwest of the southern extent of the proposed action. The former cattle property, now in the ownership of TMR, covers 390.25 ha in total and is comprised of four lots:

- Lot 3 on RP32561 (152.69 ha)
- Lot 174 on W311810 (64.88 ha)
- Lot 296 on W312231 (43.04 ha)
- Lot 85 on W311299 (129.64 ha).

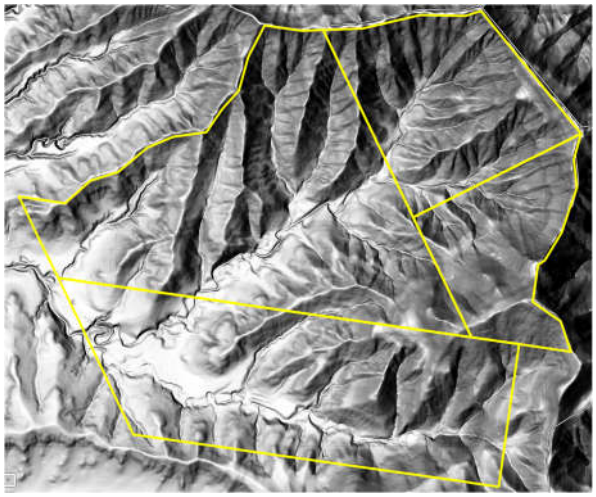
2.0 PROPERTY DESCRIPTION

2.1 TOPOGRAPHY AND CLIMATE

The Tabooba property is located on the western and southern slopes of the Jinbroken Range which separates the Albert and Logan River valleys (Figure 2.1). Formed of Albert Basalt, the range borders the property to the north and east, reaching its highest point at 453 m (known as 'Kerry') on the north-eastern property boundary.

Within the property, ridges and incised valleys fall steeply from the elevated crest of the range, grading to foothills, lower colluvial slopes and eventually to alluvial flats bordering two main creeklines which flow westwards through the property, merging at the western boundary before joining Christmas Creek. These features are highlighted in the hillshades of Image 1. The average slope from the range ridgeline to the lower foothills is 25-30%.

Image 1. Hillshade (source: Qld Globe)



Queensland Government (2017) describes basalt as permeable, with the potential to form aquifers which store and transmit groundwater through its structure, fractures and weathered zones, with discharge of groundwater common around the contact between basalt and less permeable underlying geologies. This is a common phenomenon on the property where groundwater seepage occurs in many locations, primarily in the weeks and months following rainfall (pers. comm. Ian Johnson). Soils derived from basalt are considered to be moderately fertile soils on lower slopes and highly fertile soils on alluvial plains (DNRME 2017).

The closest weather station to the property is Beaudesert Drumley St Station (040983), 17.7 km away, and has been operational since 2006. Mean annual rainfall is 921.8 mm/year and mean monthly rainfall is shown in Image 2. Mean maximum temperature is 27°C, ranging from 31.4°C in January to 21.7 °C in July and August (Image 3). The highest maximum temperatures were above 40°C in the months from November to February.

2.2 MANAGEMENT HISTORY

The Logan Valley came under agricultural settlement in the 1860s, with cattle and sheep grazing, cotton-growing and timber cutting forming the primary agricultural activities.

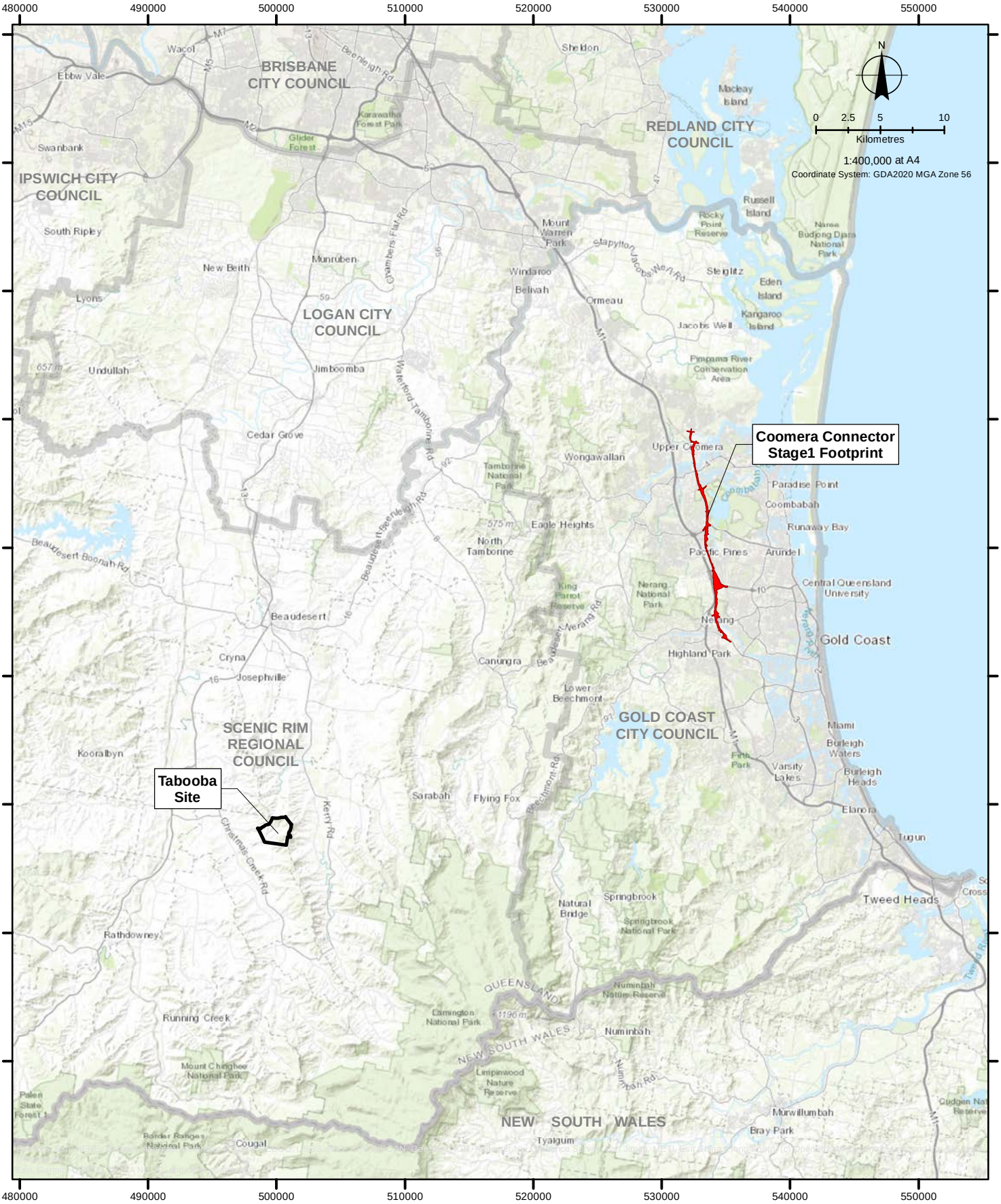
The most recent landholder had managed the property for cattle grazing for a period of approximately 30 years, prior to the purchase by TMR in 2022. Land management practices included maintaining cleared pastures on alluvial flats, stick-raking valleys and slopes in the higher country to remove tree regrowth (Photo 1) and sowing of exotic, high-yield pasture grasses such as Rhodes Grass in cleared areas.

Fire has been used as a tool to reduce fuel loads and decrease risk of wildfire, control regrowth vegetation, and maintain a grassy understorey for cattle grazing beneath the woodland vegetation on higher slopes. Cool, mosaic pattern burning has been carried out since the 1980s.

Cattle have not been fenced from watercourses and evidence of erosion and weed proliferation is apparent in watercourses on the lower slopes and alluvial plains (Photo 2).

Photo 1. Stick-raking of regrowth vegetation

Photo 2. Weed proliferation in watercourses



Tabooba site

Impact site

LGA boundaries

Figure:	**1.1**
Title:	**Locality Map**
Project:	**Coomera Connector Offsets Project, Tabooba Offset Property Assessment Report**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

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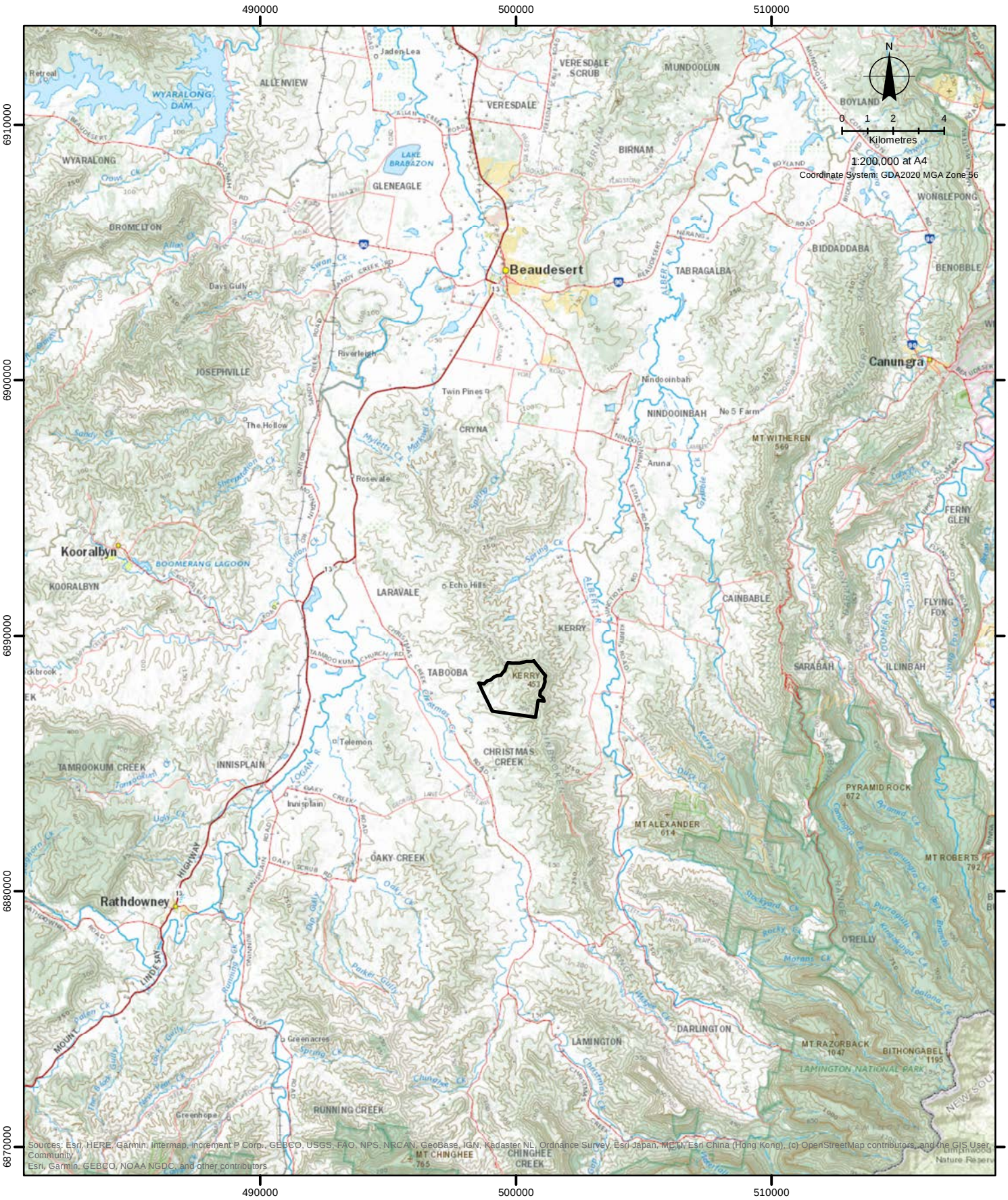

Tabooba site

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

Figure:	**2.1**
Title:	**Topographic Map**
Project:	**Coomera Connector Offsets Project, Tabooba Offset Property Assessment Report**
Client:	**TMR**

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Image 2. Beaudesert Drumley St Station Mean Maximum Monthly Temperatures

BEAUDESERT DRUMLEY STREET

Mean maximum temperature (°C)

Site details

Site name: BEAUDESERT DRUMLEY STREET | **Site number:** 040983 | **Commenced:** 2007
Latitude: 27.97 °S | **Longitude:** 152.99 °E | **Elevation:** 47 m | **Operational status:** Still Open

Yearly data | 30 year statistics | Comparison site | First statistic | Second statistic — **Note:** Only one option can be redrawn at a time

Include data for the year: 2022 Redraw

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean maximum temperature (°C) for years 2007 to 2022	31.4	30.6	29.2	27.0	24.2	21.7	21.7	23.4	26.3	28.2	30.0	30.7	27.0	15

12.3 = Not quality controlled

Image 3. Beaudesert Drumley St Station Mean Maximum Monthly Rainfall Totals

BEAUDESERT DRUMLEY STREET

Mean rainfall (mm)

Site details

Site name: BEAUDESERT DRUMLEY STREET | **Site number:** 040983 | **Commenced:** 2007
Latitude: 27.97 °S | **Longitude:** 152.99 °E | **Elevation:** 47 m | **Operational status:** Still Open

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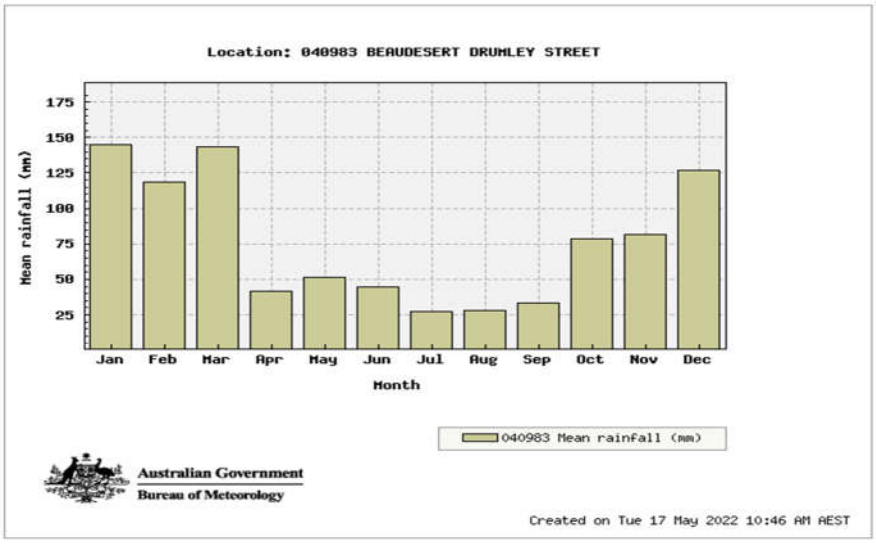
Include data for the year: 2022 Redraw



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean rainfall (mm) for years 2007 to 2022	145.0	118.9	143.6	42.0	51.4	44.7	27.3	28.3	33.3	78.4	81.4	126.5	921.8	14

12.3 = Not quality controlled

Aerial imagery is available for the property from 1955 (see Image 4) and shows extensive clearing of vegetation on alluvial flats and lower valleys and hillslopes to increase the carrying capacity for livestock grazing.

There has been a change in the extent of clearing since that time (Images 5 and 6) where regrowth vegetation cover has increased on many of the lower ridges.

Image 4. 1955 aerial photography

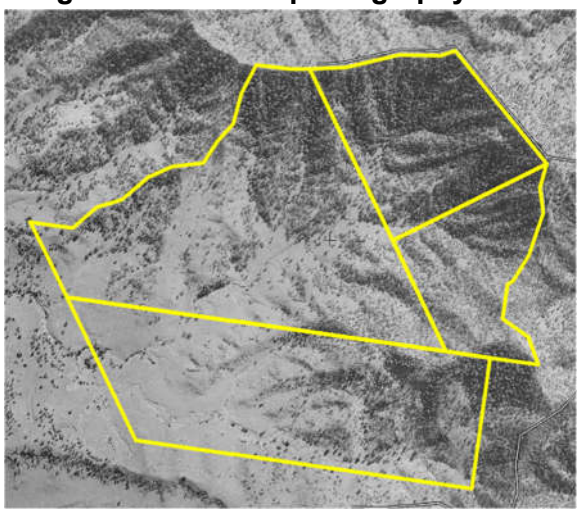


Image 5. 1985 aerial photography

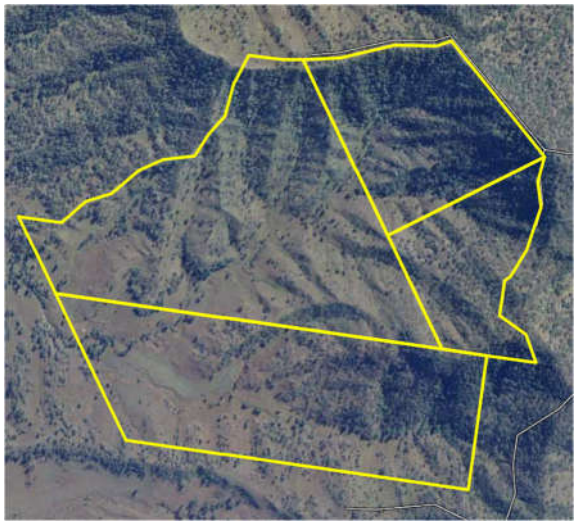
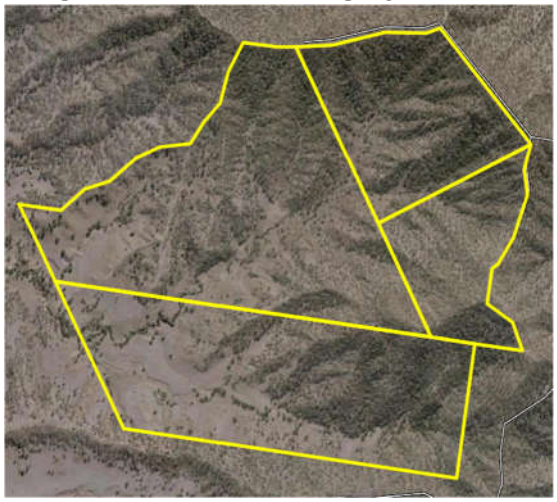


Image 6. 2021 aerial imagery



2.3 KOALAS IN THE LANDSCAPE

The Atlas of Living Australia (ALA) provides publicly available location data for species, including those records held by the Queensland Government. Figure 2.2 shows the locations of Koala records in the landscape over the Queensland Government's Regulated Vegetation Mapping, although the records are unlikely to represent the full distribution of the species as many locations in the ranges are inaccessible, and most records for the region have been made along roads and tracks. There are multiple Koala records from the region, present within mapped remnant and regrowth vegetation, and throughout the lands mapped as 'Category X' which are generally exempt from regulation under the *Vegetation Management Act 1999* (VM Act). Category X incorporates cleared, regrowth and sometimes remnant vegetation that was not mapped as remnant or regrowth vegetation in 2016 when the Queensland Government allowed landholders to "lock in" unmapped vegetation as Category X to avoid a rush to clear remnant vegetation prior to changes to the VM Act.

The Scenic Rim Regional Council (SRRC) Biodiversity Strategy 2015-2025, provided as Image 7 shows the location of the property in relation to existing habitats and landscape linkages. The property lies within an area mapped as a 'Core Node', taking in much of the vegetation of the Jinbroken Range and connecting to the south with Core habitat termed by SRRC as the 'Lamington Core'.

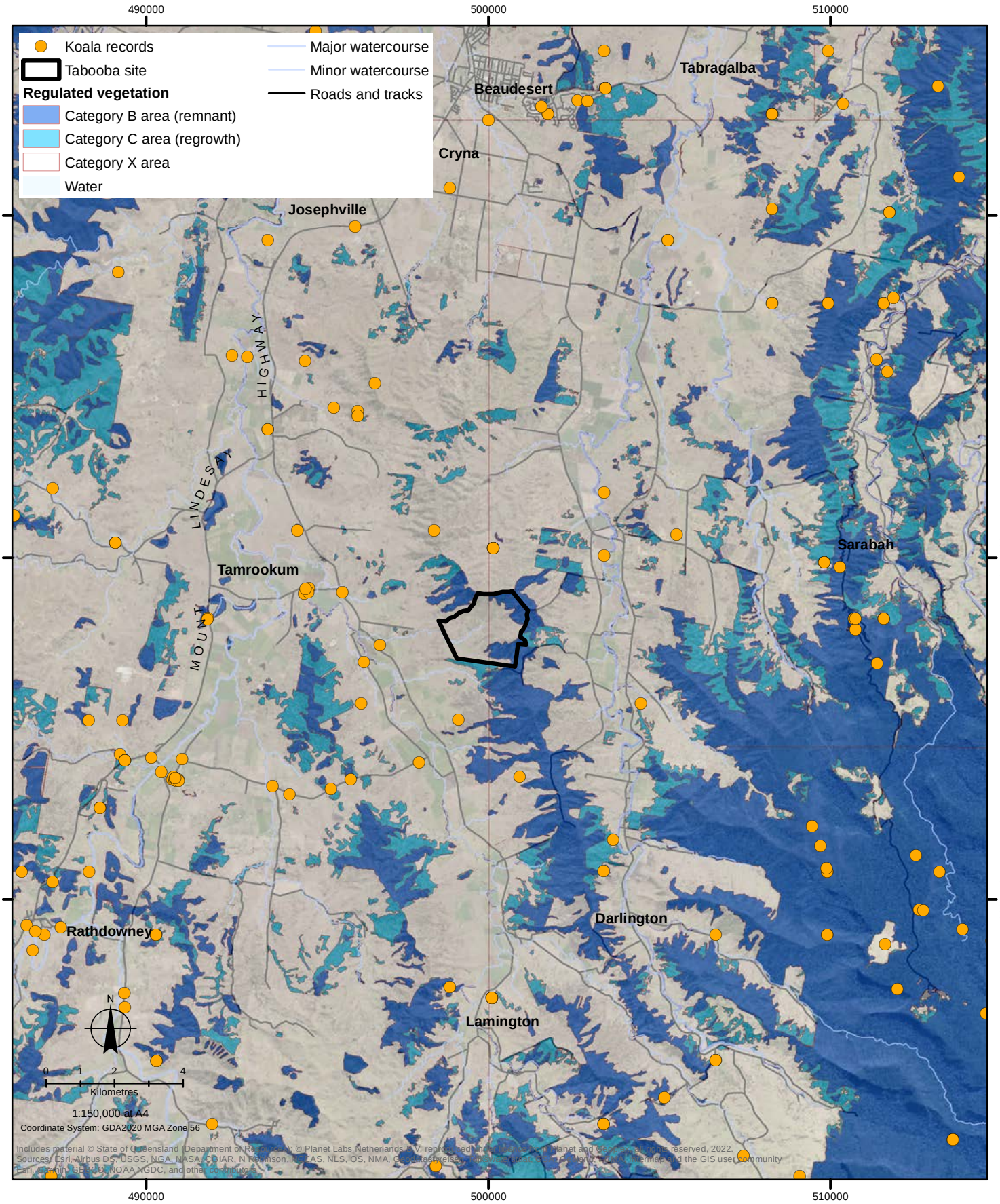
Existing State regional ecosystem mapping for the property is shown on Figure 2.4, indicating the presence of remnant REs 12.8.16 and 12.8.14 on the high ridges and slopes within and adjacent to the property. The property is bordered to the east and south by habitat mapped by the Queensland Government as 'Core' Koala habitat over the REs mapped as 12.8.16/12.8.14/12.8.4/12.8.3. REs 12.8.4 and 12.8.3 are both notophyll vine forest REs and these habitats are not considered to represent important Koala habitat.

RE 12.8.16 is described as sparse *Eucalyptus crebra,* generally with *E. melliodora* and *E. tereticornis* +/- *E. albens grassy woodland.* Occurs on dry hillslopes on Cainozoic igneous rocks, especially basalt. A 'special value' of the RE from the RE description is that it is known to provide suitable habitat for Koalas (Queensland Government https://apps.des.qld.gov.au/regional-ecosystems/details/?re=12.8.16). Consideration of the dominant canopy species indicates the RE has high value for Koala (DAWE 2022, DES 2020).

RE 12.8.14 is described as mid-dense *Eucalyptus eugenioides, E. biturbinata, E. melliodora* +/- *E. tereticornis, Corymbia intermedia, E. crebra* open forest. *Allocasuarina torulosa* is a common understorey species. Localised occurrences of *Eucalyptus laevopinea, E. quadrangul*ata and *E. banksii* may occur. Occurs on Cainozoic igneous rocks, especially basalt. A 'special value' of the RE in the RE description is that it is known to provide suitable habitat for Koalas (Qld Government https://apps.des.qld.gov.au/regional-ecosystems/details/?re=12.8.14). Consideration of the dominant canopy species indicates the RE has moderate value for Koala (DAWE 2022, DES 2020).

The SRRC Biodiversity Strategy maps Koala habitat within the LGA, shown as Image 8 and indicating the presence of significant strategic landscape connections for Koalas north and south of the property.

The Tabooba property is well-located to provide valuable Koala habitat on the ranges, lower slopes and the wetter and more fertile alluvial flats, which are currently cleared and are predominantly cleared in the surrounding landscape. Riparian habitats provide important refuge for Koalas during times of drought (Reed and Lunney 1990), facilitate local movement (Davies *et al.* 2013), and are important for long distance dispersal (McAlpine et al. 2006a and b; Norman *et al.* 2019), with Koala persistence within riparian areas supported by the presence of intact non-riparian habitat (Smith *et al.* 2013). At present the riparian habitats of the property are largely degraded by impenetrable weed growth (Photo 2) and are not bordered by non-riparian habitat due to clearing of alluvial flats and lower hill slopes for grazing purposes. Lower hillslopes and ranges of the property are heavily infested with Lantana and are susceptible to uncontrolled fire. Restoring and maintaining Koala habitat connectivity between the riparian and ridgeline habitats of the property would have significant benefits by enabling Koalas to safely inhabit and move between the range of altitudinal habitats for feeding and breeding purposes and to seek refuge during periods of climatic extremes.



Data sources:
Koala records
Atlas of Living Australia 2022
Vegetation management regulated vegetation management map - v 5.07
Published 04/05/2022
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

Figure:	**2.2**
Title:	**Koala records in the landscape and Regulated Vegetation Mapping**
Project:	**Coomera Connector Offsets Project, Tabooba Offset Property Assessment Report**
Client:	**Queensland Department of Transport and Main Roads**

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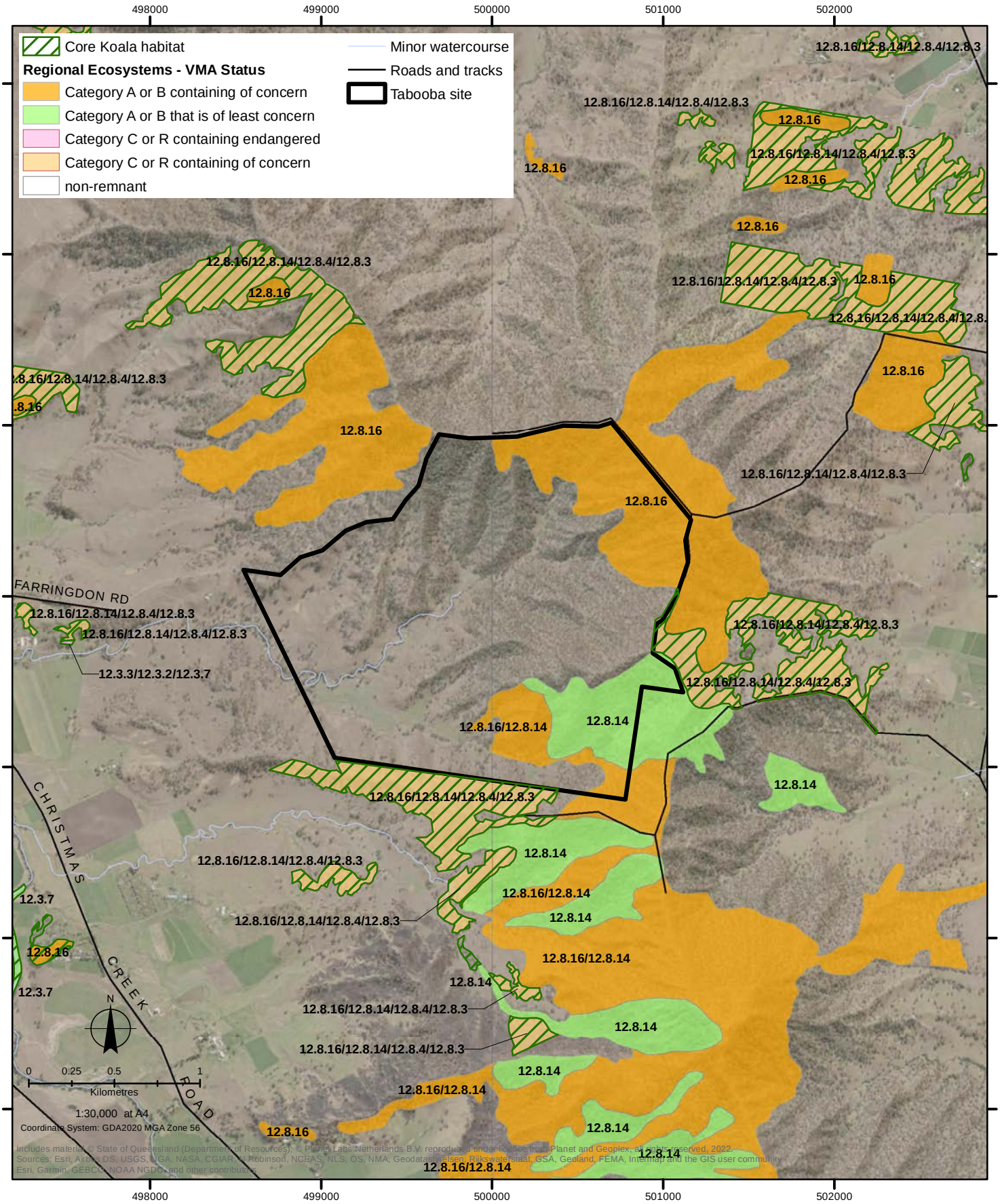

Data sources:
MSES - wildlife habitat - koala habitat areas - core
Published 08/09/2021
Vegetation management regional ecosystem map - v12.00
Published 04/05/2022
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM Reviewed by: PJ Date: 5/08/2022

Figure:	2.3
Title:	Current Regional Ecosystem and Koala Habitat Mapping
Project:	Coomera Connector Offsets Project, Tabooba Offset Property Assessment Report
Client:	Queensland Department of Transport and Main Roads

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Image 7. SCRC Biodiversity Framework (Source: SCRC (2015) property boundary added to original image in black)

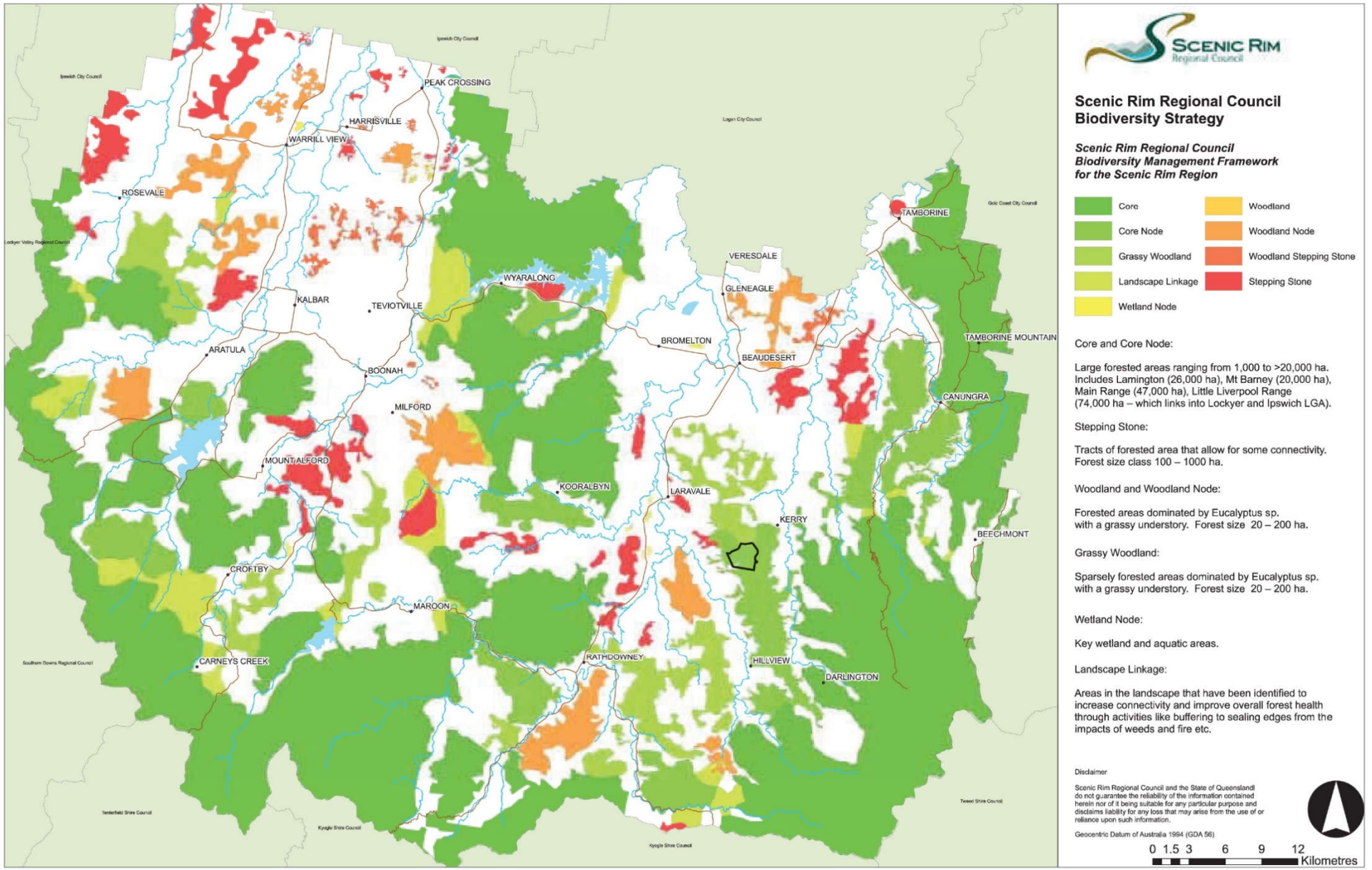
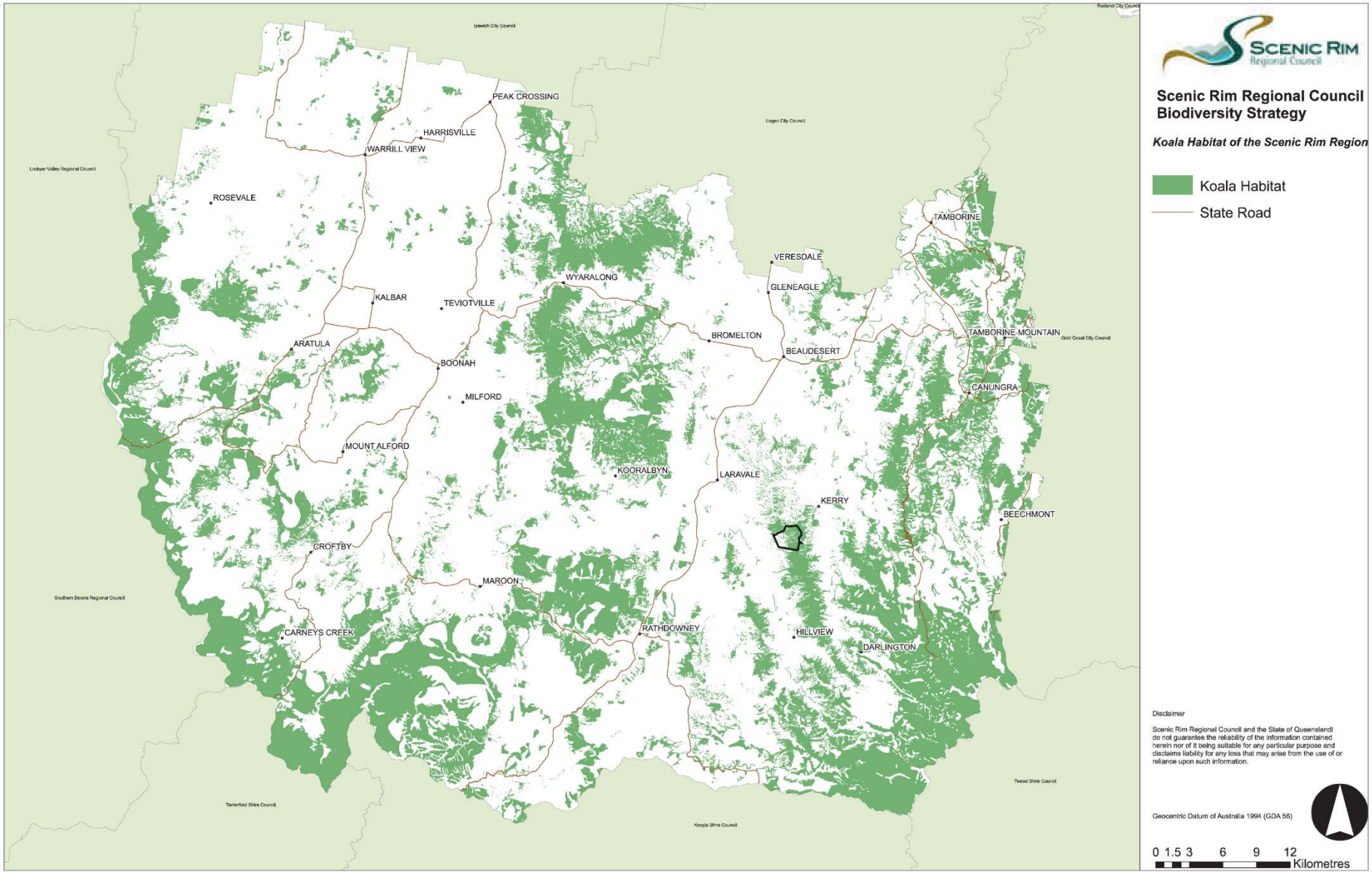


Image 7. SCRC Koala Habitat of the Scenic Rim (Source: SCRC (2015) property boundary added to original image in black)



2.4 GREY-HEADED FLYING-FOX IN THE LANDSCAPE

ALA database records for Grey-headed Flying-fox in the landscape are shown on Figure 2.4, along with the locations of known flying-fox camps supporting Grey-headed Flying-fox as indicated in data sourced from the National Flying-fox Monitoring Viewer (https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf)

The number of Grey-headed Flying-fox records shown on Figure 2.4 is not expected to represent the full distribution of the species in the landscape as they are active nocturnally, often in extensive and inaccessible woodlands and forests in response to flowering events.

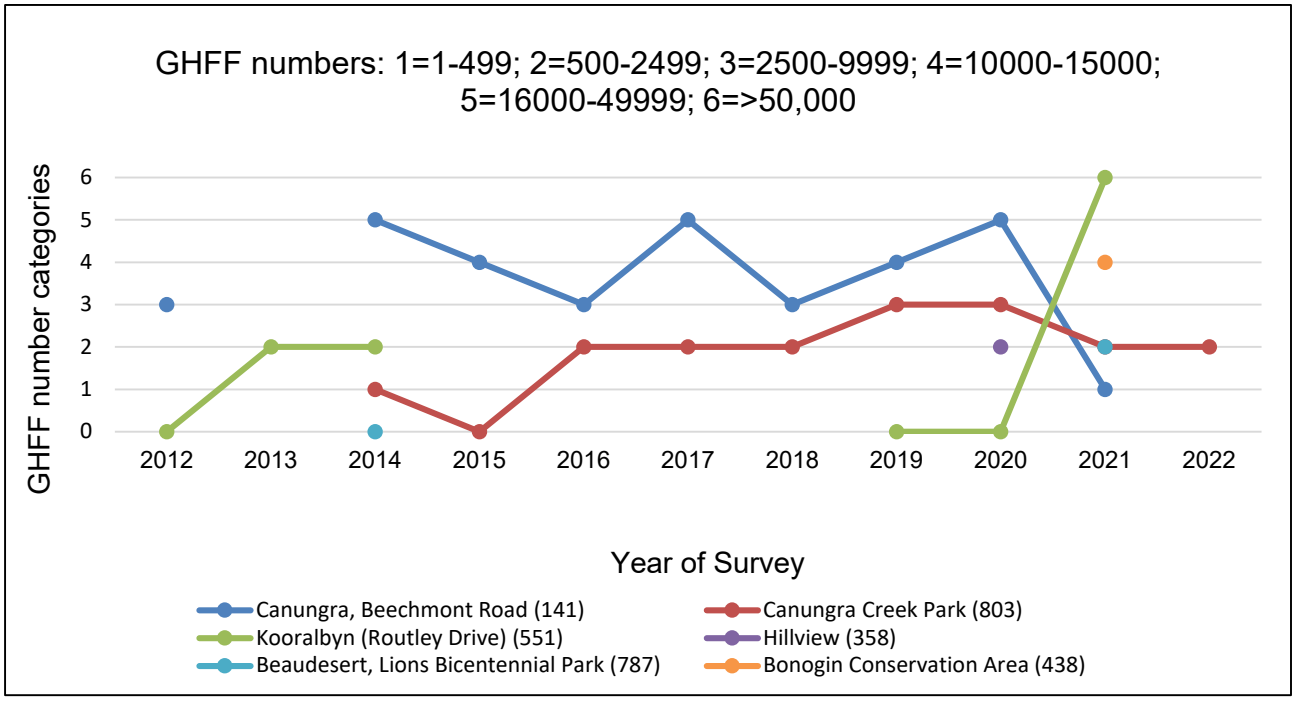
There are six flying-fox camps within 20 km of the property in which Grey-headed Flying-fox has been recorded. The Canungra, Beechmont Road camp located 19.5 km to the north east of the property is identified as a 'nationally important flying-fox camp', defined as a camp that has contained ≥10,000 Grey-headed Flying-foxes in more than one year in the last 10 years, or has been occupied by more than 2,500 Grey-headed Flying-foxes permanently or seasonally every year for the last 10 years. The Beechmont Road camp has records of 16,000-49,000 Grey-headed Flying-fox present on three occasions in the last 10 years.The Kooralbyn Routely Drive camp is located 15.7 km to the north west of the property boundary, and while six surveys between 2012 and 2020 twice recorded 500-2,499 Grey-headed Flying-fox, there were >50,000 Grey-headed Flying-fox present at the camp during a survey in November 2021.

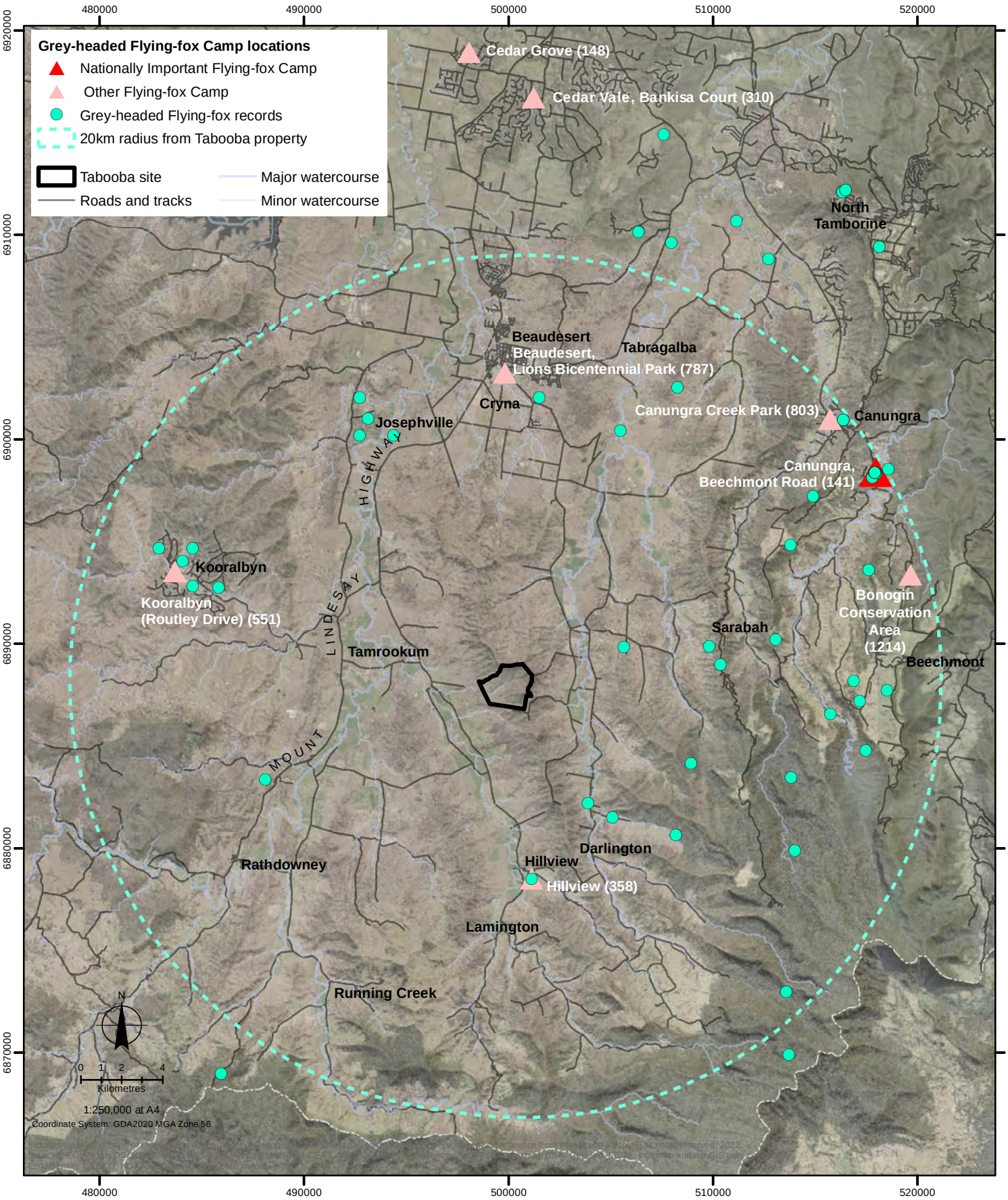
Grey-headed Flying-fox numbers at the camps within 20 km of the boundary of the site are shown on Figure 2.5.

At night, Grey-headed Flying-foxes typically feed on blossoms and fleshy fruits within 20 km of their roosts (although they can travel as much as 50 km), feeding in remnant forest, patches of vegetation on cleared land and urbanised areas (Roberts *et al.,* 2012). Habitats of the property are within the typical foraging distance of the six camps shown on Figure 2.4.

Consideration of the dominant canopy species within the two REs present (Figure 2.3) indicates RE 12.8.16 has high value for Grey-headed Flying-fox and RE 12.8.14 has moderate value for Grey-headed Flying-fox (DAWE 2021, Eby and Law 2008).

Figure 2.5. Grey-headed Flying-fox (GHFF) number from camps within 20 km of the property (source: National flying-fox monitoring viewer.





Data sources:
Grey-headed Flying-fox records
Atlas of Living Australia 2022
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM Reviewed by: PJ Date: 5/08/2022

Figure:	2.4
Title:	Grey-headed Flying-fox records in the landscape
Project:	Coomera Connector Offsets Project, Tabooba Offset Property Assessment Report
Client:	Queensland Department of Transport and Main Roads

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3.0 ASSESSMENT METHODS

3.1 HABITAT QUALITY ASSESSMENT

To assess the suitability of the property for Koala and Grey-headed Flying-fox offsets, habitat assessment has been undertaken by applying the methods of the *Guide to Determining Terrestrial Habitat Quality – Version 1.3* (Queensland Government 2020) in line with the habitat assessments undertaken at the Coomera Connector Stage 1 impact area for Koala (Planit 2021a) and Grey-headed Flying-fox (Planit 2021b).

Additional assessment has been undertaken for Koalas and Grey-headed Flying-fox as described in Sections 3.2 and 3.3, and the results have been applied in accordance with the DSEWPC (2012) document 'how to use the offsets assessment guide', taking into account site condition, site context and species stocking rate to contribute to the calculation of habitat quality using the EPBC Act offsets assessment guide.

3.2 KOALA SURVEYS

This report provides the results of Spot Assessment surveys after the Spot Assessment Technique (SAT) of Phillips and Callaghan (2011) to measure localised levels of habitat use by Koalas, and thermal-imaging drone Koala surveys to gather baseline Koala density data.

Thermal-imaging drone Koala surveys were a necessary tool to understand Koala distribution and measure Koala density due to (1) the inaccessibility of much of the property resulting from heavy and persistent rainfall in February and March of 2022 preventing access by vehicle by day and making night-time access on tracks too dangerous for spotlighting, (2) heavy and persistent rainfall in the weeks prior to the survey washing away scats, particularly on slopes, and (3) the steepness and weed cover on upper slopes impeding surveys of Koala on foot. On the slopes, tall lantana obscured the view into the trees, and the steep and rocky slopes of 25% or more were considered too dangerous to conduct strip transects in that the focus of observers would have to be on keeping their feet rather than looking upward. Much of the remaining vegetation on the alluvial flats was associated with drainage lines which were largely inaccessible due to dense weed cover, affecting the ability of observers to detect Koala scats during SAT surveys.

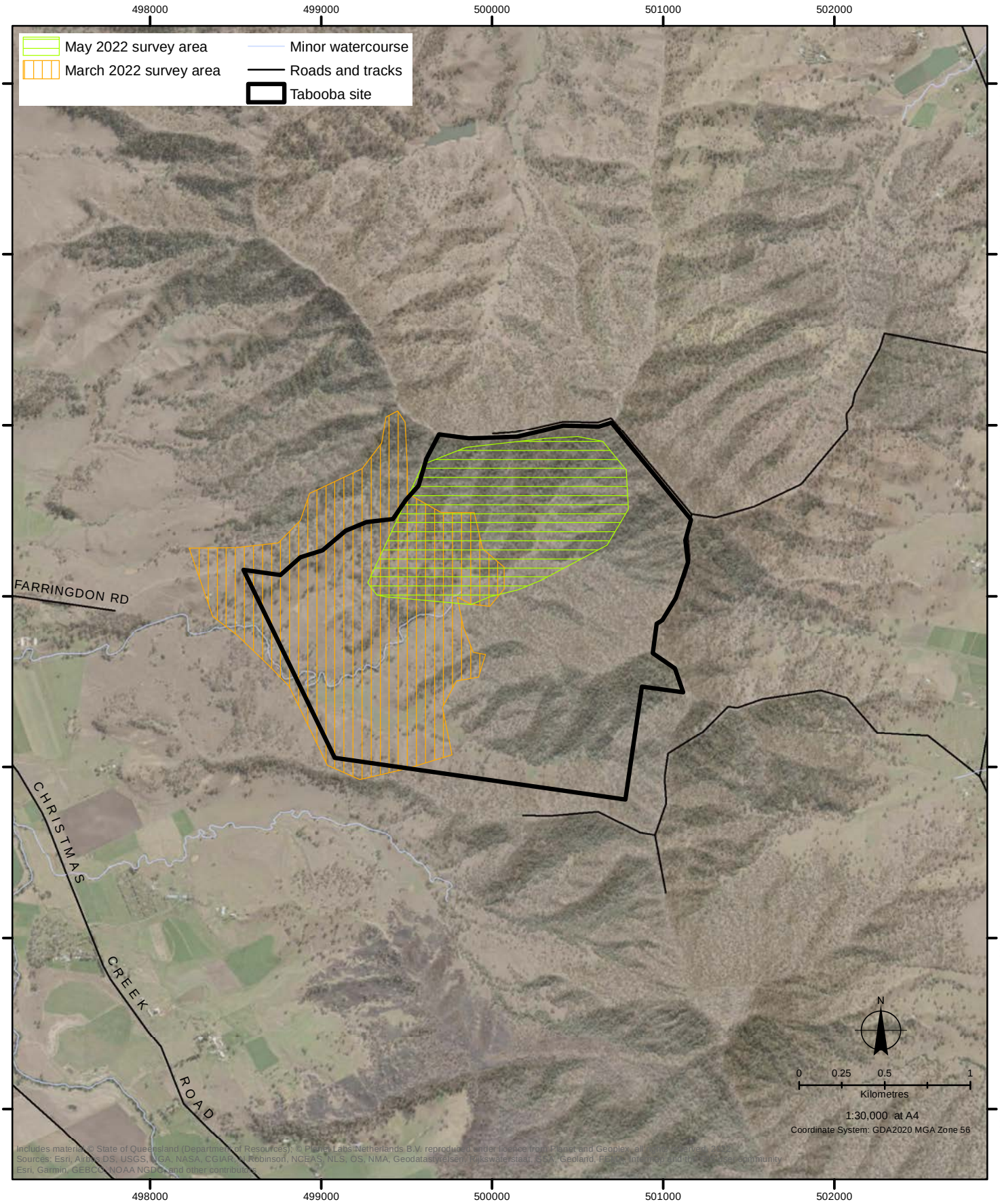
3.2.1 Thermal imaging drone surveys

Thermal-imaging drone surveys were conducted over two nights (17-18 March between 23:00 hrs and 02:00 hrs and 19-20 May between 19.00 hrs and 02:00 hrs) using a DJI Matrice 300 RTK drone with a payload of a dual optical and thermal camera (H20T) and spotlight (EVE 2022a and 2022b – Appendices 2 and 3). The first survey covered approximately 200 ha of the western third of the property, and some adjacent bushland habitat to the northwest. The second survey covered approximately 107 ha of the property. For both surveys, access into the interior of the property by the drone, which must be maintained within line of site, was limited due to wet track conditions and therefore habitats in the eastern portion of the property were not surveyed. Those areas covered by the drone surveys are shown in Figure 3.1.

Thermal heat signatures suggestive of Koalas were investigated, and verification and optical light photographs were taken with illumination by a drone-mounted spotlight. When a Koala was detected, the GPS location was acquired using a drone-mounted laser rangefinder and the position recorded. Koala locations and drone flight paths were plotted on Google Earth.

While relying on thermal imagery to detect potential Koalas, the photography component of the method minimises the opportunity for false positive or negative detection, which has been a particular issue when using thermal imaging for Koala detection (Corcoran *et al.* 2019; Hamilton *et al.* 2020).

In a test of the accuracy of remotely piloted aircraft system thermal imaging (RPAS) against traditional spot lighting and SAT surveys, Witt *et al.* (2020) found that RPAS coupled with thermal



Data sources:
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

Figure:	**3.1**
Title:	**Thermal Koala Survey Areas**
Project:	**Coomera Connector Offsets Project, Tabooba Offset Property Assessment Report**
Client:	**Queensland Department of Transport and Main Roads**

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imaging cameras proved to be a promising efficient and effective alternative method to systematic spotlighting and the SAT surveys for detecting koalas and estimating density at low density sites in the winter period (when heat signatures are most easily detected).

In terms of direct detection Witt *et al.* (2020) reported that RPAS detected one Koala per 2.18 hrs compared with one Koala per 6.75 hrs for spotlighting and one Koala per 43.39 hrs for SAT surveys, proving the efficiency of RPAS. Additionally, their work showed that with repeat surveys at low density sites, RPAS was the optimal method for direct detection of individual Koalas (n = 11 of 12), compared to Spotlight (n = 4 of 12) and the SAT (n = 1 of 12), while the SAT method remains optimal for determining site occupancy given the value in confirming transient koala habitat.

The reduction of survey time and the ability to survey difficult terrain provided by RPAS also provides a risk adverse method of ecological surveying (Witt *et al.* 2020), which is of relevance for Koala surveys and future monitoring within the rugged terrain of the proposed offset property.

3.2.2 Spot Assessment surveys

Spot Assessment surveys were carried out in accessible locations on the property on 17 March 2022 and 6-7 May 2022.

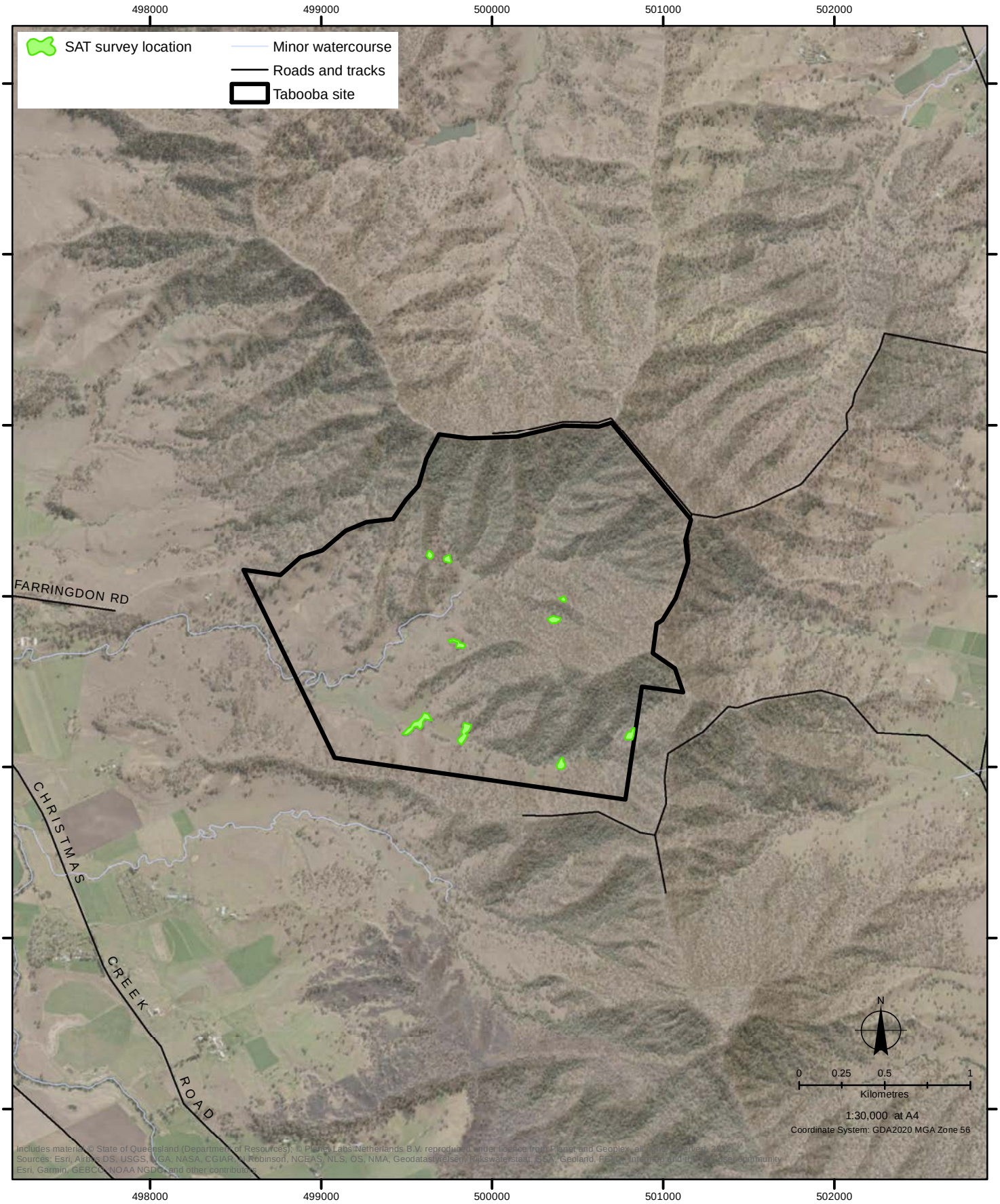
The Spot Assessment technique (SAT) of Phillips and Callaghan (2011) involves a radial assessment within the immediate area surrounding a tree of any species that is known to have been utilised by the species, or otherwise considered to be of some importance to Koala. To apply the SAT, the following technique was applied:

1. Location and marking of a tree (the centre tree) that met one or more of the following selection criteria:
    a. a tree of any species beneath which one or more Koala faecal pellets have been observed and/or
    b. a tree in which a Koala has been observed and/or
    c. any other tree known or considered to be potentially important for Koala, or of interest for other assessment purposes.
2. identify and uniquely mark the 29 nearest trees to the centre tree,
3. undertake a search for Koala faecal pellets beneath each of the 30 marked trees based on a cursory inspection of the undisturbed ground surface within a distance of 100 centimetres around the base of each tree, followed (if no faecal pellets are initially detected) by a more thorough inspection involving disturbance of the leaf litter and ground cover within the prescribed search area.

Initial assessment of the property on 17 March involved reconnaissance to check track conditions and assess potential to access the range of habitat types and conditions present. Access to suitable SAT survey sites was limited due to the wet conditions.

The field team inspected individual trees that were considered likely to be used by Koalas, and recorded Koala evidence (scats and scratches) outside of the SAT survey sites, as well as searching for scratches during SAT surveys. In one location where Koala evidence was found just outside of the western boundary of the property it was not possible to survey the closest 30 trees as these were widely scattered in cleared and boggy areas, and some were on a neighbouring property.

There was a lack of visible evidence of Koalas in most areas that could be searched and ultimately centre trees for the surveys were selected based on their size and known value as Koala forage species (e.g. *Eucalyptus tereticornis* and *Eucalyptus crebra*).



Data sources:
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

Figure:	**3.2**
Title:	**SAT Survey Locations**
Project:	**Coomera Connector Offsets Project, Tabooba Offset Property Assessment Report**
Client:	**Queensland Department of Transport and Main Roads**

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Nine SAT surveys were carried out over three days, predominantly within advanced and young regrowth vegetation as remnant vegetation on the steeper slopes was relatively inaccessible with dense lantana and/or too steep to survey safely. There was only one site where a SAT survey could be undertaken in riparian vegetation as the channel was relatively shallow and erosion had reduced the amount of weed cover. Other riparian locations were steeply incised and choked with weeds, predominantly lantana, which restricted access and reduced potential for scat visibility.

Conditions for observing scats were not ideal as the surveys followed an extended period of heavy and persistent rainfall and scats would have been washed away on the steeper slopes and from riparian areas. Warm and consistently wet conditions over the preceding months and weeks would have also degraded scats. Additionally, the grassy groundcover was high and dense, making searching for scats difficult in woodland areas. Considerable time was taken at the base of each tree, slowing survey progress significantly.

3.3 GREY-HEADED FLYING-FOX SURVEYS

No flying-fox camps were recorded on site, and none have been known from the property previously.

During the field assessments in March and May 2022 there were no flowering events of canopy or subcanopy species observed during diurnal surveys and no other trees (e.g. the few fig trees on the property) were in fruit. As such, there was no value in undertaking spotlighting surveys for foraging Grey-headed Flying-fox.

The assessment relies on the known presence of the species in the landscape, the proximity of the property to known Grey-headed Flying-fox camps and the assumption that Grey-headed Flying-fox would forage seasonally in vegetation on the property due to the dominant presence of known important forage species (e.g. *Eucalyptus tereticornis* and *Eucalyptus crebra*).

4.0 SURVEY RESULTS

4.1 HABITAT QUALITY SURVEYS

4.1.1 Assessment Units

In accordance with the methods of the *Guide to Determining Terrestrial Habitat Quality – Version 1.3* (the guide) the property was mapped into like Assessment Units (AUs), differentiated based on:

- Regional ecosystem type; and
- Vegetation condition (remnant, advanced regrowth, young regrowth or cleared).

Advanced regrowth was mapped in areas supporting a mostly continuous canopy in aerial imagery that was distinguishable from areas mapped as remnant. Young regrowth was mapped for areas supporting a broken canopy with scattered taller trees, but generally dominated by scattered smaller trees as evident in aerial imagery.

Ground-truthing of the RE types was undertaken through applying the quaternary survey method of Neldner *et al.* (2017). Field observations and the use of historical aerial photography contributed to delineation of the two regrowth categories. A brief description of each AU is provided below, and the AU mapping results and field survey locations are shown in Figure 4.1.

AU1 REMNANT RE 12.8.16: 49.8 ha. Remnant *Eucalyptus crebra*, *E tereticornis* +/- *Angophora subvelutina* open forest.

AU2 ADVANCED REGROWTH RE 12.8.16: 145.02 ha. Advanced regrowth of open forest dominated by *Eucalyptus tereticornis* subsp. *basaltica, Eucalyptus crebra* +/- *Cormybia tessellaris, Corymbia intermedia.* Occasional relictual trees present.

AU3 YOUNG REGROWTH RE 12.8.16: 48.1 ha. Young regrowth open forest with occasional emergent relictual trees. Dominant species include *Eucalyptus crebra, Eucalyptus tereticornis* and *Corymbia tessellaris*.

AU4 REMNANT RE 12.8.14: 50.62 ha. Remnant open forest dominated by *Eucalyptus melliodora, Eucalyptus tereticornis* subsp. *basaltica*, *Eucalyptus eugeniodes*, *Angophora subvelutina* and *Corymbia intermedia*.

AU5 ADVANCED REGROWTH RE 12.8.14: 19.8 ha. Advanced regrowth of *Eucalyptus eugeniodes, E. tereticornis* subsp *basaltica, Eucalyptus melanophloia* open forest.

CLEARED PADDOCK FORMERLY OF RE 12.8.16: 75.6 ha. Cleared paddocks with lone trees. Queensland Herbarium Pre-clear RE mapping indicates the paddocks would have supported RE 12.8.16.

4.1.2 Habitat Quality Surveys

The guide suggests the number of Habitat Quality/BioCondition transect surveys that should be undertaken within each AU to represent the condition of each AU (Table 4.1). Table 4.2 provides a breakdown of AUs for the property as shown in Figure 4.1, their total areas and the number of BioCondition transect surveys undertaken within each.

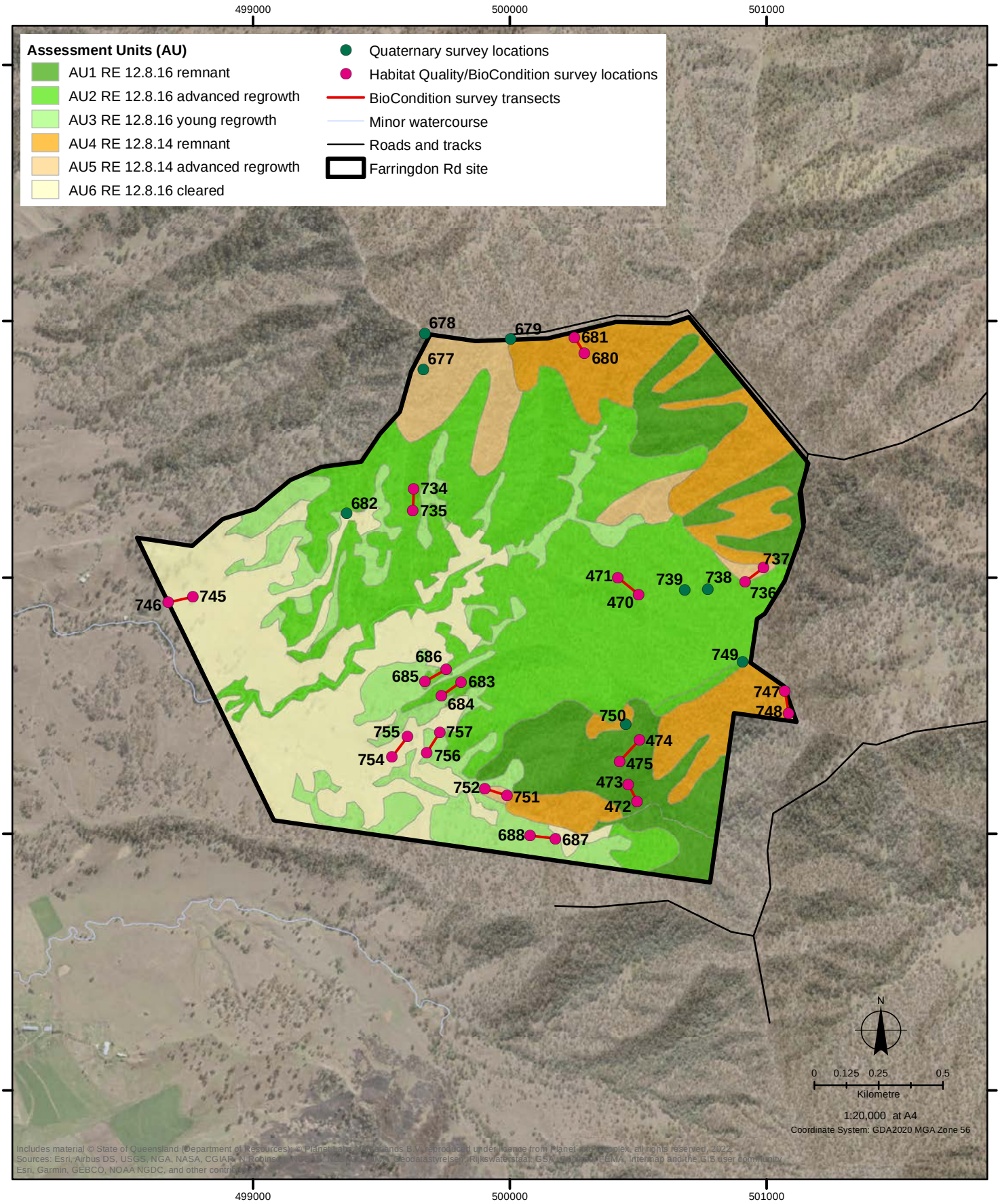
Table 4.1 Sampling sites relative to AU size

AU size (ha)	Suggested no. of sampling sites
0-50	At least 2
50-100	Three
100-500	Four
500-1000	Five
>1000	Six

Table 4.2 AU Areas and BioCondition Transects completed

AU description	Area (ha)	Suggested transects	Transects completed
AU1 RE 12.8.16 remnant	49.8	≥2	2
AU 2 RE 12.8.16 regrowth	145.02	4	4
AU3 RE 12.8.16 young regrowth	48.1	≥2	2
AU4 RE 12.8.14 remnant	50.62	3	2
AU5 RE 12.8.14 regrowth	19.8	≥2	2
AU6 Cleared (preclear 12.8.16)	75.6	3	2

Results of the Habitat Quality/BioCondition transects are provided in Appendix 1.



Data sources:
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM **Reviewed by: PJ** **Date: 30/09/2022**

Figure:	**4.1**
Title:	**Assessment Units, Quaternary and Habitat Quality survey locations**
Project:	**Coomera Connector Offsets Project, Farringdon Road Offset Property Assessment Report**
Client:	**TMR**

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4.2 THERMAL KOALA SURVEYS

Two reports detailing the March (EVE 2022a) and May (EVE 2022b) thermal Koala surveys over the property are provided in Appendices 2 and 3 respectively.

For the March survey, the drone covered an area of approximately 200 ha and detected two Koalas (Koala locations shown on Figure 4.2). One of these was recorded just outside of the property boundary in the northwest within mapped remnant RE 12.8.16, and the other in the north-western quarter of the property within AU2 (RE 12.8.16 advanced regrowth). Allowing for a detection probability of 90%, EVE (2022a) estimated the property probably supports four or five Koalas (a density of 0.01-0.013 Koalas/ha.

For the May survey, the drone was able to be operated from further inside the property, reaching higher into the range and covering an area of approximately 107 ha of habitat. Eight Koalas were detected (locations shown on Figure 4.2), mostly on the mid-upper slopes of the range in the following AUs:

- two Koalas in AU1 RE12.8.16 remnant
- two Koalas in AU2 RE12.8.16 advanced regrowth
- three Koalas in AU4 RE12.8.14 remnant
- one Koala in AU5 RE12.8.14 advanced regrowth.

Allowing for a detection probability of 90%, EVE (2022b) calculated a population density of 0.08 Koalas/ha.

EVE (2022b) noted that the presence of such an abundance of koalas on the mid-upper slopes of the ridge was somewhat unexpected given that more nutrient-rich geology undoubtedly occurs on the lower slopes and flats. However, the lower slopes and flats are largely cleared and are managed for beef cattle production.

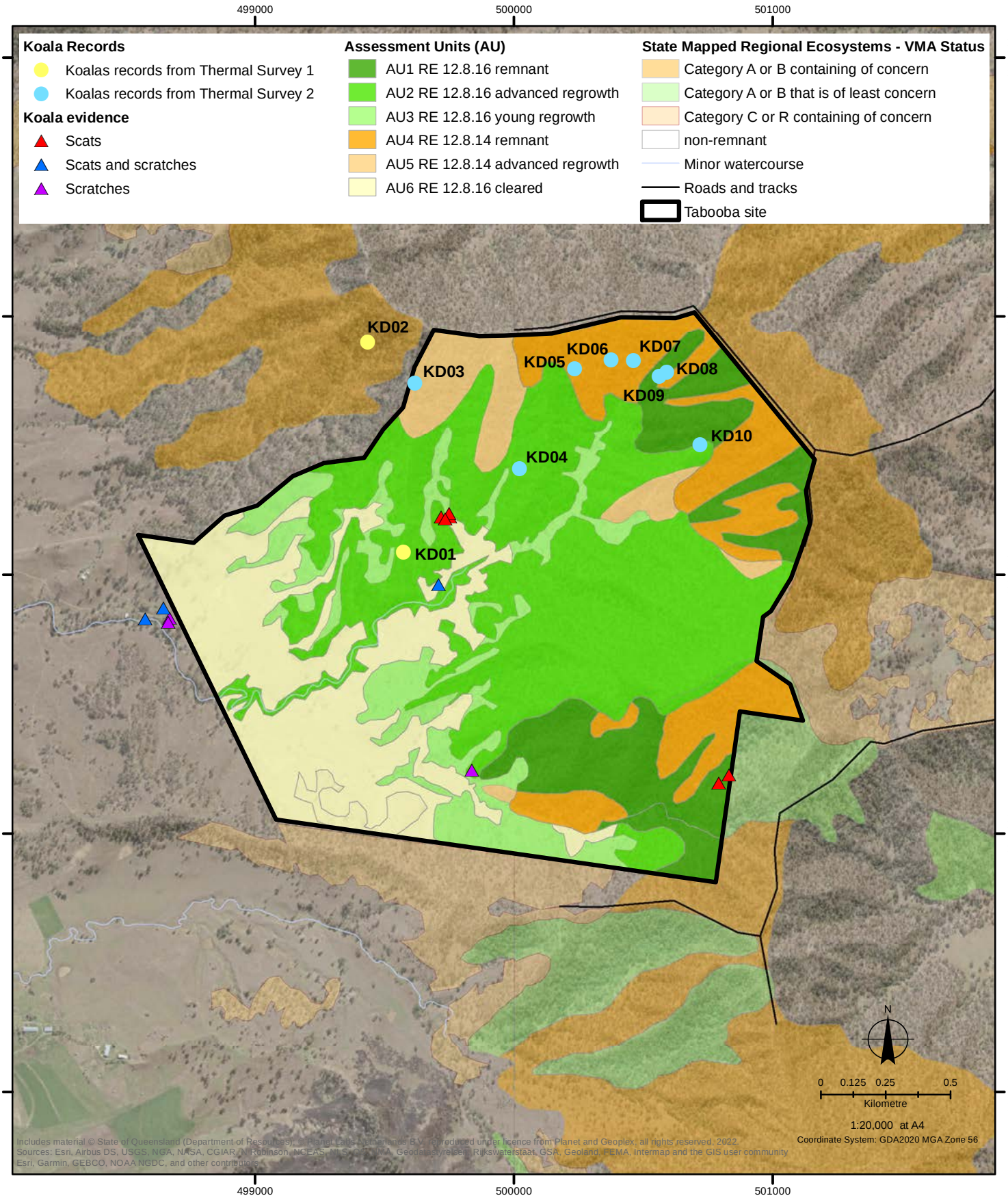
As shown in Figure 2.1 the Jinbroken Range orients east to west on the northern boundary of the property rather than the northeast to southwest orientation of the remainder of the range. The south-facing slopes are likely to be cooler as they are sheltered from the western sun and may provide refuge for Koalas during hot weather.

When conditions are improved for deploying the drone further into the property, it is intended to survey habitats further to the east to refine Koala density estimates as there are no specific guides to high, medium and low Koala density for this region.

4.3 KOALA SAT SURVEYS

Records of Koala evidence from the SAT surveys and other searches are also shown on Figure 4.2. Koala scats were recorded at SAT sites within AU1 and AU2, and Koala scats and scratches were recorded outside of the SAT surveys in one location at a lone mature *Eucalyptus tereticornis* within AU6 (cleared RE 12.8.16) and immediately outside of the eastern boundary of the property at four mature *Eucalyptus tereticornis* in a mostly cleared paddock on alluvial flats. Table 4.3 provides the SAT survey results.

The SAT survey results indicate the surveyed habitats of the property are categorised by Phillips and Callaghan (2011) as ‘low use’ (<22.52%). This is likely an underestimate of the Koala activity level on the property, due to the challenges with applying this survey method in steep and complex terrain following heavy rainfall. Phillips and Callaghan (2011) suggest that low Koala activity is expected in the west of the species East Coast range in areas receiving less than 600 mm annual rainfall. The local area receives over 900 mm annual rainfall and should therefore fall into the Phillips and Callaghan (2011) category of East Coast medium-high Koala activity.



Data sources:
Vegetation_management_watercourse_and_drainage_feature_map_100k
Published 08/09/2021
Baseline roads and tracks - Queensland
Published 31/03/2022
State of Queensland (Department of Resources) 2022

Drawn By: KM **Reviewed by: PJ** **Date: 5/08/2022**

Figure: 4.2

Title: Thermal Survey Koala Records, SAT Survey Scat Records and other Koala Evidence

Project: Coomera Connector Offsets Project, Tabooba Offset Property Assessment Report

Client: Queensland Department of Transport and Main Roads

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Table 4.3 SAT Survey Results

SAT Site ID	Assessment Unit	No of trees with scats	Activity level*	Activity category*
SAT A	AU2	0	0	Low use
SAT B	AU2	0	0	Low use
SAT C	AU2/AU3/AU6	0	0	Low use
SAT D	AU2	0	0	Low use
SAT E	AU2/AU3	4 (from AU2)	13%	Low use
SAT F	AU2	0	0	Low use
SAT G	AU2/AU3/AU6	0	0	Low use
SAT H	AU1	2	6%	Low use
SAT I	AU3	0	0	Low use

*Philips and Callaghan (2011)

The size of the property, its topography and inaccessibility will continue to cause difficulty in undertaking broad SAT surveys and alternative methods of monitoring Koala activity across the property should be considered, such as collaring and radio-tracking Koalas by drone, although it may be difficult to capture Koalas in the steeper habitats. In addition, once specific habitat restoration sites are identified and safe access is in place, SAT surveys can be undertaken prior to and in the years following restoration works to monitor Koala activity levels at these locations.

4.4 KOALA FOOD TREES

Evidence of Koala presence in mature *Eucalyptus tereticornis* on alluvial flats immediately outside of the property boundary suggests that restored habitat on the alluvial flats within the property would be occupied by Koalas.

During the SAT surveys, Koala scats were recorded beneath *Eucalyptus tereticornis (subsp. basaltica* on the ridge slopes)*, E. crebra* and *Corymbia intermedia*. *E. tereticornis* subsp. *basaltica* and *C. crebra* were found to be dominant canopy species in remnant and regrowth REs 12.8.16 and 12.8.14 from which eight Koalas were recorded in one night over a 107 ha survey area. Other canopy species present in smaller numbers are *E. eugenioides*, *E. melliodora*, *Corymbia tessellaris* and *Angophora subvelutina*. *Allocasuarina torulosa* occurred as a subcanopy species within remnant and advanced regrowth REs 12.8.16 and 12.8.14.

Yongentob *et al.* (2021) list Eucalyptus crebra, E. tereticornis and E. eugenioides as locally important koala trees in South East Queensland, with *Corymbia intermedia C. tessellaris* and *A. torulosa* listed as ancillary habitat trees.

White (1999) conducted a study of the ecology of the Koala in rural south-east Queensland at Mutdapilly Research Station in the Scenic Rim LGA, 50 km northwest of the proposed offset property. The two main vegetation types in the fragmented 845 ha study area of alluvial flats, low hills and surrounding farms were mixed stands, dominated by either *Eucalyptus crebra* or *E. tereticornis*, with *E. melanophloia, E. tessellaris* and *E. intermedia*, and pure stands of *E. tereticornis*. During the study which involved collaring 122 Koalas over two summer periods and two winter periods, 90% of Koala observations were made in *E. tereticornis* and *E. crebra*.

Of the 1793 observations of Koalas in *E. tereticornis* and *E. crebra* an average of 58.3% were made in *E. crebra* and an average of 41.75% were made in *E. tereticornis*. There was some differential use of the two tree species by male and female Koalas during breeding and non-breeding seasons, and the results are skewed by the availability of each species in the various study areas; however, they indicate that both tree species are important for Koalas in the region during their lifecycle.

The field results and literature indicate the property supports vegetation types dominated by tree species that are important for Koalas in the region.

4.5 RESOURCES FOR GREY-HEADED FLYING-FOX

No surveys targeting Grey-headed Flying-fox were conducted at the property as there were no flowering events at the time of surveys. However, the property is dominated by preferred forage species of Grey-headed Flying-fox, including the winter-flowering *Eucalyptus tereticornis* and *E. crebra*, which are critical resources for the species (National Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus DAWE, 2021).

Both REs present on the property rank as high value foraging habitat for Grey-headed Flying-fox (see Section 1.3). The Recovery Plan describes vegetation communities containing (amongst other species) *Eucalyptus crebra, E. tereticornis* and *E. melliodora* as important resources for Grey-headed Flying-fox on coastal lowlands of Southern Queensland as they flower reliably over the winter and spring period. While the property is not located within the coastal lowlands of southern Queensland, Eby and Law (2008) state that productive areas for winter flowering are concentrated in South East Queensland and northern New South Wales where flowering occurs in small remnants in coastal floodplains, coastal dunes and inland slopes, and during spring the extent of productive habitat increases in northern regions, expanding from the coastal lowlands into the coastal ranges and valleys.

Grey-headed flying fox forage species, as identified by Eby and Law (2008) and the Recovery Plan within the AUs of the property are listed in Table 5.4 with an indication of the known flowering times of each species. Flowering times for most species were given by Eby and Law (2008) with the exception of *E. crebra*, where the southeast Queensland flowering season is given as June-July and August-September within the 'Implementation of the national Flying-Fox monitoring program' report (Rural Industries Research and Development Corporation 2015); and *E. tereticornis* subsp. *basaltica* which has been recorded flowering from May to November (EUCLID 2022).

The property supports habitat critical to the survival of Grey-headed Flying-fox. Protection of existing habitats from clearing, restoration of cleared habitats, weed management to improve canopy recruitment in remnant and advanced regrowth, and improved fire management to reduce the risk of wildfire would ensure available habitat within the property is increased and habitat condition is improved.

Table 4.4. Recorded flowering times for GHFF forage species

Species	D-J	F-M	A-M	J-J	A-S	O-N
Corymbia intermedia						
Corymbia tessellaris						
Eucalyptus crebra						
Eucalyptus melanophloia						
Eucalyptus melliodora						
Eucalyptus tereticornis subsp. *basaltica*						
Eucalyptus tereticornis subsp. *tereticornis*						
Lophostemon confertus						

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APPENDIX 1

BioCondition Transect Data and Photographs

		AU1	AU1	AU2	AU2	AU2	AU2	AU3	AU3	AU4	AU4	AU5	AU5	AU6	AU6
Broad title	**Attribute**	**472-473**	**474-475**	**470-471**	**683-684**	**685-686**	**734-735**	**687-688**	**756-757**	**680-681**	**747-748**	**736-737**	**751-752**	**745-746**	**754-755**
LOCATION	Site ID	472-473	474-475	470-471	683-684	685-686	734-735	687-688	756-757	680-681	747-748	736-737	751-752	745-746	754-755
	Date	6/05/2022	6/05/2022	6/05/2022	17/03/2022	17/03/2022	6/05/2022	17/03/2022	7/05/2022	17/03/2022	7/05/2022	6/05/2022	7/05/2022	7/05/2022	7/05/2022
	Observers	DF & LW	DF & LW	DF & LW	DF & LW	DF & LW	DF & LW	DF & LW	DF & LW	DF & LW	DF & LW	DF & LW	DF & LW	DF & LW	DF & LW
	Location	Tabooba	Tabooba	Tabooba	Tabooba	Tabooba	Tabooba	Tabooba	Tabooba	Tabooba	Tabooba	Tabooba	Tabooba	Tabooba	Tabooba
	Datum	MGA94/GDA Zone 58	MGA94/GDA Zone 59	MGA94/GDA Zone 57	MGA94/GDA Zone 56	MGA94/GDA Zone 56	MGA94/GDA Zone 60	MGA94/GDA Zone 56	MGA94/GDA Zone 66	MGA94/GDA Zone 56	MGA94/GDA Zone 63	MGA94/GDA Zone 61	MGA94/GDA Zone 64	MGA94/GDA Zone 62	MGA94/GDA Zone 65
	Plot Origin Zone														
	Plot Origin easting														
	Plot Origin northing														
	Plot Centre Zone														
	Plot Centre easting														
	Plot Centre northing														
	Plot bearing	350	30	270	210	210	350	270	30	150	330	210	270	60	30
	Plot allignment description														
	Locality description														
REGIONAL ECOSYSTEM & TREE HEIGHTS	Habitat description	Remnant *Eucalyptus crebra, E tereticornis* and *Angophora subvelutina* open forest	Remnant *Eucalyptus crebra* and *E tereticornis* open forest	Advanced regrowth *Eucalyptus crebra* and *E. tereticornis* subsp *basaltica* open forest	Advanced regrowth open forest dominated by *Eucalyptus tereticornis* subsp. *basaltica* , *Eucalyptus crebra* and *Corymbia intermedia*	Advanced regrowth open forest with occasional emergent relictual trees. Dominant species include *Eucalyptus crebra, Eucalyptus tereticornis, Corymbia tessellaris* and *Corymbia intermedia*	Advanced regrowth open *Eucalyptus crebra* forest	Young regrowth open forest with occasional emergent relictual trees. Dominant species include *Eucalyptus crebra, Eucalyptus tereticornis* and *Corymbia tessellaris*	Young regrowth open forest of *Eucalyptus crebra* and *E tereticornis*	Remnant open forest dominated by *Eucalyptus melliodora, Eucalyptus tereticornis* subsp. *basaltica, Eucalyptus eugenioides, Angophora subvelutina* and *Corymbia intermedia*	Remnant *Eucalyptus tereticornis* subsp *basaltica, E. melliodora* and *E. eugenioides* open forest	Advanced regrowth *Eucalyptus eugenioides , E. tereticornis* subsp *basaltica, Eucalyptus melanophloia* open forest	Advanced regrowth open forest of *Eucalyptus tereticornis* subsp *basaltica* and *E. eugenioides*	Cleared paddock (previously 12.8.16)	Cleared paddock (previously 12.8.16)
	Regional Ecosystem	12.8.16	12.8.16	12.8.16	12.8.16	12.8.16	12.8.16	12.8.16	12.8.16	12.8.14	12.8.14	12.8.14	12.8.14	12.8.16	12.8.16
	Tree canopy (EDL) height	15	18	10	16	8	10	15	8	18	15	12	10	0	0
	Tree sub canopy height	8	10	5	8	3	4	5	3	10	5	6	5	0	0
	Emergent height	0	0	0	0	16	0	0	0	0	0	0	0	20	0
SITE PHOTOS	Photo north from plot centre	Labelled	Labelled	Labelled	Labelled	Labelled	Labelled	Labelled	Labelled	Labelled	Labelled	Labelled	Labelled	Labelled	Labelled
	Photo south from plot centre	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Photo east from plot centre	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Photo west from plot centre	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
50x20m AREA	Coarse woody debris (m) (all logs >10cm diam; 0.5m long)	1.8	17	17.5	17.7	9.4	7.9	27.7	6.1	12.8	0.5	17.6	14.6	0	0
100x50m AREA	List native species from EDL	*Eucalyptus crebra* *Eucalyptus tereticornis* *Angophora subvelutina*	*Eucalyptus crebra* *Eucalyptus tereticornis*	*Eucalyptus crebra* *Eucalyptus tereticornis subsp basaltica*	*Eucalyptus tereticornis subsp. basaltica* *Eucalyptus crebra* *Corymbia intermedia*	*Eucalyptus crebra* *Eucalyptus tereticornis* *Corymbia tessellaris* *Corymbia intermedia*	*Eucalyptus crebra* *Corymbia tessellaris* *Corymbia intermedia*	*Eucalyptus crebra* *Corymbia tessellaris* *Eucalyptus tereticornis*	*Eucalyptus crebra* *Eucalyptus tereticornis* *Corymbia tessellaris*	*Eucalyptus melliodora* *Eucalyptus tereticornis subsp. basaltica* *Eucalyptus eugenioides* *Angophora subvelutina* *Corymbia intermedia*	*Eucalyptus tereticornis subsp basaltica* *Eucalyptus melliodora* *Eucalyptus eugenioides*	*Eucalyptus eugenioides* *Eucalyptus tereticornis subsp. basaltica* *Corymbia tessellaris* *Eucalyptus melanophloia* *Corymbia intermedia*	*Eucalyptus eugenioides* *Eucalyptus tereticornis subsp basaltica* *Angophora subvelutina* *Corymbia tessellaris* *Eucalyptus crebra*	*na*	*na*
	Total number of native tree spp from EDL only	3	2	2	3	4	3	3	3	5	3	5	5	0	0
	List other native tree species not in EDL (tree = single stemmed and >2m)	*Laphostemon confertus* *Allocasuarina torulosa* *Melia azedarach*	*Corymbia tessellaris* *Brachychiton populneus* *Xanthorrhoea glauca* *Allocasuarina torulosa*	*Xanthorrhoea glauca*	*Allocasuarina torulosa* *Eucalyptus melliodora*	*Xanthorrhoea glauca*	*Allocasuarina torulosa* *Xanthorrhoea glauca* *Eucalyptus tereticornis*	*Angophora subvelutina* *Corymbia intermedia*	*Eucalyptus melanophloia* *Angophora subvelutina*	*Allocasuarina torulosa* *Xanthorrhoea glauca* *Brachychiton populneus*	*Brachychiton populneus* *Allocasuarina torulosa* *Dodonaea viscosa* *Laphostemon confertus* *Corymbia intermedia* *Angophora subvelutina*	Angophora subvelutina Allocasuarina torulosa Xanthorrhoea glauca	*Melaleuca bracteata* *Allocasuarina torulosa* *Xanthorrhoea glauca*	*Eucalyptus tereticornis* (emergent)	*na*
	Total number of non-EDL species	3	4	1	2	1	3	2	2	3	6	3	3	1	0
	Total native tree spp richness (all tree species >2m + EDL) (Tree Richness)	6	6	3	5	5	6	5	5	8	9	8	8	0	0
	Total natiive tree spp from EDL recruiting	3	2	2	3	2	3	2	3	5	2	5	5	0	0
	Proportion of EDL Recruiting %	100	100	100	100	50	100	66.66666667	100	100	66.66666667	100	100	0	0
	Eucalypt large tree DBH	42	42	42	42	42	42	42	42	44	44	44	44	42	42
	Non-eucalypt large tree DBH	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Number of large eucalypt trees	5	7	4	6	6	3	1	2	11	3	5	2	0	0
	Number of large non-eucalypt trees	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total large trees	5	7	4	6	6	3	1	2	11	3	5	2	0	0
50x10m AREA	List native shrub species	*Allocasuarina torulosa* *Angophora subvelutina* *Corymbia intermedia* *Eucalyptus crebra* *Eucalyptus tereticornis subsp. basaltica* *Glochidion ferdinandi* *Laphostemon confertus* *Trema tomentosa* *Xanthorrhoea glauca*	*Acacia decora* *Allocasuarina torulosa* *Angophora subvelutina* *Breynia oblongifolia* *Corymbia intermedia* *Eucalyptus crebra* *Eucalyptus tereticornis subsp. basaltica* *Laphostemon confertus* *Trema tomentosa* *Xanthorrhoea glauca*	*Corymbia intermedia* *Corymbia tessellaris* *Eucalyptus tereticornis subsp. basaltica* *Grewia latifolia* *Xanthorrhoea glauca*	*Corymbia intermedia* *Eucalyptus tereticornis subsp. basaltica* *Xanthorrhoea glauca*	*Brachychiton populneus* *Corymbia intermedia* *Corymbia tessellaris* *Xanthorrhoea glauca*	*Xanthorrhoea glauca*	*Corymbia tessellaris* *Eucalyptus crebra* *Grewia latifolia* *Xanthorrhoea glauca*	*Corymbia tessellaris* *Eucalyptus crebra* *Eucalyptus tereticornis subsp. basaltica*	*Acacia implexa* *Brachychiton populneus* *Eucalyptus melliodora* *Eucalyptus tereticornis subsp. basaltica* *Grewia latifolia* *Trema tomentosa* *Xanthorrhoea glauca*	*Acacia implexa* *Dodonaea viscosa* *Eucalyptus eugenioides* *Eucalyptus tereticornis subsp. Basaltica*	*Acacia implexa* *Allocasuarina torulosa* *Angophora subvelutina* *Corymbia tessellaris* *Eucalyptus eugenioides* *Eucalyptus melanophloia* *Eucalyptus tereticornis subsp. basaltica* *Exocarpos strictus* *Xanthorrhoea glauca*	*Angophora subvelutina* *Bursaria spinosa* *Corymbia tessellaris* *Eucalyptus crebra* *Eucalyptus eugenioides* *Eucalyptus tereticornis subsp. basaltica* *Xanthorrhoea glauca*	*Corymbia intermedia*	-
	Total number of native shrub species (Shrub Richness)	9	10	5	3	4	1	4	3	7	4	9	7	1	0
	List native grass species	*Aristida gracilipes* *Capillipedium spicigerum* *Heteropogon contortus* *Imperata cylindrica* *Oplismenus aemulus* *Panicum effusum* *Panicum simile* *Poa labillardierei* *Sarga leiocladum* *Themeda triandra*	*Aristida benthamii* *Bothriochloa decipiens* *Capillipedium spicigerum* *Cymbopogon refractus* *Digitaria divaricatissima* *Eragrostis sororia* *Heteropogon contortus* *Imperata cylindrica* *Oplismenus aemulus* *Panicum effusum* *Panicum queenslandicum*	*Bothriochloa macra* *Capillipedium spicigerum* *Dichanthium setosum* *Eriochloa crebra* *Heteropogon contortus* *Panicum effusum* *Panicum simile* *Sehima nervosa* *Themeda triandra*	*Aristida benthamii* *Bothriochloa decipiens* *Heteropogon contortus* *Imperata cylindrica* *Panicum effusum* *Panicum simile* *Poa labillardierei* *Themeda triandra*	*Bothriochloa decipiens* *Heteropogon contortus* *Panicum effusum*	*Bothriochloa macra* *Heteropogon contortus* *Panicum effusum* *Panicum simile* *Themeda triandra*	*Bothriochloa decipiens* *Capillipedium spicigerum* *Eragrostis sororia* *Heteropogon contortus* *Imperata cylindrica* *Panicum effusum* *Themeda triandra*	*Aristida gracilipes* *Bothriochloa decipiens* *Bothriochloa macra* *Capillipedium spicigerum* *Heteropogon contortus* *Imperata cylindrica* *Panicum effusum* *Themeda triandra*	*Capillipedium spicigerum* *Dichanthium tenue* *Imperata cylindrica* *Oplismenus aemulus* *Oplismenus imbecillis* *Paspalidium distans* *Poa labillardierei* *Sarga leiocladum* *Themeda triandra*	*Bothriochloa decipiens* *Capillipedium spicigerum* *Dichanthium setosum* *Eragrostis brownii* *Heteropogon contortus* *Imperata cylindrica* *Panicum effusum* *Panicum simile* *Sarga leiocladum* *Themeda triandra*	*Aristida gracilipes* *Bothriochloa macra* *Capillipedium spicigerum* *Digitaria divaricatissima* *Heteropogon contortus* *Imperata cylindrica* *Panicum effusum* *Panicum simile* *Themeda triandra*	*Aristida gracilipes* *Capillipedium spicigerum* *Eragrostis brownii* *Heteropogon contortus* *Imperata cylindrica* *Panicum effusum* *Panicum simile* *Sarga leiocladum* *Themeda triandra*	*Aristida gracilipes* *Bothriochloa macra* *Capillipedium spicigerum* *Dichanthium setosum* *Eragrostis sororia* *Heteropogon contortus* *Imperata cylindrica* *Panicum effusum* *Panicum simile* *Themeda triandra*	*Aristida gracilipes* *Bothriochloa decipiens* *Bothriochloa macra* *Capillipedium spicigerum* *Eriochloa crebra* *Heteropogon contortus* *Imperata cylindrica* *Panicum effusum* *Themeda triandra*
	Total number of native grass species (Grass Richness)	10	16	9	8	3	5	7	8	9	10	9	9	10	9
	List native forbs and other	*Adiantum atroviride* *Apowollastonia spilanthoides* *Chelianthes sieberi* *Coleus australis* *Cyanthillium cinereum* *Cymbidium suave* *Cyperus gracilis* *Desmodium brachypodum* *Desmodium gunnii* *Desmodium rhytidophyllum* *Desmodium varians* *Dianella longifolia* *Dichondra repens* *Einadia hastata* *Eustrephus latifolius* *Galactia tenuiflora* *Geranium gardneri* *Glycine clandestina* *Ipomoea plebeia* *Lobelia purpurascens* *Lomandra multiflora* *Oplismenus aemulus* *Oxalis exilis* *Pigea stellarioides* *Rubus parviflorus* *Scleria mackaviensis* *Senecio quadridentatus* *Smilax australis* *Trema tomentosa* *Verbena africana* *Vittadinia sulcata*	*Apowollastonia spilanthoides* *Chamaecrista nomame* *Chelianthes sieberi* *Coleus australis* *Crassocephalum crepidioides* *Crotalaria montana* *Cyanthillium cinereum* *Cyperus gracilis* *Desmodium brachypodum* *Desmodium gunnii* *Desmodium rhytidophyllum* *Desmodium varians* *Dianella longifolia* *Dichondra repens* *Eustrephus latifolius* *Gahnia subaequiglumis* *Galactia tenuiflora* *Geranium gardneri* *Glossocardia bidens* *Glycine clandestina* *Lespedeza juncea* *Lobelia purpurascens* *Lomandra multiflora* *Oplismenus aemulus* *Pigea stellarioides* *Scleria mackaviensis* *Senecio quadridentatus* *Sida subspicata* *Smilax australis* *Trema tomentosa* *Verbena africana* *Vittadinia dissecta* *Vittadinia sulcata*	*Apowollastonia spilanthoides* *Chelianthes sieberi* *Chrysocephalum apiculatum* *Crotalaria montana* *Cyanthillium cinereum* *Cyperus cyperoides* *Cyperus gracilis* *Desmodium rhytidophyllum* *Desmodium varians* *Dianella brevipedunculata* *Dianella longifolia* *Dichondra repens* *Euchiton sphaericum* *Galactia tenuiflora* *Glossocardia bidens* *Glycine latifolia* *Glycine tabacina* *Indigofera linnaei* *Ipomoea plebeia* *Lespedeza juncea* *Lomandra multiflora* *Mentha satureioides* *Oxalis exilis* *Rhynchosia minima* *Scleria mackaviensis* *Sida subspicata* *Tephrosia baueri* *Vittadinia sulcata* *Zornia dyctiocarpa*	*Adiantum hispidulum* *Apowollastonia spilanthoides* *Asperula charophyton* *Chrysocephalum apiculatum* *Crotalaria brevis* *Cyanthillium cinereum* *Cyanthillium cinereum* *Cyclophyllum leptophyllum* *Cyperus cyperoides* *Cyperus gracilis* *Cyperus gracilis* *Daucus glochidiatus* *Desmodium gunnii* *Desmodium rhytidophyllum* *Desmodium varians* *Dichondra repens* *Eustrephus latifolius* *Galactia tenuiflora* *Geranium gardneri* *Glossocardia bidens* *Glycine tabacina* *Hydrocotyle laxiflora* *Lespedeza juncea* *Lobelia purpurascens* *Oxalis chnoodes* *Oxalis exilis* *Oxalis exilis* *Plantago debilis* *Ranunculus plebeius* *Scleria mackaviensis* *Viola betonicifolia* *Wahlenbergia communis*	*Brunoniella australis* *Chelianthes distans* *Chrysocephalum apiculatum* *Cyanthillium cinereum* *Cyperus gracilis* *Daucus glochidiatus* *Dichondra repens* *Euphorbia hirta* *Glycine latifolia* *Glycine tabacina* *Indigofera linnaei* *Lespedeza juncea* *Panicum simile* *Scleria mackaviensis* *Sida fibulifera*	*Cheilanthes sieberi* *Cyanthillium cinereum* *Cyperus cyperoides* *Desmodium rhytidophyllum* *Desmodium varians* *Gahnia aspera* *Galactia tenuiflora* *Glycine latifolia* *Glycine tomentella* *Indigofera linnaei* *Lespedeza juncea* *Mentha satureioides* *Oxalis exilis* *Phyllanthus similis* *Scleria mackaviensis* *Vittadinia sulcata* *Zornia dyctiocarpa*	*Cassytha pubescens* *Cheilanthes sieberi* *Chrysocephalum apiculatum* *Crotalaria lanceolata* *Crotalaria montana* *Cyperus cyperoides* *Cyperus gracilis* *Desmodium rhytidophyllum* *Desmodium varians* *Galactia tenuiflora* *Glycine latifolia* *Indigofera linnaei* *Ipomoea plebeia* *Lespedeza juncea* *Pterocaulon redolens* *Rhynchosia minima* *Vittadinia scabra*	*Boerhavia dominii* *Cassytha pubescens* *Centella asiatica* *Cheilanthes sieberi* *Chrysocephalum apiculatum* *Cyperus cyperoides* *Desmodium varians* *Dichondra repens* *Euphorbia dallachyana* *Galactia tenuiflora* *Glossocardia bidens* *Glycine latifolia* *Glycine stenophita* *Glycine tomentella* *Hypericum gramineum* *Indigofera linnaei* *Lobelia concolor* *Phyllanthus similis* *Pigea stellarioides* *Pimelea glauca* *Rumex brownii* *Schenkia australis* *Scleria mackaviensis* *Tephrosia baueri* *Verbena africana* *Zornia dyctiocarpa*	*Ajuga australis* *Apowollastonia spilanthoides* *Asperula charophyton* *Chamaecrista nomame* *Crotalaria brevis* *Cyanthillium cinereum* *Desmodium brachypodum* *Desmodium gunnii* *Desmodium rhytidophyllum* *Desmodium varians* *Dichondra repens* *Eremophila debilis* *Gahnia aspera* *Galactia tenuiflora* *Glycine tabacina* *Glycine tomentella* *Hardenbergia violacea* *Lespedeza juncea* *Lomandra longifolia* *Lomandra multiflora* *Ranunculus plebeius* *Schenkia australis* *Scleria mackaviensis* *Swainsona galegifolia* *Tephrosia baueri?* *Verbena africana*	*Apowollastonia spilanthoides* *Calotis cuneifolia* *Centella asiatica* *Cheilanthes sieberi* *Crotalaria montana* *Cyanthillium cinereum* *Cyperus cyperoides* *Desmodium gunnii* *Desmodium rhytidophyllum* *Desmodium varians* *Dianella brevipedunculata* *Dianella caerulea* *Dianella longifolia* *Dichondra repens* *Digitaria didactyla* *Eremophila debilis* *Euphorbia dallachyana* *Fimbristylis dichotoma* *Gahnia aspera* *Galactia tenuiflora* *Geranium gardneri* *Geranium homeanum* *Glycine latifolia* *Glycine tabacina* *Hydrocotyle laxiflora* *Hydrocotyle laxiflora* *Hypericum gramineum* *Jasminum lineare* *Lespedeza juncea* *Lobelia concolor* *Mentha satureioides* *Oxalis exilis* *Phyllanthus similis* *Phyllanthus similis* *Pigea stellarioides* *Poa labillardierei* *Polygala sp.* *Rhodanthe anthemoides* *Rostellularia obtusa* *Schenkia australis* *Scleria mackaviensis* *Swainsona galegifolia* *Verbena africana* *Vittadinia sulcata* *Wahlenbergia communis*	*Adiantum atroviride* *Apowollastonia spilanthoides* *Chelianthes distans* *Chelianthes sieberi* *Cyanthillium cinereum* *Cyperus cyperoides* *Desmodium rhytidophyllum* *Desmodium varians* *Dianella brevipedunculata* *Dianella longifolia* *Dichondra repens* *Digitaria didactyla* *Eremophila debilis* *Euphorbia dallachyana* *Galactia tenuiflora* *Geranium gardneri* *Glycine clandestina* *Glycine latifolia* *Glycine stenophita* *Glycine tomentella* *Hydrocotyle laxiflora* *Hydrocotyle laxiflora* *Hypericum gramineum* *Lespedeza juncea* *Lobelia purpurascens* *Mentha satureioides* *Oxalis exilis* *Phyllanthus similis* *Phyllanthus similis* *Pigea stellarioides* *Pimelea glauca* *Rostellularia obtusa* *Schenkia australis* *Scleria mackaviensis* *Verbena africana* *Vittadinia sulcata* *Wahlenbergia communis* *Zornia dyctiocarpa*	*Ajuga australis* *Apowollastonia spilanthoides* *Centella asiatica* *Cheilanthes sieberi* *Chrysocephalum apiculatum* *Cyanthillium cinereum* *Cyperus cyperoides* *Desmodium gangeticum* *Desmodium gunnii* *Desmodium rhytidophyllum* *Desmodium varians* *Dianella brevipedunculata* *Dianella longifolia* *Dichondra repens* *Digitaria didactyla* *Eremophila debilis* *Euphorbia dallachyana* *Galactia tenuiflora* *Geitonoplesium cymosum* *Geranium gardneri* *Glycine clandestina* *Glycine latifolia* *Glycine stenophita* *Glycine tomentella* *Hydrocotyle laxiflora* *Hydrocotyle laxiflora* *Hypericum gramineum* *Lespedeza juncea* *Lobelia purpurascens* *Mentha satureioides* *Oxalis exilis* *Phyllanthus similis* *Phyllanthus similis* *Picris angustifolia* *Pimelea linifolia* *Rhodanthe anthemoides* *Rhynchosia minima* *Schenkia australis* *Scleria mackaviensis* *Sigesbeckia orientalis* *Swainsona galegifolia* *Tephrosia baueri* *Verbena africana* *Vittadinia sulcata* *Wahlenbergia communis* *Wahlenbergia gracilis*	*Centella asiatica* *Cheilanthes sieberi* *Crotalaria montana* *Cyanthillium cinereum* *Cyperus cyperoides* *Desmodium rhytidophyllum* *Desmodium varians* *Dichondra repens* *Digitaria didactyla* *Euphorbia dallachyana* *Fimbristylis dichotoma* *Gahnia aspera* *Galactia tenuiflora* *Geranium gardneri* *Glycine latifolia* *Glycine stenophita* *Hydrocotyle laxiflora* *Hypericum gramineum* *Jasminum lineare* *Lagenifera sp.* *Lespedeza juncea* *Lobelia concolor* *Mentha satureioides* *Oxalis exilis* *Phyllanthus similis* *Phyllanthus similis* *Pigea stellarioides* *Pimelea glauca* *Rostellularia obtusa* *Schenkia australis* *Scleria mackaviensis* *Verbena africana* *Vittadinia sulcata* *Wahlenbergia communis* *Zornia dyctiocarpa*	*Centella asiatica* *Cheilanthes sieberi* *Cyperus cyperoides* *Desmodium varians* *Dichondra repens* *Euphorbia dallachyana* *Geranium gardneri* *Glycine latifolia* *Glycine stenophita* *Glycine stenophita* *Hydrocotyle laxiflora* *Hypericum gramineum* *Lespedeza juncea* *Lobelia concolor* *Oxalis exilis* *Phyllanthus similis* *Pigea stellarioides* *Rumex brownii* *Schenkia australis* *Verbena africana*
	Total number of native forbs and other species (Forbs Richness)	31	34	29	32	15	18	17	27	26	46	27	48	36	20

		AU1	AU1	AU2	AU2	AU2	AU2	AU3	AU3	AU4	AU4	AU5	AU5	AU6	AU6
Broad title	**Attribute**	**Ageratina riparia Bidens pilosa Co**	**Bidens pilosa Conyza bonariensis C**	**Ambrosia artemisiifolia Bidens pilosa**	**683-684**	**685-686**	**Dichanthium annulatumLantana c**	**687-688**	**Dichanthium annulatumEuphorbia hirta**	**680-681**	**Ambrosia artemisiifolia Aster subulatu**	**Bidens pilosa**	**Cirsium vulgareCrotalaria linifoliaDich**	**Aster subulatusDichanthium annula**	**Alternanthera nodifloraAmbrosia ar**
	Non native species	*Ageratina riparia* *Bidens pilosa* *Conyza bonariensis* *Crassocephalum crepidioides* *Crotalaria linearis* *Euphorbia hirta* *Lantana camara* *Macroptilium atropurpureum* *Malvastrum americanum* *Melinis repens* *Passiflora suberosa* *Passiflora subpeltata* *Solanum americanum* *Sonchus oleraceus* *Verbena bonariensis*	*Bidens pilosa* *Conyza bonariensis* *Crassocephalum crepidioides* *Crotalaria linearis* *Euphorbia hirta* *Gomphocarpus physocarpus* *Lantana camara* *Macroptilium atropurpureum* *Malvastrum americanum* *Melinis repens* *Passiflora suberosa* *Passiflora subpeltata* *Physalis peruviana* *Solanum americanum* *Verbena bonariensis*	*Ambrosia artemisiifolia* *Bidens pilosa* *Crassocephalum crepidioides* *Crotalaria linearis* *Euphorbia hirta* *Lantana camara* *Macroptilium atropurpureum* *Malvastrum americanum* *Melinis repens* *Senecio madagascariensis* *Solanum americanum* *Sonchus oleraceus* *Sporobolus fertilis* *Tridax procumbens* *Verbena littoralis*	*Bidens pilosa* *Cirsium vulgare* *Gomphocarpus physocarpus* *Macroptilium lathyroides* *Sigesbeckia orientalis* *Verbena litoralis* *Digitaria didactyla* *Melinis repens* *Lantana camara*	*Bidens pilosa* *Cirsium vulgare* *Crotalaria lanceolata* *Gomphocarpus physocarpus* *Malvastrum americanum* *Physalis angulata* *Senecio madagascariensis* *Tridax procumbens* *Verbena litoralis* *Melinis repens* *Sporobolus fertilis* *Lantana camara*	*Dichanthium annulatum* *Lantana camara* *Macroptilium atropurpureum* *Melinis repens* *Senecio madagascariensis* *Sonchus oleraceus* *Verbena littoralis*	*Ambrosia artemisiifolia* *Bidens pilosa* *Cirsium vulgare* *Euphorbia hirta* *Senecio madagascariensis* *Sigesbeckia orientalis* *Tridax procumbens* *Lantana camara*	*Dichanthium annulatum* *Euphorbia hirta* *Gomphocarpus physocarpus* *Macroptilium atropurpureum* *Melinis repens* *Neonotonia wightii* *Senecio madagascariensis* *Sida retusa* *Tridax procumbens* *Verbena bonariensis* *Verbena littoralis*	*Ambrosia artemisiifolia* *Bidens pilosa* *Erigeron bonariensis* *Passiflora suberosa* *Sigesbeckia orientalis* *Lantana camara* *Verbena litoralis*	*Ambrosia artemisiifolia* *Aster subulatus* *Euphorbia hirta* *Gomphocarpus physocarpus* *Macroptiloma* *Senecio madagascariensis* *Sida retusa* *Tagetes minuta* *Verbena bonariensis* *Verbena littoralis*	*Bidens pilosa* *Celtis sinensis* *Cirsium vulgare* *Crotalaria linearis* *Dichanthium annulatum* *Lantana camara* *Macroptilium atropurpureum* *Melinis repens* *Senecio madagascariensis* *Sonchus oleraceus* *Tridax procumbens* *verbena littoralis*	*Cirsium vulgare* *Crotalaria linifolia* *Dichanthium annulatum* *Emilia sonchifolia* *Euphorbia hirta* *Gomphocarpus physocarpus* *Macroptilium atropurpureum* *Malvastrum americanum* *Melinis repens* *Senecio madagascariensis* *Sida retusa* *Tagetes minuta* *Verbena bonariensis* *Verbena littoralis*	*Aster subulatus* *Dichanthium annulatum* *Euphorbia hirta* *Gomphocarpus physocarpus* *Polygala duarteana* *Senecio madagascariensis* *Sida retusa* *Verbena bonariensis* *Verbena littoralis*	*Alternanthera nodiflora* *Ambrosia artemisiifolia* *Aster subulatus* *Chloris gayana* *Cyclophyllum leptophyllum* *Dichanthium annulatum* *Euphorbia hirta* *Gomphocarpus physocarpus* *Macroptilium atropurpureum* *Neonotonia wightii* *Senecio madagascariensis* *Setaria sphacelata* *Sida retusa* *Verbena bonariensis* *Verbena littoralis*
	Non native % cover	40	15	5	20	35	15	30	10	10	35	20	20	20	80
Five 1x1m plots	Plot 1 Native perenial ('decreaser') grass cover %	20	30	5	35	80	7	70	5	30				0	0
	Plot 1 Native other grass (if relevant) %	5	40	15	0	0	54	0	30	0	57		57	10	25
	Plot 1 Native forbs and other species %	4		6	15	5	3	20	5	0	10	2	10	0	0
	Plot 1 Native shrubs <1m %				0	0	17	0		60		52		0	0
	Plot 1 Non-native grass %			45	0	5	9	0		0		40		80	75
	Plot 1 Non-native forbs and shrubs %	55	20	9	35	0	6	10		10	33	2	33	0	0
	Plot 1 Litter %	6	10	20	15	0	4	0	10	0		1		0	0
	Plot 1 Rock %	10			0	5		0		0		2		0	0
	Plot 1 Bare ground %				0	5		0	50	0		1		10	0
	Plot 1 Cryptograms %				0	0		0		0				0	0
	Plot 1 Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Plot 2 Native perenial ('decreaser') grass cover %	35	36		20	85		80		45	10	44	60	5	0
	Plot 2 Native other grass (if relevant) %	6	9	10	0	0	20	0		0		10	10	10	0
	Plot 2 Native forbs and other species %	3	3	8	25	5	3	10		15		3	5	10	0
	Plot 2 Native shrubs <1m %				0	0		0		0	5			0	0
	Plot 2 Non-native grass %			60	0	0	60	5	10	0		20		65	95
	Plot 2 Non-native forbs and shrubs %	50	46	12	50	5	12	5		30	80	11		5	0
	Plot 2 Litter %	6	6	10	0	0		0	5	10	5		20	0	0
	Plot 2 Rock %				0	0		0	5	0		7		0	0
	Plot 2 Bare ground %				5	5	5	0	80	0		5	5	5	5
	Plot 2 Cryptograms %				0	0		0		0				0	0
	Plot 2 Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Plot 3 Native perenial ('decreaser') grass cover %	55	55	11	75	90	7	90		70	35	45	15	5	0
	Plot 3 Native other grass (if relevant) %		30	19	0	0	40	0	25	0		15	70	5	0
	Plot 3 Native forbs and other species %	1	5	30	15	5		5	5	15	5	5	5	5	0
	Plot 3 Native shrubs <1m %				0	0	44	0		0				0	0
	Plot 3 Non-native grass %	4		8	0	0	6	0	60	0		7	5	85	85
	Plot 3 Non-native forbs and shrubs %	40		7	5	5	3	0		0	25	6	5	0	10
	Plot 3 Litter %		10	18	5	0		0	4	10	30			0	0
	Plot 3 Rock %			7	0	0		5		0		8		0	0
	Plot 3 Bare ground %				0	0		0	5	5	5	5		0	5
	Plot 3 Cryptograms %				0	0		0	1	0		9		0	0
	Plot 3 Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Plot 4 Native perenial ('decreaser') grass cover %		15		85	50		75	5	90	15	56	5	0	0
	Plot 4 Native other grass (if relevant) %	40	70	66	0	0	35	0	50	0			20	5	0
	Plot 4 Native forbs and other species %			9	5	0	2	10	5	5	10	3	5	0	0
	Plot 4 Native shrubs <1m %				0	0	30	0		0		10		0	0
	Plot 4 Non-native grass %			5	0	0	3	0	30	0		5		70	95
	Plot 4 Non-native forbs and shrubs %	55	5	7	5	40	30	10		0	30	15	60	10	0
	Plot 4 Litter %	5	5	6	5	10		5		5	30	4	10	0	0
	Plot 4 Rock %				0	0		0		0		7		0	0
	Plot 4 Bare ground %		5	5	0	0		0	10	0	15			15	5
	Plot 4 Cryptograms %			2	0	0		0		0				0	0
	Plot 4 Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Plot 5 Native perenial ('decreaser') grass cover %		60		30	50	9	70	10	40		7	20	30	0
	Plot 5 Native other grass (if relevant) %	20	25	27	0	0		0	50	0	40		60	50	0
	Plot 5 Native forbs and other species %	25	10	4	10	10	8	10		10			15	10	0
	Plot 5 Native shrubs <1m %			40	0	0		0		0		80		5	0
	Plot 5 Non-native grass %			26	0	0	63	0	30	0		7		0	95
	Plot 5 Non-native forbs and shrubs %	45			50	40	12	5		30	60	5	5	0	5
	Plot 5 Litter %	10	5	3	10	0	2	10	5	20		1		0	0
	Plot 5 Rock %				0	0		5		0				0	0
	Plot 5 Bare ground %				0	0	6	0	4	0				5	0
	Plot 5 Cryptograms %				0	0		0	1	0				0	0
	Plot 5 Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Mean of all Plots Native perenial ('decreaser') grass cover %	22	27.2	3.2	43	61	2.8	63	2	47	12	29	16	2	0
	Mean of all Plots Native other grass (if relevant) %	10.2	29.8	22	0	0	29.8	0	21	0	11.4	5	31.4	6	5
	Mean of all Plots Native forbs and other species %	1.6	1.6	10.6	12	3	1.6	9	3	7	5	2.6	5	3	0
	Mean of all Plots Native shrubs <1m %	0	0	0	0	0	18.2	0	0	12	1	12.4	0	0	0
	Mean of all Plots Non-native grass %	0.8	0	23.6	0	1	15.6	1	20	0	0	14.4	1	60	70
	Mean of all Plots Non-native forbs and shrubs %	40	14.2	7	19	10	10.2	5	0	8	33.6	6.8	19.6	3	2
	Mean of all Plots Litter %	3.4	6.2	10.8	5	2	0.8	1	3.8	5	13	1	6	0	0
	Mean of all Plots Rock %	2	0	1.4	0	1	0	1	1	0	0	4.8	0	0	0
	Mean of all Plots Bare ground %	0	1	1	1	2	1	0	29	1	4	2.2	1	6	3
	Mean of all Plots Cryptograms %	0	0	0.4	0	0	0	0	0.2	0	0	1.8	0	0	0
100m Transect	Canopy Total (m)	44.1	83	23.5	43.5	3	35	28	28	35	27	44	40.5	0	0
	Sub canopy total (m)	17.5	1	6	7	3	11.5	7	3.5	14	0	5	10.5	0	0
	Emergent canopy total (m)	0	0	0	0	4	0	0	0	0	0	0	0	6	0
	Native Shrub total (m)	1	0	1.5	4.5	0	19	0	0	3	1	2	1	0	0
	Exotic Shrub total (m)	32	2.5	1	18	5	8	0.5	3.5	3	38	3.5	0.5	0	0

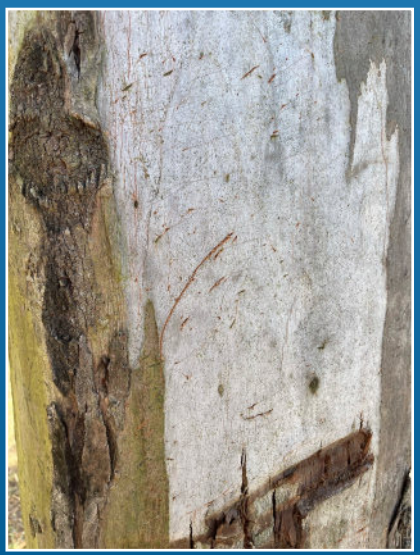
APPENDIX 2

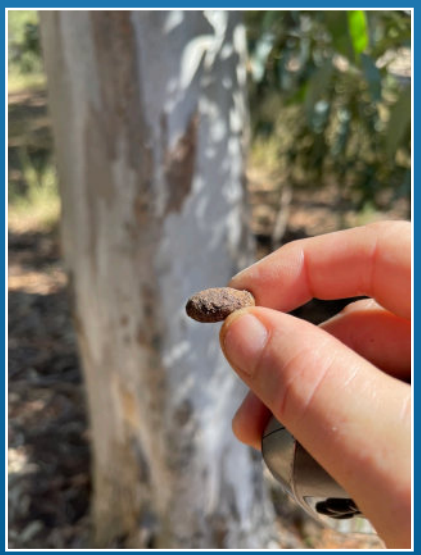
March 2022 Koala Thermal Survey Report

Koala Survey and Monitoring
for the
Coomera Connector Project

Thermal koala survey

Farringdon Road Site 17-18 March 2022





Farringdon Road site thermal drone survey for koalas for the Coomera Connector project.

17-18 March 2022

Background and methods

Endeavour Veterinary Ecology (EVE) was requested by the Department of Transport and Main Roads (TMR) Coomera Connector project team to conduct a preliminary survey of a potential offset property in the Scenic Rim to determine the presence and relative abundance of koalas. This was desirable to add to the existing historic records of koala sightings in the area and allow a more informed assessment of the suitability of the site as a potential offset for koala habitat.

A thermal-imaging drone survey was conducted over one night from the 17-18 March between 23:00 hrs and 02:00 hrs using a DJI Matrice 300 RTK drone with a payload of a dual optical and thermal camera (H20T) and spotlight. The survey covered approximately 200 ha of the western third of the site (Lots: 3 RP32561, 174 W311810, 296 W312231, 85 W311299), and some adjacent bushland habitat to the northwest. Thermal heat signatures suggestive of koalas were investigated, and verification and optical light photographs were taken with illumination by a drone-mounted spotlight. When a koala was detected, the GPS location was acquired using a drone-mounted laser rangefinder and the position recorded. Koala locations and drone flight paths were plotted on Google Earth.

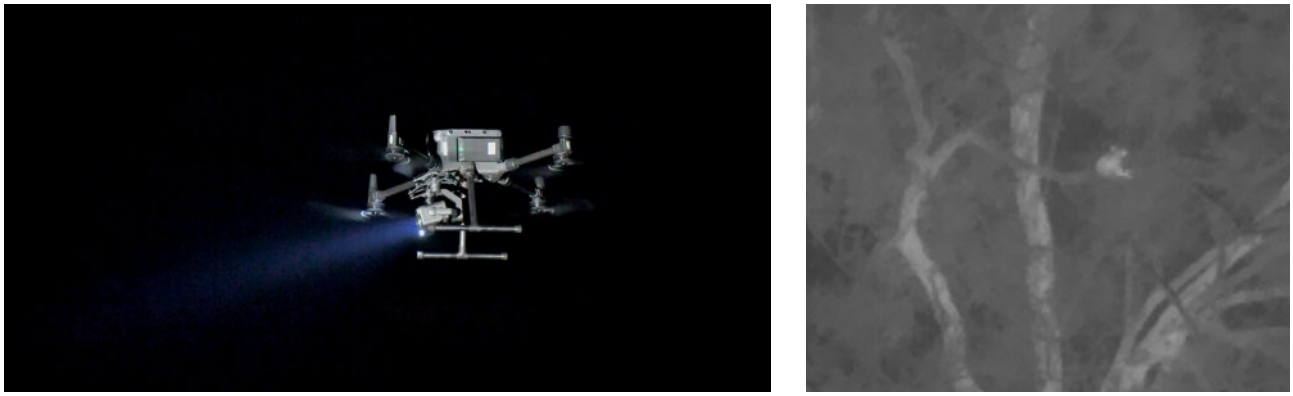


Figure 1: DJI Matrice 300 RTK drone with H20T (thermal and optical) camera and GL-60 Zoom spotlight in flight (left image) and thermal image of typical koala detection (right image).

Results and discussion

Two koalas were detected in a search of approximately 200 ha of habitat, on and adjacent to the site (Figure 2 (overleaf)). One koala was a female and the other a male (Figure 3 (overleaf)). Based on our finding of two koalas in an approximately 200 ha search area, and allowing for a detection probability of 0.9 (90%), we estimate that the target property probably supports four or five koalas. Although this figure appears low for the area/size, several reasons can explain an abundance well below the apparent habitat carrying capacity.

Typically, better koala habitat occurs on nutrient-rich alluvial soils, and this vegetation is often cleared for grazing. In addition, chlamydial disease, severe drought and heatwave conditions, livestock-caused mortality, and predation can explain the density of koalas at the site being somewhat less that what it might otherwise be able to sustainably carry.

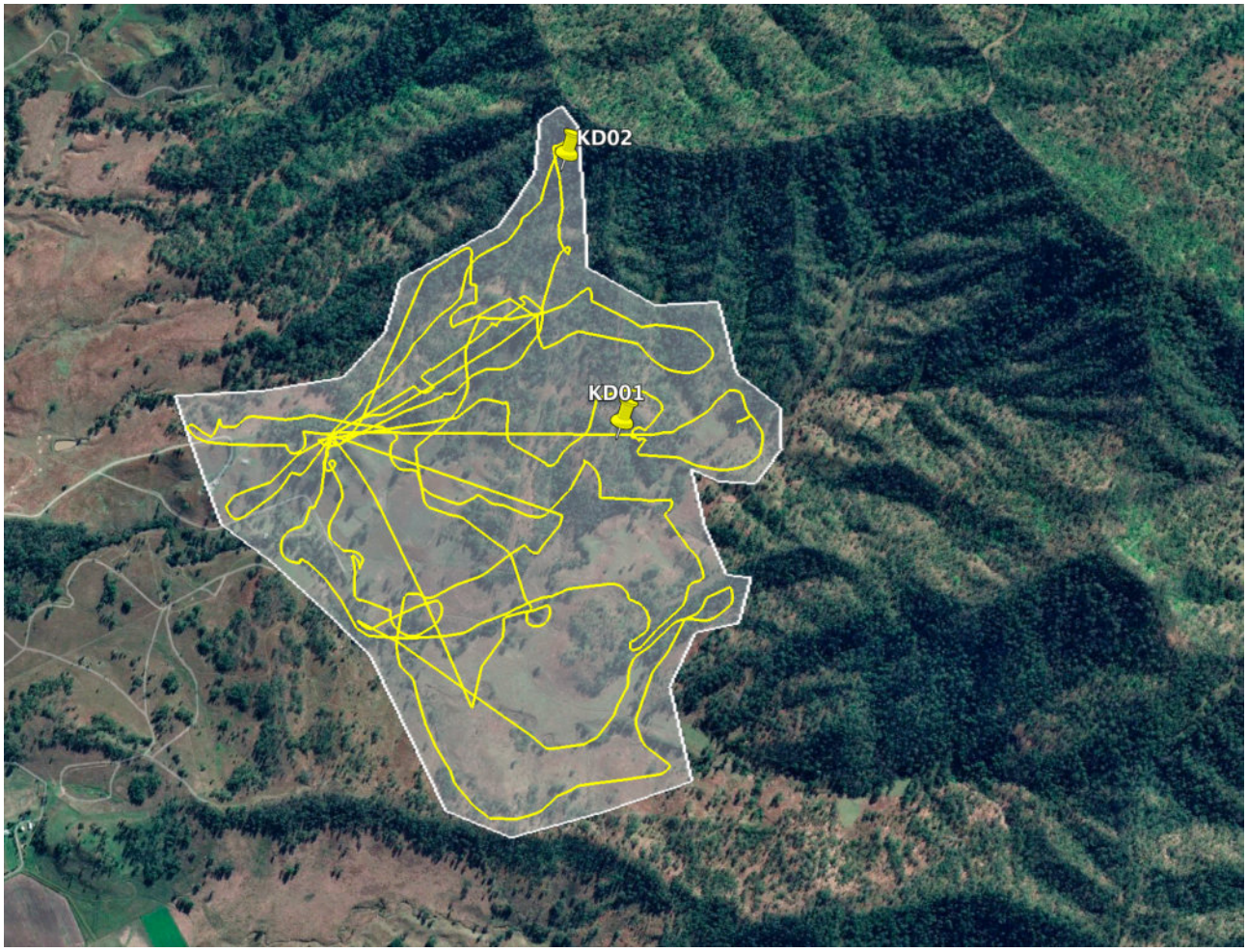


Figure 2: Location of the two koalas detected during the thermal drone survey. Drone flight paths are shown as yellow lines. The White shaded polygon is approximately 200 ha, and includes some habitat to the west of the target property (See figure 3, overleaf).

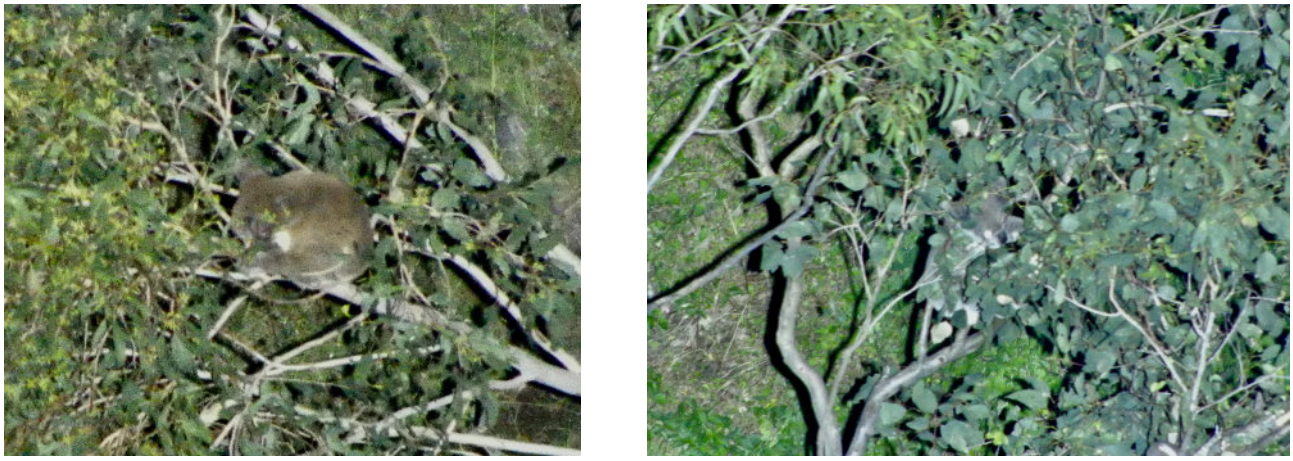


Figure 3: Male koala detected within the target property (left) and female koala detected just to the north-west of the target property (right).

Acquisition of the site for koala conservation, with associated habitat restoration and improvement, removal of livestock, careful monitoring and management of predation and disease impacts, and planting of heat refuge species to provide favourable microclimate conditions at various locations on the site, are all actions that could be expected to provide significant and durable benefits for the local koala population.

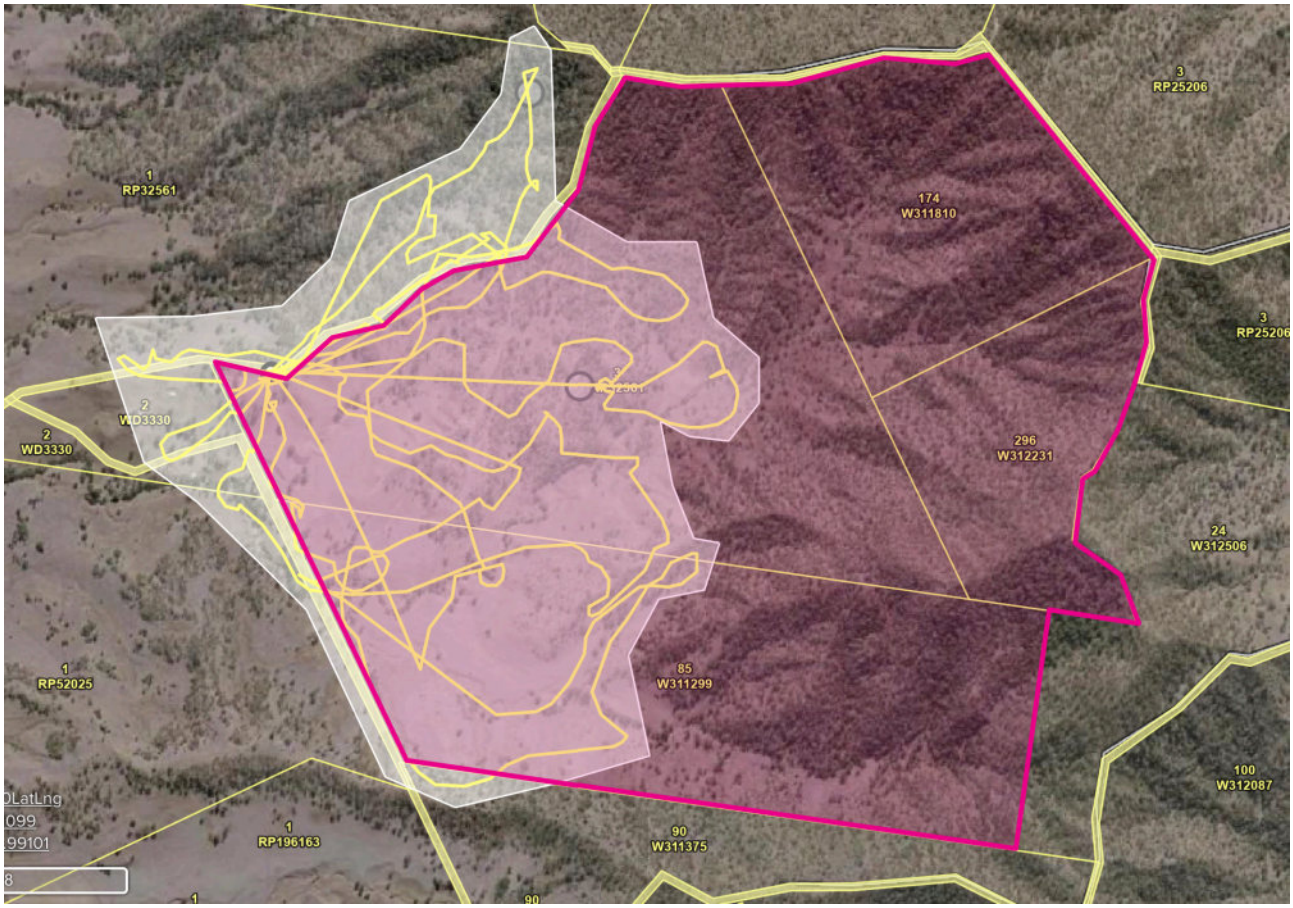


Figure 4. Drone survey area shown in white shading (with yellow lines showing drone flight paths) and target property in Magenta. The two koala detections are shown by small circles. One is to the north-west of the target property boundary.

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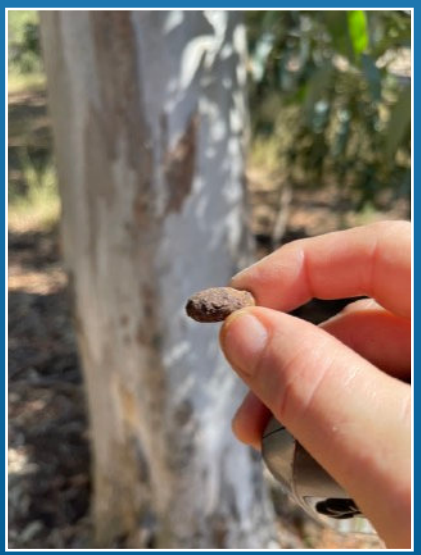
APPENDIX 3

May 2022 Koala Thermal Survey Report

Koala Survey and Monitoring
for the
Coomera Connector Project

Thermal koala survey (#2)

Farringdon Road Site 19-20 May 2022



Farringdon Road site thermal drone survey for koalas for the Coomera Connector project.

19-20 May 2022

Background and methods

Endeavour Veterinary Ecology (EVE) was requested by the Department of Transport and Main Roads (TMR) Coomera Connector project team to conduct a second survey of an offset property at Tabooba, in the Scenic Rim LGA, to determine the presence and relative abundance of koalas. This was to add data to a preliminary survey conducted by us on 18-19th March 2022 during which two koalas were detected in a survey of the western half of the site.

A thermal-imaging drone survey was conducted over one night from the 19th-20th May 2022 between 19:00 hrs and 02:00 hrs using a DJI Matrice 300 RTK drone with a payload of a dual optical and thermal camera (H20T) and spotlight. The survey covered approximately 107 ha of the central northern third of the site, focussing on the southern slopes of the ridge-line bordering the north of the site. Thermal heat signatures suggestive of koalas were investigated, and verification and optical light photographs were taken with illumination by a drone-mounted spotlight. When a koala was detected, the GPS location was acquired using a drone-mounted laser rangefinder and the position recorded. Koala locations and drone flight paths were plotted on Google Earth.

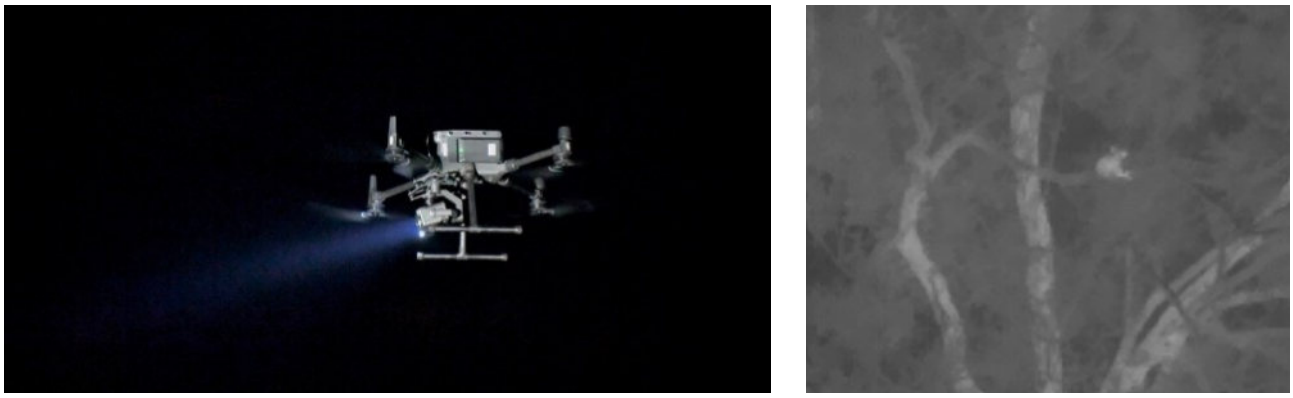


Figure 1: DJI Matrice 300 RTK drone with H20T (thermal and optical) camera and GL-60 Zoom spotlight in flight (left image) and thermal image of typical koala detection (right image).

Results

Eight (8) koalas were detected in a search of approximately 107 ha of habitat, mainly in the mid to upper southern slopes of the ridge bordering the north of the property (Figure 2 (overleaf)). Two koalas (detections KD04 and KD07) were female, and two were male (detections KD05 and KD10). The gender of the remaining four detections was not determined. Figure 3 (overleaf)). Based on our finding of eight koalas in an approximately 107 ha search area, and allowing for a detection probability of 0.9 (90%), this equates to a koala density of approximately 0.08 koalas per ha. This figure differs significantly from the figure derived from the initial survey, in which 2 koalas were detected in an approximately 200-ha survey polygon, resulting in a koala density estimate of 0.01 koala per ha. This demonstrates the significant variability in koala densities that can occur on a single site, and the importance of surveying a representative sample of habitat and geology/terrain types. (See Figure 5, on page 4, for results and survey area from the March (initial survey).

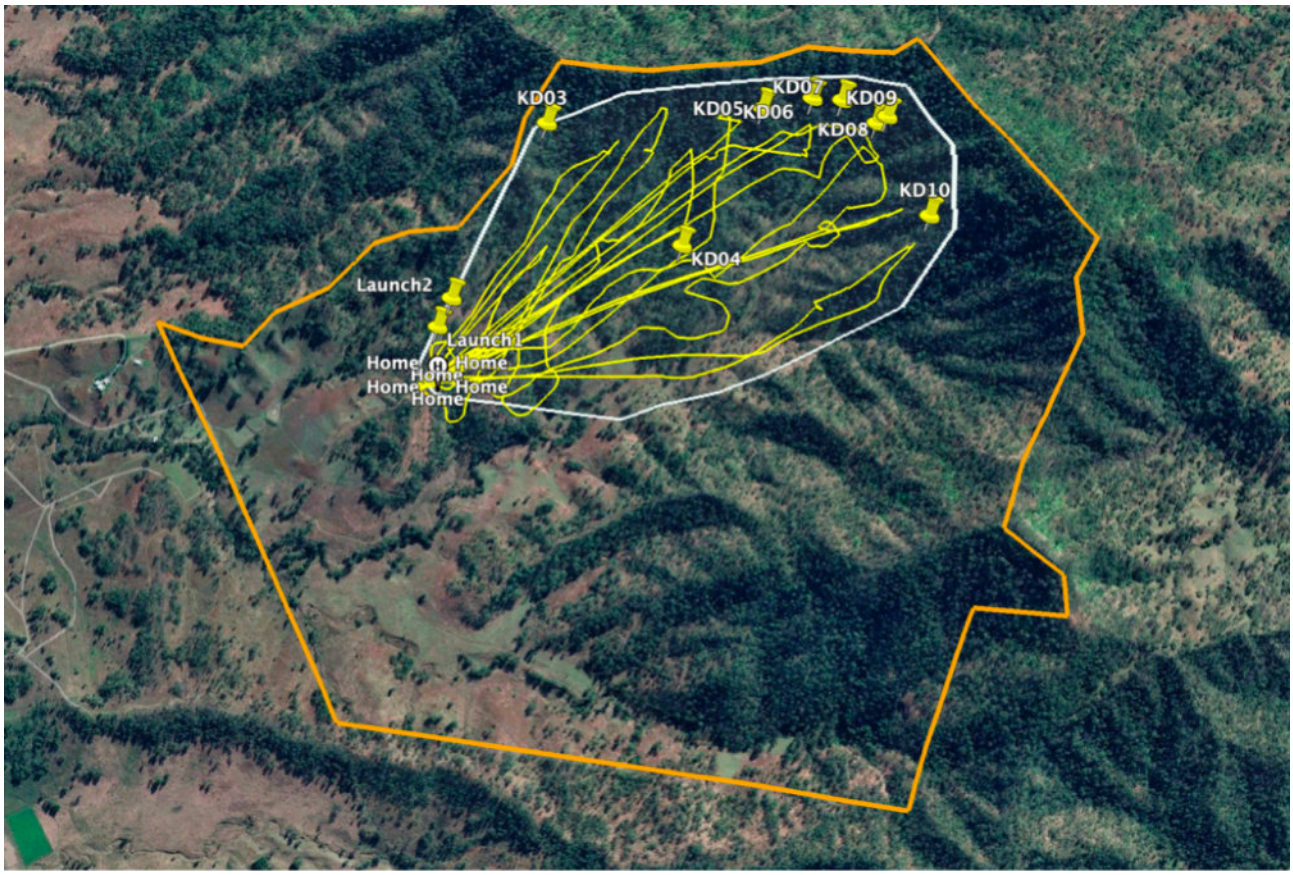


Figure 2: Drone flight paths (yellow lines) and koala detections (dropped pins) in the survey area (white outline). The property boundary is outlined in orange.

Figure 3: Location of the 8 koalas detected during the second thermal drone survey in May 2022, plus drone flight path and indicative survey area. Red dots indicate koalas for which gender was not determined, blue dots are males and green dots are females.

Survey polygons, drone flight paths and koala detections in the context of the site boundary and lot boundaries are shown in Figure 4, below. For reference, Figure 5 shows the initial survey data.

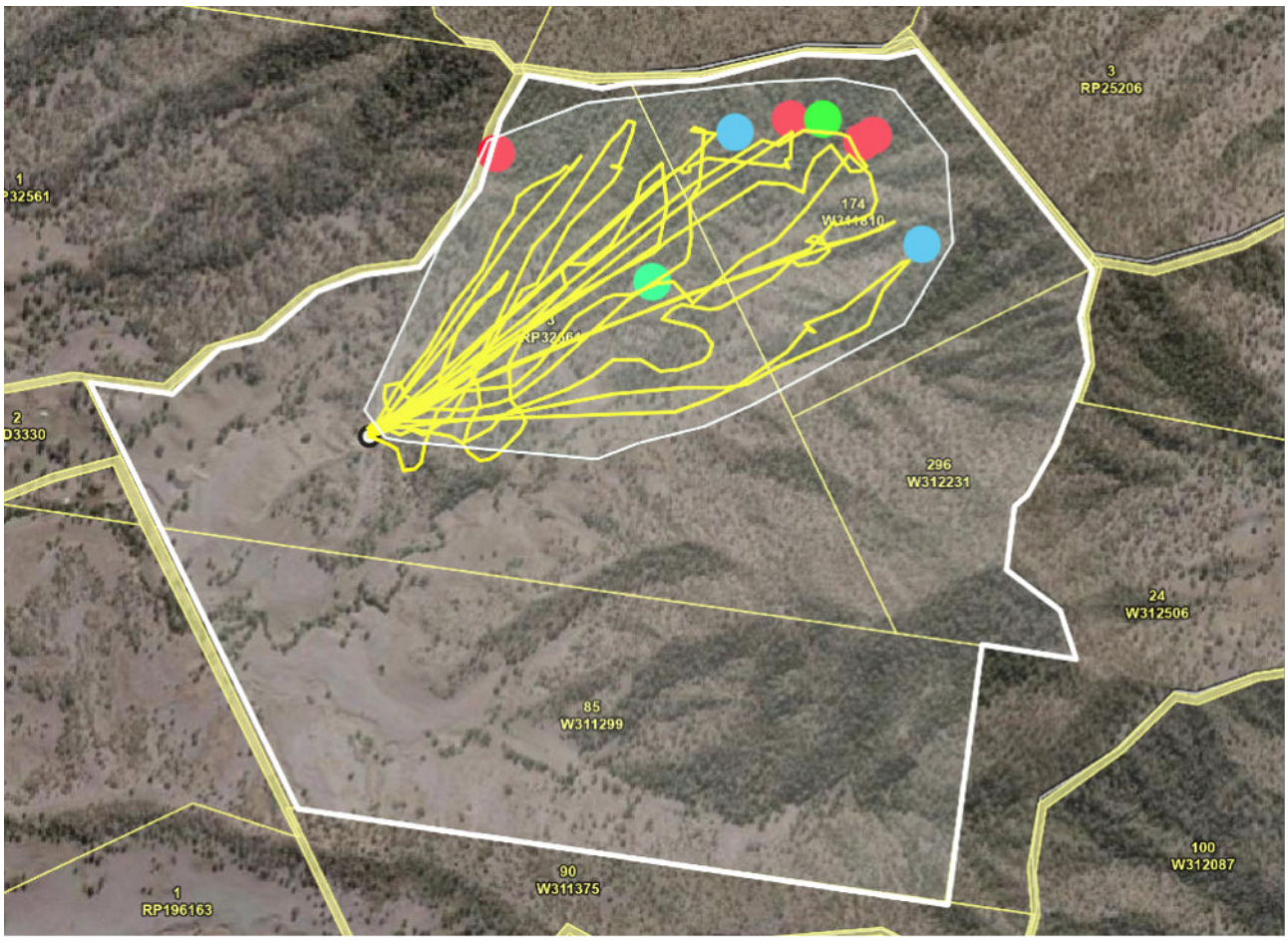


Figure 4: Property outline is shown in white with internal lot boundaries and lot/plan numbers in yellow. Thicker yellow lines indicate the drone flight path for the second drone survey, which focused on the ridge slopes. Koala detection are shown as coloured dots: red for gender not determined, green for females and blue for males.

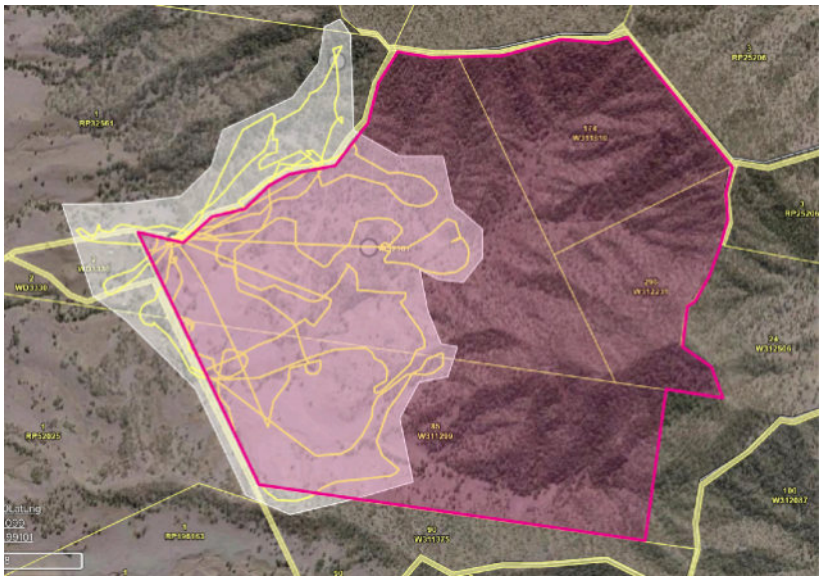


Figure 5. Initial (March 2022) drone survey area shown in white shading (with yellow lines showing drone flight paths) and target property in Magenta. The two koala detections are shown by small circles. One is to the north-west of the target property boundary.

Discussion

The second thermal survey detected eight koalas, most of which were located on the mid-upper slopes of the ridge which forms the northern border of the offset property. All koalas seemed to be at a similar elevation. Whether this is just by chance or due to microclimate or other conditions at the time is unknown. Taken together, the surveys indicate the variability in koala density across such a site, and the risks of not either surveying a sufficient representative sample or sufficient total area such that koala density and abundance across the whole site are misrepresented: the initial survey in March, which surveyed approximately 200 ha, resulted in only two koala detections, and a density estimate (corrected for a detection probability <1) of 0.01 koalas/ha, whereas the May survey, of only half that area, resulted in 8 koala detections, giving a corrected koala density of 0.08 koalas/ha.

Survey of the balance of this offset site was not possible at the time due to the constraints of access around the site caused by recent prolonged wet weather, and the range limitations of remotely-piloted systems (both technological and regulatory). Additional survey of the remains of the site (the south-eastern third) will be possible if current access tracks dry out and/or new all-weather access tracks are created.

The presence of such an abundance of koalas on the mid-upper slopes of the ridge was somewhat unexpected (by us) given that more nutrient-rich geology undoubtedly occurs on the lower slopes and flats. However, as is apparent, the lower slopes and flats are largely cleared and used for beef cattle production. Cattle are known to kill koalas, which are particularly susceptible when crossing open areas devoid of trees.

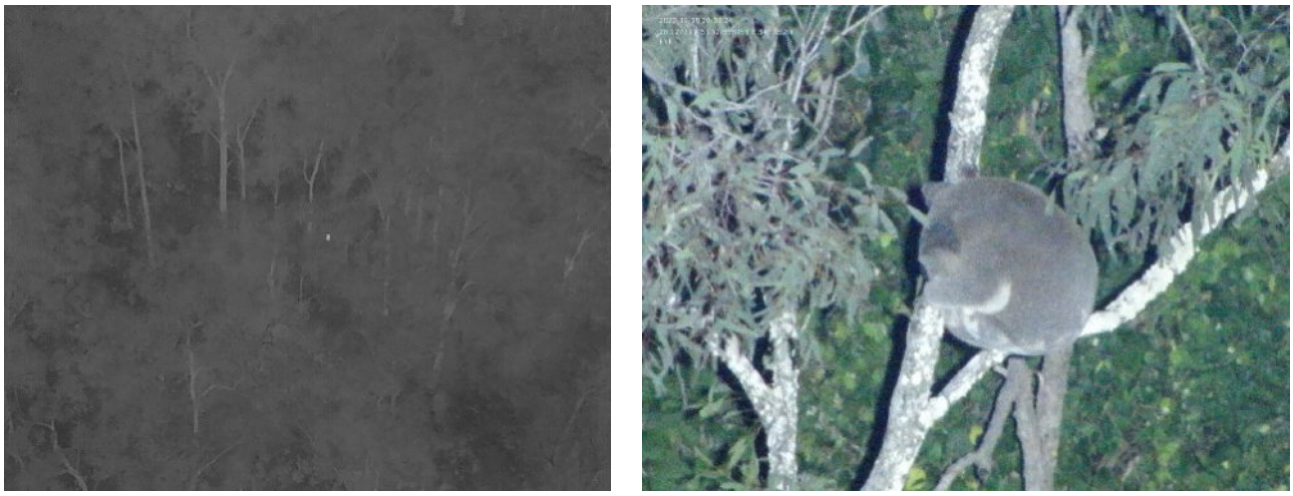


Figure 6: Thermal image showing koala detection with the thermal camera (left) and optical image with spotlight illumination, used to verify thermal detections.

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APPENDIX 3

GREENRIDGE FIELD ASSESSMENT RESULTS

GREENRIDGE OFFSET PROPERTY ASSESSMENT RESULTS

COOMERA CONNECTOR STAGE 1 - EPBC 2020/8646

Prepared for
Queensland Department of Transport and Main Road

Biodiversity Assessment and Management Pty Ltd
PO Box 1376
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BAAM
ECOLOGICAL CONSULTANTS

Document Control Sheet

File Number: 0101-030c

Project Manager/s: Paulette Jones

Client: Queensland Department of Transport and Main Roads

Project Title: Greenridge Offset Property Assessment Results
Coomera Connector Stage 1 - EPBC 2020/8646

Project Author/s: Paulette Jones, Elizabeth Williams, Emma Green and David Francis.

Project Summary: Report of field assessment undertaken to assess the suitability of the Greenridge, Pimpama property for Coastal Swamp Oak Threatened Ecological Community (TEC), Koala and Grey-headed Flying-fox offsets for Coomera Connector Project Stage 1.

Draft Preparation History:

Draft No.	Date draft completed	Reviewed by	Issued by
0101-030b Draft A	29/07/2022		Paulette Jones

Revision/ Checking History Track:

Version	Date of Issue	Checked by	Issued by
0101-030b Version 0	01/08/2022	Alan Key	Paulette Jones
0101-030b Version 1	30/09/2022	Jedd Appleton	Paulette Jones

Document Distribution:

Destination	Revision							
	1	Date Dispatched	2	Date Dispatched	3	Date Dispatched	4	Date Dispatched
Client Copy 1 - digital	A	29/07/2022	0	01/08/2022	1	30/09/2022		
PDF & Word document cloud backup	A	29/07/2022	0	01/08/2022	1	30/09/2022		

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Biodiversity Assessment and Management Pty Ltd has produced this report in its capacity as {consultants} for and on the request of the Queensland Department of Transport and Main Roads (the "Client") for the sole purpose of providing an assessment of the suitability of the Greenridge, Pimpama property for Coastal Swamp Oak Threatened Ecological Community (TEC), Koala and Grey-headed Flying-fox offsets for Stage 1 of the Coomera Connector Project (the "Specified Purpose"). This information and any recommendations in this report are particular to the Specified Purpose and are based on facts, matters and circumstances particular to the subject matter of the report and the Specified Purpose at the time of production. This report is not to be used, nor is it suitable, for any purpose other than the Specified Purpose. Biodiversity Assessment and Management Pty Ltd disclaims all liability for any loss and/or damage whatsoever arising either directly or indirectly as a result of any application, use or reliance upon the report for any purpose other than the Specified Purpose.

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Date: 30 September 2022

Managing Director

GREENRIDGE OFFSET PROPERTY

ASSESSMENT RESULTS

COOMERA CONNECTOR STAGE 1 – EPBC 2020/8646

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Table of Terms and Abbreviations

ALA	Atlas of Living Australia
AU	Assessment Unit
BAAM	Biodiversity Assessment and Management Pty Ltd
DAWE	Commonwealth Department of Agriculture, Water and Environment
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EVE	Endeavour Veterinary Ecology
GCCC	Gold Coast City Council
LGA	Local Government Area
MNES	Matters of national environmental significance
PER	Public Environmental Report
RE	Regional Ecosystem
RPAS	Remotely Piloted Aircraft System
SAT	Spot Assessment Technique of Phillips and Callaghan (2011)
TMR	Queensland Department of Transport and Main Roads
VM Act	*Vegetation Management Act 1999*

1.0 INTRODUCTION

1.1 OFFSET MATTERS

The Queensland Department of Transport and Main Roads (TMR) intended to construct and operate a new 16 km high-speed arterial road between Shipper Drive, Coomera and Nerang-Broadbeach Road, Nerang called the Coomera Connector Stage 1 (the proposed action).

The proposed action was the subject of an EPBC Act referral in June 2020 (EPBC 2020/8646). The referral decision was that the proposed action is a controlled action due to likely significant impacts on:

- Ramsar wetlands;
- Listed threatened species and communities; and
- Listed migratory species.

The proposed action is to be assessed by Public Environment Report (PER).

The extent and quality of matters of national environmental significance (MNES) that would be impacted by the proposed action have been confirmed through detailed ecological surveys. The results of these surveys and subsequent impact assessment are provided in the PER. Following the application of all possible avoidance and mitigation measures, the PER identifies significant residual impact of the proposed action on 61.486 ha of Koala habitat, 56.442 ha of Grey-headed Flying-fox habitat, and 15.0131 ha of Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland threatened ecological community ('Coastal Swamp Oak TEC') and a small (<1ha) area of Subtropical and Temperate Coastal Saltmarsh ecological community from within the proposed action footprint.

As detailed in the PER, there is no Ramsar wetland present within the proposed action footprint and no significant impact is predicted for habitats of listed Migratory species and therefore no offsets are proposed for these matters.

1.2 PURPOSE OF THIS REPORT

Biodiversity Assessment and Management Pty Ltd was commissioned by TMR to assess an Offset Investigation Area to inform the proposed action Offset Strategy. This report provides the results of surveys to determine the suitability of the Greenridge Offset Investigation Area to provide offsets for proposed action impacts to Koala *Phascolarctos cinereus* (EPBC Act Endangered – vulnerable at the time of the controlled action decision), Grey-headed Flying-fox *Pteropus poliocephalus* (EPBC Act Vulnerable) and Coastal Swamp Oak TEC (EPBC Act Endangered).

1.3 OFFSET SITE SELECTION

Relevant literature was reviewed to determine habitat types that are suitable for Koala and Grey-headed Flying-fox, and Coastal Swamp Oak TEC. Grey-headed Flying-fox habitat includes rainforest, mangroves and cultivated areas in its foraging options, and both Grey-headed Flying-fox and Koala forage in open forests and woodlands dominated by eucalyptus species. Communities of Coastal Swamp Oak occur typically in coastal catchments where soils are at least occasionally saturated, water-logged or inundated and typically where groundwater is saline or brackish. The TEC in Queensland is also known to occur as part of a mosaic habitat within RE 12.3.20 which also comprises foraging resources for both Koala and Grey-headed Flying-fox.

Potential offset properties/habitat were identified using the following criteria:

- Properties located within the same bioregion as the impact area and as close to the proposed action corridor as possible.

- Land owned by the Queensland Government, in private ownership but not under conservation, or properties for sale on the open market.
- Land supporting habitats suitable for Koala, Grey-headed Flying-fox, and Coastal Swamp Oak TEC.
- The presence of past records of Koala, Grey-headed Flying-fox, and Coastal Swamp Oak TEC within or near Greenridge.
- Properties positioned in the landscape such that habitat restoration would provide a conservation outcome for the MNES (e.g. connecting and/or supplementing existing Koala habitats and Coastal Swamp Oak TEC, and within 20 km of a nationally significant Grey-headed Flying-fox roost).
- Land supporting habitats that are not protected under state legislation from clearing or other uses not compatible with conservation of the protected matters.
- Land supporting habitats that have been significantly cleared or degraded, and where habitat restoration would achieve a conservation outcome for the protected matters.
- Properties of a size that would accommodate a significant proportion of the required offsets for Koala, Grey-headed Flying-fox, and Coastal Swamp Oak TEC to facilitate focused application of offset management actions.

Regional Ecosystem (RE) mapping describes the dominant canopy species present within each map unit and provides a tool for determining where suitable forage tree species for Koala and Grey-headed Flying-fox and potential patches of Coastal Swamp Oak may occur. Suitable habitat for both Koala and Grey-headed Flying-fox was determined based on identifying areas with significant and key food sources for both species.

In particular, for Koala, suitable habitat was considered to be:

- REs that are ranked as either 'Medium' or 'High' suitability in the report *Spatial modelling for koalas in South East Queensland v2.0* (DES 2021);
- REs with ≥50% dominant or subdominant tree species described in the *Draft National Recovery Plan for the Koala* (DAWE 2021a) as important in the north (i.e. in Queensland); or
- REs with ≥50% dominant or subdominant tree species listed in scientific publications as Koala habitat in areas between central Queensland to central New South Wales, including:
  - *Ranking and mapping Koala habitat quality for conservation planning on the basis of indirect evidence of tree species use: A case study of Noosa Shire, south-eastern Queensland* (Callaghan *et al.,* 2011),
  - *Tree use, diet and home range of the Koala* (Phascolarctos cinereus) *at Blair Athol, central Queensland* (Ellis *et al*. 2002),
  - *The habitat and diet of koalas* (Phascolarctos cinereus) *in Queensland* (Melzer *et al.* 2014),
  - *Tree use by Koalas* (Phascolarctos cinereus) *after fire in remnant coastal rainforest* (Matthews et al., 2007).

For Grey-headed Flying-fox, suitable habitat was considered to be:

- REs with ≥50% dominant or subdominant vegetation species that are listed in *Ranking the feeding habitats of Grey-headed Flying-fox for conservation management* (Eby and Law 2008) as significant flowering or fruiting species; or
- REs with ≥50% dominant or subdominant vegetation species that are listed in the *National Recovery Plan for the Grey-headed Flying-fox* (DAWE 2021) as important winter and spring food trees.

For Coastal Swamp Oak TEC, suitable habitat was considered as the two Regional Ecosystems known to support the ecological community in Queensland from the Conservation Advice (Department of the Environment and Energy 2018):

- RE 12.1.1 (*Casuarina glauca* woodland on margins of marine clay plains) (listed as 'of concern'); and
- RE 12.3.20 (*Melaleuca quinquenervia, Casuarina glauca +/-Eucalyptus tereticornis, E. siderophloia* open forest on low coastal alluvial plains) (listed as 'endangered'), in areas where the canopy is dominated by *Casuarina glauca* (Department of the Environment and Energy 2018).

The REs determined to be suitable habitat for Koala, Grey-headed Flying-fox and Coastal Swamp Oak TEC were used to spatially map vegetation and identify suitable properties, and the areas within properties, that had potential to meet offset requirements for each MNES.

Offset opportunities were sought as close as possible to the impact within the City of Gold Coast local government area (LGA). The 407 ha property known as 'Greenridge' off Green Meadows Road, Pimpama was identified as a suitable offset property and has been subject to the detailed assessment reported herein.

1.4 PROPOSED OFFSET PROPERTY LOCATION

Greenridge is located at 108 Green Meadows Road, Pimpama, approximately 3.5 km northeast of the northern extent of the proposed action (**Figure 1.1**). Greenridge covers 407 ha in total and is comprised of 12 lots:

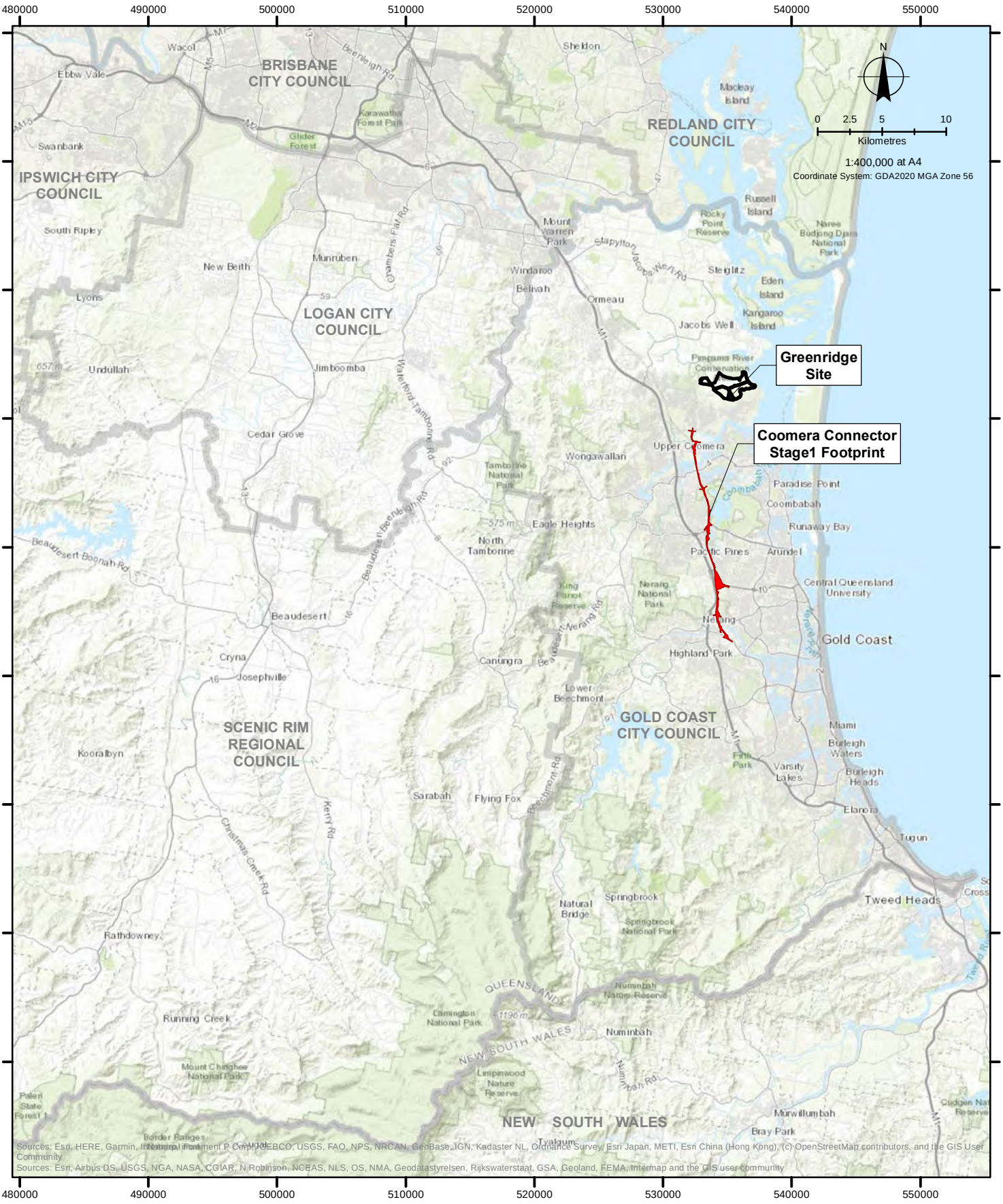
- Lot 121 on RP903491 (28.43 ha)
- Lot 15 on SP145312 (62 ha)
- Lot 6 on RP50178 (60.57 ha)
- Lot 7 on RP50178 (26.69 ha)
- Lot 8 on RP50178 (37.69 ha)
- Lot 11 on RP50178 (15.68 ha)
- Lot 12 on RP50178 (16.28 ha)
- Lot 13 on RP50178 (54.6 ha)
- Lot 14 on RP50178 (19.98 ha)
- Lot 15 on RP50178 (40.65 ha)
- Lot 16 on RP50178 (14.37 ha)
- Lot 71 on W31402 (30.35 ha).

2.0 PROPERTY DESCRIPTION

2.1 LOCALITY FEATURES AND CLIMATE

Greenridge is located in the Gold Coast City LGA suburb of Pimpama. It is situated at the southern-most extent of a broader >100 km^2 area of agricultural land that exists between the Logan River in the north and McCoys Creek in the south. Agricultural land uses in the broader area are dominated by sugar cane production. Also present are extractive industries, including sand mining and hard rock quarrying, along with aquaculture enterprises and facilities for boating. This area is bound to the west by the Pacific Motorway (M1), which is adjoined by industrial and residential development. The eastern boundary is the southern extent of Moreton Bay including the Moreton Bay Ramsar Wetland, and there are patches of remnant vegetation along the coastline and associated with inlets, rivers and creeks. New residential developments are beginning to emerge along the coastline. Much of the area is less than 10 m above sea level.

Figure 2.1 shows the location of Greenridge between McCoys Creek in the south and the Gold Coast City Council Pimpama River Conservation Area in the north. Its eastern boundary is formed by the Pimpama River and lands associated with a Gold Coast City Council sewage treatment plant and a nature reserve are located to the west.



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Greenridge site
Impact site
LGA boundaries

Drawn By: KM **Reviewed by: PJ** **Date: 28/07/2022**

Figure:	**1.1**
Title:	**Locality Map**
Project:	**Greenridge Offset Property Assessment Results Coomera Connector Stage 1 – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

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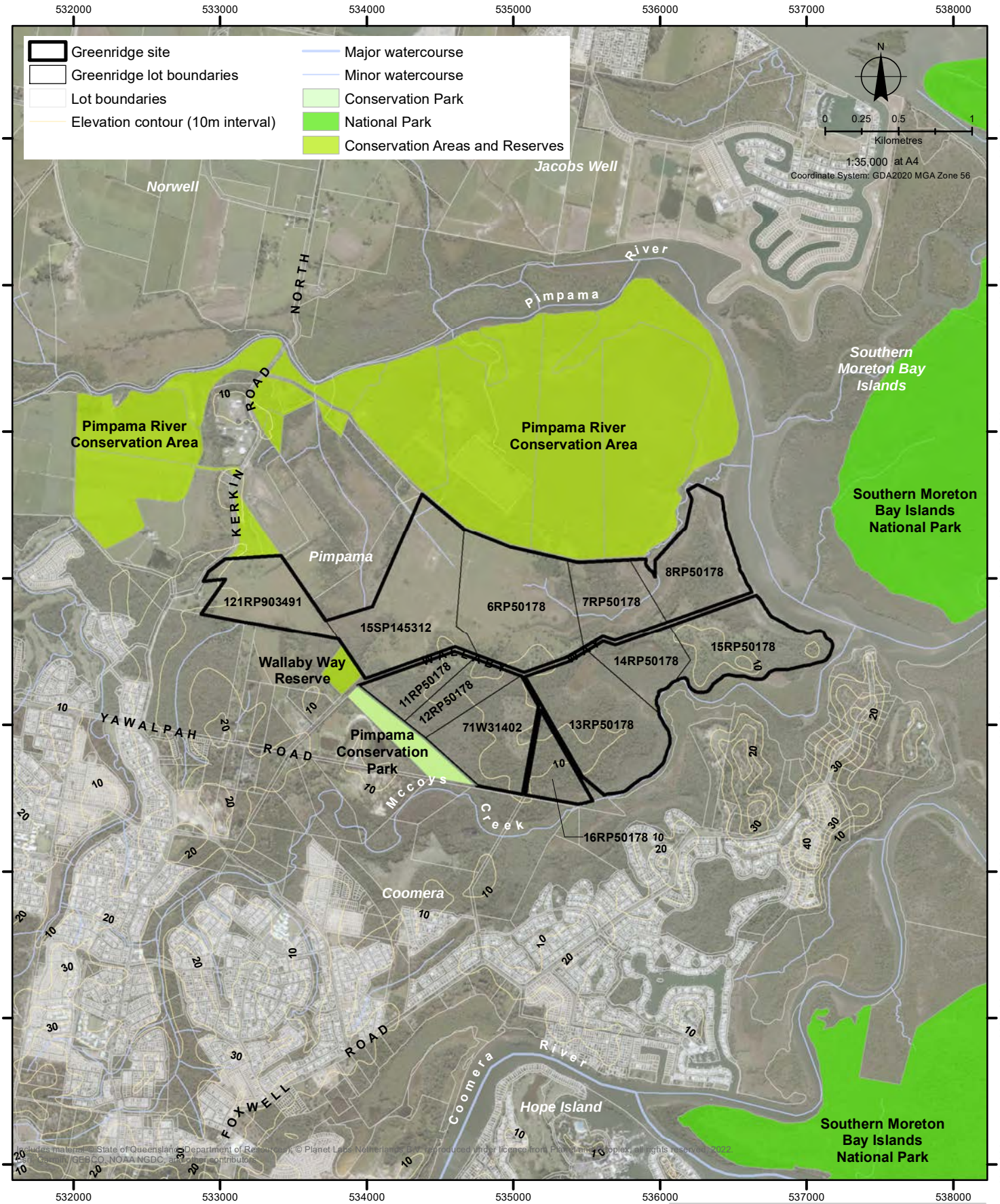

Data sources:
Cadastral data - Queensland - by area of interest, Published 30/05/2022
Elevation contours - 10 metre interval, Published 26/08/2019
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
MSES - Protected area - estates, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources)

Drawn By: KM **Reviewed by: PJ** **Date: 28/07/2022**

Document Location: D:\Projects\BAAM\BAAM 2022-009 Coomera Connector Offsets\Output\0101-030c-0002-A (Greenridge_Topo).mxdDate: 28/07/2022 9:11:38 PM

Figure: 2.1

Title: Site Locality Features

Project: Greenridge Offset Property Assessment Results Coomera Connector Stage 1 – EPBC 2020/8646

Client: Queensland Department of Transport and Main Roads

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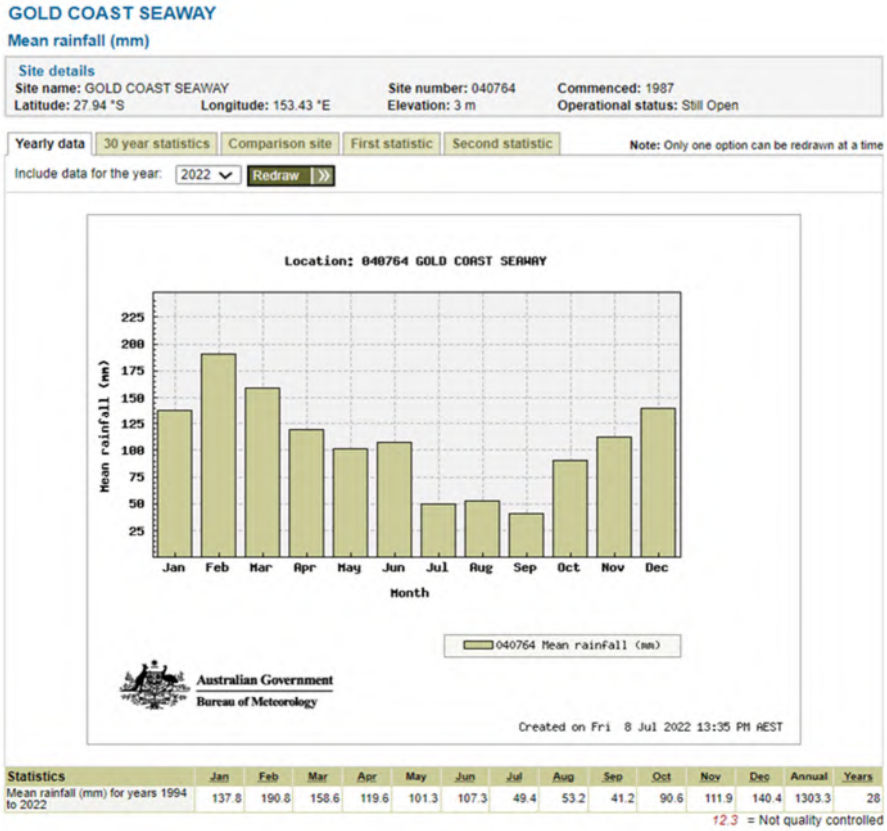
The central to southern portions of Greenridge contains small ridges and hills up to 20 m above sea level and composed of sandy clays to stony lithosols derived from Neranleigh-Fernvale beds with colluvial deposits at the base of slopes. These higher areas are characterised by open eucalypt woodland supporting Koala and Grey-headed Flying-fox habitat.

The north-east and north-west of Greenridge consist predominately of alluvial plains supporting a network of shallow alluvial channels draining into the Pimpama River and McCoys Creek. This area is comprised of poorly drained clays to sandy clays, derived from river alluvial, beach and estuarine sediments and supports a mosaic of aquatic and terrestrial vegetation types typical of low-lying coastal areas.

A considerable portion of Greenridge has been cleared in the past for agricultural purposes.

The closest weather station to Greenridge is Gold Coast Seaway Station (040764), approximately 15 km away, and has been operational since 1987. At this station mean annual rainfall is 1303.3 mm/year and mean monthly rainfall is as shown in Image 1. Mean maximum temperature is 25.3˚C, ranging from 28.8˚C in January to 21.3˚C in July. The highest maximum temperatures were above 30˚C in the months from December to February.

Image 1. Gold Coast Seaway Station Mean Maximum Monthly Rainfall Totals



2.2 MANAGEMENT HISTORY

The earliest available aerial imagery (from 1955) indicates the north-western portion of Greenridge was historically cleared of vegetation to facilitate sugarcane farming (Image 2). Broad-scale and selective vegetation clearance continued into the central and southeastern portion of Greenridge for cattle-grazing and establishment of small-scale slash pine plantations as shown in the 1971 aerial photograph (Image 3). Sugar-cane production appears to have ceased between 1978 and 1985. By 1989 (Image 4) Greenridge was being managed primarily for cattle grazing and slash pine plantation, as well as for recreational use by light aircraft. All vegetation on Greenridge was either cleared or substantially thinned and cattle grazing has been the predominant use to recent times.

Image 2. 1955 aerial photography (source: QImagery)

Image 3. 1971 aerial photography (source: QImagery)

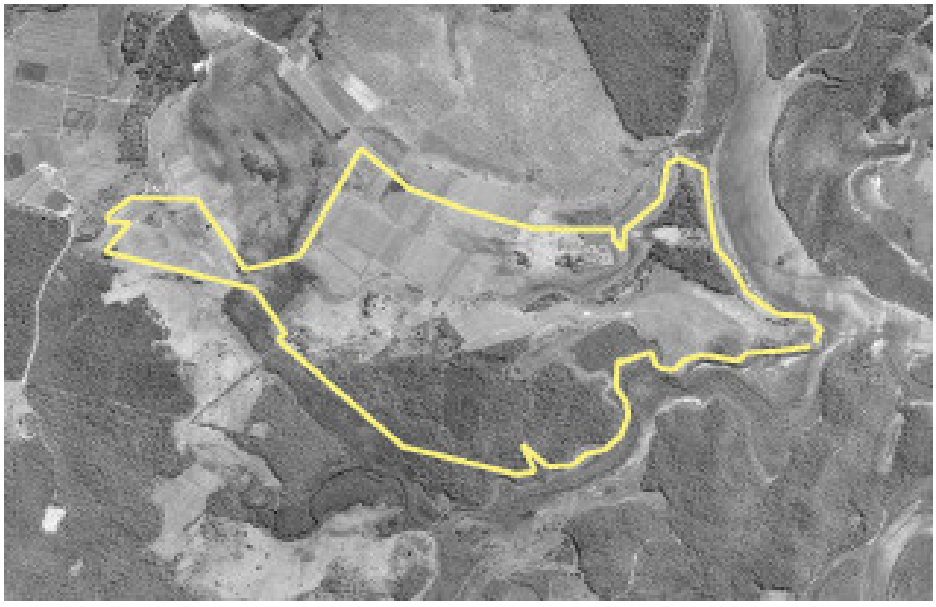


Image 4. 1989 aerial photography (source: QImagery)

In addition to historical broadscale clearing causing major changes to the landscape, areas once mapped as marine-influenced RE 12.1.1 have been significantly altered due to the suppression of tidal inundation from the installation of tidal gates at Kerkins Road and Green Meadows Road (**Photo 1**) which close at high tide and open (drain) at low tide. This has led to a greater retention of freshwater runoff and establishment of freshwater wetland habitat within the western portion of Greenridge (**Photo 2**).

Photo 1: Tidal gate located on Green Meadows Road

Photo 2: Freshwater wetland in RE12.1.1

Though most recently used for cattle grazing, Greenridge does not exhibit any signs of recent cattle usage. Pasture dominated by the exotic South African Pigeon Grass *Setaria sphacelata* is heavily overgrown and infested with Fireweed *Senecio madagascariensis* (toxic to livestock) indicative of little pastural management. Fencing has also been removed from areas once restricting cattle access to saltmarsh and mangrove communities in the central to southern portions of Greenridge.

Historical logging/thinning in forested areas of Greenridge is evident with large stumps remaining in place of removed trees. Weed proliferation is apparent throughout Greenridge with sporadic

infestations of dense Lantana and Groundsel cover. It is unknown what, if any, fire management practices were historically employed on Greenridge; however, it appears that there has been no recent management to prevent wildfire, or any other vegetation management measures implemented in recent years.

In addition to significant pest plant proliferation in parts of Greenridge, signs of invasive fauna - specifically Feral Pigs and European Foxes - were observed on Greenridge, evidenced by characteristic diggings and tracks. Pig diggings appeared to be concentrated beneath *Casuarina glauca* as illustrated in **Photos 3-5**. *Casuarina glauca* is known to fix atmospheric nitrogen in root nodules through actinorhizal associations with *Frankia* spp. bacteria (Hammerton 2001). As the evidence of pig diggings throughout Greenridge was concentrated in areas of *Casuarina glauca* it is possible that feral pigs search out the nitrogen and amino acid-rich nodules, in addition to fruiting bodies produced by mycorrhizal fungi, as valuable protein resources as is common for browsing and grazing animals in forested habitats (Maser *et al.* 2008). Insufficient information is available to determine whether any pest-animal management has historically been carried out on Greenridge, but increased numbers of Feral Pigs on the Gold Coast have been reported in recent years attributed to higher rainfall in the region and are thought to be breeding in vegetation along the Pimpama River (Sheehan and Forbes 2021).

Photos 3-5: Feral pig diggings beneath and surrounding *Casuarina glauca*

2.3 COASTAL SWAMP OAK IN THE LANDSCAPE

In South East Queensland, *Casuarina glauca* occurs in almost monospecific stands as woodland on the margins of marine clays pans (RE 12.1.1) and in an open forest mosaic with *Melaleuca quinquenervia*, with or without *Eucalyptus tereticornis* and *E siderophloia*, on low coastal alluvial plains (RE 12.3.20). Clearing for agricultural and urban purposes on the coastal plain has significantly reduced the area of these communities on the western shores of Moreton Bay.

Accurate representation of the distribution of the TEC is difficult to determine as patches of RE 12.1.1 are often too small to map at the State mapping scale, and its occurrence within RE 12.3.20 can only be determined by field verification.

Local distribution of these REs from State mapping for Greenridge and surrounds is shown on Figure 2.2.

2.4 KOALAS IN THE LANDSCAPE

2.4.1 Koala records and activity levels

The Atlas of Living Australia (ALA) provides publicly available location data for species, including those records held by the Queensland Government. Figure 2.3 shows the locations of ALA Koala records within 10 km of Greenridge. Koala records in the locality have been numerous over the years of data collection, including within areas where habitat has since been cleared for residential and other developments – particularly within the area between the Coomera River and McCoys Creek. Koalas in this location are now largely confined to residual bushland patches and narrow habitat corridors through residential areas. There is some habitat connection from this area to the Greenridge property via mostly freehold land, and Greenridge provides opportunity for a viable connection of habitats between the Coomera River and the Pimpama River Conservation Area.

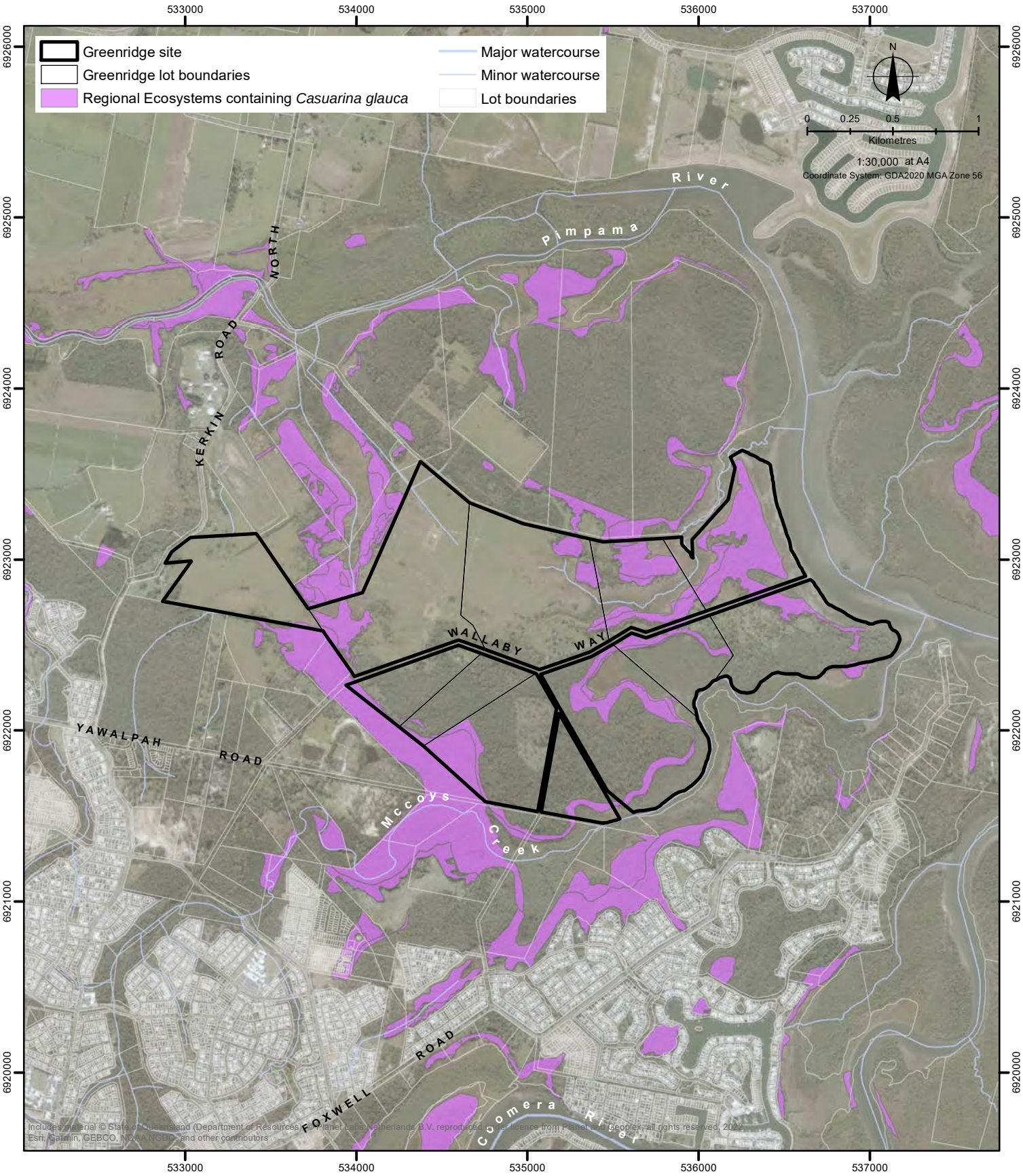
EVE (2020) carried out a Comprehensive Koala Survey for the Coomera Connector Stage 1. The study identified the Pimpama River Conservation Area and the Pimpama Conservation Park as suitable recipient locations for Koala translocation and also addressed the suitability of Greenridge for this purpose. The report recommended capture, tagging and longitudinal monitoring (for at least 6 months) of resident Koalas and risks in the location, including chlamydial disease and wild dog predation. This work is currently ongoing.

In 2021, Planit Consulting prepared the plan, provided here as Image 6, to advise TMR of the Koala activity results of previous studies on Greenridge and surrounds. These studies include Koala sightings from the EVE (2020) study, as well as publicly available Koala records and sightings, including Koala hospital data. The results of 2007, 2017 and 2020 SAT surveys are also shown. 2017 SAT surveys indicated high-medium Koala activity for all terrestrial habitats in Greenridge.

2.4.2 Habitat suitability and connectivity

Existing regional ecosystem mapping for Greenridge is shown on Figure 2.4, indicating the presence of remnant REs 12.11.23, 12.3.20, and 12.3.5 on Greenridge. 'Core' Koala habitat is mapped over these REs on Greenridge, which adjoins other areas of Core Koala Habitat external to Greenridge boundary to the north and south west. The southern portion of Greenridge intercepts a mapped 'Statewide biodiversity corridor' and the north-eastern tip of Greenridge adjoins the 'Statewide riparian corridor' associated with the Pimpama River.

RE 12.11.23 is described as *Eucalyptus pilularis* open forest on coastal metamorphics and interbedded volcanics. Other canopy species include *E. microcorys, Corymbia intermedia, Angophora woodsiana, E. tindaliae and E. carnea.* Occurs on low coastal Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. A 'special value' of the RE from the RE description is that it is known to provide suitable habitat for Koalas (Queensland Government https://apps.des.qld.gov.au/regional-ecosystems/details/?re=12.11.23). Consideration of the dominant canopy species indicates the RE has high value for Koala (DES 2021).



Data sources:
Cadastral data - Queensland - by area of interest, Published 30/05/2022
Vegetation management regional ecosystem map - v12.00, Published 04/05/2022
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources)

Figure:	**2.2**
Title:	**Local occurrence of Regional Ecosystems containing *Casuarina glauca***
Project:	**Greenridge Offset Property Assessment Results Coomera Connector Stage 1 – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 30/07/2022**

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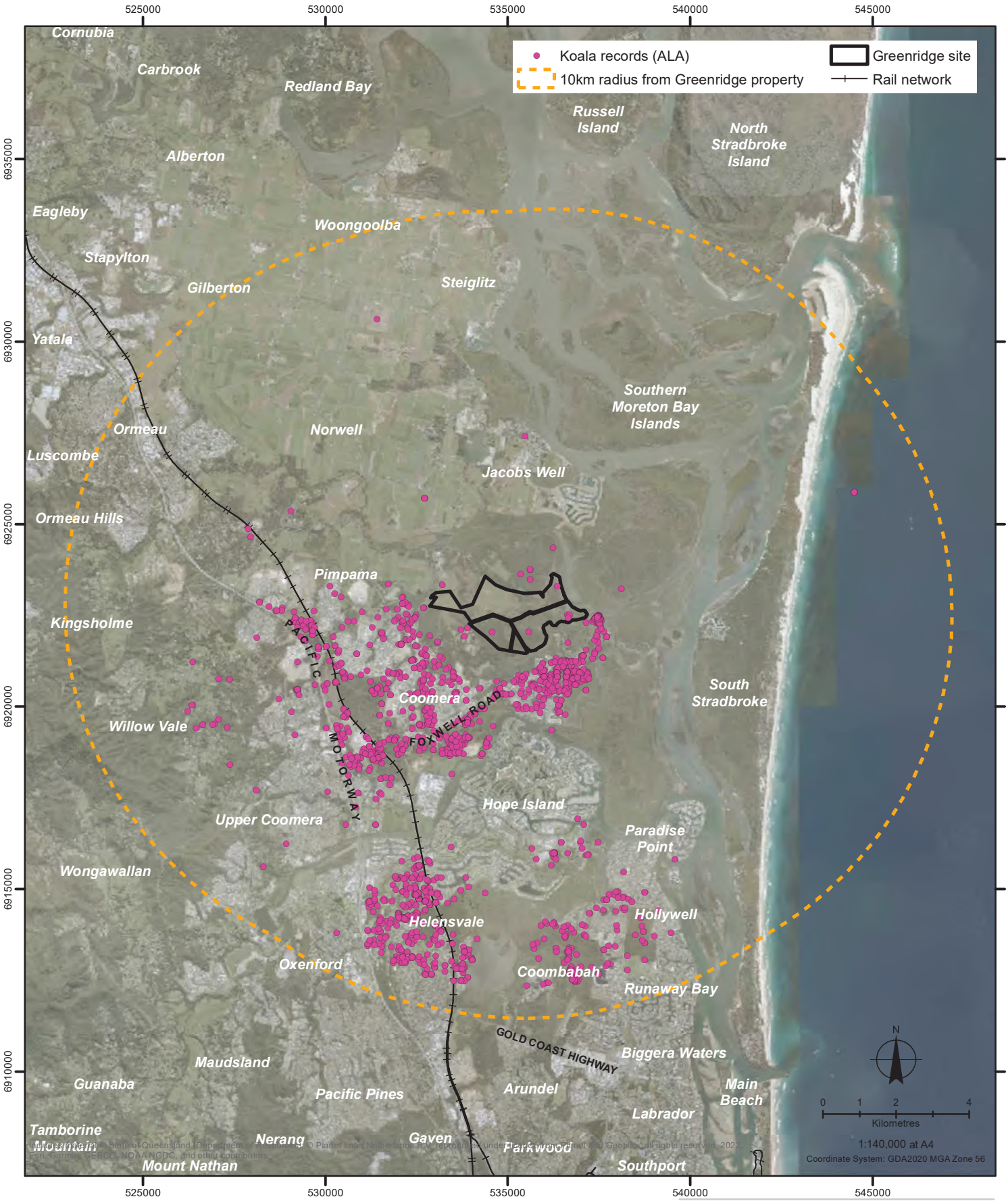

Data sources:
Koala records
ALA
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources) 2022

Figure:	**2.3**
Title:	**ALA Koala Records**
Project:	**Greenridge Offset Property Assessment Results Coomera Connector Stage 1 – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 29/07/2022**

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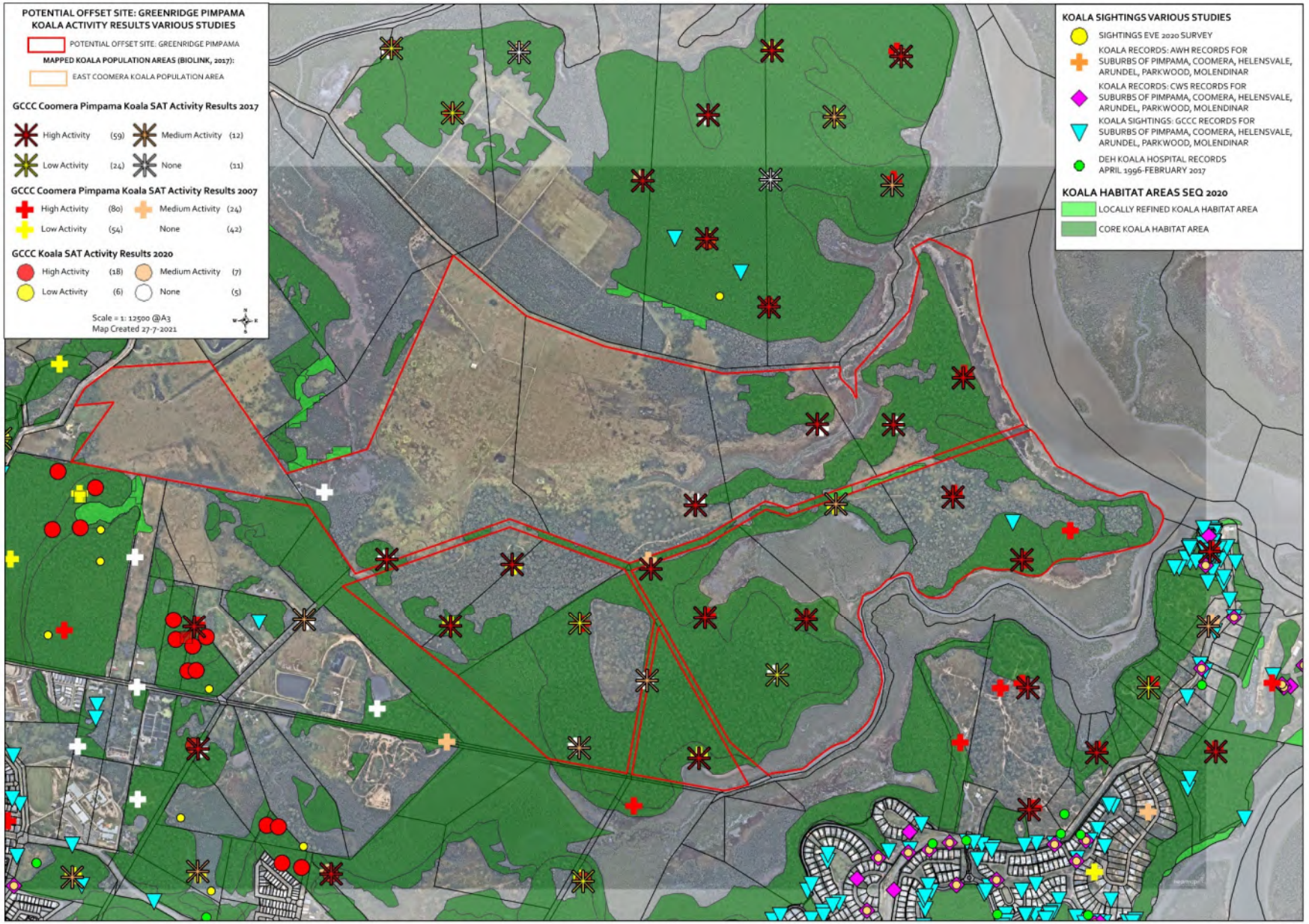
Document Location: D:\Projects\BAAM\BAAM 2022-009 Coomera Connector Offsets\Output\0101-030c-0004-A (Greenridge_Koala Records).mxdDate: 29/07/2022 9:47:03 AM

Image 6. Results of Previous Koala Surveys within and surrounding Greenridge



RE 12.3.20 is described as *Melaleuca quinquenervia, Casuarina glauca* +/- *Eucalyptus tereticornis*, *E. siderophloia*, *M. styphelioides* open forest on low coastal alluvial plains. Occurs on lowest terraces of Quaternary alluvial plains in coastal areas. A 'special value' of the RE in the RE description is that it is known to provide suitable habitat for Koalas (Qld Government https://apps.des.qld.gov.au/regional-ecosystems/details/?re=12.3.20). Consideration of the dominant canopy species indicates the RE has medium value for Koala (DES 2021).

RE 12.3.5 is described as *Melaleuca quinquenervia* open forest on coastal alluvium. Other tree species that may be present as scattered individuals or clumps include *Lophostemon suaveolens*, *Eucalyptus robusta, E. tereticornis, E. bancroftii, E. latisinensis, Corymbia intermedia*, *Melaleuca salicina, Livistona australis, Casuarina glauca,* and *Endiandra sieberi.* Occurs on Quaternary alluvium in coastal areas. A 'special value' of the RE in the RE description is that it is known to provide suitable habitat for Koalas (Qld Government https://apps.des.qld.gov.au/regional-ecosystems/details/?re=12.3.5). Consideration of the dominant canopy species indicates the RE has medium value for Koala (DES 2021).

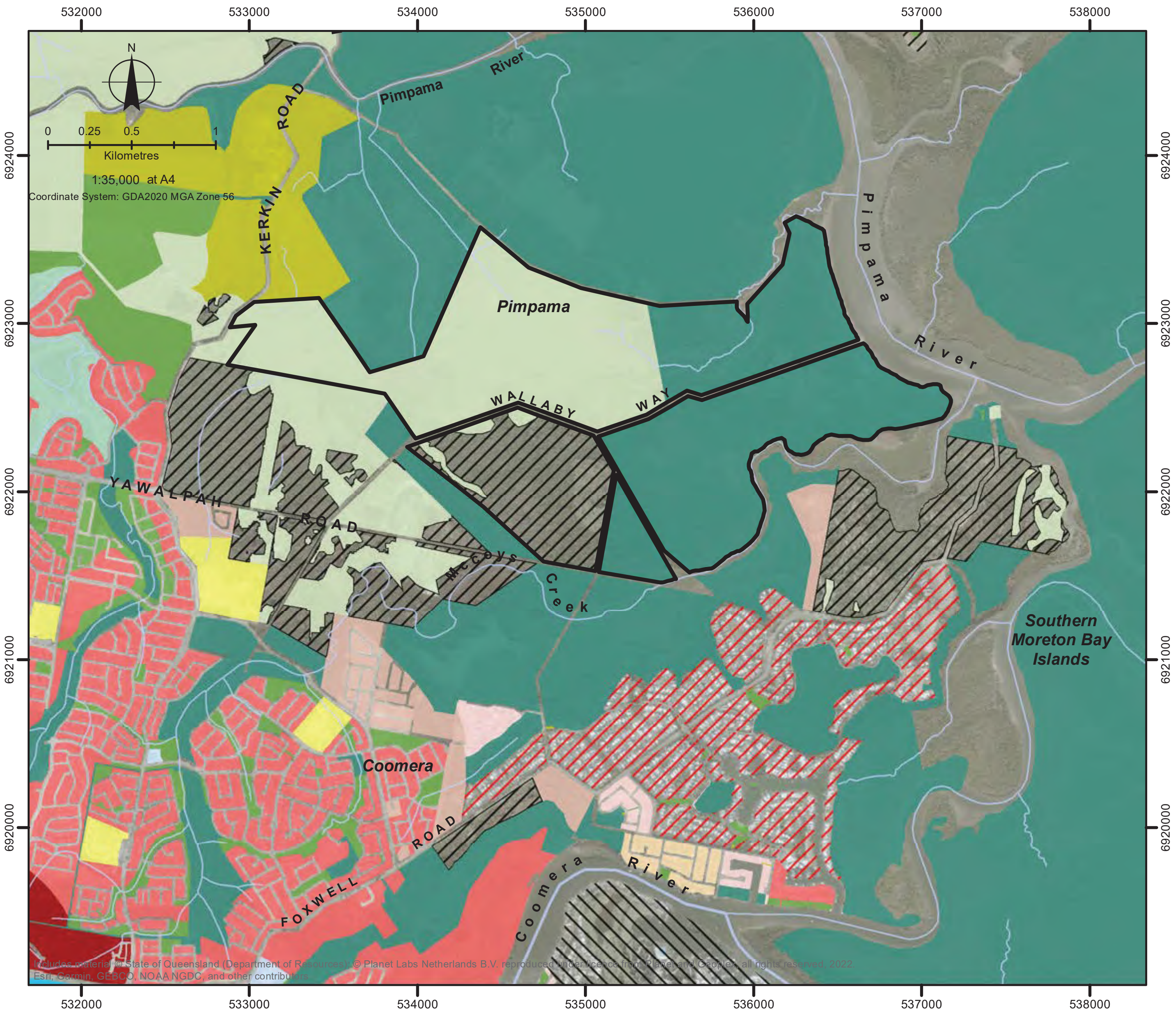
The ecological values of portions of Greenridge are recognised in the Gold Coast City Plan (Figure 2.5), where the eastern half of Greenridge is zoned for Conservation and forms part of a broader conservation node. The eventual inclusion of an additional 150 ha of currently 'Rural' zoned land on Greenridge into this conservation node in the form of offsets for Koalas and other matters would increase available habitat for Koalas. For the entire site, including those locations currently supporting remnant and regrowth vegetation, management as offset habitat would implement long-term measures to reduce threats to Koalas, such as controlling European Foxes and wild dogs and managing Lantana where it is a barrier to Koala movement and a risk for uncontrolled bushfire.

Movement of Koalas between Greenridge and the adjacent state-mapped 'Core' Koala habitat in the 355 ha Pimpama River Conservation Area (PRCA) to the north (Figure 2.1) is known anecdotally. A tributary of the Pimpama River which separates vegetated eastern and central portions of Greenridge from the PRCA, confines Koala movement between these areas to the terrestrial habitats in the western portion of Greenridge. At present, the cleared paddocks in the western portion are mostly treeless and support long pasture grasses and dense *Setaria sphacelate*, which may discourage Koala movement though these areas. The western boundary of Greenridge is adjacent to the 14 ha Pimpama Conservation Park, the 5 ha Wallaby Way Reserve, partly treed land zoned for rural uses and a local government sewerage treatment facility, which are ultimately connected to the PRCA and likely form the predominant passage between Greenridge and the PRCA for Koalas.

Future restoration of Koala habitat in cleared portions of Greenridge would significantly improve connectivity between exiting remnant habitat and the PRCA.

McCoys Creek on the southern boundary of Greenridge supports dense mangroves and expanses of saltmarsh vegetation that would restrict Koala movement to the south.

Figure 2.4. Regional Ecosystems, Queensland Koala Habitat Mapping and Biodiversity Corridors



Gold Coast City Council - City Plan Zones

- Low density residential
- Low density residential, Calypso Bay precinct
- Low density residential, Large lot precinct
- Medium density residential
- High density residential
- Neighbourhood centre
- Sport and recreation
- Open space
- Conservation
- Community facilities
- Emerging community
- Innovation
- Rural
- Rural, Rural landscape and environment precinct
- Rural residential, Rural residential landscape and environment precinct
- Special purpose
- Special purpose, Special development areas precinct
- Township

- Greenridge site
- Major watercourse
- Minor watercourse

Data sources:
City of Gold Coast Plan v8
Gold Coast City Council
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources) 2022

Figure:	**2.5**
Title:	**Gold Coast City Plan Land Uses**
Project:	**Greenridge Offset Property Assessment Results Coomera Connector Stage 1 – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

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Document Location: D:\Projects\BAAM\BAAM 2022-009 Coomera Connector Offsets\Output\0101-030c-0006-A (Greenridge_GCCC_LandUse).mxdDate: 29/07/2022 10:21:43 AM

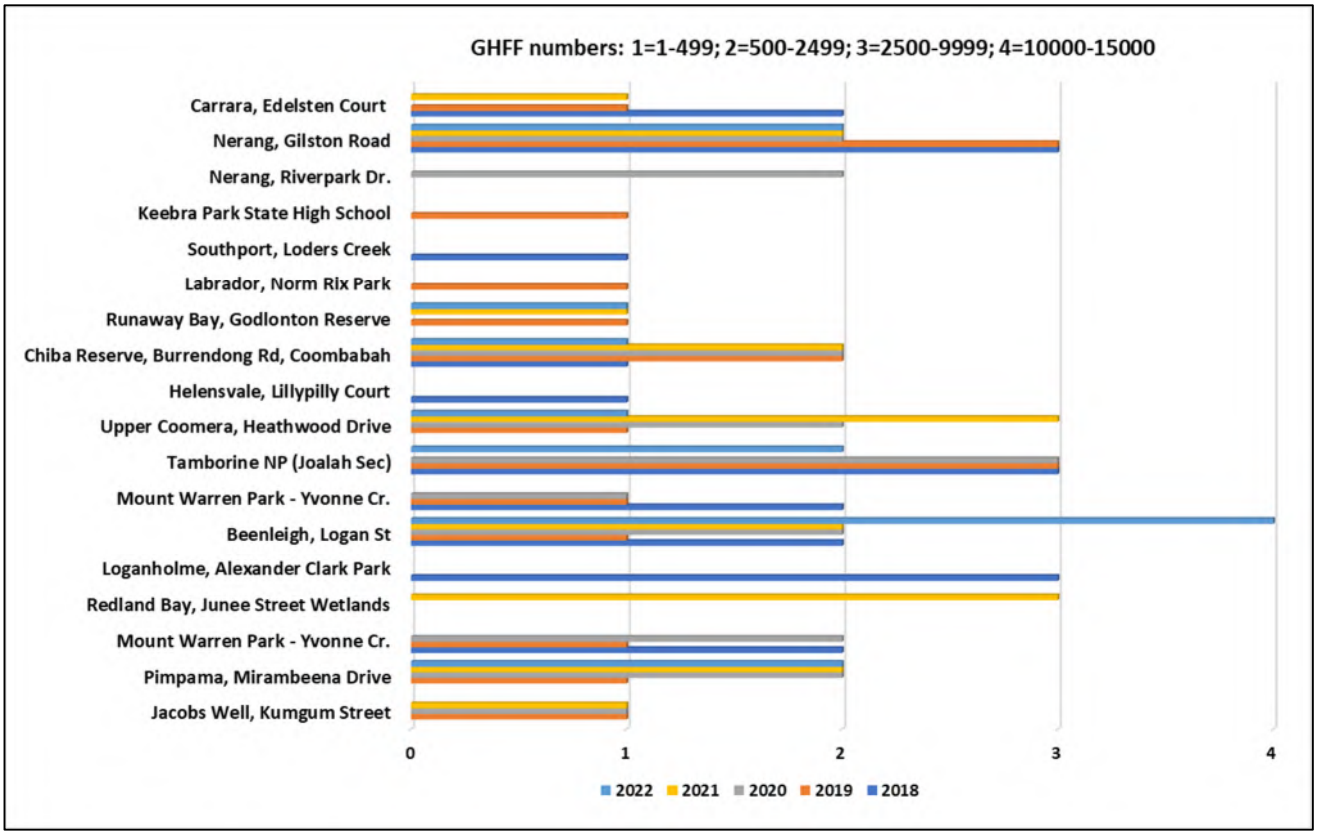
2.5 GREY-HEADED FLYING-FOX IN THE LANDSCAPE

ALA database records for Grey-headed Flying-fox in the landscape are shown on Figure 2.6, along with the locations of known flying-fox camps supporting Grey-headed Flying-fox as indicated in data sourced from the National Flying-fox Monitoring Viewer (http://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf).

The number of Grey-headed Flying-fox records shown on Figure 2.6 is not expected to represent the full distribution of the species in the landscape as they are active nocturnally, often in extensive and inaccessible woodlands and forests in response to flowering events.

At night, Grey-headed Flying-foxes typically feed on blossoms and fleshy fruits within 20 km of their roosts (although they can travel as much as 50 km), feeding in remnant forest, patches of vegetation on cleared land and urbanised areas (Roberts *et al*., 2012). Habitats of Greenridge are within the typical foraging distance of the 21 camps shown on Figure 2.6, which includes the Nationally Important Flying-fox camp at Carrara, Edelsten Court, which is just outside of the 20 km radius of Greenridge. Figure 2.7 shows the number of Grey-headed Flying-foxes recorded at these camps over the past five years. The most active camps have been Beenleigh, Logan Street (10,000-15,000 recorded in 2022), Tamborine National Park (500-9,999 recorded on four survey years from 2018 to 2022) and Nerang, Gilston Road (500-9,999 recorded each year from 2018 to 2022). The camp at Chiba Reserve at Coombaba has also had Grey-headed Flying-fox consistently present in the past five years.

Figure 2.7. Grey-headed Flying-fox numbers from camps within 20 km of Greenridge.



Consideration of the dominant canopy species within the REs present (Figure 2.4) indicates REs 12.3.5, 12.3.20 and 12.11.23 have high value for Grey-headed Flying-fox, attributed to the dominance of winter-flowering canopy species (DAWE 2021, Eby and Law 2008).

During a Koala survey of Greenridge conducted by ddwfauna for Titanium Enterprises Pty Ltd in 2006, Grey-headed Flying-foxes were reported to be widespread throughout vegetated areas and were observed feeding on *E. tereticornis* and *M. quinquenervia*.

Data sources:
Grey-headed Flying-fox records
Atlas of Living Australia 2022
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources) 2022

Figure:	**2.5**
Title:	**Grey-headed Flying-fox ALA records and camp locations**
Project:	**Greenridge Offset Property Assessment Results Coomera Connector Stage 1 – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 30/07/2022**

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Document Location: D:\Projects\BAAM\BAAM 2022-009 Coomera Connector Offsets\Output\0101-030c-0007-A (Greenridge_GHFF Records).mxdDate: 30/07/2022 2:33:44 PM

3.0 ASSESSMENT METHODS

3.1 HABITAT QUALITY ASSESSMENT

To assess the suitability of Greenridge for Coastal Swamp Oak and Koala, habitat assessment has been undertaken by applying the methods of the *Guide to Determining Terrestrial Habitat Quality – Version 1.3* (Queensland Government 2020) in line with the habitat assessments undertaken at the Coomera Connector Stage 1 impact area for Koala (Planit 2021a) and Coastal Swamp Oak TEC (Planit 2021b).

Additional assessment has been undertaken for Koalas and Grey-headed Flying-fox as described in **Sections 3.2 and 3.3**.

3.2 KOALA SURVEYS

This report provides the results of spot assessment surveys after the Spot Assessment Technique (SAT) of Phillips and Callaghan (2011) to measure localised levels of habitat use by Koalas, and Strip Transects in general accordance with Dique *et al.* (2003) to gather baseline Koala density data.

A thermal-imaging drone Koala survey by Endeavour Veterinary Ecology (EVE 2022) (Appendix 1) contributes significantly to understanding Koala distribution and Koala density for Greenridge.

3.2.1 Spot Assessment Technique (SAT) surveys

Seven SAT surveys were carried out on Greenridge over 30 June, 1 July, 27 July and 3 August 2022. Two of these, undertaken on 27 July and 3 August (locations shown on Figure 4.1), are reported as these were the only sites relevant to a proposed Stage 1 Koala offset Assessment Unit.

The SAT of Phillips and Callaghan (2011) involves a radial assessment within the immediate area surrounding a tree of any species that is known to have been utilised by the species, or otherwise considered to be of some importance to Koala. To apply the SAT, the following technique was applied:

1. Location and marking of a tree (the centre tree) that met one or more of the following selection criteria:
   a. a tree of any species beneath which one or more Koala faecal pellets have been observed and/or
   b. a tree in which a Koala has been observed and/or
   c. any other tree known or considered to be potentially important for Koala, or of interest for other assessment purposes.
2. identify and uniquely mark the 29 nearest trees to the centre tree,
3. undertake a search for Koala faecal pellets beneath each of the 30 marked trees based on a cursory inspection of the undisturbed ground surface within a distance of 100 centimetres around the base of each tree, followed (if no faecal pellets are initially detected) by a more thorough inspection involving disturbance of the leaf litter and ground cover within the prescribed search area.

The field team inspected individual trees that were considered likely to be used by Koalas showing evidence of scratches and/or faecal pellets. Where signs of Koala were not evident, centre trees for the surveys were selected based on their size and known value as Koala forage or shelter species.

3.2.2 Koala Strip Transect Surveys

Seven strip transect surveys were carried out on Greenridge over 30 June, 1 July and 27 July 2022. Two of these, undertaken on 27 July and 3 August (locations shown on Figure 4.1), are reported as these were the only site relevant to a proposed Stage 1 Koala offset Assessment Unit.

Strip-transect surveys were undertaken using a method modified from Dique *et al.* (2003). This involved selecting a random start-point from which a 100m tape was laid out in a straight line following a fixed bearing and an area 25m wide on each side of the tape (100m x 50m total) was searched for Koalas. Each search was carried out by two experienced observers spaced about 10m apart and, with the aid of binoculars, traversed one side of the tape from the starting point to the end and then returned along the other side of the tape inspecting all tree canopies for Koalas. Using this method, Koala sightings are recorded and density estimates are made based on the number of Koalas observed per hectare of area searched.

3.2.3 Additional Data from BioCondition Transects

Additional data were collected during field surveys to inform habitat quality scoring parameters for MNES not captured using the standard BioCondition method. These included the following based on the relevant MNES:

1. Koala tree canopy cover

   When assessing the quality of food and foraging habitat for koala using the scoring method applied in the Impact Area Assessment prepared by Planit (2021a), it was necessary to record the proportion of canopy cover comprised of koala food tree species known to support koalas within the region.

   Gold Coast City Council identify the following species as diet species for Koala in the region (from: https://www.goldcoast.qld.gov.au/Council-region/About-our-city/Environment-sustainability/About-our-environment/Native-animals/Koalas)

   Preferred koala food trees:

   - forest red gum or Queensland blue gum (*Eucalyptus tereticornis*)
   - tallowwood (*E. microcorys*)
   - swamp mahogany (*E. robusta*)
   - grey gums (*E. propinqua and E. biturbinata*).

   Important local supplementary food sources:

   - narrow-leaved red gum (*E. seeana*)
   - white stringybark (*E. tindaliae*)
   - red mahogany (*E. resinifera*)
   - brush box (*Lophostemon confertus*)
   - broad-leaved paperbark (*Melaleuca quinquenervia*).

   The City of Gold Coast Koala Conservation Plan states that many other species are known to be utilised by Koala. An In-situ monitoring program at East Coomera during 2007-2014 identified Koalas using more than 40 tree species including those of the genera *Eucalyptus*, *Corymbia, Melaleuca, Lophostemon* and *Angophora*; however, it is unclear which species, if any, are utilised solely for shelter as opposed to constituting diet (Gold Coast City Council 2018). Based on the REs recorded on the Greenridge property that are known to provide suitable habitat for Koalas and are dominated by recognised Koala food trees, species from any of the above genera have been counted as potential Koala food trees for the purposes of this assessment.

   Standard BioCondition surveys record canopy cover by measuring the vertical projection of canopy intercepting a 100m transect line (Eyre *et al.* 2015). To capture the proportion of the canopy comprised of Koala food trees, these species were distinguished separately from other

canopy species when recording canopy cover over the 100m transect. Distances of the Koala tree canopies over the 100m transect were summed and then calculated as a proportion of the total canopy cover (Koala tree cover plus non-Koala tree cover, less any overlaps).

2. *Casuarina glauca* canopy cover

   Using the same method described above for Koala tree canopy cover, the proportion of *Casuarina glauca* cover for some transects was also recorded to assist in identifying patches of Coastal Swamp Oak that would qualify as the TEC.

3. Grey-headed Flying-fox foraging tree abundance

   Included in the impact site Grey-headed Flying-fox habitat assessment performed by Planit (2021b), the abundance of foraging trees and significant foraging trees as documented within Eby and Law (2008), Eby *et al.* (2019) and DAWE (2021) was recorded at each BioCondition plot by counting all foraging trees within the T1 canopy layer of the 50m x100m plot.

   With an understanding that Grey-headed Flying-foxes forage in both the canopy and sub-canopy, all trees identified as foraging species from the above referenced literature with a DBH ≥10cm and ≥2m tall was included in the stem counts used in assessing foraging tree abundance at the Greenridge property. These trees were counted within the 50m x 100m BioCondition plots by taking a tally for each identified forage species. In plots where trees were particularly dense throughout Greenridge, a subset was counted in the 50m x 20m sub-plot to save time and avoid double-counting trees. These tallies were used to estimate the stem-density per hectare of each forage tree species within each site to be used in the assessment of foraging tree abundance.

3.2.4 Thermal imaging drone survey

Thermal-imaging drone surveys of the Pimpama River Conservation Area and Greenridge were conducted by EVE over 13 nights from 2 December 2021 to 10 February 2022, with six of those nights focused on Greenridge.

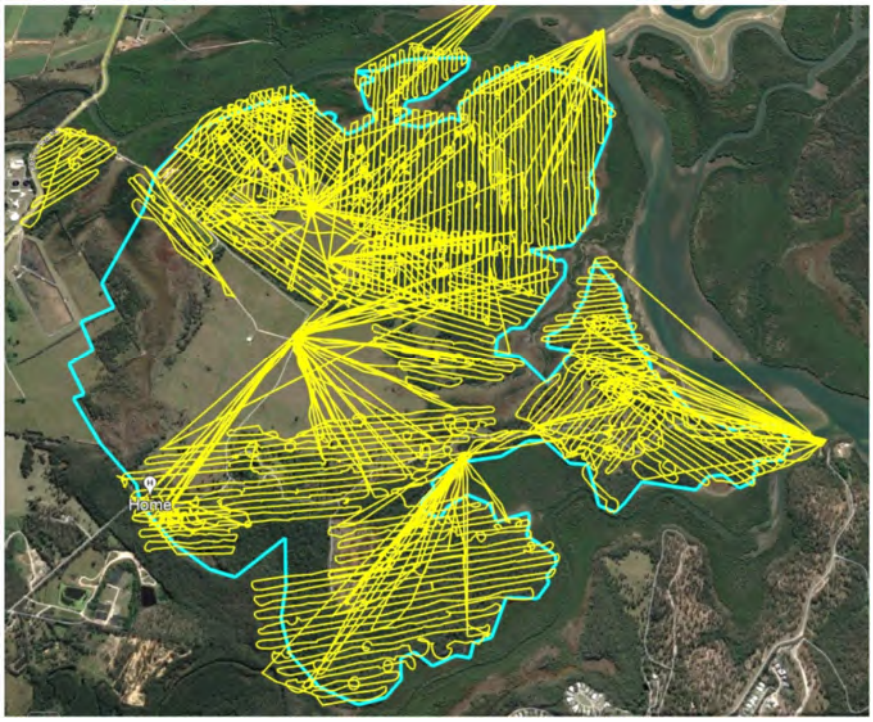
All areas of Koala habitat were surveyed, except for two small areas on Greenridge (approximately 9.5 ha in total) where site terrain made it difficult to maintain visual line of sight of the drone (a Civil Aviation Safety Authority requirement). The area was divided into six discrete search polygons and each area was systematically searched in an 'up-and-back' lawn-mower pattern using a Matrice 300 RTK (M300) with H20T camera (dual optical and thermal). Thermal heat signatures suggestive of Koalas were investigated to positively identify the origin of the heat source. Where a Koala was identified, the location of the Koala was determined using a laser rangefinder and the GPS coordinates recorded in a spreadsheet and a reference screen shot of the Koala with the coordinates was saved. Coordinates and drone flight paths were plotted on Google Earth and any obvious duplicate detections were deleted. Image 7 shows the drone survey flight paths for the survey period.

While relying on thermal imagery to detect potential Koalas, the photography component of the method minimises the opportunity for false positive or negative detection, which has been a particular issue when using thermal imaging for Koala detection (Corcoran *et al.* 2019; Hamilton *et al.* 2020).

In a test of the accuracy of remotely piloted aircraft system thermal imaging (RPAS) against traditional spot lighting and SAT surveys, Witt *et al.* (2020) found that RPAS coupled with thermal imaging cameras proved to be a promising efficient and effective alternative method to systematic spotlighting and the SAT surveys for detecting koalas and estimating density at low density sites in the winter period (when heat signatures are most easily detected).

In terms of direct detection Witt *et al.* (2020) reported that RPAS detected one Koala per 2.18 hrs compared with one Koala per 6.75 hrs for spotlighting and one Koala per 43.39 hrs for SAT surveys, proving the efficiency of RPAS. Additionally, their work showed that with repeat surveys at low density sites, RPAS was the optimal method for direct detection of individual Koalas (n = 11 of 12), compared to Spotlight (n = 4 of 12) and the SAT (n = 1 of 12), while the SAT method remains optimal for determining site occupancy given the value in confirming transient Koala habitat.

Image 7. Thermal Koala survey flight paths (EVE 2022)



3.3 GREY-HEADED FLYING-FOX SURVEYS

No flying-fox camps were recorded on site, and none have been known from Greenridge previously.

Grey-headed Flying-fox surveys were not undertaken on Greenridge as the REs present are known to be of high value to the species, Greenridge is within 20 km of 20 flying-fox camps used by Grey-headed Flying-fox and the species has been recorded from Greenridge previously, foraging on *Melaleuca quinquenervia* and *Eucalyptus tereticornis* (ddwfauna 2006). During Koala surveys in 2022, the EVE Koala survey team noted heavy flying-fox use of flowering Eucalypts on site (pers comm. Deidre de Villiers). Grey-headed Flying-fox is expected to forage on site regularly during Eucalyptus and Melaleuca flowering events.

4.0 SURVEY RESULTS

4.1 HABITAT QUALITY SURVEYS

4.1.1 Assessment Units

In accordance with the methods of the *Guide to Determining Terrestrial Habitat Quality – Version 1.3* (the guide) Greenridge was mapped into like Assessment Units (AUs), differentiated based on:

- Regional ecosystem type; and
- Vegetation condition (remnant, advanced regrowth, young regrowth or cleared).

Ground-truthing of a number of polygons of the RE types supporting *Casuarina glauca* was undertaken through applying the quaternary survey method of Neldner *et al.* (2017). Field observations and the use of historical aerial photography contributed to delineation of the regrowth vegetation.

A brief description of each AU is provided below, and the AU mapping results and field survey locations are shown in Figure 4.1.

AU1 REMNANT RE 12.1.1: 14.2ha. Remnant *Casuarina glauca* open forest. Wholly analogous with the Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and Southeast Queensland Threatened Ecological Community.

AU2 REGROWTH RE 12.1.1: 5.16ha. Regrowth *Casuarina glauca* open forest.

***AU3 NON-REMNANT RE 12.1.1*:** 22.15ha. Non-remnant *Casuarina glauca* open forest (presently grassland).

AU4 REMNANT RE 12.3.20: 28.7ha. Remnant *Casuarina glauca, Eucalyptus tereticornis* and *Melaleuca quinquenervia* open forest. Where dominated by *Casuarina glauca* the community is analogous with the Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and Southeast Queensland Threatened Ecological Community.

AU5 REGROWTH RE 12.3.20: 4.77ha. Regrowth Casuarina glauca, Eucalyptus tereticornis and *Melaleuca quinquenervia* open forest.

AU6 NON-REMNANT RE1 2.3.20: 11.881ha. Non-remnant Casuarina glauca, Eucalyptus tereticornis and Melaleuca *quinquenervia* open forest (presently grassland).

4.1.2 Habitat Quality Surveys

The guide suggests the number of Habitat Quality/BioCondition transect surveys that should be undertaken within each AU to represent the condition of each AU (Table 4.1). Table 4.2 provides a breakdown of AUs for Greenridge as shown in Figure 4.1, their total areas and the number of BioCondition transect surveys undertaken within each.

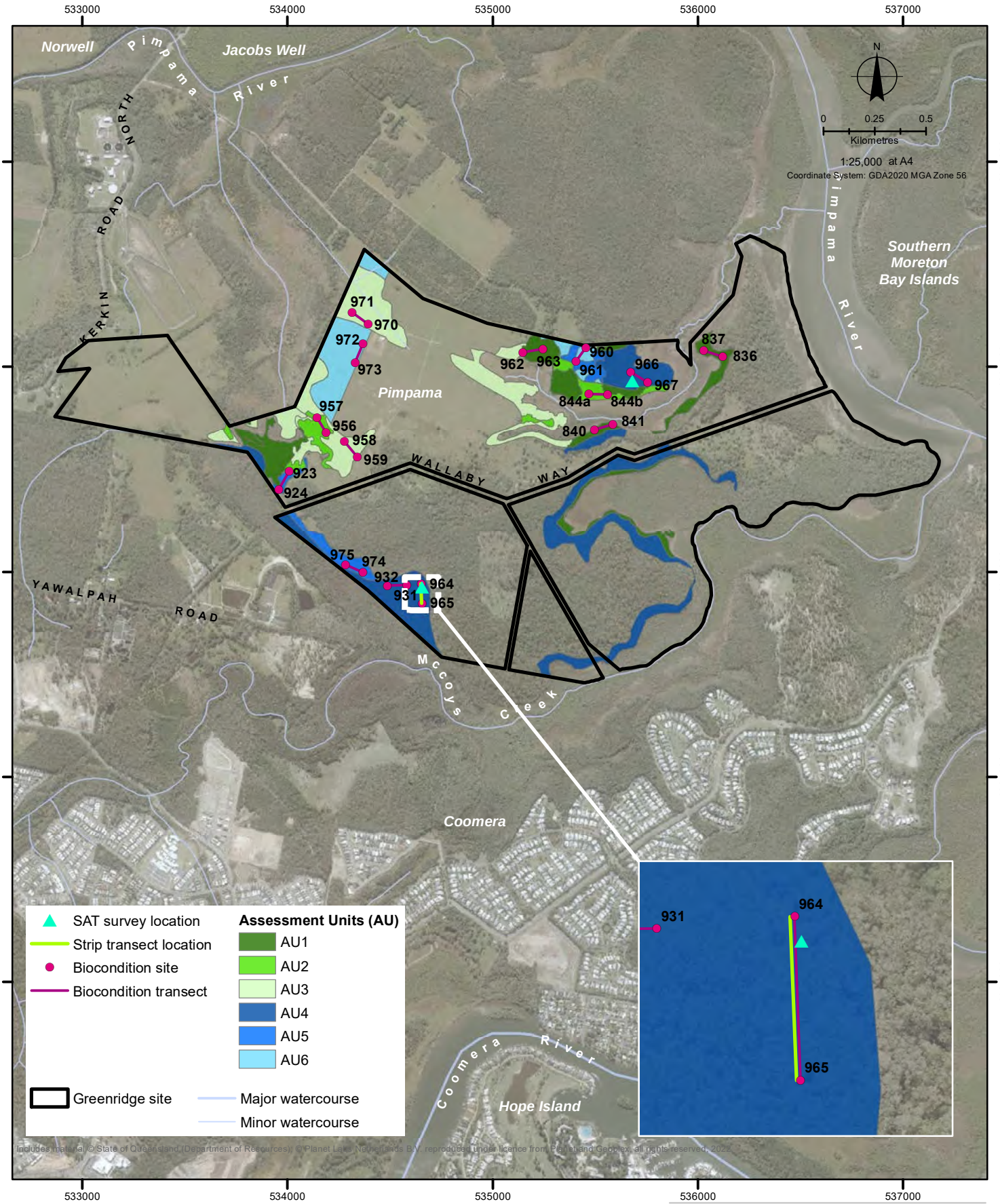
Table 4.1 Sampling sites relative to AU size

AU size (ha)	Suggested no. of sampling sites
0-50	At least 2
50-100	Three
100-500	Four
500-1000	Five
>1000	Six

Table 4.2 AU Areas and BioCondition Transects completed

AU description	Area (ha)	Suggested transects	Transects completed
AU1 RE 12.1.1 remnant	14.2	≥2	3
AU 2 RE 12.1.1 regrowth	5.16	≥2	2
AU3 RE 12.1.1 non rem (preclear)	22.15	≥2	2
AU4 RE 12.3.20 remnant	28.7	≥2	3
AU5 RE 12.3.20 regrowth	4.77	≥2	2
AU6 RE 12.3.20 non rem (preclear)	11.88	≥2	2

Results of the Habitat Quality/BioCondition transects are provided in Appendix 2.



Data sources:
Vegetation management regional ecosystem map - v12.00, Published 04/05/2022
Vegetation management watercourse and drainage feature map (1:25000) – South East Queensland v5.0, Published 08/09/2021
Baseline roads and tracks - Queensland, Published 31/03/2022
State of Queensland (Department of Resources) 2022

Figure:	**4.1**
Title:	**AU mapping results and survey locations**
Project:	**Greenridge Offset Property Assessment Results Coomera Connector Stage 1 – EPBC 2020/8646**
Client:	**Queensland Department of Transport and Main Roads**

Drawn By: KM **Reviewed by: PJ** **Date: 28/09/2022**

BAAM ECOLOGICAL CONSULTANTS

Document Location: D:\Projects\BAAM\BAAM 2022-009 Coomera Connector Offsets\Output\0101-030c-0005-C (Greenridge_AU mapping and survey locations).mxdDate: 28/09/2022 8:23:21 AM

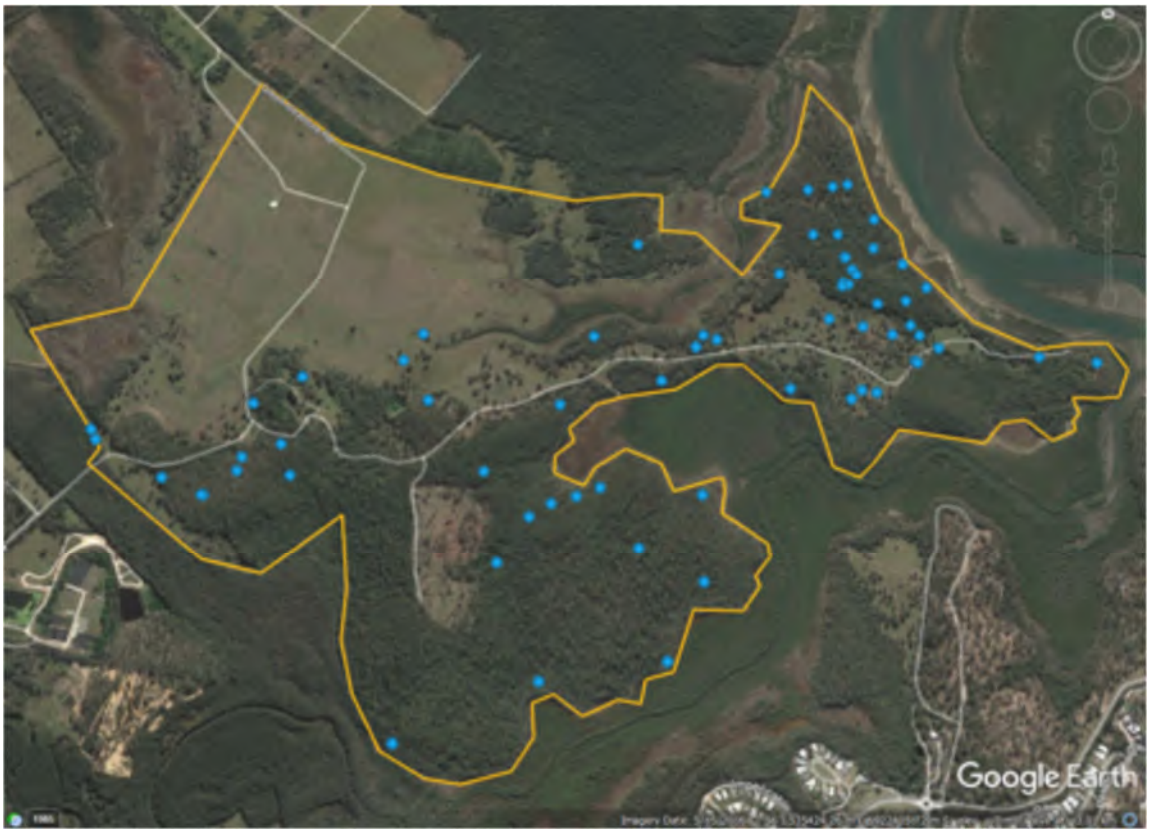
4.2 THERMAL IMAGING DRONE SURVEYS

Endeavour Veterinary Ecology (EVE) was commissioned by TMR to conduct thermal imaging drone surveys over an area that included the Greenridge property. The survey was conducted between December 2021 and January 2022 over six nights. During that survey 68 Koalas were detected at the locations shown in Image 8.

Applying the estimated detection rates of 0.65 and 0.85, the study concluded Greenridge supported a population of 80 to 105 Koalas (EVE 2022). The full report is provided as Appendix 1.

When the drone records are overlaid on ground-truthed RE mapping for Greenridge, nine Koalas were recorded within 27.52 ha of remnant RE 12.3.20. Corrected for an average 0.75 detection rate (75% of Koalas detected), remnant RE 12.3.20 supported approximately 0.4 Koalas per hectare at the time of survey. This is consistent with the findings of Biolink (2017) which reported Koala densities of 0.34/ha based on SAT search area and 0.47/ha based on Strip Transect search data for the East Coomera area.

Image 5. Location of 68 koalas detected by thermal drone surveys (source: EVE 2022)



4.3 KOALA SAT AND STRIP TRANSECT SURVEYS

Two Koala SAT surveys and two Strip Transect surveys were undertaken with AU4. An additional SAT survey and Strip Transect survey was carried out in the eastern portion of Greenridge in State-mapped RE 12.3.20; however, the mapped RE 12.3.20 at this location was subsequently ground-truthed as a heterogenous polygon comprised of three separate REs (including 12.3.20) and the survey results at that location are therefore not considered representative of a homogenous polygon of 12.3.20.

No Koala scats were recorded from the two SAT surveys undertaken within AU4 and no Koalas were recorded from the two Strip Transects undertaken within AU4.

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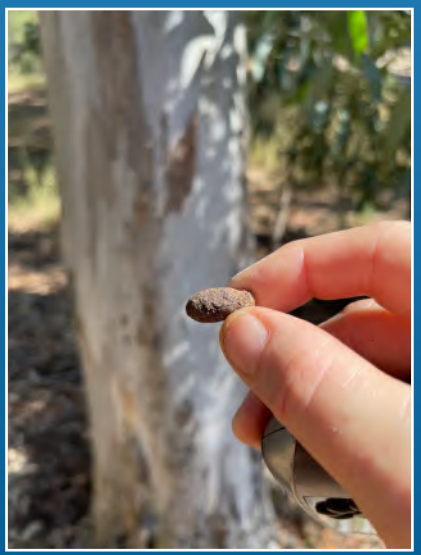
APPENDIX 1

December 2021/January 2022 Koala Thermal Survey Report

Koala Survey and Monitoring

Thermal koala survey

GREENRIDGE SITE Dec. 2021- Jan. 2022



Greenridge thermal drone survey

Background

Drones are increasingly being used for ecological applications such as surveys of flora and fauna and wildlife management activities. Surveys of koalas are ideally suited to thermal imaging drone surveys as they are cryptic in nature and the detection rate of koalas using traditional transect (ground) surveys can vary widely depending on factors such as the vegetation type and cover and the experience of the survey team.

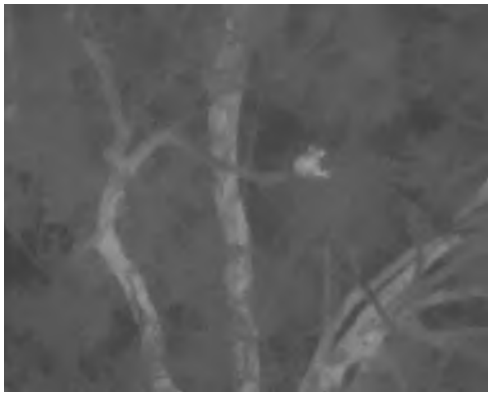
Endeavour Veterinary Ecology (EVE) was engaged by the Department of Transport and Main Roads to conduct koala surveys in areas within and adjacent to the Coomera Connector corridor. Surveys to determine the distribution and abundance, health, and reproductive status of local koala populations are essential to effectively understand and manage the long-term viability of these populations. EVE conducted surveys of the PRCA and Greenridge site to assess the distribution and estimate the number of koalas residing on the site. Both sites were surveyed as this area is somewhat isolated and the koala populations on both sites are closely linked and from an ecological perspective, can be considered a single population. The health of the PRCA koalas is being actively managed through capture, the fitting of monitoring devices and comprehensive health assessments and treatment of sick animals.

Methods

Drone surveys were conducted over 13 nights from 2 December 2021 to 10 February 2022, with the Greenridge site surveyed over 6 nights. All areas of koala habitat were surveyed, except for two small areas on the site (approx 9.5 ha in total) where site terrain made it difficult to maintain visual line of sight of the drone (a Civil Aviation Safety Authority requirement). The area was divided into 6 discrete search polygons and each area was systematically searched in an ‘up-and-back’ lawn-mower pattern using a Matrice 300 RTK (M300) with H20T camera (dual optical and thermal).

Thermal heat signatures suggestive of koalas were investigated to positively identify the origin of the heat source. Where a koala was identified, the location of the koala was determined using a laser rangefinder and the GPS coordinates recorded in a spreadsheet and a reference screen shot of the koala with the coordinates was saved. Coordinates and drone flight paths were plotted on Google Earth and any obvious duplicate detections were deleted.

Detection rates were estimated based on the known locations of existing radio-tagged koalas and the proportion of animals detected or missed on any given night. We estimated our detection rate ranged between 0.65 and 0.85 (65% to 85% of koalas detected). As with traditional surveys, thermal drone detections of koalas are impeded by vegetation type/canopy density, the experience of the spotters, as well as environmental conditions where warm temperatures and water bodies can mask heat signatures by reducing the temperature differential between the environment and the koala.



Results

In total, 68 koalas were detected on site (Figure 1) during thermal drone surveys of areas of koala habitat. These detections were all positively identified as koalas using optical imaging. Based on our estimated detection rate where we know koalas are missed, the estimated numbers of koalas at the Greenridge site was estimated to be between 80 and 105 animals, where 68 detections at a detection rate of 85% equates to approximately 80 animals and a 65% detection rate equates to approximately 105 animals.

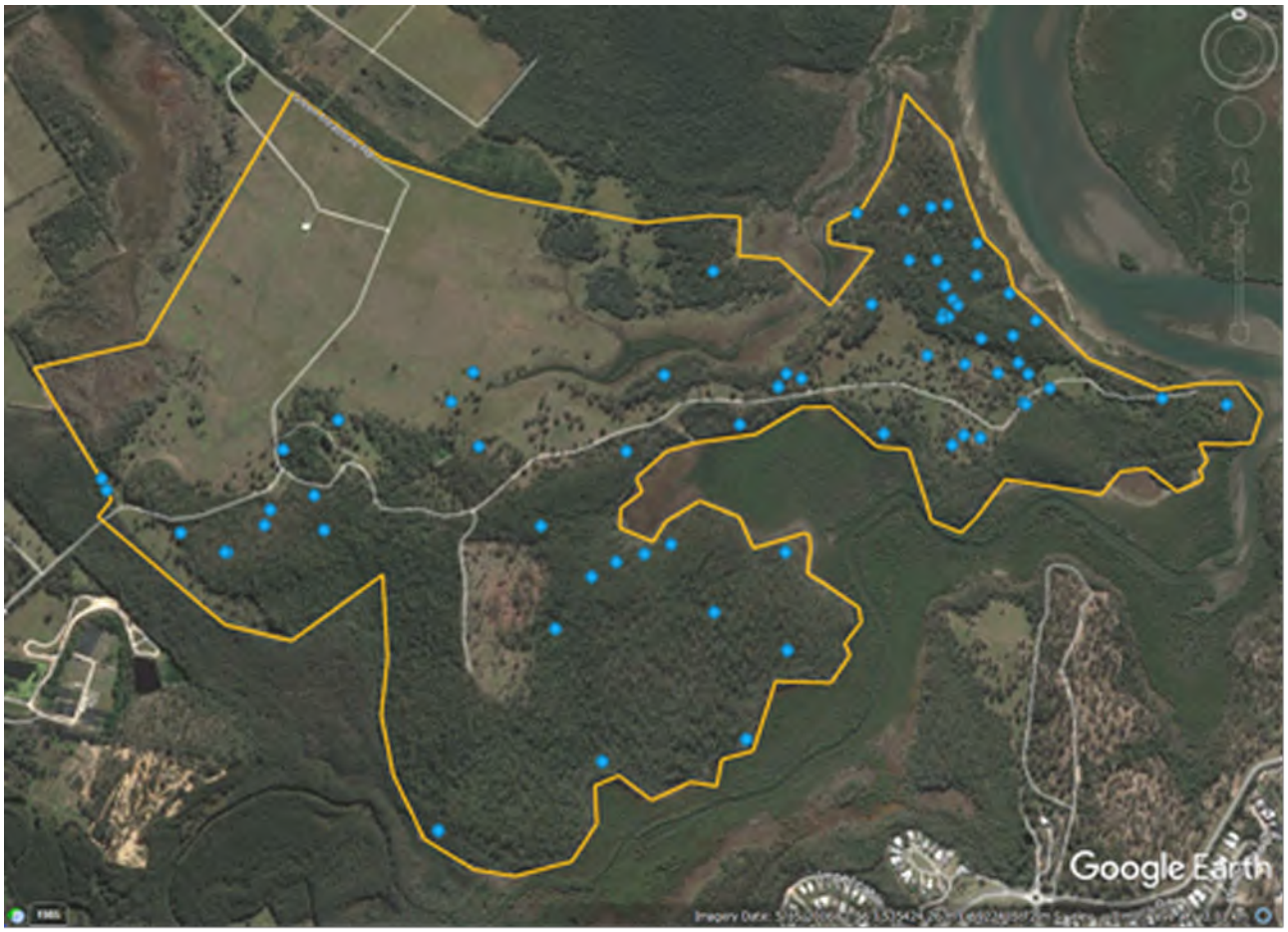


FIGURE 1. LOCATION OF THE 68 KOALAS DETECTED BY THERMAL DRONE SURVEYS IN THE PRCA AND THE GREENRIDGE SITE.

Discussion

Thermal drone surveys are becoming an increasingly common method of surveying flora and fauna. Koalas are ideally suited to night time thermal surveys as: 1. Animals are most active in the tops of the canopies feeding at night; and, 2. Koalas are a relatively large animal with an often-distinctive heat signature that can be detected well above the tree canopy by thermal cameras and can result in a greater detection of animals than traditional ground-based surveys. However, as is the case with any survey method, there are limitations to the use of thermal drones for koala population surveys where an understanding of detailed population metrics is required. Besides the legal requirements enforced by CASA around the use of drones, when koalas are detected, the assessment of the sex, reproductive and health status of the animal is often not possible. Ground-based field validation and monitoring of koalas is still an important component of koala population management.

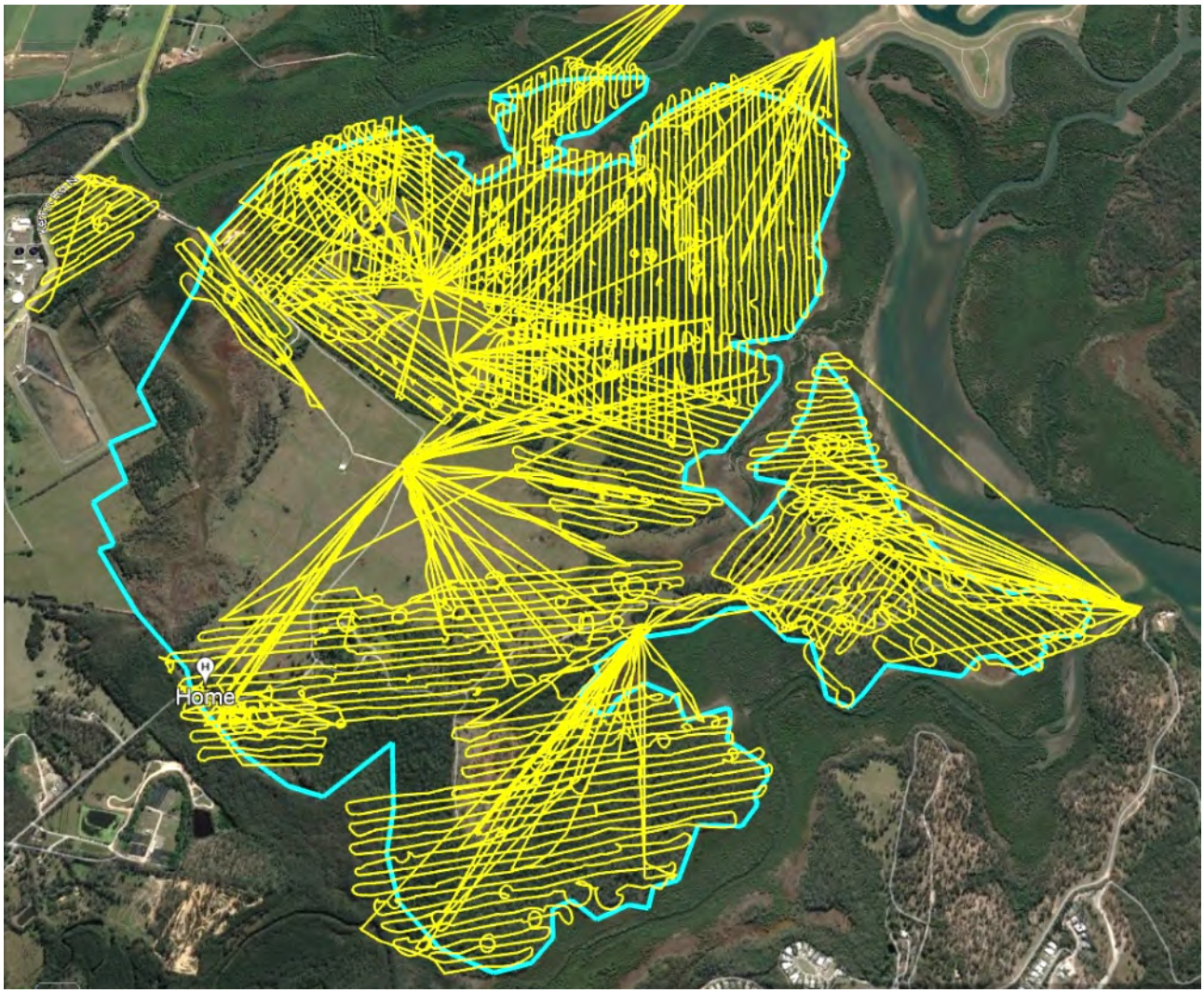


FIGURE 2. DRONE SURVEY TRANSECTS COVERED ALMOST ALL AREAS OF KOALA HABITAT WITHIN THE PRCA AND GREENRIDGE SITE.

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1800 568 978

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NERANG QLD 4211

APPENDIX 2

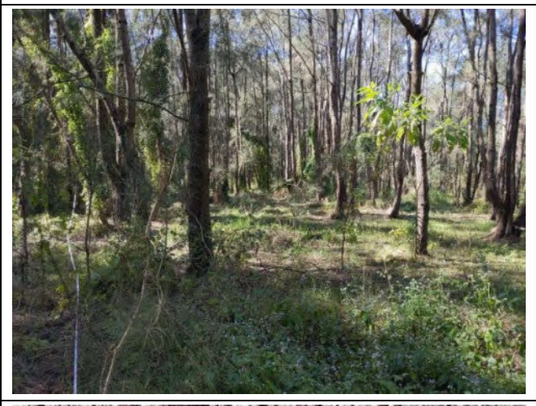
BioCondition Survey Data

APPENDIX 2: BIOCONDITION SURVEY DATA

Broad title	Attribute	AU1 – RE 12.1.1 Remnant	AU1 – RE 12.1.1 Remnant	AU1 – RE 12.1.1 Remnant	AU2 – RE 12.1.1 Regrowth	AU2 – RE 12.1.1 Regrowth	AU3 – RE 12.1.1 Non-remnant	AU3 – RE 12.1.1 Non-remnant	AU4 – RE 12.3.20 Remnant	AU4 – RE 12.3.20 Remnant	AU4 – RE 12.3.20 Remnant	AU5 – RE 12.3.20 Regrowth	AU5 – RE 12.3.20 Regrowth	AU6 – RE 12.3.20 Non-remnant	AU6 – RE 12.3.20 Non-remnant
LOCATION	Site ID	836-837	840-841	962-963	844a-844b	956-957	958-959	970-971	931-932	964-965	966-967	974-975	923-924	972-973	960-961
	Date	30/06/2022	1/07/2022	27/07/2022	1/07/2022	14/07/2022	14/07/2022	21/09/2022	14/07/2022	27/07/2022	3/08/2022	21/09/2022	14/07/2022	21/09/2022	14/07/2022
	Observers	DF/LW/NW	DF/LW	PL/EG	DF/LW	DF/EG	DF/EG	NB/EG	DF/EG	PL/EG	EG/LB	NB/EG	DF/EG	NB/EG	DF/EG
	Location	Coomera	Coomera	Coomera	Coomera	Coomera	Coomera	Coomera	Coomera	Coomera	Coomera	Coomera	Coomera	Coomera	Coomera
REGIONAL ECOSYSTEM & TREE HEIGHTS	Habitat description	Remnant 12.1.1	Remnant 12.1.1	Remnant 12.1.1 Casuarina glauca forest	Regrowth 12.1.1	Regrowth 12.1.1	Non-remnant 12.1.1	Non-remnant 12.1.1 Grassy paddock	Remnant 12.3.20	Remnant 12.1.1	Remnant 12.3.20	Regrowth 12.3.20 Dense regrowth of Melaluca and Casuarina	Regrowth 12.3.20	Non-remnant 12.3.20 Cleared, overgrown pasture	Non-remnant 12.3.20
	Regional Ecosystem	12.1.1	12.1.1	12.1.1	12.1.1	12.1.1	12.1.1	12.1.1	12.3.20	12.1.1	12.3.20	12.3.20	12.3.20	12.3.20	12.3.20
	Tree canopy (EDL) height	15	12	18	10	10	6	3	18	13	25	11	6	0	9
	Tree sub canopy height	7	4	5	5	3	2	0	5	6	15	7	3	0	2
	Emergent height													0	
SITE PHOTOS	Photo north from plot centre	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Photo south from plot centre	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Photo east from plot centre	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Photo west from plot centre	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
50x20m AREA	Coarse woody debris (m) (all logs >10cm diam; 0.5m long)	17	4.7	21.9	0.6	3.5	0	0	26	31.5	16.5	0	0	0	0
	Coarse woody debris (m/ha)	170	47	219	6	35	0	0	260	315	165	0	0	0	0
100x50m AREA	List native species from EDL	*Casuarina glauca* *Melaleuca quinquenervia* *Eucalyptus tereticornis*	*Casuarina glauca* *Eucalyptus tereticornis*	*Casuarina glauca*	*Casuarina glauca*	*Casuarina glauca*	*Casuarina glauca*	*Casuarina glauca*	*Casuarina glauca* *Melaleuca quinquenervia*	*Melaleuca quinquenervia*	*Casuarina glauca* *Eucalyptus tereticornis*	*Melaluca quinquenervia* *Casuarina glauca*	*Casuarina glauca* *Eucalyptus tereticornis*		*Casuarina glauca*
	Total number of native tree spp from EDL only	3	2	1	1	1	1	1	2	1	2	2	2	0	1
	List other native tree species not in EDL (tree = single stemmed and >2m)	*Cupaniopsis anacardioides*	*Eucalyptus siderophloia* *Melaleuca salicina*		*Melaleuca salicina* *Myrsine variabilis*				*Acacia disparrima*	*Casuarina glauca*	*Melaleuca quinquenervia* *Corymbia intermedia* *Lophostemon confertus* *Acacia disparrima* *Melaleuca salicina*	*Acacia concurrens* *Melaleuca salicina* *Glochidion sumanatrum* *Glochidion ferdinandi* *Melaleuca sp.* *Lophostemon suaveolons*	*Melaleuca quinquenervia* *Glochidion ferdinandi*		
	Lantana cover estimate (%)	0		3		0	0		0	0	10	6	1		0
	Total number of non-EDL species	1	2	0	2	0	0	0	1	1	5	1	3	0	0
	Total native tree spp richness (all tree species >2m + EDL) (Tree Richness)	4	4	1	3	1	1	1	3	2	7	8	5	0	1
	Total native tree spp from EDL recruiting	2	1	1	1	1	1	1	1	1	2	2	2	0	1
	Proportion of EDL Recruiting %	67	50	100	100	100	100	100	50	100	100	100	100	0	100
	Eucalypt large tree DBH	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Non-eucalypt large tree DBH	29	29	29	29	29	29	29	30	30	30	30	30	30	30
	Number of large eucalypt trees	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Number of large non-eucalypt trees	8	1	27	8	10	0	0	62	65	29	4	5	0	0
	Total large trees	8	1	27	8	10	0	0	62	65		8	5	0	0
50x10m AREA	List native shrub species	*Casuarina glauca* *Eucalyptus tereticornis* *Melaleuca quinquenervia* *Ficus rubiginosa* *Cupaniopsis anacardioides* *Acacia concurrens* *Enchylaena tomentosa*	*Casuarina glauca* *Eucalyptus tereticornis* *Melaleuca salicina* *Maclura cochinchinensis* *Eucalyptus siderophloia*		*Casuarina glauca* *Maclura cochinchinensis* *Melaleuca salicina* *Myrsine variabilis*		*Ludwigia octovalvis*		*Casuarina glauca*		*Casuarina glauca* *Melaleuca quinquenervia* *Alphitonia excelsa* *Acacia disparrima*	*Casuarina glauca* *Alphitonia excelsa* *Ghlochidion sumanatrum* *Melaleuca quinquenervia*	*Casuarina glauca* *Macular cochinchinensis* *Casuarina glauca* *Eucalyptus tereticornis* *Alphitonia excelsa*		*Urena lobata* *Casuarina glauca*
	Total number of native shrub species (Shrub Richness)	7	5	2	4	0	1	0	1	2	4	4	5	0	2
	List native grass species	*Sporobolus virginicus* *Paspalum distichum* *Zoysia macrantha* *Einadia nutans*	*Sporobolus virginicus* *Paspalum scrobiculatum* *Enteropogon acicularis* *Paspalidium distans* *Paspalum distichum*		*Sporobolus virginicus* *Paspalum scrobiculatum* *Paspalidium distans* *Enteropogon acicularis*	*Sporobolus virginicus* *Phragmites australis*	*Imperata cylindrica*	*Sporobolus virginicus* *Imperata cylindrica* *Phragmites australis*	*Phragmites australis* *Sporobolus virginicus (infertile)* *Hemarthria uncinate (infertile)*		*Ottochloa gracilima* *Imperata cylindrica* *Unknown 1* *Unknown 2*	*Sporobolus virginicus* *Imperata cylindrica* *Grass 1* *Panicum simile* *Grass 2*	*Imperata cylindrica* *Ottochloa gracillima* *Capillipedium spicigerum*		*Imperata cylindrica*
	Total number of native grass species (Grass Richness)	4	5	4	4	2	1	3	3	1	4	5	3	0	1
	List native forbs and other	*Fimbristylis ferruginea* *Alternanthera nana* *Notothixos subaureus* *Amyema cambagei* *Parsonsia straminea* *Cyperus polystachyos* *Juncus kraussii* *Commelina diffusa*	*Fimbristylis ferruginea* *Amyema cambagei* *Oxalis thompsoniae* *Dianella brevipedunculata* *Commelina diffusa* *Eustrephus latifolius*		*Bacopa monnieri* *Fimbristylis ferruginea* *Suaeda australis* *Eclipta platyglossa* *Alternanthera nana* *Parsonsia straminea* *Dianella brevipedunculata*	*Persicaria subsessilis* *Ranunculus inundatus* *Hydrocotyle verticillata* *Alternanthera denticulata* *Juncus usitatus* *Cyperaceae sp1* *Eleocharis dulcis* *Parsonsia straminea* *Gahnia clarkei* *Rumex brownii* *Baumea articulata* *Cyperaceae sp2* *Typha orientalis* *Commelina sp* *Neoachmandra cunninghamii* *Hydrocotyle acutifolia*	*Persicaria subsessilis* *Ranunculus inundatus* *Juncus usitatus* *Alternanthera* *Rumex brownii* *Cyperaceae sp1* *Cyperus polystachyos* *Cyperaceae sp2* *Bacopa monnieri*	*Reed 1* *Reed 2* *Ranunculus inundatus* *Persicaria attenuata* *Amaranthus sp.*	*Triglochin striatum* *Parsonsia straminea* *Alternanthera denticulata* *Centella asiatica*		*Lomandra hystrix* *Commelina diffusa* *Parsonsia straminea* *Pteridium esculentum* *Dianella sp.*	*Reed 1* *Forb 1* *Forb 2* *Parsonsia straminea* *Convolvulus sp* *viola sp* *Hydrocotyle acutifolia* *Forb 3* *Lobelia purpurascens* *Sedge 1* *Reed 2* *Dianella longifolia*	*Parsonsia straminea* *Centella asiatica* *Dianella longifolia* *Geitonoplesium cymosum* *Polymeria calycina* *Stephania japonica* *Cyperus polystachyos*	*Convolvulus sp* *viola sp* *Parsonsia straminea*	*Cyperus polystachyos* *Polymeria* *Ranunculus* *Centella asiatica* *Dianella brevipedunculata*
	Total number of native forbs and other species (Forbs Richness)	8	6	9	7	16	9	5	4	6	5	10	7	3	5
	Non native species	*Solanum seaforthianum*	*Passiflora pallida* *Solanum americanum* *Lantana camara* *Asparagus aethiopicus*		*Lantana camara* *Solanum seaforthianum* *Asparagus aethiopicus* *Emilia sonchifolia* *Sonchus oleraceus* *Passiflora pallida* *Baccharis halimifolia* *Ottochloa gracillima*	*Cuphea carthagenensis* *Solanum nigrum* *Tomato* *Biden pilosa* *Solanum seaforthianum* *Eclipta prostrata* *Setaria*	*Setaria sphacelata* *Cuphea carthagenensis* *Eclipta prostrata* *Paspalum urvillei* *Balloon cotton* *Aster subulatus* *Chloris gayana* *Baccharis halimifolia*	*Setaria sphacelata* *Chloris gayana* *Rumex crispus* *weed (forb)* *Gomphocarpus physocarpus* *Ambrosia artemisiifolia* *Solanum nigrum* *Malva parviflora* *Baccharis halimifolia* *Verbena sp* *Cuphea carthagenensis*	*Baccharis halimifolia*		*Lantana camara* *Passiflora suberosa*	*Lantana camara* *Passiflora suberosa* *Ageratum houstonianum* *Schinus terebinthifolius* *weed forb* *Baccharis halimifolia* *Setaria sphacelata*	*Solanum seaforthianum* *Schinus terebinthifolius* *Ageratum houstonianum* *Gomphocarpus physocarpus* *Aster subulatus* *Lantana camara* *Bidens pilosa* *Emelina sonchifolia* *Cuphea carthagenensis* *Senna pendula var. glabrata* *Solanum torvum* *Sida rhombifolia* *Paspalum mandiocanum* *Murraya paniculata* *Passiflora suberosa* *Passiflora foetida* *Verbena bonariensis*	*Setaria sphacelata* *Senecio madagascariensis* *Verbena sp* *Gomphocarpus physocarpus* *Sida sp* *weed forb* *Chloris gayana*	*Setaria sphacelata* *Baccharis halimifolia* *Senecio madagascariensis* *Chloris gayana* *Lantana camara* *Cynodon dactylon* *Billy goat* *Cuphea* *Aster* *Solanum nigrum* *Solanum mauritianum* *Conyza bonariensis* *Spear thistle* *Solanum seaforthianum* *Solanum sp*
	Non native % cover	0	0	20	2	1	60	75	1	0	5	5	10	95	95
Five 1x1m plots	Plot 1 Native perennial ('decreaser') grass cover %	95	85	2	85	5	0	30	10	60	88	0	80	0	95
	Plot 1 Native other grass (if relevant) %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 1 Native forbs and other species %	0	0	10	0	0	2	0	80	0	0	1	5	0	0
	Plot 1 Native shrubs <1m %	0	0	0	0	0	0	0	0	0	0	0	0	0	5
	Plot 1 Non-native grass %	0	0	0	0	0	98	70	0	0	0	0	5	100	0
	Plot 1 Non-native forbs and shrubs %	0	0	15	10	5	0	0	0	0	2	1	7	0	0
	Plot 1 Litter %	5	15	68	5	90	0	0	10	30	10	98	3	0	0
	Plot 1 Rock %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 1 Bare ground %	0	0	5	0	0	0	0	0	10	0	0	0	0	0
	Plot 1 Cryptograms %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 1 Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Plot 2 Native perennial ('decreaser') grass cover %	90	95	5	10	25	0	0	12	50	75	10	85	0	0
	Plot 2 Native other grass (if relevant) %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 2 Native forbs and other species %	0	0	5	0	0	4	0	83	0	0	0	5	0	0
	Plot 2 Native shrubs <1m %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 2 Non-native grass %	0	0	0	0	5	0	100	0	0	0	0	0	40	70
	Plot 2 Non-native forbs and shrubs %	0	0	5	80	0	66	0	0	0	0	0	0	1	10
	Plot 2 Litter %	10	5	80	10	70	30	0	5	50	20	80	10	59	20
	Plot 2 Rock %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 2 Bare ground %	0	0	5	0	0	0	0	0	0	5	10	0	0	0
	Plot 2 Cryptograms %	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Broad title	Attribute	AU1 - RE 12.1.1 Remnant	AU1 - RE 12.1.1 Remnant	AU1 - RE 12.1.1 Remnant	AU2 - RE 12.1.1 Regrowth	AU2 - RE 12.1.1 Regrowth	AU3 - RE 12.1.1 Non-remnant	AU3 - RE 12.1.1 Non-remnant	AU4 - RE 12.3.20 Remnant	AU4 - RE 12.3.20 Remnant	AU4 - RE 12.3.20 Remnant	AU5 - RE 12.3.20 Regrowth	AU5 - RE 12.3.20 Regrowth	AU6 - RE 12.3.20 Non-remnant	AU6 - RE 12.3.20 Non-remnant
LOCATION	Site ID	836-837	840-841	962-963	844a-844b	956-957	958-959	970-971	931-932	964-965	966-967	974-975	923-924	972-973	960-961
	Plot 2 Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Plot 3 Native perennial ('decreaser') grass cover %	90	80	5	30	5	0	0	0	30	40	26	20	0	0
	Plot 3 Native other grass (if relevant) %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 3 Native forbs and other species %	0	0	5	0	0	0	15	0	0	2	0	35	0	0
	Plot 3 Native shrubs <1m %	1	0	0	0	0	5	0	0	0	5	10	0	0	0
	Plot 3 Non-native grass %	0	0	0	0	0	10	10	0	0	0	0	33	100	0
	Plot 3 Non-native forbs and shrubs %	0	0	75	0	0	0	0	0	0	0	1	0	0	20
	Plot 3 Litter %	9	20	15	35	95	85	90	85	70	35	65	12	0	80
	Plot 3 Rock %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 3 Bare ground %	0	0	0	35	0	0	0	0	0	18	0	0	0	0
	Plot 3 Cryptograms %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 3 Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Plot 4 Native perennial ('decreaser') grass cover %	60	60	3	30	50	0	0	0	5	40	0	0	0	0
	Plot 4 Native other grass (if relevant) %	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Plot 4 Native forbs and other species %	0	0	0	0	0	20	0	0	65	0	0	3	0	5
	Plot 4 Native shrubs <1m %	0	0	0	0	0	0	5	0	0	5	0	0	0	0
	Plot 4 Non-native grass %	0	0	0	0	0	80	80	0	0	0	0	92	90	90
	Plot 4 Non-native forbs and shrubs %	0	0	20	20	0	0	0	0	0	0	0	5	0	5
	Plot 4 Litter %	40	40	62	30	50	0	20	95	30	55	97	0	10	0
	Plot 4 Rock %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 4 Bare ground %	0	0	15	20	0	0	0	0	0	0	3	0	0	0
	Plot 4 Cryptograms %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 4 Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Plot 5 Native perennial ('decreaser') grass cover %	45	90	40	15	5	0	1	59	10	66	10	0	0	0
	Plot 5 Native other grass (if relevant) %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 5 Native forbs and other species %	0	0	0	0	0	0	0	1	80	2	0	0	0	0
	Plot 5 Native shrubs <1m %	0	0	0	0	0	0	0	0	0	2	1	0	0	0
	Plot 5 Non-native grass %	0	0	0	0	0	40	20	0	0	0	1	50	65	100
	Plot 5 Non-native forbs and shrubs %	0	0	0	0	0	0	10	0	0	0	1	3	0	0
	Plot 5 Litter %	55	10	60	40	95	60	69	40	10	30	86	47	35	0
	Plot 5 Rock %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 5 Bare ground %	0	0	0	45	0	0	0	0	0	0	1	0	0	0
	Plot 5 Cryptograms %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Plot 5 Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Mean of all Plots Native perennial ('decreaser') grass cover %	76	82	11	34	18	0	6.2	16.2	31	61.8	9.2	37	0	19
	Mean of all Plots Native other grass (if relevant) %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mean of all Plots Native forbs and other species %	0	0	4	0	0	5.2	0	35.8	29	0.8	0.2	9.6	0	1
	Mean of all Plots Native shrubs <1m %	0.2	0	0	0	0	1	0	1	0	2.4	2.2	0	0	1
	Mean of all Plots Non-native grass %	0	0	0	0	1	45.6	56	0	0	0	0.2	36	79	52
	Mean of all Plots Non-native forbs and shrubs %	0	0	23	22	1	13.2	2	0	0	0.4	0.6	3	0.2	7
	Mean of all Plots Litter %	23.8	18	57	24	80	35	35.8	47	38	30	85.2	14.4	20.8	20
	Mean of all Plots Rock %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mean of all Plots Bare ground %	0	0	5	20	0	0	0	0	2	4.6	2.8	0	0	0
	Mean of all Plots Cryptograms %	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100m Transect	Canopy Total (m)	79.5	99.5	82.4	77.5	82.5	0	0	99.5	73.6	83	57	44.5	0	12.5
	Sub canopy total (m)	3.5	3	11.6	22	0	0	0	1.5	8	34	22	3.5	0	0
	Emergent canopy total (m)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Native Shrub total (m)	4	1	11.9	2.5	0	0	0	0.5	7	11	5.5	2	0	1
	Exotic Shrub total (m)	0	0	9.8	0	0	0	0	0	0	3	0	27	0	14
	Swamp oak canopy cover (m)		99.5	82.4	77.5	82.5	0	0	84.5	24	45	24.5	35.5	0	12.5
	Swamp oak canopy cover (% of canopy)	0	100	100	100	100	0	0	84.9	32.6	54.2	43.0	79.8	0	100
	Koala tree species canopy cover (m)		8.5	0	0	0	0	0	33	49.6	50	50.5	12.5	0	0
	Koala tree species canopy cover (% of canopy)	0	8.5	0	0	0	0	0	33.2	67.4	60.2	88.6	28.1	0	0

GREENRIDGE BIOCONDITION SURVEY SITE PHOTOS

Site No	North	East	South	West
836-837 AU1 RE 12.1.1 Remnant				
840-841 AU1 RE 12.1.1 Remnant				
962-963 AU1 RE 12.1.1 Remnant				
844a-844b AU2 RE 12.1.1 Regrowth				

GREENRIDGE BIOCONDITION SURVEY SITE PHOTOS

Site No	North	East	South	West
956-957 AU2 RE 12.1.1 Regrowth				
958-959 AU3 RE12.1.1 Non-remnant				
970-971 AU3 RE 12.1.1 Non remnant				
931-932 AU4 RE12.3.20 Remnant				

GREENRIDGE BIOCONDITION SURVEY SITE PHOTOS

Site No	North	East	South	West
964-965 AU4 RE 12.3.20 Remnant				
966-967 AU4 RE12.3.20 Remnant				
974-975 AU5 Re 12.3.20 Regrowth				
923-924 AU5 RE 12.3.20 Regrowth				

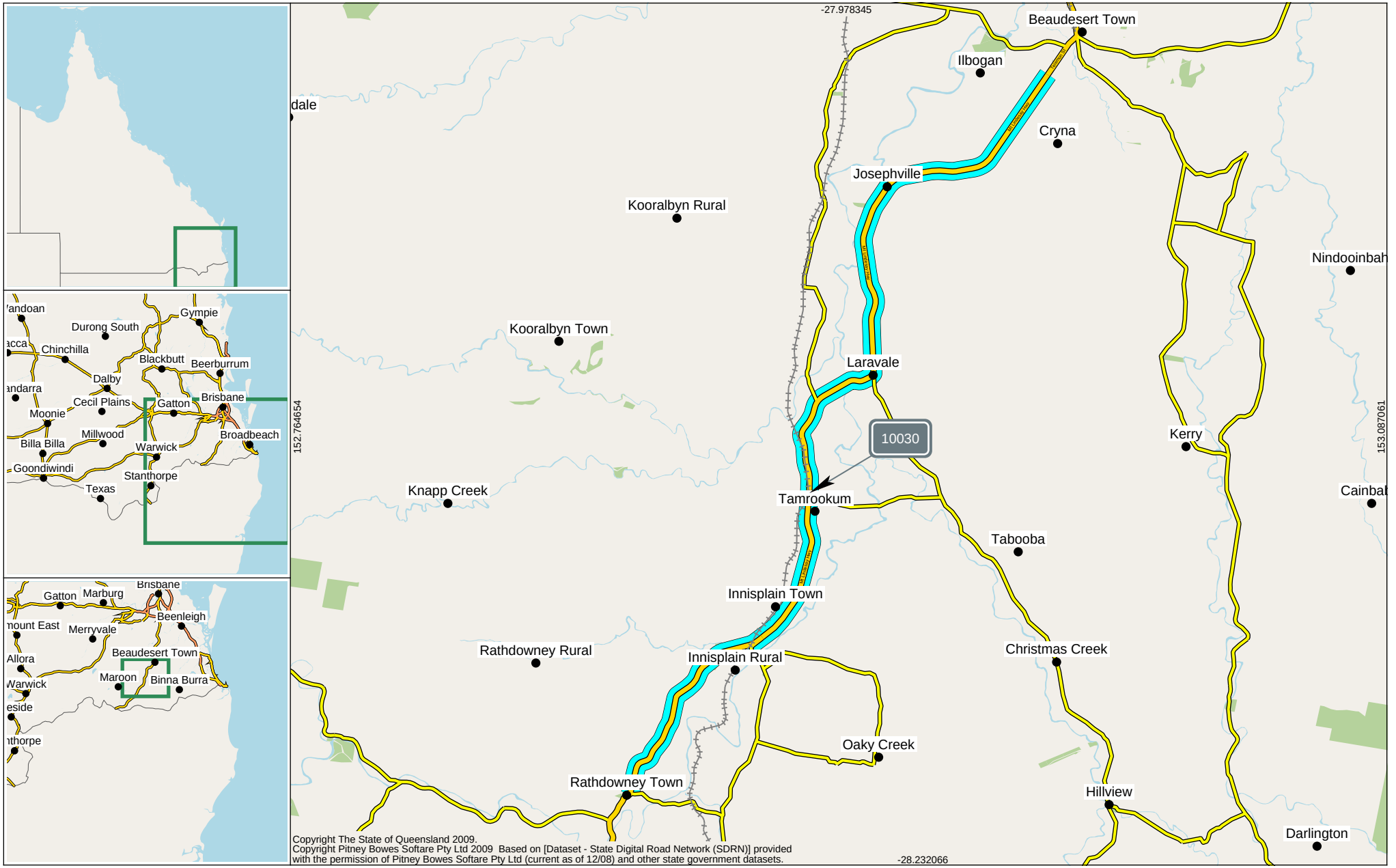
GREENRIDGE BIOCONDITION SURVEY SITE PHOTOS

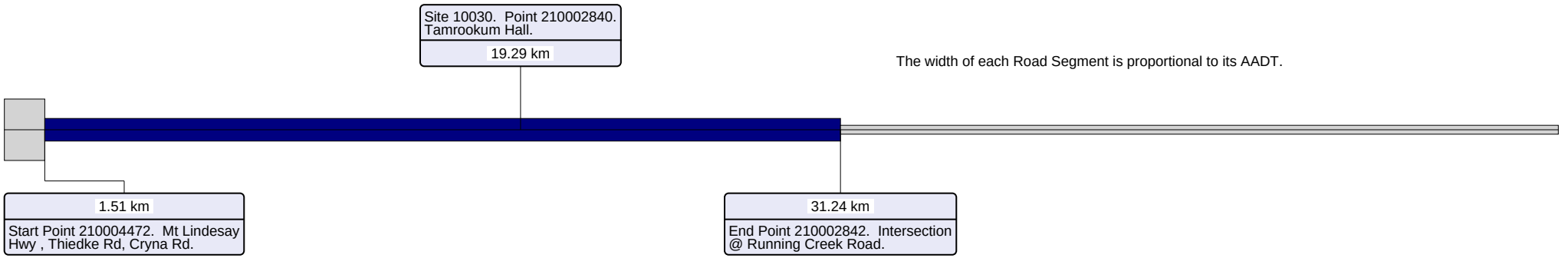
Site No	North	East	South	West
972-973 AU6 RE 12.3.20 Non remnant				
960-961 AU6 RE 12.3.20 Non-remnant				

APPENDIX 4

AADT SEGMENT REPORT

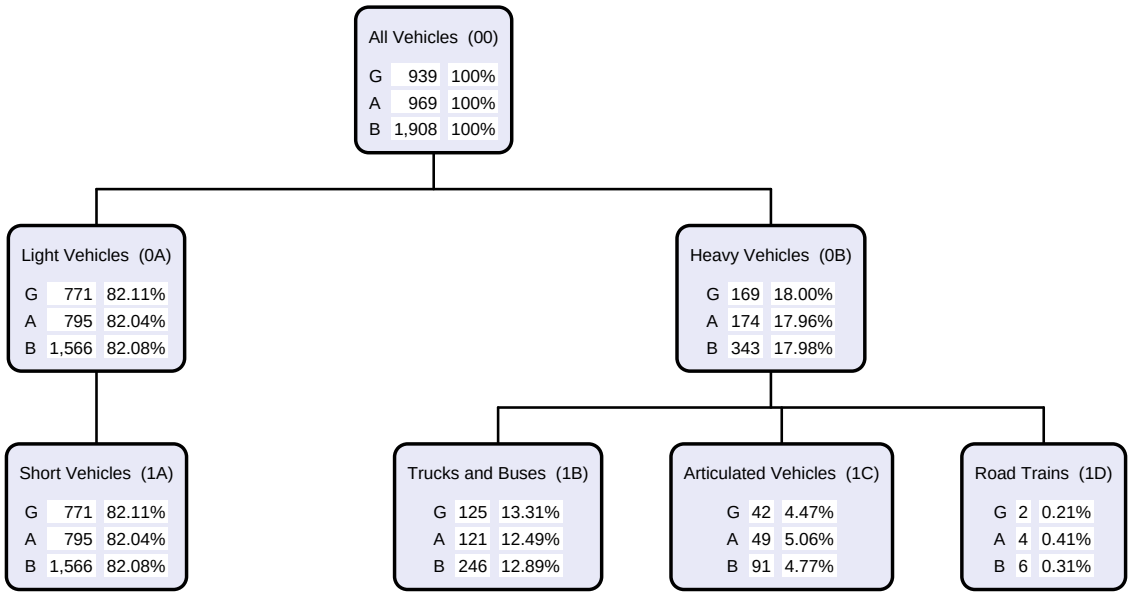
ROAD SECTION 25b – MT LINDESAY HIGHWAY





The width of each Road Segment is proportional to its AADT.

This report shows Annual Average Daily Traffic values (AADTs). Because the AADT values are converted to whole numbers, there will be occasional inaccuracies due to rounding. These inaccuracies are statistically insignificant.



AADT Segment Annual Volume Report
Provides summary data for the selected AADT Segment of a Road Section. Summary data is presented as both directional information and a combined bi-directional figure. The data is then broken down by Traffic Class, when available. The report also includes maps displaying the location of both the AADT Segment and the traffic count site.

Annual Average Daily Traffic (AADT)
Annual Average Daily Traffic (AADT) is the number of vehicles passing a point on a road in a 24 hour period, averaged over a calendar year.

AADT Segments
The State declared road network is broken into Road Sections and then further broken down into AADT Segments. An AADT Segment is a sub-section of the declared road network where traffic volume is similar along the entire AADT Segment.

Area
For administration purposes the Department of Transport and Main Roads has divided Queensland into 12 Districts. The Area field in TSDM reports displays the District Name and Number.

District Name	District
Central West District	401
Darling Downs District	402
Far North District	403
Fitzroy District	404
Mackay/Whitsunday District	405
Metropolitian District	406
North Coast District	407
North West District	409
Northern District	408
South Coast District	410
South West District	411
Wide Bay/Burnett District	412

AADT Values
AADT values are displayed by direction of travel as:

- G Traffic flow in gazettal direction
- A Traffic flow against gazettal direction
- B Traffic flow in both directions

Data Collection Year
Is the most recent year that data was collected at the data collection site.

Please Note:
Due to location and/or departmental policy, some sites are not counted every year.

Gazettal Direction
Is the direction of the traffic flow. It can be easily recognised by referring to the name of the road eg. Road Section: 10A Brisbane - Gympie denotes that the gazettal direction is from Brisbane to Gympie.

Maps
Display the selected location from a range of viewing levels, the start and end position details for the AADT Segment and the location of the traffic count site.

Road Section
Is the Gazetted road from which the traffic data is collected. Each Road Section is given a code, allocated sequentially in Gazettal Direction. Larger roads are broken down into sections and identified by an ID code with a suffix for easier data collection and reporting (eg. 10A, 10B, 10C). Road Sections are then broken into AADT Segments which are determined by traffic volume.

Segment Site
Is the unique identifier for the traffic count site representing the traffic flow within the AADT Segment.

Site
The physical location of a traffic counting device. Sites are located at a specified Through Distance along a Road Section.

Site Description
The description of the physical location of the traffic counting device.

Start and End Point
The unique identifier for the Through Distance along a Road Section.

Vehicle Class
Traffic is categorised as per the Austroads Vehicle Classification scheme. Traffic classes are in the following hierarchical format:

Volume or All Vehicles
00 = 0A + 0B

Light Vehicles
0A = 1A
1A = 2A + 2B

Heavy Vehicles
0B = 1B + 1C + 1D
1B = 2C + 2D + 2E
1C = 2F + 2G + 2H + 2I
1D = 2J + 2K + 2L

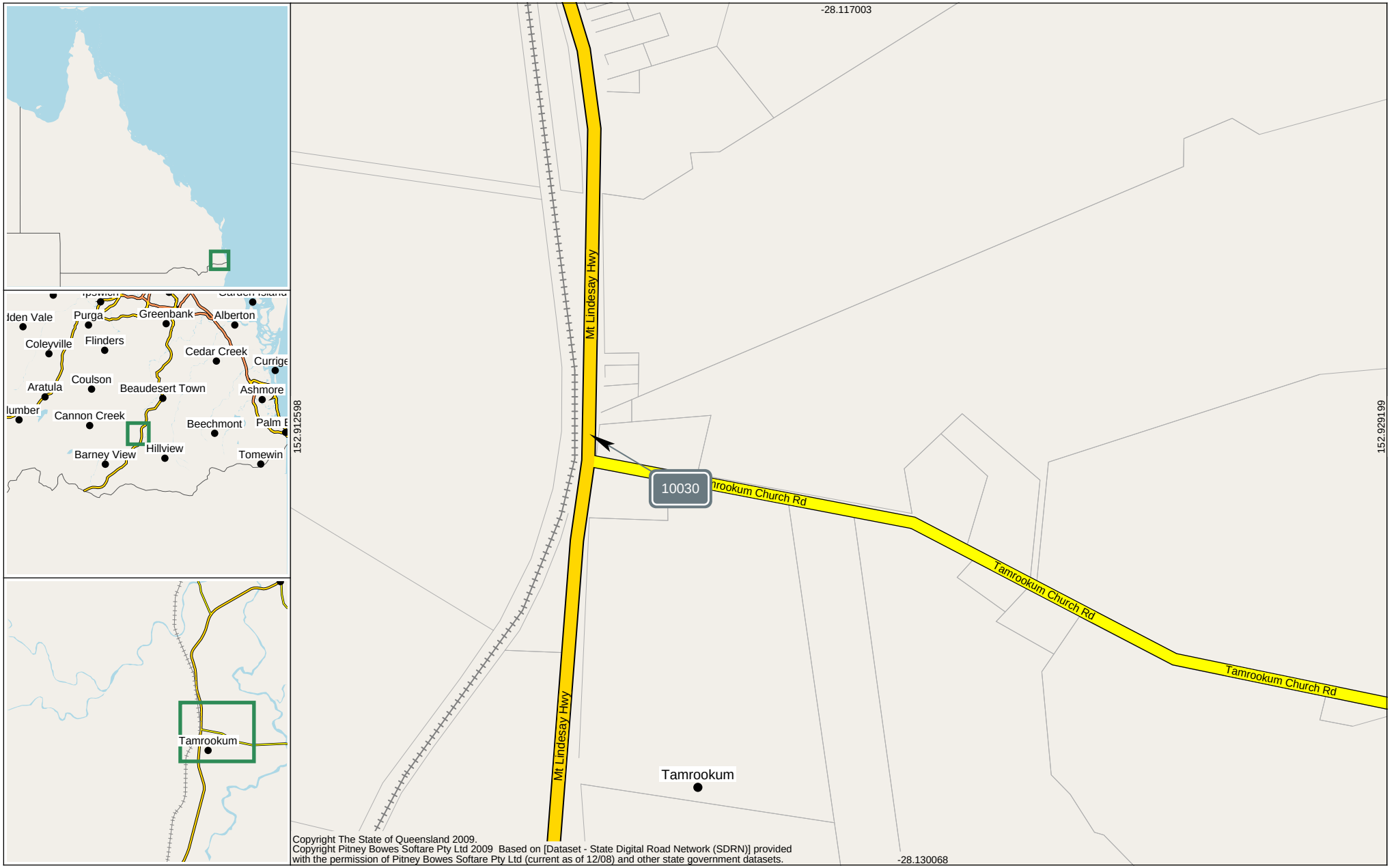
The following classes are the categories for which data can be captured:

Volume
00 All vehicles

2-Bin
0A Light vehicles
0B Heavy vehicles

4-Bin
1A Short vehicles
1B Truck or bus
1C Articulated vehicles
1D Road train

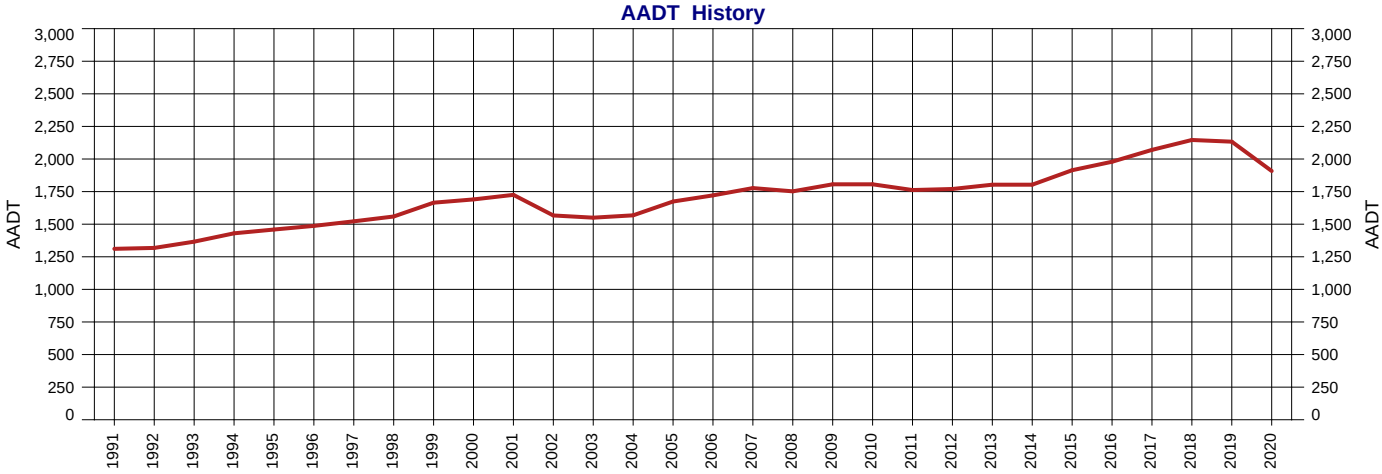
12-Bin
2A Short 2 axle vehicles
2B Short vehicles towing
2C 2 axle truck or bus
2D 3 axle truck or bus
2E 4 axle truck
2F 3 axle articulated vehicle
2G 4 axle articulated vehicle
2H 5 axle articulated vehicle
2I 6 axle articulated vehicle
2J B double
2K Double road train
2L Triple road train



Area	410 - South Coast District
Road Section	25B - MOUNT LINDESAY HIGHWAY (BEAUDESERT - BORDER)
Site	10030 - 100m sth of Tamrookum Church Rd
Thru Dist	19.287
Type	P - Permanent
Stream	TB - Bi-directional traffic flow

Year	2020	Growth last Year	-10.55%
AADT	1,908	Growth last 5 Yrs	-1.36%
Avg Week Day	1,869	Growth last 10 Yrs	0.48%
Avg Weekend Day	2,003		

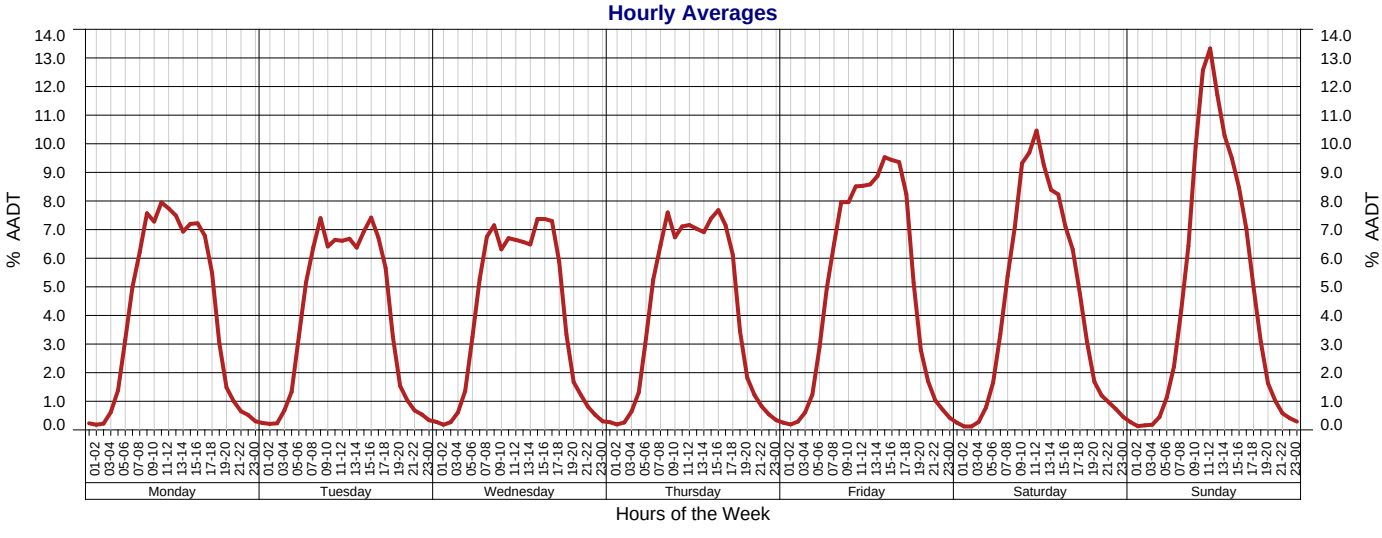
AADT History



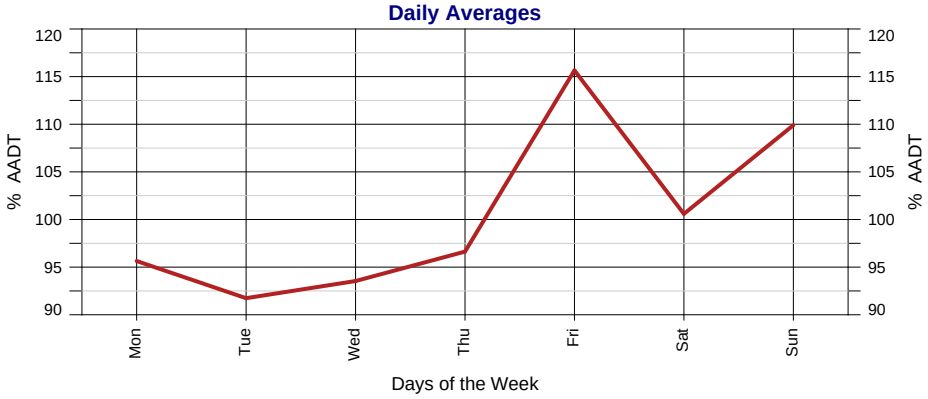
Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
2020	1,908	-10.55%	-1.36%	0.48%
2019	2,133	-0.61%	2.86%	2.25%
2018	2,146	3.67%	3.91%	2.53%
2017	2,070	4.60%	3.61%	2.10%
2016	1,979	3.40%	2.81%	1.59%
2015	1,914	6.16%	1.90%	1.28%
2014	1,803	0.00%	0.17%	0.73%
2013	1,803	1.86%	0.36%	1.04%
2012	1,770	0.45%	-0.14%	1.01%
2011	1,762	-2.44%	0.05%	0.90%
2010	1,806	0.00%	1.25%	1.26%
2009	1,806	3.08%	2.24%	1.28%
2008	1,752	-1.41%	2.23%	1.02%
2007	1,777	3.25%	3.14%	1.43%
2006	1,721	2.81%	1.63%	1.20%

Year	AADT	1-Year Growth	5-Year Growth	10-Year Growth
2005	1,674	6.76%	0.46%	1.04%
2004	1,568	1.16%	-1.58%	0.35%
2003	1,550	-1.08%	-1.44%	0.54%
2002	1,567	-9.16%	-0.48%	1.11%
2001	1,725	2.07%	3.02%	2.90%
2000	1,690	1.50%	3.21%	2.79%
1999	1,665	6.80%	3.47%	2.80%
1998	1,559	2.43%	2.44%	2.17%
1997	1,522	2.35%	2.67%	
1996	1,487	1.92%	2.70%	
1995	1,459	2.03%	2.20%	
1994	1,430	4.69%	1.85%	
1993	1,366	3.64%	1.25%	
1992	1,318	0.53%		
1991	1,311	-4.38%		0.85%

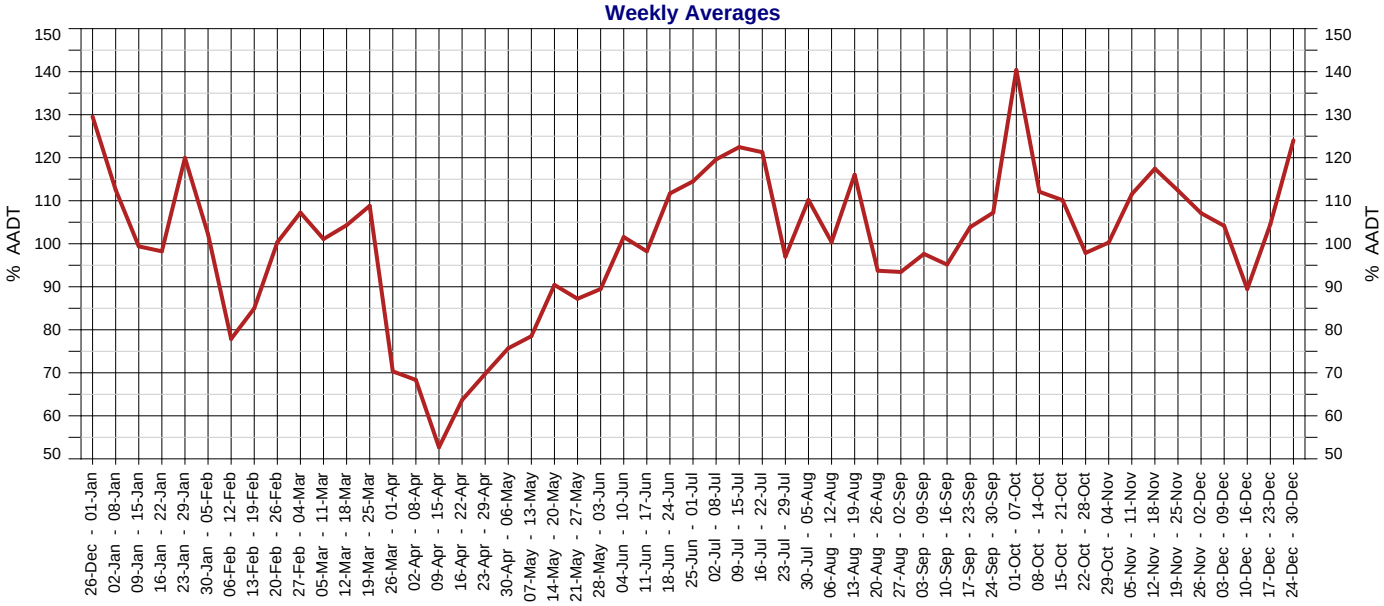
Hourly Averages



Daily Averages



Weekly Averages



2020 Calendar

January

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

February

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	

March

M	T	W	T	F	S	S
30	31					1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

April

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

May

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

June

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

July

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

August

M	T	W	T	F	S	S
31					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

September

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November

M	T	W	T	F	S	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

December

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Days on which traffic data was collected.

Annual Volume Report
Displays AADT history with hourly, daily and weekly patterns by Stream in addition to annual data for AADT figures with 1 year, 5 year and 10 year growth rates.

Annual Average Daily Traffic (AADT)
Annual Average Daily Traffic (AADT) is the number of vehicles passing a point on a road in a 24 hour period, averaged over a calendar year.

AADT History
Displays the years when traffic data was collected at this count site.

Area
For administration purposes the Department of Transport and Main Roads has divided Queensland into 12 Districts. The Area field in TSDM reports displays the District Name and Number.

District Name	District
Central West District	401
Darling Downs District	402
Far North District	403
Fitzroy District	404
Mackay/Whitsunday District	405
Metropolitian District	406
North Coast District	407
North West District	409
Northern District	408
South Coast District	410
South West District	411
Wide Bay/Burnett District	412

Avg Week Day
Average daily traffic volume during the week days, Monday to Friday.

Avg Weekend Day
Average daily traffic volume during the weekend, Saturday and Sunday.

Calendar
Days on which traffic data was collected are highlighted in green.

Gazettal Direction
The Gazettal Direction is the direction of the traffic flow. It can be easily recognised by referring to the name of the road eg. Road Section: 10A Brisbane - Gympie denotes that the gazettal direction is from Brisbane to Gympie.

- G Traffic flowing in Gazettal Direction
- A Traffic flowing against Gazettal Direction
- B The combined traffic flow in both Directions

Growth Percentage
Represents the increase or decrease in AADT, using a exponential fit over the previous 1, 5 or 10 year period.

Hour, Day & Week Averages
The amount of traffic on the road network will vary depending on the time of day, the day of the week and the week of the year. The ebb and flow of traffic travelling through a site over a period of time forms a pattern. The Hour, Day and Week Averages are then used in the calculation of AADT.

Road Section
Is the Gazetted road from which the traffic data is collected. Each Road Section is given a code, allocated sequentially in Gazettal Direction. Larger roads are broken down into sections and identified by an ID code with a suffix for easier data collection and reporting (eg. 10A, 10B, 10C). Road Sections are then broken into AADT Segments which are determined by traffic volume.

Site
The unique identifier and description of the physical location of a traffic counting device. Sites are located at a Through Distance along a Road Section.

Stream
The lane in which the traffic is travelling in. This report provides data for the combined flow of traffic in both directions.

Thru Dist or TDist
The distance from the beginning of the Road Section, in kilometres.

Type
There are two types of traffic counting sites, Permanent and Coverage. Permanent means the traffic counting device is in place 24/7. Coverage means the traffic counting device is in place for a specified period of time.

Year
Is the current year for the report. Where an AADT Year record is missing a traffic count has not been conducted, for that year.

APPENDIX 5

COASTAL SWAMP OAK TEC OFFSET AREA

HABITAT QUALITY ASSESSMENT TABLES

TABLE A5.1 **GREENRIDGE AU1 RE 12.1.1 REMNANT START QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE:	**8**

Assessment Unit - Regional Ecosystem	AU 1 - RE 12.1.1 Remnant											
Site Reference	Benchmark	Site 836-837			Site 840-841			Site 962-963				
	12.1.1	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Average % benchmark	Average Score
Site Condition												
Recruitment of woody perennial species in EDL	100	66.7	66.7	3	50.0	50.0	3	100.0	100.0	5	72.2	3
Native plant species richness - trees	1	4	400.0	5	4.0	400.0	5	1.0	100.0	5	300.0	5
Native plant species richness - shrubs	1	7	700.0	5	5.0	500.0	5	2.0	200.0	5	466.7	5
Native plant species richness - grasses	2	4	200.0	5	5.0	250.0	5	4.0	200.0	5	216.7	5
Native plant species richness - forbs	3	8	266.7	5	6.0	200.0	5	9.0	300.0	5	255.6	5
Tree canopy height	12	15	125.0	5	12.0	100.0	5	13.0	108.3	5	111.1	5
Tree subcanopy height	7	7	100.0	5	4.0	57.1	3	6.0	85.7	5	81.0	5
Tree canopy height (average of emergent, canopy, sub-canopy)	9.5	11	115.8	5	8.0	84.2	5	9.5	100.0	5	100.0	5
Tree canopy cover (EDL)	67	79.5	118.7	5	99.5	148.5	5	82.4	123.0	5	130.0	5
Subcanopy cover	23	3.5	15.2	2	3.0	13.0	2	11.6	50.4	5	26.2	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	41.5	92.2	5	51.3	113.9	5	47.0	104.4	5	103.5	5
Shrub canopy cover	5	4	80.0	5	1.0	20.0	3	11.9	238.0	3	112.7	5
Native grass cover	85	76	89.4	3	82.0	96.5	5	11.0	12.9	1	66.3	3
Organic litter	5	23.8	476.0	3	18.0	360.0	3	57.0	1140.0	3	658.7	3
Total large trees per hectare	92	16	17.4	5	2.0	2.2	5	54.0	58.7	10	26.1	5
Coarse woody debris (m/ha)	360	170	47.2	2	47.0	13.1	2	219.0	60.8	5	40.4	2
Non-native plant cover	0	0		10	0.0		10	20.0		5	6.7	10
Site Condition Score				61			61			62		61.0
MAX Site Condition Score				*80*			*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**				**Average**	**Average Score**
Size of patch (ha)												
Remnant			781.3			781.3			781.3		781.3	
Regrowth			105.0	10		105.0	10		105.0	10	105.0	10
Connectivity												
Remnant %			95.0			91.2			31.3		72.5	
Regrowth %				5			5		19.2	2	19.2	4
Context												
Remnant %			68.7			62.5			49.1		60.1	
Regrowth %			1.0	4		1.0	4		1.3	4	1.1	4
Site Context Score				19			19			16		18.0
MAX Site Context Score				*20*			*20*			*20*		*20*
Total habitat quality score /100				**80.00**			**80.00**			**78.00**		**79.00**
MAX Habitat Quality Score				***100***			***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	79.00	73.00	32.50	84.00	74.00	22.50	60.83
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	7.90	7.30	3.25	8.40	7.40	2.25	*6.08*
Size Weighting	1.00						
Weighted Habitat Quality Score	***7.90***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***7.90***

TABLE A5.2 **GREENRIDGE AU1 RE 12.1.1 REMNANT WITHOUT OFFSET QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE: **7**

Assessment Unit - Regional Ecosystem	AU 1 - RE 12.1.1 Remnant											
Site Reference	Benchmark	Site 836-837			Site 840-841			Site 962-963				
	12.1.1	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Average % benchmark	Average Score
Site Condition												
Recruitment of woody perennial species in EDL	100	66.7	66.7	3	50.0	50.0	3	100.0	100.0	5	72.2	3
Native plant species richness - trees	1	4	400.0	5	4.0	400.0	5	1.0	100.0	5	300.0	5
Native plant species richness - shrubs	1	7	700.0	5	5.0	500.0	5	2.0	200.0	5	466.7	5
Native plant species richness - grasses	2	4	200.0	5	5.0	250.0	5	4.0	200.0	5	216.7	5
Native plant species richness - forbs	3	8	266.7	5	6.0	200.0	5	9.0	300.0	5	255.6	5
Tree canopy height	12	15	125.0	5	12.0	100.0	5	13.0	108.3	5	111.1	5
Tree subcanopy height	7	7	100.0	5	4.0	57.1	3	6.0	85.7	5	81.0	5
Tree canopy height (average of emergent, canopy, sub-canopy)	9.5	11	115.8	5	8.0	84.2	5	9.5	100.0	5	100.0	5
Tree canopy cover (EDL)	67	79.5	118.7	5	99.5	148.5	5	82.4	123.0	5	130.0	5
Subcanopy cover	23	3.5	15.2	2	3.0	13.0	2	11.6	50.4	5	26.2	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	41.5	92.2	5	51.3	113.9	5	47.0	104.4	5	103.5	5
Shrub canopy cover	5	4	80.0	3	1.0	20.0	3	11.9	238.0	3	112.7	5
Native grass cover	85	76	89.4	3	82.0	96.5	3	11.0	12.9	0	66.3	1
Organic litter	5	23.8	476.0	3	18.0	360.0	3	57.0	1140.0	3	658.7	3
Total large trees per hectare	92	16	17.4	5	2.0	2.2	5	54.0	58.7	10	26.1	5
Coarse woody debris (m/ha)	360	170	47.2	2	47.0	13.1	2	219.0	60.8	5	40.4	2
Non-native plant cover	0	0		5	0.0		5	20.0		3	6.7	3
Site Condition Score				54			54			59		52.0
MAX Site Condition Score				*80*			*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**				**Average**	**Average Score**
Size of patch (ha)												
Remnant			781.3			781.3			781.3		781.3	
Regrowth			105.0	10		105.0	10		105.0	10	105.0	10
Connectivity												
Remnant %			95.0			91.2			31.3		72.5	
Regrowth %				5			5		19.2	2	19.2	4
Context												
Remnant %			68.7			62.5			49.1		60.1	
Regrowth %			1.0	4		1.0	4		1.3	4	1.1	4
Site Context Score				19			19			16		18.0
MAX Site Context Score				*20*			*20*			*20*		*20*
Total habitat quality score /100				**73.00**			**73.00**			**75.00**		**70.00**
MAX Habitat Quality Score				***100***			***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	70.00	71.00	29.50	72.50	74.00	22.50	56.58
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	7.00	7.10	2.95	7.25	7.40	2.25	*5.66*
Size Weighting	1.00						
Weighted Habitat Quality Score	***7.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***7.00***

TABLE A5.3 **GREENRIDGE AU1 RE 12.1.1 REMNANT WITH OFFSET QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE: **9**

Assessment Unit - Regional Ecosystem	AU 1 - RE 12.1.1 Remnant											
Site Reference	Benchmark	Site 836-837			Site 840-841			Site 962-963				
	12.1.1	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Average % benchmark	Average Score
Site Condition												
Recruitment of woody perennial species in EDL	100	66.7	66.7	5	50.0	50.0	5	100.0	100.0	5	72.2	5
Native plant species richness - trees	1	4	400.0	5	4.0	400.0	5	1.0	100.0	5	300.0	5
Native plant species richness - shrubs	1	7	700.0	5	5.0	500.0	5	2.0	200.0	5	466.7	5
Native plant species richness - grasses	2	4	200.0	5	5.0	250.0	5	4.0	200.0	5	216.7	5
Native plant species richness - forbs	3	8	266.7	5	6.0	200.0	5	9.0	300.0	5	255.6	5
Tree canopy height	12	15	125.0	5	12.0	100.0	5	13.0	108.3	5	111.1	5
Tree subcanopy height	7	7	100.0	3	4.0	57.1	5	6.0	85.7	5	81.0	5
Tree canopy height (average of emergent, canopy, sub-canopy)	9.5	11	115.8	5	8.0	84.2	5	9.5	100.0	5	100.0	5
Tree canopy cover (EDL)	67	79.5	118.7	5	99.5	148.5	5	82.4	123.0	5	130.0	5
Subcanopy cover	23	3.5	15.2	5	3.0	13.0	5	11.6	50.4	5	26.2	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	41.5	92.2	5	51.3	113.9	5	47.0	104.4	5	103.5	5
Shrub canopy cover	5	4	80.0	5	1.0	20.0	5	11.9	238.0	5	112.7	5
Native grass cover	85	76	89.4	5	82.0	96.5	5	11.0	12.9	3	66.3	5
Organic litter	5	23.8	476.0	5	18.0	360.0	5	57.0	1140.0	5	658.7	5
Total large trees per hectare	92	16	17.4	10	2.0	2.2	10	54.0	58.7	10	26.1	5
Coarse woody debris (m/ha)	360	170	47.2	5	47.0	13.1	5	219.0	60.8	5	40.4	5
Non-native plant cover	0	0		10	0.0		10	20.0		10	6.7	10
Site Condition Score				75			75			73		70.0
MAX Site Condition Score				*80*			*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**				**Average**	**Average Score**
Size of patch (ha)												
Remnant			781.3			781.3			781.3		781.3	
Regrowth			105.0	10		105.0	10		105.0	10	105.0	10
Connectivity												
Remnant %			95.0			91.2			31.3		72.5	
Regrowth %				5			5		19.2	2	19.2	4
Context												
Remnant %			68.7			62.5			49.1		60.1	
Regrowth %			1.0	4		1.0	4		1.3	4	1.1	4
Site Context Score				19			19			16		18.0
MAX Site Context Score				*20*			*20*			*20*		*20*
Total habitat quality score /100				**94.00**			**94.00**			**89.00**		**88.00**
MAX Habitat Quality Score				***100***			***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	88.00	89.00	69.00	91.50	88.00	86.00	85.25
Habitat Quality Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	8.80	8.90	6.90	9.15	8.80	8.60	*8.53*
Size Weighting	1.00						
Weighted Habitat Quality Score	***8.80***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***8.80***

TABLE A5.4 GREENRIDGE AU2 RE 12.1.1 REGROWTH START QUALITY FOR COASTAL SWAMP OAK TEC

START SCORE: 7

Assessment Unit - Regional Ecosystem	AU2 - RE 12.1.1 Regrowth								
Site Reference	Benchmark	Site 844a-844b			Site 956-957				
	12.1.1	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Average % benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	1	3	300.0	5	1	100.0	5	200.0	5
Native plant species richness - shrubs	1	4	400.0	5	0	0.0	0	200.0	5
Native plant species richness - grasses	2	4	200.0	5	2	100.0	5	150.0	5
Native plant species richness - forbs	3	7	233.3	5	16	533.3	5	383.3	5
Tree canopy height	12	10	83.3	5	10	83.3	5	83.3	5
Tree subcanopy height	7	5	71.4	5	3	42.9	3	57.1	3
Tree canopy height (average of emergent, canopy, sub-canopy)	9.5	7.5	78.9	5	6.5	68.4	3	73.7	5
Tree canopy cover (EDL)	67	77.5	115.7	5	82.5	123.1	5	119.4	5
Subcanopy cover	23	22	95.7	5	0	0.0	0	47.8	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	49.75	110.6	5	41.3	91.7	5	101.1	5
Shrub canopy cover	5	2.5	50.0	5	0	0.0	0	25.0	3
Native grass cover	85	34	40.0	1	18	21.2	1	30.6	1
Organic litter	5	24	480.0	3	80	1600.0	3	1040.0	3
Total large trees per hectare	92	16	17.4	5	20	21.7	5	19.6	5
Coarse woody debris (m/ha)	360	6	1.7	0	35	9.7	0	5.7	0
Non-native plant cover	0	2		10	1		10	1.5	10
Site Condition Score				59			47		57
MAX Site Condition Score				*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			883.3			884.3		883.8	
Regrowth			3.0	10		2.0	10	2.5	10
Connectivity									
Remnant %			44.5			6.0		25.2	
Regrowth %				2			0		2
Context									
Remnant %			60.5			28.0		44.2	
Regrowth %			1.0	4		3.4	2	2.2	4
Site Context Score				16			12		16
MAX Site Context Score				*20*			*20*		*20*
Total habitat quality score /100				**75.00**			**59.00**		**73.00**
MAX Habitat Quality Score				***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	79.00	73.00	32.50	84.00	74.00	22.50	60.83
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	7.90	7.30	3.25	8.40	7.40	2.25	*6.08*
Size Weighting		1.00					
Weighted Habitat Quality Score	***0.00***	***7.30***	***0.00***	***0.00***	***0.00***	***0.00***	***7.30***

TABLE A5.5 GREENRIDGE AU2 RE 12.1.1 REGROWTH WITHOUT OFFSET QUALITY FOR COASTAL SWAMP OAK TEC

START SCORE: 7

Assessment Unit - Regional Ecosystem	AU2 - RE 12.1.1 Regrowth								
Site Reference	Benchmark	Site 844a-844b			Site 956-957			Average % benchmark	Average Score
	12.1.1	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	1	3	300.0	5	1	100.0	5	200.0	5
Native plant species richness - shrubs	1	4	400.0	5	0	0.0	0	200.0	5
Native plant species richness - grasses	2	4	200.0	5	2	100.0	5	150.0	5
Native plant species richness - forbs	3	7	233.3	5	16	533.3	5	383.3	5
Tree canopy height	12	10	83.3	5	10	83.3	5	83.3	5
Tree subcanopy height	7	5	71.4	5	3	42.9	3	57.1	3
Tree canopy height (average of emergent, canopy, sub-canopy)	9.5	7.5	78.9	5	6.5	68.4	3	73.7	5
Tree canopy cover (EDL)	67	77.5	115.7	3	82.5	123.1	5	119.4	5
Subcanopy cover	23	22	95.7	5	0	0.0	0	47.8	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	49.75	110.6	5	41.3	91.7	5	101.1	5
Shrub canopy cover	5	2.5	50.0	3	0	0.0	0	25.0	1
Native grass cover	85	34	40.0	1	18	21.2	1	30.6	1
Organic litter	5	24	480.0	3	80	1600.0	3	1040.0	3
Total large trees per hectare	92	16	17.4	10	20	21.7	10	19.6	10
Coarse woody debris (m/ha)	360	6	1.7	0	35	9.7	0	5.7	0
Non-native plant cover	0	2		5	1		5	1.5	5
Site Condition Score				57			47		55
MAX Site Condition Score				*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			883.3			884.3		883.8	
Regrowth			3.0	10		2.0	10	2.5	10
Connectivity									
Remnant %			44.5			6.0		25.2	
Regrowth %				2			0		2
Context									
Remnant %			60.5			28.0		44.2	
Regrowth %			1.0	4		3.4	2	2.2	4
Site Context Score				16			12		16
MAX Site Context Score				*20*			*20*		*20*
Total habitat quality score /100				**73.00**			**59.00**		**71.00**
MAX Habitat Quality Score				***100***			***100***		***100***

Final habitat quality score (weighted)	AU1 RE 12.1.1 Remnant	AU2 RE 12.1.1 Regrowth	AU3 RE 12.1.1 Non-remnant	AU4 RE12.3.20 Remnant	AU5 RE 12.3.20 Regrowth	AU6 RE 12.3.20 Non-remnant	Average/Final
Habitat Quality Score (measured /100)	70.00	71.00	29.50	72.50	74.00	22.50	56.58
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	7.00	7.10	2.95	7.25	7.40	2.25	*5.66*
Size Weighting		1.00					
Weighted Habitat Quality Score	***0.00***	***7.10***	***0.00***	***0.00***	***0.00***	***0.00***	***7.10***

TABLE A5.6 GREENRIDGE AU2 RE 12.1.1 REGROWTH WITH OFFSET QUALITY FOR COASTAL SWAMP OAK TEC

START SCORE: 9

Assessment Unit - Regional Ecosystem	AU2 - RE 12.1.1 Regrowth								
Site Reference	Benchmark	Site 844a-844b			Site 956-957			Average % benchmark	Average Score
	12.1.1	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	1	3	300.0	5	1	100.0	5	200.0	5
Native plant species richness - shrubs	1	4	400.0	5	0	0.0	5	200.0	5
Native plant species richness - grasses	2	4	200.0	5	2	100.0	5	150.0	5
Native plant species richness - forbs	3	7	233.3	5	16	533.3	5	383.3	5
Tree canopy height	12	10	83.3	5	10	83.3	5	83.3	5
Tree subcanopy height	7	5	71.4	5	3	42.9	5	57.1	5
Tree canopy height (average of emergent, canopy, sub-canopy)	9.5	7.5	78.9	5	6.5	68.4	5	73.7	5
Tree canopy cover (EDL)	67	77.5	115.7	5	82.5	123.1	5	119.4	5
Subcanopy cover	23	22	95.7	5	0	0.0	2	47.8	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	49.75	110.6	5	41.3	91.7	5	101.1	5
Shrub canopy cover	5	2.5	50.0	5	0	0.0	5	25.0	5
Native grass cover	85	34	40.0	3	18	21.2	3	30.6	3
Organic litter	5	24	480.0	5	80	1600.0	5	1040.0	5
Total large trees per hectare	92	16	17.4	10	20	21.7	10	19.6	10
Coarse woody debris (m/ha)	360	6	1.7	5	35	9.7	5	5.7	5
Non-native plant cover	0	2		10	1		10	1.5	10
Site Condition Score				73			73		73
MAX Site Condition Score				*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			883.3			884.3		883.8	
Regrowth			3.0	10		2.0	10	2.5	10
Connectivity									
Remnant %			44.5			6.0		25.2	
Regrowth %				2			0		2
Context									
Remnant %			60.5			28.0		44.2	
Regrowth %			1.0	4		3.4	2	2.2	4
Site Context Score				16			12		16
MAX Site Context Score				*20*			*20*		*20*
Total habitat quality score /100				**89.00**			**85.00**		**89.00**
MAX Habitat Quality Score				***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	88.00	89.00	69.00	91.50	88.00	86.00	85.25
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	8.80	8.90	6.90	9.15	8.80	8.60	*8.53*
Size Weighting		1.00					
Weighted Habitat Quality Score	***0.00***	***8.90***	***0.00***	***0.00***	***0.00***	***0.00***	***8.90***

TABLE A5.7 **GREENRIDGE AU3 RE 12.1.1 NON-REMNANT START QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE:	**3**

Assessment Unit - Regional Ecosystem	AU3 - RE 12.1.1 Non-remnant								
Site Reference	Benchmark	Site 958-959			Site 970-971				
	12.1.1	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Average % benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	1	1	100.0	5	1	100.0	5	100.0	5
Native plant species richness - shrubs	1	1	100.0	5	0	0.0	0	50.0	2.5
Native plant species richness - grasses	2	1	50.0	2.5	3	150.0	5	100.0	5
Native plant species richness - forbs	3	9	300.0	5	5	166.7	5	233.3	5
Tree canopy height	12	6	50.0	3	3	25.0	3	37.5	3
Tree subcanopy height	7	2	28.6	3	0	0.0	0	14.3	0
Tree canopy height (average of emergent, canopy, sub-canopy)	9.5	4	42.1	3	1.5	15.8	0	28.9	3
Tree canopy cover (EDL)	67	0	0.0	0	0	0.0	0	0.0	0
Subcanopy cover	23	0	0.0	0	0	0.0	0	0.0	0
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	0.0	0	0	0.0	0	0.0	0
Shrub canopy cover	5	0	0.0	0		0.0	0	0.0	0
Native grass cover	85	0	0.0	0	6.2	7.3	0	3.6	0
Organic litter	5	35	700.0	3	35.8	716.0	3	708.0	3
Total large trees per hectare	92	0	0.0	0	0	0.0	0	0.0	0
Coarse woody debris (m/ha)	360	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	60		0	75	67.5	0	67.5	0
Site Condition Score				28.5			23		28.5
MAX Site Condition Score				*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			0.0			0		0.0	
Regrowth			0.0	0		0	0	0.0	0
Connectivity									
Remnant %						0		0.0	
Regrowth %			39.0	2		6.33	0	22.7	0
Context									
Remnant %			31.5			33.05		32.3	
Regrowth %			3.3	4		7.7	4	5.5	4
Site Context Score				6			4		4
MAX Site Context Score				*20*			*20*		*20*
Total habitat quality score /100				**34.50**			**27.00**		**32.50**
MAX Habitat Quality Score				***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	79.00	73.00	32.50	84.00	74.00	22.50	60.83
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	7.90	7.30	3.25	8.40	7.40	2.25	*6.08*
Size Weighting			1.00				
Weighted Habitat Quality Score	***0.00***	***0.00***	***3.25***	***0.00***	***0.00***	***0.00***	***3.25***

TABLE A5.8 **GREENRIDGE AU3 RE 12.1.1 NON-REMNANT WITHOUT OFFSET QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE:	3

Assessment Unit - Regional Ecosystem	AU3 - RE 12.1.1 Non-remnant								
Site Reference	Benchmark	Site 958-959			Site 970-971			Average % benchmark	Average Score
	12.1.1	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	1	1	100.0	5	1	100.0	5	100.0	5
Native plant species richness - shrubs	1	1	100.0	5	0	0.0	0	50.0	2.5
Native plant species richness - grasses	2	1	50.0	2.5	3	150.0	5	100.0	5
Native plant species richness - forbs	3	9	300.0	5	5	166.7	5	233.3	5
Tree canopy height	12	6	50.0	0	3	25.0	3	37.5	0
Tree subcanopy height	7	2	28.6	0	0	0.0	0	14.3	0
Tree canopy height (average of emergent, canopy, sub-canopy)	9.5	4	42.1	0	1.5	15.8	0	28.9	0
Tree canopy cover (EDL)	67	0	0.0	0	0	0.0	0	0.0	0
Subcanopy cover	23	0	0.0	0	0	0.0	0	0.0	0
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	0.0	0	0	0.0	0	0.0	0
Shrub canopy cover	5	0	0.0	0		0.0	0	0.0	0
Native grass cover	85	0	0.0	0	6.2	7.3	0	3.6	0
Organic litter	5	35	700.0	3	35.8	716.0	3	708.0	3
Total large trees per hectare	92	0	0.0	0	0	0.0	0	0.0	0
Coarse woody debris (m/ha)	360	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	60		0	75		0	67.5	0
Site Condition Score				25.5			23		25.5
MAX Site Condition Score				*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			0.0			0		0.0	
Regrowth			0.0	0		0	0	0.0	0
Connectivity									
Remnant %						0		0.0	
Regrowth %			39.0	2		6.33	0	22.7	0
Context									
Remnant %			31.5			33.05		32.3	
Regrowth %			3.3	4		7.7	4	5.5	4
Site Context Score				6			4		4
MAX Site Context Score				*20*			*20*		*20*
Total habitat quality score /100				**31.50**			**27.00**		**29.50**
MAX Habitat Quality Score				***100***			***100***		***100***

Final habitat quality score (weighted)	AU1 RE 12.1.1 Remnant	AU2 RE 12.1.1 Regrowth	AU3 RE 12.1.1 Non-remnant	AU4 RE12.3.20 Remnant	AU5 RE 12.3.20 Regrowth	AU6 RE 12.3.20 Non-remnant	Average/Final
Habitat Quality Score (measured /100)	70.00	71.00	29.50	72.50	74.00	22.50	56.58
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	7.00	7.10	2.95	7.25	7.40	2.25	*5.66*
Size Weighting			1.00				
Weighted Habitat Quality Score	***0.00***	***0.00***	***2.95***	***0.00***	***0.00***	***0.00***	***2.95***

TABLE A5.9 GREENRIDGE AU3 RE 12.1.1 NON-REMNANT WITH OFFSET QUALITY FOR COASTAL SWAMP OAK TEC

START SCORE: 7

Assessment Unit - Regional Ecosystem	AU3 - RE 12.1.1 Non-remnant								
Site Reference	Benchmark	Site 958-959			Site 970-971			Average % benchmark	Average Score
	12.1.1	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	1	1	100.0	5	1	100.0	5	100.0	5
Native plant species richness - shrubs	1	1	100.0	5	0	0.0	5	50.0	5
Native plant species richness - grasses	2	1	50.0	5	3	150.0	5	100.0	5
Native plant species richness - forbs	3	9	300.0	5	5	166.7	5	233.3	5
Tree canopy height	12	6	50.0	5	3	25.0	5	37.5	5
Tree subcanopy height	7	2	28.6	5	0	0.0	3	14.3	3
Tree canopy height (average of emergent, canopy, sub-canopy)	9.5	4	42.1	5	1.5	15.8	3	28.9	5
Tree canopy cover (EDL)	67	0	0.0	5	0	0.0	5	0.0	5
Subcanopy cover	23	0	0.0	5	0	0.0	5	0.0	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	0.0	5	0	0.0	5	0.0	5
Shrub canopy cover	5	0	0.0	5		0.0	5	0.0	5
Native grass cover	85	0	0.0	5	6.2	7.3	5	3.6	5
Organic litter	5	35	700.0	5	35.8	716.0	5	708.0	5
Total large trees per hectare	92	0	0.0	5	0	0.0	5	0.0	5
Coarse woody debris (m/ha)	360	0	0.0	5	0	0.0	5	0.0	5
Non-native plant cover	0	60		5	75		5	67.5	5
Site Condition Score				65			63		65.0
MAX Site Condition Score				*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			0.0			0		0.0	
Regrowth			0.0	0		0	0	0.0	0
Connectivity									
Remnant %						0		0.0	
Regrowth %			39.0	2		6.33	0	22.7	0
Context									
Remnant %			31.5			33.05		32.3	
Regrowth %			3.3	4		7.7	4	5.5	4
Site Context Score				6			4		4
MAX Site Context Score				*20*			*20*		*20*
Total habitat quality score /100				**71.00**			**67.00**		**69.00**
MAX Habitat Quality Score				***100***			***100***		***100***

Final habitat quality score (weighted)	AU1 RE 12.1.1 Remnant	AU2 RE 12.1.1 Regrowth	AU3 RE 12.1.1 Non-remnant	AU4 RE12.3.20 Remnant	AU5 RE 12.3.20 Regrowth	AU6 RE 12.3.20 Non-remnant	Average/Final
Habitat Quality Score (measured /100)	88.00	89.00	69.00	91.50	88.00	86.00	85.25
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	8.80	8.90	6.90	9.15	8.80	8.60	*8.53*
Size Weighting			1.00				
Weighted Habitat Quality Score	***0.00***	***0.00***	***6.90***	***0.00***	***0.00***	***0.00***	***6.90***

TABLE A5.10 **GREENRIDGE AU4 RE 12.3.20 REMNANT START QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE:	**8**

Assessment Unit - Regional Ecosystem	AU4 - RE 12.3.20 Remnant											
Site Reference	Benchmark	Site 931-932			Site 964-965			Site 966-967				
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Average % benchmark	Average Score
Site Condition												
Recruitment of woody perennial species in EDL	100	50	50.0	3	100	100.0	5	100	100	5	83.3	5
Native plant species richness - trees	4	3	75.0	2.5	2	50.0	2.5	7	175	5	100.0	5
Native plant species richness - shrubs	4	1	25.0	2.5	2	50.0	2.5	4	100	5	58.3	2.5
Native plant species richness - grasses	2	3	150.0	5	1	50.0	2.5	4	200	5	133.3	5
Native plant species richness - forbs	8	4	50.0	2.5	6	75.0	2.5	5	62.5	2.5	62.5	2.5
Tree canopy height	16	18	112.5	5	15	93.8	5	25	156.25	5	120.8	5
Tree subcanopy height	8	5	62.5	3	8	100.0	5	15	187.5	5	116.7	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	11.5	95.8	5	11.5	95.8	5	20	166.7	5	119.4	5
Tree canopy cover (EDL)	70	99.5	142.1	5	73.6	105.1	5	83	118.6	5	122.0	5
Subcanopy cover	20	1.5	7.5	0	8	40.0	2	34	170	5	72.5	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	50.5	112.2	5	40.8	90.7	5	58.5	130.0	5	111.0	5
Shrub canopy cover	15	0.5	3.3	0	7	46.7	3	11	73.3	5	41.1	3
Native grass cover	20	16.2	81.0	3	31.0	155.0	5	61.8	309	5	181.7	5
Organic litter	30	47	156.7	5	38	126.7	5	30	100	5	127.8	5
Total large trees per hectare	165	124	75.2	10	130	78.8	10	58	35.2	5	63.0	10
Coarse woody debris (m/ha)	890	260	29.2	2	315.0	35.4	2	165	18.5	2	27.7	2
Non-native plant cover	0	1		10	0		10	5		5	2.0	10
Site Condition Score				55.5			60			59.5		65.0
MAX Site Condition Score				*80*			*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)												
Remnant			781.3			781.3			781.3		781.3	
Regrowth			105.0	10		105.0	10		105.0	10	105.0	10
Connectivity												
Remnant %			99.4			99.4			68.2		89.0	
Regrowth %				5			5		4.0	4		5
Context												
Remnant %			52.2			52.2			68.7		57.7	
Regrowth %			2.9	4		2.9	4		1.0	4	2.3	4
Site Context Score				19			19			18		19.0
MAX Site Context Score				*20*			*20*			*20*		*20*
Total habitat quality score /100				**74.50**			**79.00**			**77.50**		**84.00**
MAX Habitat Quality Score				***100***			***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	79.00	73.00	32.50	84.00	74.00	22.50	60.83
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	7.90	7.30	3.25	8.40	7.40	2.25	*6.08*
Size Weighting				1.00			
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***8.40***	***0.00***	***0.00***	***8.40***

TABLE A5.11 **GREENRIDGE AU4 RE 12.3.20 REMNANT WITHOUT OFFSET QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE: **7**

Assessment Unit - Regional Ecosystem	AU3 - RE 12.1.1 Non-remnant		AU4 - RE 12.3.20 Remnant											
Site Reference	Benchmark	Site 958-959	Benchmark	Site 931-932			Site 964-965			Site 966-967			Average % benchmark	Average Score
	12.1.1	Raw Data	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition														
Recruitment of woody perennial species in EDL	100	100	100	50	50.0	3	100	100.0	3	100	100	3	83.3	3
Native plant species richness - trees	1	1	4	3	75.0	2.5	2	50.0	2.5	7	175	5	100.0	5
Native plant species richness - shrubs	1	1	4	1	25.0	2.5	2	50.0	2.5	4	100	5	58.3	2.5
Native plant species richness - grasses	2	1	2	3	150.0	2.5	1	50.0	2.5	4	200	2.5	133.3	2.5
Native plant species richness - forbs	3	9	8	4	50.0	0	6	75.0	2.5	5	62.5	2.5	62.5	2.5
Tree canopy height	12	6	16	18	112.5	5	15	93.8	5	25	156.25	5	120.8	5
Tree subcanopy height	7	2	8	5	62.5	5	8	100.0	5	15	187.5	5	116.7	5
Tree canopy height (average of emergent, canopy, sub-canopy)	9.5	4	12	11.5	95.8	5	11.5	95.8	5	20	166.7	5	119.4	5
Tree canopy cover (EDL)	67	0	70	99.5	142.1	5	73.6	105.1	5	83	118.6	5	122.0	5
Subcanopy cover	23	0	20	1.5	7.5	2	8	40.0	5	34	170	5	72.5	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	45	50.5	112.2	5	40.8	90.7	5	58.5	130.0	5	111.0	5
Shrub canopy cover	5	0	15	0.5	3.3	0	7	46.7	3	11	73.3	5	41.1	3
Native grass cover	85	0	20	16.2	81.0	3	31.0	155.0	5	61.8	309	5	181.7	3
Organic litter	5	35	30	47	156.7	3	38	126.7	3	30	100	5	127.8	5
Total large trees per hectare	92	0	165	124	75.2	10	130	78.8	10	58	35.2	10	63.0	10
Coarse woody debris (m/ha)	360	0	890	260	29.2	2	315.0	35.4	2	165	18.5	2	27.7	2
Non-native plant cover	0	60	0	1		5	0		5	5		3	2.0	5
Site Condition Score						43.5			51			58		53.5
MAX Site Condition Score						*80*			*80*			*80*		*80*
Site Context					**Value**	**Score**		**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)														
Remnant					781.3			781.3			781.3		781.3	
Regrowth					105.0	10		105.0	10		105.0	10	105.0	10
Connectivity														
Remnant %					99.4			99.4			68.2		89.0	
Regrowth %						5			5		4.0	4		5
Context														
Remnant %					52.2			52.2			68.7		57.7	
Regrowth %					2.9	4		2.9	4		1.0	4	2.3	4
Site Context Score						19			19			18		19.0
MAX Site Context Score						*20*			*20*			*20*		*20*
Total habitat quality score /100						**62.50**			**70.00**			**76.00**		**72.50**
MAX Habitat Quality Score						***100***			***100***			***100***		***100***

Final habitat quality score (weighted)	AU1 RE 12.1.1 Remnant	AU2 RE 12.1.1 Regrowth	AU3 RE 12.1.1 Non-remnant	AU4 RE12.3.20 Remnant	AU5 RE 12.3.20 Regrowth	AU6 RE 12.3.20 Non-remnant	Average/Final
Habitat Quality Score (measured /100)	70.00	71.00	29.50	72.50	74.00	22.50	56.58
Habitat Quality Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	7.00	7.10	2.95	7.25	7.40	2.25	*5.66*
Size Weighting				1.00			
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***7.25***	***0.00***	***0.00***	***7.25***

TABLE A5.12 **GREENRIDGE AU4 RE 12.3.20 REMNANT WITH OFFSET QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE: **9**

Assessment Unit - Regional Ecosystem	AU4 - RE 12.3.20 Remnant											
Site Reference	Benchmark	Site 931-932			Site 964-965			Site 966-967				
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Average % benchmark	Average Score
Site Condition												
Recruitment of woody perennial species in EDL	100	50	50.0	5	100	100.0	5	100	100	5	83.3	5
Native plant species richness - trees	4	3	75.0	2.5	2	50.0	2.5	7	175	5	100.0	5
Native plant species richness - shrubs	4	1	25.0	2.5	2	50.0	2.5	4	100	5	58.3	2.5
Native plant species richness - grasses	2	3	150.0	5	1	50.0	5	4	200	5	133.3	5
Native plant species richness - forbs	8	4	50.0	2.5	6	75.0	2.5	5	62.5	5	62.5	5
Tree canopy height	16	18	112.5	5	15	93.8	5	25	156.25	5	120.8	5
Tree subcanopy height	8	5	62.5	5	8	100.0	5	15	187.5	5	116.7	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	11.5	95.8	5	11.5	95.8	5	20	166.7	5	119.4	5
Tree canopy cover (EDL)	70	99.5	142.1	5	73.6	105.1	5	83	118.6	5	122.0	5
Subcanopy cover	20	1.5	7.5	2	8	40.0	5	34	170	5	72.5	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	50.5	112.2	5	40.8	90.7	5	58.5	130.0	5	111.0	5
Shrub canopy cover	15	0.5	3.3	3	7	46.7	5	11	73.3	5	41.1	5
Native grass cover	20	16.2	81.0	5	31.0	155.0	5	61.8	309	5	181.7	5
Organic litter	30	47	156.7	5	38	126.7	5	30	100	5	127.8	5
Total large trees per hectare	165	124	75.2	10	130	78.8	10	58	35.2	10	63.0	10
Coarse woody debris (m/ha)	890	260	29.2	5	315.0	35.4	5	165	18.5	5	27.7	5
Non-native plant cover	0	1		10	0		10	5		10	2.0	10
Site Condition Score				65.5			67.5			75		72.5
MAX Site Condition Score				*80*			*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)												
Remnant			781.3			781.3			781.3		781.3	
Regrowth			105.0	10		105.0	10		105.0	10	105.0	10
Connectivity												
Remnant %			99.4			99.4			68.2		89.0	
Regrowth %				5			5		4.0	4		5
Context												
Remnant %			52.2			52.2			68.7		57.7	
Regrowth %			2.9	4		2.9	4		1.0	4	2.3	4
Site Context Score				19			19			18		19.0
MAX Site Context Score				*20*			*20*			*20*		*20*
Total habitat quality score /100				**84.50**			**86.50**			**93.00**		**91.50**
MAX Habitat Quality Score				***100***			***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	88.00	89.00	69.00	91.50	88.00	86.00	85.25
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	8.80	8.90	6.90	9.15	8.80	8.60	*8.53*
Size Weighting				1.00			
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***9.15***	***0.00***	***0.00***	***9.15***

TABLE A5.13 **GREENRIDGE AU5 RE 12.3.20 REGROWTH START QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE: **7**

Assessment Unit - Regional Ecosystem	AU5 - RE 12.3.20 Regrowth								
Site Reference	Benchmark	Site 974-975			Site 923-924				
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Average % benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	4	8	200.0	5	4	100.0	5	150.0	5
Native plant species richness - shrubs	4	4	100.0	5	5	125.0	5	112.5	5
Native plant species richness - grasses	2	5	250.0	5	3	150.0	5	200.0	5
Native plant species richness - forbs	8	10	125.0	5	7	87.5	2.5	106.3	5
Tree canopy height	16	11	68.8	3	6	37.5	3	53.1	3
Tree subcanopy height	8	7	87.5	5	3	37.5	3	62.5	3
Tree canopy height (average of emergent, canopy, sub-canopy)	12	9	75.0	5	4.5	37.5	3	56.3	3
Tree canopy cover (EDL)	70	57	81.4	5	44.5	63.6	5	72.5	5
Subcanopy cover	20	22	110.0	5	3.5	17.5	2	63.8	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	39.5	87.8	5	24	53.3	5	70.6	5
Shrub canopy cover	15	5.5	36.7	3	2	13.3	3	25.0	3
Native grass cover	20	9.2	46.0	1	37	185.0	5	115.5	5
Organic litter	30	85.2	284.0	3	14	46.7	3	165.3	5
Total large trees per hectare	165	8	4.8	5	10	6.1	5	5.5	5
Coarse woody debris (m/ha)	890	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	5		5	10		5	7.5	5
Site Condition Score				52			51.5		56.0
MAX Site Condition Score				*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			654.84			0		327.4	
Regrowth			33.5	10		1.09	0	17.27	10
Connectivity									
Remnant %			79.87			29.5		54.69	
Regrowth %			0	5		0	2	0.0	4
Context									
Remnant %			52.65			39.82		46.24	
Regrowth %			9.11	4		9.85	4	9.48	4
Site Context Score				19			6		18
MAX Site Context Score				*20*			*20*		*20*
Total habitat quality score /100				**71.00**			**57.50**		**74.00**
MAX Habitat Quality Score				***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	79.00	73.00	32.50	84.00	74.00	22.50	60.83
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	7.90	7.30	3.25	8.40	7.40	2.25	*6.08*
Size Weighting					1.00		
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***7.40***	***0.00***	***7.40***

TABLE A5.14 **GREENRIDGE AU5 RE 12.3.20 REGROWTH WITHOUT OFFSET QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE:	7

Assessment Unit - Regional Ecosystem	AU5 - RE 12.3.20 Regrowth								
Site Reference	Benchmark	Site 974-975			Site 923-924			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	4	8	200.0	5	4	100.0	5	150.0	5
Native plant species richness - shrubs	4	4	100.0	5	5	125.0	5	112.5	5
Native plant species richness - grasses	2	5	250.0	5	3	150.0	5	200.0	5
Native plant species richness - forbs	8	10	125.0	5	7	87.5	2.5	106.3	5
Tree canopy height	16	11	68.8	5	6	37.5	3	53.1	5
Tree subcanopy height	8	7	87.5	5	3	37.5	3	62.5	3
Tree canopy height (average of emergent, canopy, sub-canopy)	12	9	75.0	5	4.5	37.5	3	56.3	5
Tree canopy cover (EDL)	70	57	81.4	5	44.5	63.6	5	72.5	5
Subcanopy cover	20	22	110.0	5	3.5	17.5	2	63.8	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	39.5	87.8	5	24	53.3	5	70.6	5
Shrub canopy cover	15	5.5	36.7	3	2	13.3	3	25.0	3
Native grass cover	20	9.2	46.0	1	37	185.0	5	115.5	5
Organic litter	30	85.2	284.0	3	14	46.7	3	165.3	5
Total large trees per hectare	165	8	4.8	5	10	6.1	5	5.5	5
Coarse woody debris (m/ha)	890	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	5		3	10		3	7.5	3
Site Condition Score				50			49.5		56.0
MAX Site Condition Score				*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			654.84			0		327.4	
Regrowth			33.5	10		1.09	0	17.27	10
Connectivity									
Remnant %			79.87			29.5		54.69	
Regrowth %			0	5		0	2	0.0	4
Context									
Remnant %			52.65			39.82		46.24	
Regrowth %			9.11	4		9.85	4	9.48	4
Site Context Score				19			6		18
MAX Site Context Score				*20*			*20*		*20*
Total habitat quality score /100				**69.00**			**55.50**		**74.00**
MAX Habitat Quality Score				***100***			***100***		***100***

Final habitat quality score (weighted)	AU1 RE 12.1.1 Remnant	AU2 RE 12.1.1 Regrowth	AU3 RE 12.1.1 Non-remnant	AU4 RE12.3.20 Remnant	AU5 RE 12.3.20 Regrowth	AU6 RE 12.3.20 Non-remnant	Average/Final
Habitat Quality Score (measured /100)	70.00	71.00	29.50	72.50	74.00	22.50	56.58
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	7.00	7.10	2.95	7.25	7.40	2.25	*5.66*
Size Weighting					1.00		
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***7.40***	***0.00***	***7.40***

TABLE A5.15 **GREENRIDGE AU5 RE 12.3.20 REGROWTH WITH OFFSET QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE: **9**

Assessment Unit - Regional Ecosystem	AU5 - RE 12.3.20 Regrowth								
Site Reference	Benchmark	Site 974-975			Site 923-924			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	4	8	200.0	5	4	100.0	5	150.0	5
Native plant species richness - shrubs	4	4	100.0	5	5	125.0	5	112.5	5
Native plant species richness - grasses	2	5	250.0	5	3	150.0	5	200.0	5
Native plant species richness - forbs	8	10	125.0	5	7	87.5	5	106.3	5
Tree canopy height	16	11	68.8	5	6	37.5	5	53.1	5
Tree subcanopy height	8	7	87.5	5	3	37.5	3	62.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	9	75.0	5	4.5	37.5	3	56.3	5
Tree canopy cover (EDL)	70	57	81.4	5	44.5	63.6	5	72.5	5
Subcanopy cover	20	22	110.0	5	3.5	17.5	5	63.8	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	39.5	87.8	5	24	53.3	5	70.6	5
Shrub canopy cover	15	5.5	36.7	5	2	13.3	5	25.0	5
Native grass cover	20	9.2	46.0	5	37	185.0	5	115.5	5
Organic litter	30	85.2	284.0	5	14	46.7	5	165.3	5
Total large trees per hectare	165	8	4.8	5	10	6.1	5	5.5	5
Coarse woody debris (m/ha)	890	0	0.0	5	0	0.0	5	0.0	5
Non-native plant cover	0	5		10	10		10	7.5	10
Site Condition Score				70			68		70.0
MAX Site Condition Score				*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			654.84			0		327.4	
Regrowth			33.5	10		1.09	0	17.27	10
Connectivity									
Remnant %			79.87			29.5		54.69	
Regrowth %			0	5		0	2	0.0	4
Context									
Remnant %			52.65			39.82		46.24	
Regrowth %			9.11	4		9.85	4	9.48	4
Site Context Score				19			6		18
MAX Site Context Score				*20*			*20*		*20*
Total habitat quality score /100				**89.00**			**74.00**		**88.00**
MAX Habitat Quality Score				***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	88.00	89.00	69.00	91.50	88.00	86.00	85.25
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	8.80	8.90	6.90	9.15	8.80	8.60	*8.53*
Size Weighting					1.00		
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***8.80***	***0.00***	***8.80***

TABLE A5.16 **GREENRIDGE AU6 RE 12.3.20 NON-REMNANT START QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE:	**2**

Assessment Unit - Regional Ecosystem	AU6 - RE 12.3.20 Non-remnant								
Site Reference	Benchmark	Site 972-973			Site 960-961				
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Average % benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	0	0.0	0	100	100.0	5	50.0	3
Native plant species richness - trees	4	0	0.0	0	1	25.0	2.5	12.5	0
Native plant species richness - shrubs	4	0	0.0	0	2	50.0	2.5	25.0	2.5
Native plant species richness - grasses	2	0	0.0	0	1	50.0	2.5	25.0	2.5
Native plant species richness - forbs	8	3	37.5	2.5	5	62.5	2.5	50.0	2.5
Tree canopy height	16	0	0.0	0	8	50.0	3	25.0	3
Tree subcanopy height	8	0	0.0	0	2	25.0	3	12.5	0
Tree canopy height (average of emergent, canopy, sub-canopy)	12	0	0.0	0	5	41.7	3	20.8	0
Tree canopy cover (EDL)	70	0	0.0	0	12.5	17.9	2	8.9	0
Subcanopy cover	20	0	0.0	0	0	0.0	0	0.0	0
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	0.0	0	6.25	13.9	2	6.9	0
Shrub canopy cover	15	0	0.0	0	1	6.7	0	3.3	0
Native grass cover	20	0	0.0	0	19	95.0	5	47.5	1
Organic litter	30	20.8	69.3	5	20	66.7	5	68.0	5
Total large trees per hectare	165	0	0.0	0	0		15	0.0	0
Coarse woody debris (m/ha)	890	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	95		0	95	0.0	0	95.0	0
Site Condition Score				7.5			45		16.5
MAX Site Condition Score				*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			0			0		0.0	
Regrowth			0	0		0	0	0.0	0
Connectivity									
Remnant %			28.12			28.12		28.1	
Regrowth %			20.5	2		20.5	2	20.5	2
Context									
Remnant %			33.5			64.05		48.8	
Regrowth %			8.94	4		5.67	4	7.3	4
Site Context Score				6			6		6
MAX Site Context Score				*20*			*20*		*20*
Total habitat quality score /100				**13.50**			**51.00**		**22.50**
MAX Habitat Quality Score				***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	79.00	73.00	32.50	84.00	74.00	22.50	60.83
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	7.90	7.30	3.25	8.40	7.40	2.25	*6.08*
Size Weighting						1.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***2.25***	***2.25***

TABLE A5.17 **GREENRIDGE AU6 RE 12.3.20 NON-REMNANT WITHOUT OFFSET QUALITY FOR COASTAL SWAMP OAK TEC**

START SCORE:	**2**

Assessment Unit - Regional Ecosystem	AU6 - RE 12.3.20 Non-remnant								
Site Reference	Benchmark	Site 972-973			Site 960-961				
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Average % benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	0	0.0	0	100	100.0	5	50.0	3
Native plant species richness - trees	4	0	0.0	0	1	25.0	2.5	12.5	0
Native plant species richness - shrubs	4	0	0.0	0	2	50.0	2.5	25.0	2.5
Native plant species richness - grasses	2	0	0.0	0	1	50.0	2.5	25.0	2.5
Native plant species richness - forbs	8	3	37.5	2.5	5	62.5	2.5	50.0	2.5
Tree canopy height	16	0	0.0	0	8	50.0	3	25.0	3
Tree subcanopy height	8	0	0.0	0	2	25.0	3	12.5	0
Tree canopy height (average of emergent, canopy, sub-canopy)	12	0	0.0	0	5	41.7	3	20.8	0
Tree canopy cover (EDL)	70	0	0.0	0	12.5	17.9	2	8.9	0
Subcanopy cover	20	0	0.0	0	0	0.0	0	0.0	0
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	0.0	0	6.25	13.9	2	6.9	0
Shrub canopy cover	15	0	0.0	0	1	6.7	0	3.3	0
Native grass cover	20	0	0.0	0	19	95.0	5	47.5	1
Organic litter	30	20.8	69.3	5	20	66.7	5	68.0	5
Total large trees per hectare	165	0	0.0	0	0	0.0	0	0.0	0
Coarse woody debris (m/ha)	890	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	95		0	95	0.0	0	95.0	0
Site Condition Score				7.5			30		16.5
MAX Site Condition Score				*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			0			0		0.0	
Regrowth			0	0		0	0	0.0	0
Connectivity									
Remnant %			28.12			28.12		28.1	
Regrowth %			20.5	2		20.5	2	20.5	2
Context									
Remnant %			33.5			64.05		48.8	
Regrowth %			8.94	4		5.67	4	7.3	4
Site Context Score				6			6		6
MAX Site Context Score				*20*			*20*		*20*
Total habitat quality score /100				**13.50**			**36.00**		**22.50**
MAX Habitat Quality Score				***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	70.00	71.00	29.50	72.50	74.00	22.50	56.58
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	7.00	7.10	2.95	7.25	7.40	2.25	*5.66*
Size Weighting						1.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***2.25***	***2.25***

TABLE A5.18 GREENRIDGE AU6 RE 12.3.20 NON-REMNANT WITH OFFSET QUALITY FOR COASTAL SWAMP OAK TEC

START SCORE: 9

Assessment Unit - Regional Ecosystem	AU6 - RE 12.3.20 Non-remnant								
Site Reference	Benchmark	Site 972-973			Site 960-961			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	0	0.0	5	100	100.0	5	50.0	5
Native plant species richness - trees	4	0	0.0	5	1	25.0	5	12.5	5
Native plant species richness - shrubs	4	0	0.0	5	2	50.0	5	25.0	5
Native plant species richness - grasses	2	0	0.0	5	1	50.0	5	25.0	5
Native plant species richness - forbs	8	3	37.5	5	5	62.5	5	50.0	5
Tree canopy height	16	0	0.0	5	8	50.0	5	25.0	5
Tree subcanopy height	8	0	0.0	5	2	25.0	5	12.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	0	0.0	5	5	41.7	5	20.8	5
Tree canopy cover (EDL)	70	0	0.0	5	12.5	17.9	5	8.9	5
Subcanopy cover	20	0	0.0	5	0	0.0	5	0.0	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	0.0	5	6.25	13.9	5	6.9	5
Shrub canopy cover	15	0	0.0	5	1	6.7	5	3.3	5
Native grass cover	20	0	0.0	5	19	95.0	5	47.5	5
Organic litter	30	20.8	69.3	5	20	66.7	5	68.0	5
Total large trees per hectare	165	0	0.0	5	0	0.0	5	0.0	5
Coarse woody debris (m/ha)	890	0	0.0	5	0	0.0	5	0.0	5
Non-native plant cover	0	95		10	95	0.0	10	95.0	10
Site Condition Score				70			70		70.0
MAX Site Condition Score				*80*			*80*		*80*
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			19.75			654.84		337.3	
Regrowth			22.02	2		34.02	10	28.0	10
Connectivity									
Remnant %			28.12			28.12		28.1	
Regrowth %			20.5	2		20.5	2	20.5	2
Context									
Remnant %			33.5			64.05		48.8	
Regrowth %			8.94	4		5.67	4	7.3	4
Site Context Score				8			16		16
MAX Site Context Score				*20*			*20*		*20*
Total habitat quality score /100				**78.00**			**86.00**		**86.00**
MAX Habitat Quality Score				***100***			***100***		***100***

Final habitat quality score (weighted)	**AU1 RE 12.1.1 Remnant**	**AU2 RE 12.1.1 Regrowth**	**AU3 RE 12.1.1 Non-remnant**	**AU4 RE12.3.20 Remnant**	**AU5 RE 12.3.20 Regrowth**	**AU6 RE 12.3.20 Non-remnant**	**Average/Final**
Habitat Quality Score (measured /100)	88.00	89.00	69.00	91.50	88.00	86.00	85.25
Habitat Quallity Score (max)	100	100	100	100	100	100	100
Assessment Unit area (ha)	14.20	5.16	22.15	22.78	2.58	10.83	77.70
Assessment Unit Habitat Quality Score /10	8.80	8.90	6.90	9.15	8.80	8.60	*8.53*
Size Weighting						1.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***8.60***	***8.60***

APPENDIX 6

KOALA OFFSET AREAS

HABITAT QUALITY ASSESSMENT TABLES

TABLE A6.1 TABOOBA AU1 RE 12.8.16 REMNANT START QUALITY FOR KOALA

START SCORE: 8

Assessment Unit - Regional Ecosystem	Tabooba AU 1 - RE12.8.16 Remnant								
Site Reference	Benchmark	Site 472-473			Site 474-475			Average %	
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	100.0	5	100.0	5
Native plant species richness - trees	7	6	85.7	2.5	6.0	85.7	2.5	85.7	2.5
Native plant species richness - shrubs	7	9	128.6	5	10.0	142.9	5	135.7	5
Native plant species richness - grasses	7	10	142.9	5	16.0	228.6	5	185.7	5
Native plant species richness - forbs	29	31	106.9	5	34.0	117.2	5	112.1	5
Tree canopy height	20	15	75.0	5	18.0	90.0	5	82.5	5
Tree subcanopy height	8	8	100.0	5	10.0	125.0	5	112.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	14	11.5	82.1	5	14.0	100.0	5	91.1	5
Tree canopy cover (EDL)	41	44.1	107.6	5	83.0	202.4	3	155.0	5
Subcanopy cover	17	17.5	102.9	5	1.0	5.9	0	54.4	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	30.8	106.2	5	42.0	144.8	5	125.5	5
Shrub canopy cover	4	0	0.0	0	0.0	0.0	0	0.0	0
Native grass cover	45	22	48.9	1	27.2	60.4	3	54.7	3
Organic litter	21	3.4	16.2	3	6.2	29.5	3	22.9	3
Number of large trees/ha	33	10	30.3	5	14.0	42.4	5	36.4	5
Coarse woody debris (m/ha)	336	18	5.4	0	170.0	50.6	5	28.0	2
Non-native plant cover	0	40		10	15.0		5	27.5	3
Quality and availability of food and foraging habitat: Koala				10			10		10
Quality and availability of shelter: Koala				10			10		10
Site Condition Score				71.5			73.5		68.5
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**2.15**			**2.21**		**2.06**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			97.73			97.73		97.73	
Dispersal habitat			2.27	5		2.27	5	2.27	5
Context									
Foraging/breeding habitat			86.26			87.48		86.87	
Dispersal habitat			13.74	5		15.52	5	14.63	5
Ecological Corridors				0			0		0
Role of site location to species overall population in the state				1			1		1
Absence of threats				7			8		10
Species mobility capacity				10			10		10
Site Context Score				38			39		38.5
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**2.04**			**2.09**		**2.06**

	Tabooba AU 1 - RE12.8.16 remnant							
	AU Koala density	Site 472-473		Site 474-475			Average Score
Species Stocking Rate (SSR)	**0.25**		Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)			10			10	10
Species usage of the site (habitat type & evidenced usage)			15			15	15
Approximate density (per ha)	0.25		30			30	30
Role/importance of species population on site*			10			10	10
Total SRR score (out of 70)			65			65	65
Max SRR Score			*70*			*70*	*70*
SRR Score (out of 4)			**3.71**			**3.71**	**3.71**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.06	1.83	1.63	2.19	2.01	2.24	1.98	0.53	*1.81*
Site Context Score (out of 3)	2.06	1.78	1.82	2.01	1.96	1.61	2.38	1.61	*1.88*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.83*	*5.90*	*4.31*	*7.91*	*6.54*	*7.56*	*6.94*	*3.85*	*6.14*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES	358.69								
Size Weighting	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***7.83***	***0.00***	***0.00***	***0.00***	***0.00***	***0.0***	***0.0***	***0.0***	***7.83***

TABLE A6.2 TABOOBA AU1 RE 12.8.16 REMNANT WITHOUT OFFSET QUALITY FOR KOALA

START SCORE: 8

Assessment Unit - Regional Ecosystem	Tabooba AU 1 - RE12.8.16 Remnant								
Site Reference	Benchmark	Site 472-473			Site 474-475			Average % benchmark	Average Score
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	100.0	5	100.0	5
Native plant species richness - trees	7	6	85.7	2.5	6.0	85.7	2.5	85.7	2.5
Native plant species richness - shrubs	7	9	128.6	5	10.0	142.9	5	135.7	5
Native plant species richness - grasses	7	10	142.9	5	16.0	228.6	5	185.7	5
Native plant species richness - forbs	29	31	106.9	5	34.0	117.2	5	112.1	5
Tree canopy height	20	15	75.0	5	18.0	90.0	5	82.5	5
Tree subcanopy height	8	8	100.0	5	10.0	125.0	5	112.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	14	11.5	82.1	5	14.0	100.0	5	91.1	5
Tree canopy cover (EDL)	41	44.1	107.6	5	83.0	202.4	3	155.0	5
Subcanopy cover	17	17.5	102.9	5	1.0	5.9	2	54.4	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	30.8	106.2	5	42.0	144.8	5	125.5	5
Shrub canopy cover	4	0	0.0	0	0.0	0.0	0	0.0	0
Native grass cover	45	22	48.9	1	27.2	60.4	3	54.7	3
Organic litter	21	3.4	16.2	3	6.2	29.5	3	22.9	3
Number of large trees (ha)	33	10	30.3	10	14.0	42.4	10	36.4	10
Coarse woody debris (m/ha)	336	18	5.4	0	170.0	50.6	5	28.0	2
Non-native plant cover	0	40		3	15.0		5	27.5	3
Quality and availability of food and foraging habitat: Koala				10			10		10
Quality and availability of shelter: Koala				10			10		10
Site Condition Score				69.5			78.5		73.5
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**2.09**			**2.36**		**2.21**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			97.7			97.7		97.7	
Dispersal habitat			2.3	5		2.3	5	2.3	5
Context									
Foraging/breeding habitat			86.3			87.5		86.9	
Dispersal habitat			13.7	5		15.5	5	14.6	5
Ecological Corridors				0			0		0
Role of site location to species overall population in the state				1			1		1
Absence of threats				7			7		5
Species mobility capacity				10			10		10
Site Context Score				38			38		38
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**2.04**			**2.04**		**2.04**

	Tabooba AU 1 - RE12.8.16 Remnant							
	AU Koala density	Site 472-473		Site 474-475				
Species Stocking Rate (SSR)	**0.25**		Score			Score		Average Score
Presence detected on or adjacent to site (neighbouring property with connecting habitat)			10			10		10
Species usage of the site (habitat type & evidenced usage)			15			15		15
Approximate density (per ha)	0.25		30			30		30
Role/importance of species population on site*			10			10		10
Total SRR score (out of 70)			65			65		65
Max SRR Score			*70*			*70*		*70*
SRR Score (out of 4)			**3.71**			**3.71**		**3.71**

Final habitat quality score (weighted)	**Tabooba AU1 RE12.8.16 remnant**	**Tabooba AU2 RE12.8.16 Advanced Regrowth**	**Tabooba AU3 RE12.8.16 Young Regrowth**	**Tabooba AU4 RE12.8.14 Remnant**	**Tabooba AU5 RE12.8.14 Advanced Regrowth**	**Greenridge AU4 RE12.3.20 Remnant**	**Greenridge AU5 RE12.3.20 Regrowth**	**Greenridge AU6 RE12.3.20 Non-remnant**	**Average/ Final**
Site Condition score (out of 3)	2.21	1.47	0.60	2.19	1.55	2.19	1.98	0.53	*1.59*
Site Context Score (out of 3)	2.04	1.74	1.79	1.98	1.90	1.61	2.33	1.61	*1.85*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.96*	*5.50*	*3.25*	*7.89*	*6.02*	*7.51*	*6.88*	*3.85*	*5.84*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES	358.69								
Size Weighting	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***7.96***	***0.00***	***0.00***	***0.00***	***0.00***	***0.0***	***0.0***	***0.0***	*7.96*

TABLE A6.3 TABOOBA AU1 RE 12.8.16 REMNANT WITH OFFSET QUALITY FOR KOALA

START SCORE: 9

Assessment Unit - Regional Ecosystem	Tabooba AU 1 - RE12.8.16 Remnant								
Site Reference	Benchmark 12.8.16	Site 472-473			Site 474-475			Average % benchmark	Average Score
		Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	100.0	5	100.0	5
Native plant species richness - trees	7	6	85.7	2.5	6.0	85.7	2.5	85.7	2.5
Native plant species richness - shrubs	7	9	128.6	5	10.0	142.9	5	135.7	5
Native plant species richness - grasses	7	10	142.9	5	16.0	228.6	5	185.7	5
Native plant species richness - forbs	29	31	106.9	5	34.0	117.2	5	112.1	5
Tree canopy height	20	15	75.0	5	18.0	90.0	5	82.5	5
Tree subcanopy height	8	8	100.0	5	10.0	125.0	5	112.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	14	11.5	82.1	5	14.0	100.0	5	91.1	5
Tree canopy cover (EDL)	41	44.1	107.6	5	83.0	202.4	3	155.0	5
Subcanopy cover	17	17.5	102.9	5	1.0	5.9	2	54.4	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	30.8	106.2	5	42.0	144.8	5	125.5	5
Shrub canopy cover	4	0	0.0	5	0.0	0.0	5	0.0	5
Native grass cover	45	22	48.9	3	27.2	60.4	5	54.7	5
Organic litter	21	3.4	16.2	5	6.2	29.5	5	22.9	5
Number of large trees (ha)	33	10	30.3	10	14.0	42.4	10	36.4	10
Coarse woody debris (m/ha)	336	18	5.4	5	170.0	50.6	5	28.0	5
Non-native plant cover	0	40		5	15.0		5	27.5	5
Quality and availability of food and foraging habitat: Koala				10			10		10
Quality and availability of shelter: Koala				10			10		10
Site Condition Score				85.5			87.5		87.5
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**2.57**			**2.63**		**2.63**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			97.73			97.73		97.73	
Dispersal habitat			2.27	5		2.27	5	2.27	5
Context									
Foraging/breeding habitat			86.26			87.48		86.87	
Dispersal habitat			13.74	5		15.52	5	14.63	5
Ecological Corridors				0			0		0
Role of site location to species overall population in the state				1			1		1
Absence of threats				11			11		10
Species mobility capacity				10			10		10
Site Context Score				42			42		42
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**2.25**			**2.25**		**2.25**

	Tabooba AU 1 - RE12.8.16 Remnant							
	AU Koala density	Site 472-473			Site 474-475			Average Score
Species Stocking Rate (SSR)	**0.25**			Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10	10
Species usage of the site (habitat type & evidenced usage)				15			15	15
Approximate density (per ha)	0.25			30			30	30
Role/importance of species population on site*				10			10	10
Total SRR score (out of 70)				65			65	65
Max SRR Score				*70*			*70*	*70*
SRR Score (out of 4)				**3.71**			**3.71**	**3.71**

Final habitat quality score (weighted)	**Tabooba AU1 RE12.8.16 remnant**	**Tabooba AU2 RE12.8.16 Advanced Regrowth**	**Tabooba AU3 RE12.8.16 Young Regrowth**	**Tabooba AU4 RE12.8.14 Remnant**	**Tabooba AU5 RE12.8.14 Advanced Regrowth**	**Greenridge AU4 RE12.3.20 Remnant**	**Greenridge AU5 RE12.3.20 Regrowth**	**Greenridge AU6 RE12.3.20 Non-remnant**	**Average/ Final**
Site Condition score (out of 3)	2.63	2.55	2.33	2.34	2.34	2.70	2.40	2.70	*2.50*
Site Context Score (out of 3)	2.25	2.20	2.17	2.20	2.22	1.77	2.65	1.93	*2.16*
Species Stocking Rate Score (out of 4)	3.71	3.71	2.57	3.71	3.71	3.71	3.71	2.00	*3.31*
Habitat Quality score (out of 10)	*8.59*	*8.46*	*7.07*	*8.25*	*8.28*	*8.18*	*8.77*	*6.63*	*7.95*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES	358.69								
Size Weighting	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***8.59***	***0.00***	***0.00***	***0.00***	***0.00***	***0.0***	***0.0***	***0.0***	***8.59***

TABLE A6.4 **TABOOBA AU2 RE 12.8.16 ADVANCED REGROWTH START QUALITY FOR KOALA**

START SCORE: **6**

Assessment Unit - Regional Ecosystem	Tabooba AU2 - RE 12.8.16 Advanced Regrowth															
Site Reference	Benchmark	Site 470-471			Site 683-684			Site 685-686			Site 734-735			Average % benchmark	Average Score
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition															
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	50	50.0	3	100	100.0	5	87.5	5
Native plant species richness - trees	7	3	42.9	2.5	5	71.4	2.5	5	71.4	2.5	6	85.7	2.5	67.9	2.5
Native plant species richness - shrubs	7	5	71.4	2.5	3	42.9	2.5	4	57.1	2.5	1	14.3	0	46.4	2.5
Native plant species richness - grasses	7	9	128.6	5	8	114.3	5	3	42.9	2.5	5	71.4	2.5	89.3	2.5
Native plant species richness - forbs	29	29	100.0	5	32	110.3	5	15	51.7	2.5	18	62.1	2.5	81.0	2.5
Tree canopy height	20	10	50.0	3	16	80.0	5	8	40.0	3	10	50.0	3	55.0	3
Tree subcanopy height	8	5	62.5	3	8	100.0	5	3	37.5	3	4	50.0	3	62.5	3
Tree canopy height (average of emergent, canopy, sub-canopy)	14	7.5	53.6	3	12	85.7	5	5.5	39.3	3	7.0	50.0	3	57.1	3
Tree canopy cover (EDL)	41	23.5	57.3	5	43.5	106.1	5	3	7.3	0	35	85.4	5	64.0	5
Subcanopy cover	17	6	35.3	2	7	41.2	2	3	17.6	2	11.5	67.6	5	40.4	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	14.8	50.9	5	25.3	87.1	5	3.0	10.3	2	23.3	80.2	5	57.1	5
Shrub canopy cover	4	1.5	37.5	3	4.5	112.5	5	0	0.0	0	19	475.0	3	156.3	5
Native grass cover	45	3.2	7.1	0	43	95.6	5	61	135.6	5	2.8	6.2	0	61.1	3
Organic litter	21	10.8	51.4	5	5	23.8	3	2	9.5	0	0.8	3.8	0	22.1	3
Number of large trees/ha	33	8	24.2	5	12	36.4	5	12	36.4	5	6	18.2	5	28.8	5
Coarse woody debris (m/ha)	336	175	52.1	5	177	52.7	5	94	28.0	2	79	23.5	2	39.1	2
Non-native plant cover	0	5		5	20		5	35		10	15		5	23.3	5
Quality and availability of food and foraging habitat: Koala				10			10			10			5		10
Quality and availability of shelter: Koala				5			10			1			5		5
Site Condition Score				66			78			51			45.5		61.00
MAX Site Condition Score				*100*			*100*			*100*			*100*		*100*
Site Condition Score - out of 3				**1.98**			**2.34**			**1.53**			**1.37**		**1.83**
Site Context			Value	Score		Value	Score		Value	Score		Value	Score	Average	Average score
Size of patch (ha)															
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10		>200			>200	10	>200	10
Connectivity															
Foraging/breeding habitat			86.09			86.09			86.09			61.65		79.98	
Dispersal habitat			13.91	5		13.91	5		13.91	5		38.35	4	20.02	5
Context															
Foraging/breeding habitat			95.77			72.74			70.12			67.44		76.52	
Dispersal habitat			4.37	5		27.26	4		29.88	4		32.55	4	23.52	5
Ecological Corridors				0			0			0			0		0
Role of site location to species overall population in the state				1			1			1			1		1
Absence of threats				6			6			5			6		5
Species mobility capacity				10			10			10			10		10
Site Context Score				37			36			25			35		33.25
MAX Site Context Score				*56*			*56*			*56*			*56*		*56*
Site Context Score - out of 3				**1.98**			**1.93**			**1.34**			**1.88**		**1.78**

	Tabooba AU2 - RE 12.8.16 Advanced Regrowth													
	AU Koala density	Site 470-471		Site 683-684		Site 685-686		Site 734-735			Average Score
Species Stocking Rate (SSR)	0.25		Score		Score		Score		Score		
Presence detected on or adjacent to site (neighbouring property with connecting habitat)			10		10		10		10		10
Species usage of the site (habitat type & evidenced usage)			15		15		15		15		15
Approximate density (per ha)	0.04		10		10		10		10		10
Role/importance of species population on site*			5		5		5		5		5
Total SRR score (out of 70)			40		40		40		40		40
Max SRR Score			*70*		*70*		*70*		*70*		*70*
SRR Score (out of 4)			**2.29**		**2.29**		**2.29**		**2.29**		**2.29**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.06	1.83	1.63	2.19	2.01	2.24	1.98	0.53	*1.81*
Site Context Score (out of 3)	2.06	1.78	1.82	2.01	1.96	1.61	2.38	1.61	*1.88*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.83*	*5.90*	*4.31*	*7.91*	*6.54*	*7.56*	*6.94*	*3.85*	*6.14*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES		145.02							
Size Weighting	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***5.90***	***0.00***	***0.00***	***0.00***	***0.0***	***0.0***	***0.0***	*5.90*

TABLE A6.5 TABOOBA AU2 RE 12.8.16 ADVANCED REGROWTH WITHOUT OFFSET QUALITY FOR KOALA

START SCORE: 6

Assessment Unit - Regional Ecosystem	Tabooba AU2 - RE 12.8.16 Advanced Regrowth															
Site Reference	Benchmark	Site 470-471			Site 683-684			Site 685-686			Site 734-735			Average % benchmark	Average Score
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition															
Recruitment of woody perennial species in EDL	100	100	100.0	3	100	100.0	3	50	50.0	3	100	100.0	3	87.5	3
Native plant species richness - trees	7	3	42.9	2.5	5	71.4	2.5	5	71.4	2.5	6	85.7	2.5	67.9	2.5
Native plant species richness - shrubs	7	5	71.4	2.5	3	42.9	2.5	4	57.1	2.5	1	14.3	0	46.4	2.5
Native plant species richness - grasses	7	9	128.6	2.5	8	114.3	2.5	3	42.9	2.5	5	71.4	2.5	89.3	2.5
Native plant species richness - forbs	29	29	100.0	2.5	32	110.3	2.5	15	51.7	2.5	18	62.1	2.5	81.0	2.5
Tree canopy height	20	10	50.0	3	16	80.0	3	8	40.0	3	10	50.0	3	55.0	3
Tree subcanopy height	8	5	62.5	3	8	100.0	3	3	37.5	3	4	50.0	3	62.5	3
Tree canopy height (average of emergent, canopy, sub-canopy)	14	7.5	53.6	3	12	85.7	3	5.5	39.3	3	7.0	50.0	3	57.1	3
Tree canopy cover (EDL)	41	23.5	57.3	5	43.5	106.1	5	3	7.3	0	35	85.4	5	64.0	5
Subcanopy cover	17	6	35.3	2	7	41.2	2	3	17.6	2	11.5	67.6	2	40.4	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	14.8	50.9	2	25.3	87.1	5	3.0	10.3	2	23.3	80.2	5	57.1	2
Shrub canopy cover	4	1.5	37.5	0	4.5	112.5	0	0	0.0	0	19	475.0	0	156.3	0
Native grass cover	45	3.2	7.1	0	43	95.6	5	61	135.6	5	2.8	6.2	0	61.1	3
Organic litter	21	10.8	51.4	3	5	23.8	3	2	9.5	0	0.8	3.8	0	22.1	3
Number of large trees (ha)	33	8	24.2	5	12	36.4	5	12	36.4	5	6	18.2	5	28.8	5
Coarse woody debris (m/ha)	336	175	52.1	5	177	52.7	5	94	28.0	2	79	23.5	2	39.1	2
Non-native plant cover	0	5		3	20		3	35		3	15		3	18.8	3
Quality and availability of food and foraging habitat: Koala				10			10			10			5		10
Quality and availability of shelter: Koala				5			10			1			5		5
Site Condition Score				49			62			44			38.5		49.00
MAX Site Condition Score				*100*			*100*			*100*			*100*		*100*
Site Condition Score - out of 3				**1.47**			**1.86**			**1.32**			**1.16**		**1.47**
Site Context			**Value**	**Score**		**Value**	**Score**		**Value**	**Score**		**Value**	**Score**	**Average**	**Average score**
Size of patch (ha)															
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10		>200			>200	10	>200	10
Connectivity															
Foraging/breeding habitat			86.1			86.1			86.1			61.6		80.0	
Dispersal habitat			13.9	5		13.9	5		13.9	5		38.4	4	20.0	5
Context															
Foraging/breeding habitat			95.8			72.7			70.1			67.4		76.5	
Dispersal habitat			4.4	5		27.3	4		29.9	4		32.6	4	23.5	5
Ecological Corridors				0			0			0			0		0
Role of site location to species overall population in the state				1			1			1			1		1
Absence of threats				5			5			5			5		5
Species mobility capacity				10			10			10			10		10
Site Context Score				36			35			25			34		32.5
MAX Site Context Score				*56*			*56*			*56*			*56*		*56*
Site Context Score - out of 3				**1.93**			**1.88**			**1.34**			**1.82**		**1.74**

	Tabooba AU2 - RE 12.8.16 Advanced Regrowth													
	AU Koala density	Site 470-471		Site 683-684			Site 685-686			Site 734-735				
Species Stocking Rate (SSR)	0.25		Score			Score			Score			Score		Average Score
Presence detected on or adjacent to site (neighbouring property with connecting habitat)			10			10			10			10		10
Species usage of the site (habitat type & evidenced usage)			15			15			15			15		15
Approximate density (per ha)	0.04		10			10			10			10		10
Role/importance of species population on site*			5			5			5			5		5
Total SRR score (out of 70)			40			40			40			40		40
Max SRR Score			*70*			*70*			*70*			*70*		*70*
SRR Score (out of 4)			**2.29**			**2.29**			**2.29**			**2.29**		**2.29**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.21	1.47	0.60	2.19	1.55	2.19	1.98	0.53	*1.59*
Site Context Score (out of 3)	2.04	1.74	1.79	1.98	1.90	1.61	2.33	1.61	*1.85*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.96*	*5.50*	*3.25*	*7.89*	*6.02*	*7.51*	*6.88*	*3.85*	*5.84*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES		145.02							
Size Weighting	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***5.50***	***0.00***	***0.00***	***0.00***	***0.0***	***0.0***	***0.0***	***5.50***

TABLE A6.6 TABOOBA AU2 RE 12.8.16 ADVANCED REGROWTH WITH OFFSET QUALITY FOR KOALA

START SCORE: 8

Assessment Unit - Regional Ecosystem	Tabooba AU2 - RE 12.8.16 Advanced Regrowth															
Site Reference	Benchmark	Site 470-471			Site 683-684			Site 685-686			Site 734-735			Average %	Average Score
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	
Site Condition															
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	50	50.0	5	100	100.0	5	87.5	5
Native plant species richness - trees	7	3	42.9	2.5	5	71.4	2.5	5	71.4	2.5	6	85.7	2.5	67.9	2.5
Native plant species richness - shrubs	7	5	71.4	2.5	3	42.9	2.5	4	57.1	2.5	1	14.3	0	46.4	2.5
Native plant species richness - grasses	7	9	128.6	5	8	114.3	5	3	42.9	2.5	5	71.4	2.5	89.3	2.5
Native plant species richness - forbs	29	29	100.0	5	32	110.3	5	15	51.7	2.5	18	62.1	2.5	81.0	2.5
Tree canopy height	20	10	50.0	5	16	80.0	5	8	40.0	5	10	50.0	5	55.0	5
Tree subcanopy height	8	5	62.5	5	8	100.0	5	3	37.5	5	4	50.0	5	62.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	14	7.5	53.6	5	12	85.7	5.0	5.5	39.3	5	7.0	50.0	5	57.1	5
Tree canopy cover (EDL)	41	23.5	57.3	5	43.5	106.1	5	3	7.3	5	35	85.4	5	64.0	5
Subcanopy cover	17	6	35.3	5	7	41.2	5	3	17.6	5	11.5	67.6	5	40.4	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	14.8	50.9	5	25.3	87.1	5	3.0	10.3	5	23.3	80.2	5	57.1	5
Shrub canopy cover	4	1.5	37.5	5	4.5	112.5	5	0	0.0	5	19	475.0	5	156.3	5
Native grass cover	45	3.2	7.1	3	43	95.6	5	61	135.6	5	2.8	6.2	3	61.1	5
Organic litter	21	10.8	51.4	5	5	23.8	3	2	9.5	3	0.8	3.8	5	22.1	5
Number of large trees (ha)	33	8	24.2	10	12	36.4	10	12	36.4	10	6	18.2	10	28.8	10
Coarse woody debris (m/ha)	336	175	52.1	5	177	52.7	5	94	28.0	5	79	23.5	5	39.1	5
Non-native plant cover	0	5		5	20		5	35		5	15		5	18.8	10
Quality and availability of food and foraging habitat: Koala				10			10			10			10		10
Quality and availability of shelter: Koala				5			10			10			10		10
Site Condition Score				78			85			80			75.5		85.00
MAX Site Condition Score				*100*			*100*			*100*			*100*		*100*
Site Condition Score - out of 3				**2.34**			**2.55**			**2.40**			**2.27**		**2.55**
Site Context			**Value**	**Score**		**Value**	**Score**		**Value**	**Score**		**Value**	**Score**	**Average**	**Average score**
Size of patch (ha)															
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10		>200	10		>200	10	>200	10
Connectivity															
Foraging/breeding habitat			86.09			86.09			86.09			61.65		79.98	
Dispersal habitat			13.91	5		13.91	5		13.91	5		38.35	4	20.02	5
Context															
Foraging/breeding habitat			95.77			72.74			70.12			67.44		76.52	
Dispersal habitat			4.37	5		27.26	4		29.88	4		32.55	4	23.52	5
Ecological Corridors				0			0			0			0		0
Role of site location to species overall population in the state				1			1			1			1		1
Absence of threats				11			11			11			11		10
Species mobility capacity				10			10			10			10		10
Site Context Score				42			41			41			40		41
MAX Site Context Score				*56*			*56*			*56*			*56*		*56*
Site Context Score - out of 3				**2.25**			**2.20**			**2.20**			**2.14**		**2.20**

	Tabooba AU2 - RE 12.8.16 Advanced Regrowth													
	AU Koala density	Site 470-471			Site 683-684			Site 685-686			Site 734-735			Average Score
Species Stocking Rate (SSR)	0.25			Score			Score			Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10			10			10	10
Species usage of the site (habitat type & evidenced usage)				15			15			15			15	15
Approximate density (per ha)	0.04			30			30			30			30	30
Role/importance of species population on site*				10			10			10			10	10
Total SRR score (out of 70)				65			65			65			65	65
Max SRR Score				*70*			*70*			*70*			*70*	*70*
SRR Score (out of 4)				**3.71**			**3.71**			**3.71**			**3.71**	**3.71**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.63	2.55	2.33	2.34	2.34	2.70	2.40	2.70	*2.50*
Site Context Score (out of 3)	2.25	2.20	2.17	2.20	2.22	1.77	2.65	1.93	*2.16*
Species Stocking Rate Score (out of 4)	3.71	3.71	2.57	3.71	3.71	3.71	3.71	2.00	*3.31*
Habitat Quality score (out of 10)	*8.59*	*8.46*	*7.07*	*8.25*	*8.28*	*8.18*	*8.77*	*6.63*	*7.95*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES		145.02							
Size Weighting	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***8.46***	***0.00***	***0.00***	***0.00***	***0.0***	***0.0***	***0.0***	*8.46*

TABLE A6.7 TABOOBA AU3 RE 12.8.16 YOUNG REGROWTH START QUALITY FOR KOALA

START SCORE: 4

Assessment Unit - Regional Ecosystem	Tabooba AU3 - RE 12.8.16 Young Regrowth								
Site Reference	Benchmark	Site 687-688			Site 756-757			Average %	
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	66.7	66.7	3	100	100.0	5	83.4	4
Native plant species richness - trees	7	5	71.4	2.5	5	71.4	2.5	71.4	2.5
Native plant species richness - shrubs	7	4	57.1	2.5	3	42.9	2.5	50.0	2.5
Native plant species richness - grasses	7	7	100.0	5	8	114.3	5	107.1	5
Native plant species richness - forbs	29	17	58.6	2.5	27	93.1	5	75.9	3.75
Tree canopy height	20	15	75.0	5	8	40.0	3	57.5	4
Tree subcanopy height	8	5	62.5	3	3	37.5	3	50.0	3
Tree canopy height (average of emergent, canopy, sub-canopy)	14	10	68.8	3	5.5	39.3	3	54.0	3
Tree canopy cover (EDL)	41	28	68.3	5	28	68.3	5	68.3	5
Subcanopy cover	17	7	41.2	2	3.5	20.6	2	30.9	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	17.5	54.7	5	15.75	44.4	2	49.6	3.5
Shrub canopy cover	4	0	0.0	0	0	0.0	0	0.0	0
Native grass cover	45	63	140.0	5	2	4.4	0	72.2	2.5
Organic litter	21	1	4.8	0	3.8	18.1	3	11.4	1.5
Number of large trees/ha	33	2	6.1	5	2	6.1	5	6.1	5
Coarse woody debris (m/ha)	336	277	82.4	5	61	18.2	2	50.3	3.5
Non-native plant cover	0	30		10	10		5		7.5
Quality and availability of food and foraging habitat: Koala				5			5		5
Quality and availability of shelter: Koala				5			5		5
Site Condition Score				58.5			50		54.25
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**1.76**			**1.50**		**1.63**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			51.60			70.95		61.3	
Dispersal habitat			48.40	4		29.05	4	38.7	4
Context									
Foraging/breeding habitat			79.74			64.89		72.3	
Dispersal habitat			20.26	5		35.11	4	27.7	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state				1			1		1
Absence of threats				4			5		5
Species mobility capacity				10			10		10
Site Context Score				34			34		34
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**1.82**			**1.82**		**1.82**

	AU3 - RE 12.8.16 Young Regrowth							
	AU Koala density	Site 687-688			Site 756-757			
Species Stocking Rate (SSR)	**0.5**			Score			Score	Average Score
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10	10
Species usage of the site (habitat type & evidenced usage)				5			5	5
Approximate density (per ha)	0			0			0	0
Role/importance of species population on site*				0			0	0
Total SRR score (out of 70)				15			15	15
Max SRR Score				*70*			*70*	*70*
SRR Score (out of 4)				**0.86**			**0.86**	**0.86**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.06	1.83	1.63	2.19	2.01	2.24	1.98	0.53	*1.81*
Site Context Score (out of 3)	2.06	1.78	1.82	2.01	1.96	1.61	2.38	1.61	*1.88*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.83*	*5.90*	*4.31*	*7.91*	*6.54*	*7.56*	*6.94*	*3.85*	*6.14*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES			48.10						
Size Weighting	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***4.31***	***0.00***	***0.00***	***0.0***	***0.0***	***0.0***	***4.31***

TABLE A6.8 TABOOBA AU3 RE 12.8.16 YOUNG REGROWTH WITHOUT OFFSET QUALITY FOR KOALA

START SCORE: 3

Assessment Unit - Regional Ecosystem	Tabooba AU3 - RE 12.8.16 Young Regrowth								
Site Reference	Benchmark	Site 687-688			Site 756-757			Average %	
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	66.7	66.7	0	100	100.0	0	83.4	0
Native plant species richness - trees	7	5	71.4	2.5	5	71.4	2.5	71.4	2.5
Native plant species richness - shrubs	7	4	57.1	2.5	3	42.9	2.5	50.0	2.5
Native plant species richness - grasses	7	7	100.0	2.5	8	114.3	2.5	107.1	2.5
Native plant species richness - forbs	29	17	58.6	2.5	27	93.1	2.5	75.9	2.5
Tree canopy height	20	15	75.0	0	8	40.0	0	57.5	0
Tree subcanopy height	8	5	62.5	0	3	37.5	0	50.0	0
Tree canopy height (average of emergent, canopy, sub-canopy)	14	10	71.4	0	5.5	39.3	0	55.4	0
Tree canopy cover (EDL)	41	28	68.3	0	28	68.3	0	68.3	0
Subcanopy cover	17	7	41.2	0	3.5	20.6	0	30.9	0
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	17.5	60.3	0	15.75	54.3	0	57.3	0
Shrub canopy cover	4	0	0.0	0	0	0.0	0	0.0	0
Native grass cover	45	63	140.0	0	2	4.4	0	72.2	0
Organic litter	21	1	4.8	0	3.8	18.1	0	11.4	0
Number of large trees (ha)	33	2	6.1	0	4	12.1	0	9.1	0
Coarse woody debris (m/ha)	336	277	82.4	0	61	18.2	0	50.3	0
Non-native plant cover	0	30	30	0	10	10	0		0
Quality and availability of food and foraging habitat: Koala				5			5		5
Quality and availability of shelter: Koala				5			5		5
Site Condition Score				20			20		20
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**0.60**			**0.60**		**0.60**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			51.60			70.95		61.3	
Dispersal habitat			48.40	4		29.05	4	38.7	4
Context									
Foraging/breeding habitat			79.74			64.89		72.3	
Dispersal habitat			20.26	5		35.11	4	27.7	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state				1			1		1
Absence of threats				4			4		5
Species mobility capacity				10			10		10
Site Context Score				34			33		33.5
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**1.82**			**1.77**		**1.79**

	Tabooba AU3 - RE 12.8.16 Young Regrowth							
	AU Koala density	Site 687-688			Site 756-757			
Species Stocking Rate (SSR)	0.5			Score			Score	Average Score
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10	10
Species usage of the site (habitat type & evidenced usage)				5			5	5
Approximate density (per ha)	0			0			0	0
Role/importance of species population on site*				0			0	0
Total SRR score (out of 70)				15			15	15
Max SRR Score				*70*			*70*	*70*
SRR Score (out of 4)				**0.86**			**0.86**	**0.86**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.21	1.47	0.60	2.19	1.55	2.19	1.98	0.53	*1.59*
Site Context Score (out of 3)	2.04	1.74	1.79	1.98	1.90	1.61	2.33	1.61	*1.85*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.96*	*5.50*	*3.25*	*7.89*	*6.02*	*7.51*	*6.88*	*3.85*	*5.84*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES			48.10						
Size Weighting	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***3.25***	***0.00***	***0.00***	***0.0***	***0.0***	***0.0***	***3.25***

TABLE A6.9 TABOOBA AU3 RE 12.8.16 YOUNG REGROWTH WITH OFFSET QUALITY FOR KOALA

START SCORE: 7

Assessment Unit - Regional Ecosystem	Tabooba AU3 - RE 12.8.16 Young Regrowth								
Site Reference	Benchmark	Site 687-688			Site 756-757			Average %	Average Score
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	
Site Condition									
Recruitment of woody perennial species in EDL	100	66.7	66.7	3	100	100.0	5	83.4	5
Native plant species richness - trees	7	5	71.4	2.5	5	71.4	2.5	71.4	2.5
Native plant species richness - shrubs	7	4	57.1	2.5	3	42.9	2.5	50.0	2.5
Native plant species richness - grasses	7	7	100.0	5	8	114.3	5	107.1	5
Native plant species richness - forbs	29	17	58.6	2.5	27	93.1	5	75.9	2.5
Tree canopy height	20	15	75.0	5	8	40.0	3	57.5	3
Tree subcanopy height	8	5	62.5	3	3	37.5	3	50.0	3
Tree canopy height (average of emergent, canopy, sub-canopy)	14	10	71.4	5	5.5	39.3	5.0	55.4	5
Tree canopy cover (EDL)	41	28	68.3	5	28	68.3	5	68.3	5
Subcanopy cover	17	7	41.2	2	3.5	20.6	2	30.9	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	17.5	60.3	5	15.75	54.3	5.0	57.3	5
Shrub canopy cover	4	0	0.0	5	0	0.0	5	0.0	5
Native grass cover	45	63	140.0	5	2	4.4	3	72.2	5
Organic litter	21	1	4.8	3	3.8	18.1	5	11.4	5
Number of large trees (ha)	33	2	6.1	5	4	12.1	5	9.1	5
Coarse woody debris (m/ha)	336	277	82.4	5	61	18.2	2	50.3	5
Non-native plant cover	0	30	30	5	10	10	10	20.0	5
Quality and availability of food and foraging habitat: Koala				10			10		10
Quality and availability of shelter: Koala				10			5		10
Site Condition Score				73.5			75		77.5
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**2.21**			**2.25**		**2.33**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			51.60			70.95		61.3	
Dispersal habitat			48.40	4		29.05	4	38.7	4
Context									
Foraging/breeding habitat			79.74			64.89		72.3	
Dispersal habitat			20.26	5		35.11	4	27.7	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state				1			1		1
Absence of threats				11			11		10
Species mobility capacity				10			10		10
Site Context Score				41			40		40.5
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**2.20**			**2.14**		**2.17**

	Tabooba AU3 - RE 12.8.16 Young Regrowth							
	AU Koala density	Site 687-688			Site 756-757			Average Score
Species Stocking Rate (SSR)	0.5			Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10	10
Species usage of the site (habitat type & evidenced usage)				15			15	15
Approximate density (per ha)	0			10			10	10
Role/importance of species population on site*				10			10	10
Total SRR score (out of 70)				45			45	45
Max SRR Score				*70*			*70*	*70*
SRR Score (out of 4)				**2.57**			**2.57**	**2.57**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.63	2.55	2.33	2.34	2.34	2.70	2.40	2.70	*2.50*
Site Context Score (out of 3)	2.25	2.20	2.17	2.20	2.22	1.77	2.65	1.93	*2.16*
Species Stocking Rate Score (out of 4)	3.71	3.71	2.57	3.71	3.71	3.71	3.71	2.00	*3.31*
Habitat Quality score (out of 10)	*8.59*	*8.46*	*7.07*	*8.25*	*8.28*	*8.18*	*8.77*	*6.63*	*7.95*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES			48.10						
Size Weighting	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***7.07***	***0.00***	***0.00***	***0.0***	***0.0***	***0.0***	***7.07***

TABLE A6.10 TABOOBA AU4 RE 12.8.14 REMNANT START QUALITY FOR KOALA

START SCORE: 8

Assessment Unit - Regional Ecosystem	Tabooba AU4 - RE 12.8.14 Remnant								
Site Reference	Benchmark 12.8.14	Site 680-681			Site 747-748			Average % benchmark	Average Score
		Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	66.7	66.7	3	83.4	5
Native plant species richness - trees	6	8	133.3	5	9	150.0	5	141.7	5
Native plant species richness - shrubs	6	7	116.7	5	4	66.7	2.5	91.7	5
Native plant species richness - grasses	8	9	112.5	5	10	125.0	5	118.8	5
Native plant species richness - forbs	21	26	123.8	5	46	219.0	5	171.4	5
Tree canopy height	22	18	81.8	5	15	68.2	3	75.0	5
Tree subcanopy height	11	10	90.9	5	5	45.5	3	68.2	3
Tree canopy height (average of emergent, canopy, sub-canopy)	16.5	14	84.8	5	10	60.6	3	72.7	5
Tree canopy cover (EDL)	16	35	218.8	3	27	168.8	5	193.8	5
Subcanopy cover	15	14	93.3	5	0	0.0	0	46.7	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	15.5	24.5	158.1	5	13.5	87.1	5	122.6	5
Shrub canopy cover	4	3	75.0	5	1	25.0	3	50.0	5
Native grass cover	58	47	81.0	3	12	20.7	1	50.9	3
Organic litter	30	5	16.7	3	13	43.3	3	30.0	3
Number of large trees/ha	45	22	48.9	5	6	13.3	5	31.1	5
Coarse woody debris (m/ha)	336	128	38.1	2	5	1.5	0	19.8	2
Non-native plant cover	0	10		5	35		10	22.5	5
Quality and availability of food and foraging habitat: Koala				10			10		10
Quality and availability of shelter: Koala				5			5		5
Site Condition Score				73			65.5		73
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**2.19**					**2.19**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			75.23			100.0		87.6	
Dispersal habitat			24.77	5		0.0	5	12.4	5
Context									
Foraging/breeding habitat			56.63			74.26		65.4	
Dispersal habitat			43.47	4		25.74	4	34.6	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state				1			1		1
Absence of threats				8			7		10
Species mobility capacity				10			10		10
Site Context Score				38			37		37.5
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**2.04**			**1.98**		**2.01**

	Tabooba AU4 - RE 12.8.14 Remnant							
	AU Koala density	Site 680-681		Site 747-748			Average Score
Species Stocking Rate (SSR)	**0.23**		Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)			10			10		10
Species usage of the site (habitat type & evidenced usage)			15			15		15
Approximate density (per ha)	0.23		30			30		30
Role/importance of species population on site*			10			10		10
Total SRR score (out of 70)			65			65		65
Max SRR Score			*70*			*70*		*70*
SRR Score (out of 4)			**3.71**			**3.71**		**3.71**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.06	1.83	1.63	2.19	2.01	2.24	1.98	0.53	*1.81*
Site Context Score (out of 3)	2.06	1.78	1.82	2.01	1.96	1.61	2.38	1.61	*1.88*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.83*	*5.90*	*4.31*	*7.91*	*6.54*	*7.56*	*6.94*	*3.85*	*6.14*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES				50.62					
Size Weighting	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***7.91***	***0.00***	***0.0***	***0.0***	***0.0***	***7.91***

TABLE A6.11 TABOOBA AU4 RE 12.8.14 REMNANT WITHOUT OFFSET QUALITY FOR KOALA

START SCORE: 8

Assessment Unit - Regional Ecosystem	Tabooba AU4 - RE 12.8.14 Remnant								
Site Reference	Benchmark	Site 680-681			Site 747-748			Average % benchmark	Average Score
	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	66.7	66.7	3	83.4	5
Native plant species richness - trees	6	8	133.3	5	9	150.0	5	141.7	5
Native plant species richness - shrubs	6	7	116.7	5	4	66.7	2.5	91.7	5
Native plant species richness - grasses	8	9	112.5	5	10	125.0	5	118.8	5
Native plant species richness - forbs	21	26	123.8	5	46	219.0	5	171.4	5
Tree canopy height	22	18	81.8	5	15	68.2	3	75.0	5
Tree subcanopy height	11	10	90.9	5	5	45.5	3	68.2	3
Tree canopy height (average of emergent, canopy, sub-canopy)	16.5	14	84.8	5	10	60.6	3	72.7	5
Tree canopy cover (EDL)	16	35	218.8	3	27	168.8	5	193.8	5
Subcanopy cover	15	14	93.3	5	0	0.0	0	46.7	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	15.5	24.5	158.1	5	13.5	87.1	5	122.6	5
Shrub canopy cover	4	3	75.0	5	1	25.0	3	50.0	5
Native grass cover	58	47	81.0	3	12	20.7	1	50.9	3
Organic litter	30	5	16.7	3	13	43.3	3	30.0	3
Number of large trees (ha)	45	22	48.9	5	6	13.3	5	31.1	5
Coarse woody debris (m/ha)	336	128	38.1	2	5	1.5	0	19.8	2
Non-native plant cover	0	10		5	35		10	22.5	5
Quality and availability of food and foraging habitat: Koala				10			10		10
Quality and availability of shelter: Koala				5			5		5
Site Condition Score				73			65.5		73
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**2.19**					**2.19**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			75.23			100.0		87.6	
Dispersal habitat			24.77	5		0.0	5	12.4	5
Context									
Foraging/breeding habitat			56.63			74.26		65.4	
Dispersal habitat			43.47	4		25.74	4	34.6	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state				1			1		1
Absence of threats				7			7		5
Species mobility capacity				10			10		10
Site Context Score				37			37		37
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**1.98**			**1.98**		**1.98**

	Tabooba AU4 - RE 12.8.14 Remnant					
	AU Koala density	Site 680-681		Site 747-748		Average Score
Species Stocking Rate (SSR)	**0.23**		Score		Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)			10		10	10
Species usage of the site (habitat type & evidenced usage)			15		15	15
Approximate density (per ha)	0.23		30		30	30
Role/importance of species population on site*			10		10	10
Total SRR score (out of 70)			65		65	65
Max SRR Score			*70*		*70*	*70*
SRR Score (out of 4)			**3.71**		**3.71**	**3.71**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.21	1.47	0.60	2.19	1.55	2.19	1.98	0.53	*1.59*
Site Context Score (out of 3)	2.04	1.74	1.79	1.98	1.90	1.61	2.33	1.61	*1.85*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.96*	*5.50*	*3.25*	*7.89*	*6.02*	*7.51*	*6.88*	*3.85*	*5.84*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES				50.62					
Size Weighting	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***7.89***	***0.00***	***0.0***	***0.0***	***0.0***	***7.89***

TABLE A6.12 TABOOBA AU4 RE 12.8.14 REMNANT WITH OFFSET QUALITY FOR KOALA

START SCORE: 8

Assessment Unit - Regional Ecosystem	Tabooba AU4 - RE 12.8.14 Remnant								
Site Reference	Benchmark 12.8.14	Site 680-681			Site 747-748			Average % benchmark	Average Score
		Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	66.7	66.7	5	83.4	5
Native plant species richness - trees	6	8	133.3	5	9	150.0	5	141.7	5
Native plant species richness - shrubs	6	7	116.7	5	4	66.7	5	91.7	5
Native plant species richness - grasses	8	9	112.5	5	10	125.0	5	118.8	5
Native plant species richness - forbs	21	26	123.8	5	46	219.0	5	171.4	5
Tree canopy height	22	18	81.8	5	15	68.2	5	75.0	5
Tree subcanopy height	11	10	90.9	5	5	45.5	5	68.2	5
Tree canopy height (average of emergent, canopy, sub-canopy)	16.5	14	84.8	5	10	60.6	5	72.7	5
Tree canopy cover (EDL)	16	35	218.8	3	27	168.8	5	193.8	5
Subcanopy cover	15	14	93.3	5	0	0.0	5	46.7	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	15.5	24.5	158.1	5	13.5	87.1	5	122.6	5
Shrub canopy cover	4	3	75.0	5	1	25.0	5	50.0	5
Native grass cover	58	47	81.0	3	12	20.7	3	50.9	3
Organic litter	30	5	16.7	5	13	43.3	5	30.0	5
Number of large trees (ha)	45	22	48.9	10	6	13.3	5	31.1	5
Coarse woody debris (m/ha)	336	128	38.1	5	5	1.5	5	19.8	5
Non-native plant cover	0	10		5	35		5	22.5	5
Quality and availability of food and foraging habitat: Koala				10			10		10
Quality and availability of shelter: Koala				5			10		5
Site Condition Score				83			83		78
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**2.49**					**2.34**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			75.23			100.0		87.6	
Dispersal habitat			24.77	5		0.0	5	12.4	5
Context									
Foraging/breeding habitat			56.63			74.26		65.4	
Dispersal habitat			43.47	4		25.74	4	34.6	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state				1			1		1
Absence of threats				11			11		11
Species mobility capacity				10			10		10
Site Context Score				41			41		41
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**2.20**			**2.20**		**2.20**

	Tabooba AU4 - RE 12.8.14 Remnant							
	AU Koala density	Site 680-681			Site 747-748			Average Score
Species Stocking Rate (SSR)	**0.23**			Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10	10
Species usage of the site (habitat type & evidenced usage)				15			15	15
Approximate density (per ha)	0.23			30			30	30
Role/importance of species population on site*				10			10	10
Total SRR score (out of 70)				65			65	65
Max SRR Score				*70*			*70*	*70*
SRR Score (out of 4)				**3.71**			**3.71**	**3.71**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.63	2.55	2.33	2.34	2.34	2.70	2.40	2.70	*2.50*
Site Context Score (out of 3)	2.25	2.20	2.17	2.20	2.22	1.77	2.65	1.93	*2.16*
Species Stocking Rate Score (out of 4)	3.71	3.71	2.57	3.71	3.71	3.71	3.71	2.00	*3.31*
Habitat Quality score (out of 10)	*8.59*	*8.46*	*7.07*	*8.25*	*8.28*	*8.18*	*8.77*	*6.63*	*7.95*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES				50.62					
Size Weighting	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***8.25***	***0.00***	***0.0***	***0.0***	***0.0***	***8.25***

TABLE A6.13 TABOOBA AU5 RE 12.8.14 ADVANCED REGROWTH START QUALITY FOR KOALA

START SCORE: 7

Assessment Unit - Regional Ecosystem	Tabooba AU5 - 12.8.14 Advanced Regrowth								
Site Reference	Benchmark	Site 736-737			Site 751-752			Average % benchmark	Average Score
	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	6	8	133.3	5	8	133.3	5	133.3	5
Native plant species richness - shrubs	6	9	150.0	5	7	116.7	5	133.3	5
Native plant species richness - grasses	8	9	112.5	5	9	112.5	5	112.5	5
Native plant species richness - forbs	21	27	128.6	5	48	228.6	5	178.6	5
Tree canopy height	22	12	54.5	3	10	45.5	3	50.0	3
Tree subcanopy height	11	6	54.5	3	5	45.5	3	50.0	3
Tree canopy height (average of emergent, canopy, sub-canopy)	16.5	9	54.5	3	7.5	45.5	3	50.0	3
Tree canopy cover (EDL)	16	44	275.0	3	40.5	253.1	3	264.1	3
Subcanopy cover	15	5	33.3	2	10.5	70.0	5	51.7	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	15.5	24.5	158.1	5	25.5	164.5	5	161.3	5
Shrub canopy cover	4	2	50.0	5	1	25.0	3	37.5	3
Native grass cover	58	29	50.0	3	16	27.6	1	38.8	1
Organic litter	30	1	3.3	0	6	20.0	3	11.7	3
Number of large trees/ha	45	10	22.2	5	4	8.9	5	15.6	5
Coarse woody debris (m/ha)	336	176	52.4	5	146	43.5	2	47.9	2
Non-native plant cover	0	20		5	20		5	20.0	5
Quality and availability of food and foraging habitat: Koala				10			10		10
Quality and availability of shelter: Koala				5			5		5
Site Condition Score				71			67		67
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3									**2.01**
Site Context			Value	Score		Value	Score	Average	Average Score
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			100.0			100.0		100.0	
Dispersal habitat			0.0	5		0.0	5	0.0	5
Context									
Foraging/breeding habitat			81.35			74.0		77.7	
Dispersal habitat			18.65	5		26.0	4	22.3	5
Ecological Corridors				0			0		0
Role of site location to species overall population in the state				1			1		1
Absence of threats				6			6		5
Species mobility capacity				10			10		10
Site Context Score				37			36		36.5
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**1.98**			**1.93**		**1.96**

	Tabooba AU5 - 12.8.14 Advanced Regrowth							
	AU Koala density	Site 736-737			Site 751-752			Average Score
Species Stocking Rate (SSR)	0.23			Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10	10
Species usage of the site (habitat type & evidenced usage)				15			15	15
Approximate density (per ha)	0.07			10			10	10
Role/importance of species population on site*				10			10	10
Total SRR score (out of 70)				45			45	45
Max SRR Score				*70*			*70*	*70*
SRR Score (out of 4)				**2.57**			**2.57**	**2.57**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.06	1.83	1.63	2.19	2.01	2.24	1.98	0.53	*1.81*
Site Context Score (out of 3)	2.06	1.78	1.82	2.01	1.96	1.61	2.38	1.61	*1.88*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.83*	*5.90*	*4.31*	*7.91*	*6.54*	*7.56*	*6.94*	*3.85*	*6.14*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES					19.80				
Size Weighting	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***6.54***	***0.0***	***0.0***	***0.0***	*6.54*

TABLE A6.14 TABOOBA AU5 RE 12.8.14 ADVANCED REGROWTH WITHOUT OFFSET QUALITY FOR KOALA

START SCORE: 6

Assessment Unit - Regional Ecosystem	Tabooba AU5 - 12.8.14 Advanced Regrowth								
Site Reference	Benchmark 12.8.14	Site 736-737 Raw Data	Site 736-737 % Benchmark	Site 736-737 Score	Site 751-752 Raw Data	Site 751-752 % Benchmark	Site 751-752 Score	Average % benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	6	8	133.3	5	8	133.3	5	133.3	5
Native plant species richness - shrubs	6	9	150.0	2.5	7	116.7	2.5	133.3	2.5
Native plant species richness - grasses	8	9	112.5	2.5	9	112.5	2.5	112.5	2.5
Native plant species richness - forbs	21	27	128.6	2.5	48	228.6	2.5	178.6	2.5
Tree canopy height	22	12	54.5	3	10	45.5	3	50.0	3
Tree subcanopy height	11	6	54.5	3	5	45.5	3	50.0	0
Tree canopy height (average of emergent, canopy, sub-canopy)	16.5	9	54.5	3	7.5	45.5	3	50.0	3
Tree canopy cover (EDL)	16	44	275.0	5	40.5	253.1	5	264.1	5
Subcanopy cover	15	5	33.3	2	10.5	70.0	2	51.7	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	15.5	24.5	158.1	5	25.5	164.5	5	161.3	2
Shrub canopy cover	4	2	50.0	0	1	25.0	0	37.5	0
Native grass cover	58	29	50.0	3	16	27.6	1	38.8	1
Organic litter	30	1	3.3	0	6	20.0	3	11.7	3
Number of large trees (ha)	45	10	22.2	5	4	8.9	5	15.6	5
Coarse woody debris (m/ha)	336	176	52.4	5	146	43.5	2	47.9	2
Non-native plant cover	0	20		3	20		3	20.0	3
Quality and availability of food and foraging habitat: Koala				10			10		10
Quality and availability of shelter: Koala				5			5		5
Site Condition Score				56.5			54.5		51.5
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3									**1.55**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			100.0			100.0		100.0	
Dispersal habitat			0.0	5		0.0	5	0.0	5
Context									
Foraging/breeding habitat			81.4			74.0		77.7	
Dispersal habitat			18.7	5		26.0	4	22.3	5
Ecological Corridors				0			0		0
Role of site location to species overall population in the state				1			1		1
Absence of threats				5			5		5
Species mobility capacity				10			10		10
Site Context Score				36			35		35.5
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**1.93**			**1.88**		**1.90**

	Tabooba AU5 - 12.8.14 Advanced Regrowth								
	AU Koala density	Site 736-737			Site 751-752				
Species Stocking Rate (SSR)	**0.23**			Score			Score		Average Score
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10		10
Species usage of the site (habitat type & evidenced usage)				15			15		15
Approximate density (per ha)	0.07			10			10		10
Role/importance of species population on site*				10			10		10
Total SRR score (out of 70)				45			45		45
Max SRR Score				*70*			*70*		*70*
SRR Score (out of 4)				**2.57**			**2.57**		**2.57**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.21	1.47	0.60	2.19	1.55	2.19	1.98	0.53	*1.59*
Site Context Score (out of 3)	2.04	1.74	1.79	1.98	1.90	1.61	2.33	1.61	*1.85*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.96*	*5.50*	*3.25*	*7.89*	*6.02*	*7.51*	*6.88*	*3.85*	*5.84*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES					19.80				
Size Weighting	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***6.02***	***0.0***	***0.0***	***0.0***	*6.02*

TABLE A6.15 TABOOBA AU5 RE 12.8.14 ADVANCED REGROWTH WITH OFFSET QUALITY FOR KOALA

START SCORE: 8

Assessment Unit - Regional Ecosystem	Tabooba AU5 - 12.8.14 Advanced Regrowth								
Site Reference	Benchmark 12.8.14	Site 736-737			Site 751-752			Average % benchmark	Average Score
		Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	6	8	133.3	5	8	133.3	5	133.3	5
Native plant species richness - shrubs	6	9	150.0	5	7	116.7	5	133.3	5
Native plant species richness - grasses	8	9	112.5	5	9	112.5	5	112.5	5
Native plant species richness - forbs	21	27	128.6	5	48	228.6	5	178.6	5
Tree canopy height	22	12	54.5	5	10	45.5	5	50.0	5
Tree subcanopy height	11	6	54.5	5	5	45.5	5	50.0	5
Tree canopy height (average of emergent, canopy, sub-canopy)	16.5	9	54.5	5	7.5	45.5	5	50.0	5
Tree canopy cover (EDL)	16	44	275.0	3	40.5	253.1	3	264.1	3
Subcanopy cover	15	5	33.3	5	10.5	70.0	5	51.7	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	15.5	24.5	158.1	5	25.5	164.5	5	161.3	5
Shrub canopy cover	4	2	50.0	5	1	25.0	5	37.5	5
Native grass cover	58	29	50.0	3	16	27.6	3	38.8	3
Organic litter	30	1	3.3	5	6	20.0	5	11.7	5
Number of large trees (ha)	45	10	22.2	10	4	8.9	5	15.6	5
Coarse woody debris (m/ha)	336	176	52.4	5	146	43.5	5	47.9	5
Non-native plant cover	0	20		5	20		5	20.0	5
Quality and availability of food and foraging habitat: Koala				10			10		10
Quality and availability of shelter: Koala				5			5		5
Site Condition Score				83			78		78
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3									**2.34**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			100.0			100.0		100.0	
Dispersal habitat			0.0	5		0.0	5	0.0	5
Context									
Foraging/breeding habitat			81.35			74.0		77.7	
Dispersal habitat			18.65	5		26.0	4	22.3	5
Ecological Corridors				0			0		0
Role of site location to species overall population in the state				1			1		1
Absence of threats				11			11		11
Species mobility capacity				10			10		10
Site Context Score				42			41		41.5
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**2.25**			**2.20**		**2.22**

	Tabooba AU5 - 12.8.14 Advanced Regrowth							
	RE Koala density	Site 736-737			Site 751-752			Average Score
Species Stocking Rate (SSR)	**0.23**			Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10	10
Species usage of the site (habitat type & evidenced usage)				15			15	15
Approximate density (per ha)	0.07			30			30	30
Role/importance of species population on site*				10			10	10
Total SRR score (out of 70)				65			65	65
Max SRR Score				*70*			*70*	*70*
SRR Score (out of 4)				**3.71**			**3.71**	**3.71**

Final habitat quality score (weighted)	**Tabooba AU1 RE12.8.16 remnant**	**Tabooba AU2 RE12.8.16 Advanced Regrowth**	**Tabooba AU3 RE12.8.16 Young Regrowth**	**Tabooba AU4 RE12.8.14 Remnant**	**Tabooba AU5 RE12.8.14 Advanced Regrowth**	**Greenridge AU4 RE12.3.20 Remnant**	**Greenridge AU5 RE12.3.20 Regrowth**	**Greenridge AU6 RE12.3.20 Non-remnant**	**Average/ Final**
Site Condition score (out of 3)	2.63	2.55	2.33	2.34	2.34	2.70	2.40	2.70	*2.50*
Site Context Score (out of 3)	2.25	2.20	2.17	2.20	2.22	1.77	2.65	1.93	*2.16*
Species Stocking Rate Score (out of 4)	3.71	3.71	2.57	3.71	3.71	3.71	3.71	2.00	*3.31*
Habitat Quality score (out of 10)	*8.59*	*8.46*	*7.07*	*8.25*	*8.28*	*8.18*	*8.77*	*6.63*	*7.95*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES					19.80				
Size Weighting	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***8.28***	***0.0***	***0.0***	***0.0***	*8.28*

TABLE A6.16 **GREENRIDGE AU4 RE 12.3.20 REMNANT START QUALITY FOR KOALA**

START SCORE: **8**

Assessment Unit - Regional Ecosystem	Greenridge AU4 12.3.20 Remnant											
Site Reference	Benchmark 12.3.20	Site 931-932			Site 964-965			Site 966-967			Average % benchmark	Average Score
		Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition												
Recruitment of woody perennial species in EDL	100	50	50.0	3	100	100.0	5	100	100	5	83.3	5
Native plant species richness - trees	4	3	75.0	2.5	2	50.0	2.5	7	175	5	100.0	5
Native plant species richness - shrubs	4	1	25.0	2.5	2	50.0	2.5	4	100	5	58.3	2.5
Native plant species richness - grasses	2	3	150.0	5	1	50.0	2.5	4	200	5	133.3	5
Native plant species richness - forbs	8	4	50.0	2.5	6	75.0	2.5	5	62.5	2.5	62.5	2.5
Tree canopy height	16	18	112.5	5	15	93.8	5	25	156.25	5	120.8	5
Tree subcanopy height	8	5	62.5	3	8	100.0	5	15	187.5	5	116.7	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	11.5	95.8	5	11.5	95.8	5	20	166.7	5	119.4	5
Tree canopy cover (EDL)	70	99.5	142.1	5	73.6	105.1	5	83	118.6	5	122.0	5
Subcanopy cover	20	1.5	7.5	0	8	40.0	2	34	170	5	72.5	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	50.5	112.2	5	40.8	90.7	5	58.5	130.0	5	111.0	5
Shrub canopy cover	15	0.5	3.3	0	7	46.7	3	11	73.3	5	41.1	3
Native grass cover	20	16.2	81.0	3	31.0	155.0	5	61.8	309	5	181.7	5
Organic litter	30	47	156.7	5	38	126.7	5	30	100	5	127.8	5
Number of large trees/ha	165	124	75.2	10	130	78.8	10	58	35.2	5	63.0	10
Coarse woody debris (m/ha)	890	260	29.2	2	315.0	35.4	2	165	18.5	2	27.7	2
Non-native plant cover	0	1		10	0		10	5		5	2.0	0
Quality and availability of food and foraging habitat: Koala				10			10			5		10
Quality and availability of shelter: Koala				5			5			10		10
Site Condition Score				70.5			75			74.5		75.0
MAX Site Condition Score				*100*			*100*			*100*		*100*
Site Condition Score - out of 3				**2.12**			**2.25**			**2.24**		**2.25**
Site Context			**Value**	**Score**		**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)												
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10		7.75	2	>200	10
Connectivity												
Foraging/breeding habitat			100.0			100.0			4.31		68.1	
Dispersal habitat			0.0	5		0.0	5		9.46	0	3.2	4
Context												
Foraging/breeding habitat			60.85			62.98			49.50		57.8	
Dispersal habitat			28.80	4		24.19	4		12.62	4	21.9	4
Ecological Corridors				6			6			6		6
Role of site location to species overall population in the state				4			4			4		4
Absence of threats				8			8			7		10
Species mobility capacity				10			10			7		10
Site Context Score				47			47			30		41
MAX Site Context Score				*56*			*56*			*56*		*56*
Site Context Score - out of 3				**2.52**			**2.52**			**1.61**		**2.21**

	Greenridge AU4 12.3.20 Remnant										
	AU Koala density	Site 931-932			Site 964-965			Site 966-967			Average Score
Species Stocking Rate (SSR)	0.4			Score			Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10			10	10
Species usage of the site (habitat type & evidenced usage)				15			15			15	15
Approximate density (per ha)		0.4		30	0.4		30	0.4		30	30
Role/importance of species population on site*				10			10			10	10
Total SRR score (out of 70)				65			65			65	65
Max SRR Score				*70*			*70*			*70*	*70*
SRR Score (out of 4)				**3.71**			**3.71**			**3.71**	**3.71**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.06	1.83	1.63	2.19	2.01	2.24	1.98	0.53	*1.81*
Site Context Score (out of 3)	2.06	1.78	1.82	2.01	1.96	1.61	2.38	1.61	*1.88*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.83*	*5.90*	*4.31*	*7.91*	*6.54*	*7.56*	*6.94*	*3.85*	*6.14*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES						28.70			
Size Weighting	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***7.6***	***0.0***	***0.0***	*7.56*

TABLE A6.17 GREENRIDGE AU4 RE 12.3.20 REMNANT WITHOUT OFFSET QUALITY FOR KOALA

START SCORE: 8

Assessment Unit - Regional Ecosystem	Greenridge AU4 - RE 12.3.20 Remnant											
Site Reference	Benchmark 12.3.20	Site 931-932			Site 964-965			Site 966-967			Average % benchmark	Average Score
		Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition												
Recruitment of woody perennial species in EDL	100	50	50.0	3	100	100.0	3	100	100	3	83.3	3
Native plant species richness - trees	4	3	75.0	2.5	2	50.0	2.5	7	175	5	100.0	5
Native plant species richness - shrubs	4	1	25.0	2.5	2	50.0	2.5	4	100	5	58.3	2.5
Native plant species richness - grasses	2	3	150.0	2.5	1	50.0	2.5	4	200	2.5	133.3	2.5
Native plant species richness - forbs	8	4	50.0	0	6	75.0	2.5	5	62.5	2.5	62.5	2.5
Tree canopy height	16	18	112.5	5	15	93.8	5	25	156.25	5	120.8	5
Tree subcanopy height	8	5	62.5	5	8	100.0	5	15	187.5	5	116.7	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	11.5	95.8	5	11.5	95.8	5	20	166.7	5	119.4	5
Tree canopy cover (EDL)	70	99.5	142.1	5	73.6	105.1	5	83	118.6	5	122.0	5
Subcanopy cover	20	1.5	7.5	2	8	40.0	5	34	170	5	72.5	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	50.5	112.2	5	40.8	90.7	5	58.5	130.0	5	111.0	5
Shrub canopy cover	15	0.5	3.3	0	7	46.7	3	11	73.3	5	41.1	3
Native grass cover	20	16.2	81.0	3	31.0	155.0	5	61.8	309	5	181.7	5
Organic litter	30	47	156.7	3	38	126.7	3	30	100	5	127.8	3
Number of large trees (ha)	165	124	75.2	10	130	78.8	10	58	35.2	10	63.0	10
Coarse woody debris (m/ha)	890	260	29.2	2	315.0	35.4	2	165	18.5	2	27.7	2
Non-native plant cover	0	1		5	0		5	5		3		5
Quality and availability of food and foraging habitat: Koala				10			10			5		10
Quality and availability of shelter: Koala				5			5			10		10
Site Condition Score				58.5			66			73		73.5
MAX Site Condition Score				*100*			*100*			*100*		*100*
Site Condition Score - out of 3				**1.76**			**1.98**			**2.19**		**2.21**
Site Context			**Value**	**Score**		**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)												
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10		7.8	2	>200	10
Connectivity												
Foraging/breeding habitat			100.0			100.0			4.3		68.1	
Dispersal habitat			0.0	5		0.0	5		9.5	0	3.2	4
Context												
Foraging/breeding habitat			60.9			63.0			49.5		57.8	
Dispersal habitat			28.8	4		24.2	4		12.6	4	21.9	4
Ecological Corridors				6			6			6		6
Role of site location to species overall population in the state				4			4			4		4
Absence of threats				7			7			7		5
Species mobility capacity				10			10			7		10
Site Context Score				46			46			30		41
MAX Site Context Score				*56*			*56*			*56*		*56*
Site Context Score - out of 3				**2.46**			**2.46**			**1.61**		**2.18**

	Greenridge AU4 - RE 12.3.20 Remnant										
	AU Koala density	Site 931-932			Site 964-965			Site 966-967			
Species Stocking Rate (SSR)	0.4			Score			Score			Score	Average Score
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10			10	10
Species usage of the site (habitat type & evidenced usage)				15			15			15	15
Approximate density (per ha)		0.4		30	0.4		30	0.4		30	30
Role/importance of species population on site*				10			10			10	10
Total SRR score (out of 70)				65			65			65	65
Max SRR Score				*70*			*70*			*70*	*70*
SRR Score (out of 4)				**3.71**			**3.71**			**3.71**	**3.71**

Final habitat quality score (weighted)	**Tabooba AU1 RE12.8.16 remnant**	**Tabooba AU2 RE12.8.16 Advanced Regrowth**	**Tabooba AU3 RE12.8.16 Young Regrowth**	**Tabooba AU4 RE12.8.14 Remnant**	**Tabooba AU5 RE12.8.14 Advanced**	**Greenridge AU4 RE12.3.20 Remnant**	**Greenridge AU5 RE12.3.20 Regrowth**	**Greenridge AU6 RE12.3.20 Non-**	**Average/ Final**
Site Condition score (out of 3)	2.21	1.47	0.60	2.19	1.55	2.19	1.98	0.53	*1.59*
Site Context Score (out of 3)	2.04	1.74	1.79	1.98	1.90	1.61	2.33	1.61	*1.85*
Habitat Quality score (out of 10)	*7.96*	*5.50*	*3.25*	*7.89*	*6.02*	*7.51*	*6.88*	*3.85*	*5.84*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES						28.70			
Size Weighting	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***7.5***	***0.0***	***0.0***	***7.51***

TABLE A6.18 GREENRIDGE AU4 RE 12.3.20 REMNANT WITH OFFSET QUALITY FOR KOALA

START SCORE: 8

Assessment Unit - Regional Ecosystem	Greenridge AU4 - RE 12.3.20 Remnant											
Site Reference	Benchmark 12.3.20	Site 931-932			Site 964-965			Site 966-967			Average % benchmark	Average Score
		Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition												
Recruitment of woody perennial species in EDL	100	50	50.0	5	100	100.0	5	100	100	5	83.3	5
Native plant species richness - trees	4	3	75.0	2.5	2	50.0	2.5	7	175	5	100.0	5
Native plant species richness - shrubs	4	1	25.0	2.5	2	50.0	2.5	4	100	5	58.3	2.5
Native plant species richness - grasses	2	3	150.0	5	1	50.0	5	4	200	5	133.3	5
Native plant species richness - forbs	8	4	50.0	2.5	6	75.0	2.5	5	62.5	5	62.5	5
Tree canopy height	16	18	112.5	5	15	93.8	5	25	156.25	5	120.8	5
Tree subcanopy height	8	5	62.5	5	8	100.0	5	15	187.5	5	116.7	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	11.5	95.8	5	11.5	95.8	5	20	166.7	5	119.4	5
Tree canopy cover (EDL)	70	99.5	142.1	5	73.6	105.1	5	83	118.6	5	122.0	5
Subcanopy cover	20	1.5	7.5	2	8	40.0	5	34	170	5	72.5	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	50.5	112.2	5	40.8	90.7	5	58.5	130.0	5	111.0	5
Shrub canopy cover	15	0.5	3.3	3	7	46.7	5	11	73.3	5	41.1	5
Native grass cover	20	16.2	81.0	5	31.0	155.0	5	61.8	309	5	181.7	5
Organic litter	30	47	156.7	5	38	126.7	5	30	100	5	127.8	5
Number of large trees (ha)	165	124	75.2	10	130	78.8	10	58	35.2	10	63.0	10
Coarse woody debris (m/ha)	890	260	29.2	5	315.0	35.4	5	165	18.5	5	27.7	5
Non-native plant cover	0	1		10	0		10	5		10	2.0	10
Quality and availability of food and foraging habitat: Koala				10			10			5		10.0
Quality and availability of shelter: Koala				5			5			10		10.0
Site Condition Score				80.5			82.5			90		92.5
MAX Site Condition Score				*100*			*100*			*100*		*100*
Site Condition Score - out of 3				**2.42**			**2.48**			**2.70**		**2.78**
Site Context			Value	Score		Value	Score		Value	Score	Average	Average Score
Size of patch (ha)												
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10		7.75	2	>200	10
Connectivity												
Foraging/breeding habitat			100.0			100.0			4.31		68.1	
Dispersal habitat			0.0	5		0.0	5		9.46	0	3.2	4
Context												
Foraging/breeding habitat			60.85			62.98			49.50		57.8	
Dispersal habitat			28.80	4		24.19	4		12.62	4	21.9	4
Ecological Corridors				6			6			6		6
Role of site location to species overall population in the state				4			4			4		4
Absence of threats				10			10			10		10
Species mobility capacity				10			10			7		10
Site Context Score				49			49			33		44
MAX Site Context Score				*56*			*56*			*56*		*56*
Site Context Score - out of 3				**2.63**			**2.63**			**1.77**		**2.34**

	Greenridge AU4 - RE 12.3.20 Remnant										
	AU Koala density	Site 931-932			Site 964-965			Site 966-967			Average Score
Species Stocking Rate (SSR)	**0.4**	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10			10	10
Species usage of the site (habitat type & evidenced usage)				15			15			15	15
Approximate density (per ha)		0.4		30	0.4		30	0.4		30	30
Role/importance of species population on site*				10			10			10	10
Total SRR score (out of 70)				65			65			65	65
Max SRR Score				*70*			*70*			*70*	*70*
SRR Score (out of 4)				**3.71**			**3.71**			**3.71**	**3.71**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.63	2.55	2.33	2.34	2.34	2.70	2.40	2.70	*2.50*
Site Context Score (out of 3)	2.25	2.20	2.17	2.20	2.22	1.77	2.65	1.93	*2.16*
Species Stocking Rate Score (out of 4)	3.71	3.71	2.57	3.71	3.71	3.71	3.71	2.00	*3.31*
Habitat Quality score (out of 10)	*8.59*	*8.46*	*7.07*	*8.25*	*8.28*	*8.18*	*8.77*	*6.63*	*7.95*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES						28.70			
Size Weighting	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***8.2***	***0.0***	***0.0***	***8.18***

TABLE A6.19 GREENRIDGE AU5 RE 12.3.20 REGROWTH START QUALITY FOR KOALA

START SCORE: 7

Assessment Unit - Regional Ecosystem	Greenridge AU5 12.3.20 Regrowth								
Site Reference	Benchmark 12.3.20	Site 974-975			Site 923-924			Average % benchmark	Average Score
		Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100	5	100.0	5
Native plant species richness - trees	4	8	200.0	5	4	100	5	150.0	5
Native plant species richness - shrubs	4	4	100.0	5	5	125	5	112.5	5
Native plant species richness - grasses	2	5	250.0	5	3	150	5	200.0	5
Native plant species richness - forbs	8	10	125.0	5	7	87.5	2.5	106.3	5
Tree canopy height	16	11	68.8	3	6	37.5	3	53.1	3
Tree subcanopy height	8	7	87.5	5	3	37.5	3	62.5	3
Tree canopy height (average of emergent, canopy, sub-canopy)	12	9	75.0	5	4.5	37.5	3	56.3	3
Tree canopy cover (EDL)	70	57	81.4	5	44.5	63.6	5	72.5	5
Subcanopy cover	20	22	110.0	5	3.5	17.5	2	63.8	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	39.5	87.8	5	24	53.3	5	70.6	5
Shrub canopy cover	15	5.5	36.7	3	2	13.3	3	25.0	3
Native grass cover	20	9.2	46.0	1	37	185	5	115.5	5
Organic litter	30	85.2	284.0	3	14	46.67	3	165.3	5
Number of large trees/ha	165	16	9.7	5	10	6.1	5	7.9	5
Coarse woody debris (m/ha)	890	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	5		5	10		5	7.5	5
Quality and availability of food and foraging habitat: Koala				5			5		5
Quality and availability of shelter: Koala				5			5		5
Site Condition Score				62			61.5		66.0
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**1.86**			**1.85**		**1.98**
Site Context			Value	Score		Value	Score	Average	Average Score
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			79.86			0.00		39.9	
Dispersal habitat			20.14	5		51.43	2	35.8	2
Context									
Foraging/breeding habitat			56.62			40.89		48.8	
Dispersal habitat			33.9	4		41.07	4	37.5	4
Ecological Corridors				6			6		6
Role of site location to species overall population in the state				4			4		4
Absence of threats				7			7		5
Species mobility capacity				10			10		10
Site Context Score				46			43		45
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**2.46**			**2.30**		**2.38**

	Greenridge AU5 12.3.20 Regrowth							
	AU Koala density	Site 974-975			Site 923-924			Average Score
Species Stocking Rate (SSR)	**0.4**			Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10	10
Species usage of the site (habitat type & evidenced usage)				15			15	15
Approximate density (per ha)		0.14		10	0.14		10	10
Role/importance of species population on site*				10			10	10
Total SRR score (out of 70)				45			45	45
Max SRR Score				*70*			*70*	*70*
SRR Score (out of 4)				**2.57**			**2.57**	**2.57**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.06	1.83	1.63	2.19	2.01	2.24	1.98	0.53	*1.81*
Site Context Score (out of 3)	2.06	1.78	1.82	2.01	1.96	1.61	2.38	1.61	*1.88*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.83*	*5.90*	*4.31*	*7.91*	*6.54*	*7.56*	*6.94*	*3.85*	*6.14*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES							4.77		
Size Weighting	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.0***	***6.9***	***0.0***	*6.94*

TABLE A6.20 GREENRIDGE AU5 RE 12.3.20 REGROWTH WITHOUT OFFSET QUALITY FOR KOALA

START SCORE: 7

Assessment Unit - Regional Ecosystem	Greenridge AU5 12.3.20 Regrowth								
Site Reference	Benchmark 12.3.20	Site 974-975 Raw Data	Site 974-975 % Benchmark	Site 974-975 Score	Site 923-924 Raw Data	Site 923-924 % Benchmark	Site 923-924 Score	Average % benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	4	8	200.0	5	4	100.0	5	150.0	5
Native plant species richness - shrubs	4	4	100.0	5	5	125.0	5	112.5	5
Native plant species richness - grasses	2	5	250.0	5	3	150.0	5	200.0	5
Native plant species richness - forbs	8	10	125.0	5	7	87.5	2.5	106.3	5
Tree canopy height	16	11	68.8	5	6	37.5	3	53.1	5
Tree subcanopy height	8	7	87.5	5	3	37.5	3	62.5	3
Tree canopy height (average of emergent, canopy, sub-canopy)	12	9	75.0	5	4.5	37.5	3	56.3	5
Tree canopy cover (EDL)	70	57	81.4	5	44.5	63.6	5	72.5	5
Subcanopy cover	20	22	110.0	5	3.5	17.5	2	63.8	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	39.5	87.8	5	24	53.3	5	70.6	5
Shrub canopy cover	15	5.5	36.7	3	2	13.3	3	25.0	3
Native grass cover	20	9.2	46.0	1	37	185.0	5	115.5	5
Organic litter	30	85.2	284.0	3	14	46.7	3	165.3	5
Number of large trees (ha)	165	8	4.8	5	10	6.1	5	5.5	5
Coarse woody debris (m/ha)	890	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	5		3	10		3	7.5	3
Quality and availability of food and foraging habitat: Koala				5			5		5
Quality and availability of shelter: Koala				5			5		5
Site Condition Score				60			59.5		66.0
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**1.80**			**1.79**		**1.98**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			79.86			0.00		39.9	
Dispersal habitat			20.14	5		51.43	2	35.8	2
Context									
Foraging/breeding habitat			56.62			40.89		48.8	
Dispersal habitat			33.9	4		41.07	4	37.5	4
Ecological Corridors				6			6		6
Role of site location to species overall population in the state				4			4		4
Absence of threats				6			6		5
Species mobility capacity				10			10		10
Site Context Score				45			42		44
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**2.41**			**2.25**		**2.33**

	Greenridge AU5 12.3.20 Regrowth							
	AU Koala density	Site 974-975			Site 923-924			Average Score
Species Stocking Rate (SSR)	**0.4**			Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10	10
Species usage of the site (habitat type & evidenced usage)				15			15	15
Approximate density (per ha)		0.14		10	0.14		10	10
Role/importance of species population on site*				10			10	10
Total SRR score (out of 70)				45			45	45
Max SRR Score				*70*			*70*	*70*
SRR Score (out of 4)				**2.57**			**2.57**	**2.57**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.21	1.47	0.60	2.19	1.55	2.19	1.98	0.53	*1.59*
Site Context Score (out of 3)	2.04	1.74	1.79	1.98	1.90	1.61	2.33	1.61	*1.85*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.96*	*5.50*	*3.25*	*7.89*	*6.02*	*7.51*	*6.88*	*3.85*	*5.84*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES							4.77		
Size Weighting	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***6.9***	***0.0***	***6.88***

TABLE A6.21 GREENRIDGE AU5 RE 12.3.20 REGROWTH WITH OFFSET QUALITY FOR KOALA

START SCORE: 9

Assessment Unit - Regional Ecosystem	Greenridge AU5 12.3.20 Regrowth								
Site Reference	Benchmark 12.3.20	Site 974-975			Site 923-924			Average % benchmark	Average Score
		Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	4	8	200.0	5	4	100.0	5	150.0	5
Native plant species richness - shrubs	4	4	100.0	5	5	125.0	5	112.5	5
Native plant species richness - grasses	2	5	250.0	5	3	150.0	5	200.0	5
Native plant species richness - forbs	8	10	125.0	5	7	87.5	5	106.3	5
Tree canopy height	16	11	68.8	5	6	37.5	5	53.1	5
Tree subcanopy height	8	7	87.5	5	3	37.5	3	62.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	9	75.0	5	4.5	37.5	3	56.3	5
Tree canopy cover (EDL)	70	57	81.4	5	44.5	63.6	5	72.5	5
Subcanopy cover	20	22	110.0	5	3.5	17.5	5	63.8	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	39.5	87.8	5	24	53.3	5	70.6	5
Shrub canopy cover	15	5.5	36.7	5	2	13.3	5	25.0	5
Native grass cover	20	9.2	46.0	5	37	185.0	5	115.5	5
Organic litter	30	85.2	284.0	5	14	46.7	5	165.3	5
Number of large trees (ha)	165	8	4.8	5	10	6.1	5	5.5	5
Coarse woody debris (m/ha)	890	0	0.0	5	0	0.0	5	0.0	5
Non-native plant cover	0	5		10	10		10	7.5	10
Quality and availability of food and foraging habitat: Koala				5			5		5
Quality and availability of shelter: Koala				5			10		5
Site Condition Score				80			83		80.0
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**2.40**			**2.49**		**2.40**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		>200	10	>200	10
Connectivity									
Foraging/breeding habitat			79.86			0.00		39.9	
Dispersal habitat			20.14	5		51.43	2	35.8	2
Context									
Foraging/breeding habitat			56.62			40.89		48.8	
Dispersal habitat			33.9	4		41.07	4	37.5	4
Ecological Corridors				6			6		6
Role of site location to species overall population in the state				4			4		4
Absence of threats				12			12		10
Species mobility capacity				10			10		10
Site Context Score				51			48		50
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**2.73**			**2.57**		**2.65**

	Greenridge AU5 12.3.20 Regrowth							
	AU Koala density	Site 974-975			Site 923-924			Average Score
Species Stocking Rate (SSR)	**0.4**			Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10	10
Species usage of the site (habitat type & evidenced usage)				15			15	15
Approximate density (per ha)		0.14		30	0.14		30	30
Role/importance of species population on site*				10			10	10
Total SRR score (out of 70)				65			65	65
Max SRR Score				*70*			*70*	*70*
SRR Score (out of 4)				**3.71**			**3.71**	**3.71**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-	Average/ Final
Site Condition score (out of 3)	2.63	2.55	2.33	2.34	2.34	2.70	2.40	2.70	*2.50*
Site Context Score (out of 3)	2.25	2.20	2.17	2.20	2.22	1.77	2.65	1.93	*2.16*
Species Stocking Rate Score (out of 4)	3.71	3.71	2.57	3.71	3.71	3.71	3.71	2.00	*3.31*
Habitat Quality score (out of 10)	*8.59*	*8.46*	*7.07*	*8.25*	*8.28*	*8.18*	*8.77*	*6.63*	*7.95*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES							4.77		
Size Weighting	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.0***	***8.8***	***0.0***	***8.77***

TABLE A6.22 GREENRIDGE AU6 RE 12.3.20 NON-REMNANT START QUALITY FOR KOALA

START SCORE: 4

Assessment Unit - Regional Ecosystem	Greenridge AU6 12.3.20 Non-remnant								
Site Reference	Benchmark 12.3.20	Site 972-973			Site 960-961			Average % benchmark	Average Score
		Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	0	0.0	0	100	100	5	50.0	3
Native plant species richness - trees	4	0	0.0	0	1	25	2.5	12.5	0
Native plant species richness - shrubs	4	0	0.0	0	2	50	2.5	25.0	2.5
Native plant species richness - grasses	2	0	0.0	0	1	50	2.5	25.0	2.5
Native plant species richness - forbs	8	3	37.5	2.5	5	62.5	2.5	50.0	2.5
Tree canopy height	16	0	0.0	0	8	50	3	25.0	3
Tree subcanopy height	8	0	0.0	0	2	25	3	12.5	0
Tree canopy height (average of emergent, canopy, sub-canopy)	12	0	0.0	0	5	41.7	3	20.8	0
Tree canopy cover (EDL)	70	0	0.0	0	12.5	17.9	2	8.9	0
Subcanopy cover	20	0	0.0	0	0	0	0	0.0	0
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	0.0	0	6.25	13.9	2	6.9	0
Shrub canopy cover	15	0	0.0	0	1	6.7	0	3.3	0
Native grass cover	20	0	0.0	0	19	95	5	47.5	1
Organic litter	30	20.8	69.3	5	20	66.67	5	68.0	5
Number of large trees/ha	165	0	0.0	0	0	0.0	0	0.0	0
Coarse woody debris (m/ha)	890	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	95		0	95		0	95.0	0
Quality and availability of food and foraging habitat: Koala				0			0		0
Quality and availability of shelter: Koala				1			0		1
Site Condition Score				8.5			30		17.5
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**0.26**			**0.90**		**0.53**
Site Context			Value	Score		Value	Score	Average	Average Score
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		7.75	2	>200	10
Connectivity									
Foraging/breeding habitat			0			4.31		2.2	
Dispersal habitat			61.79	2		9.46	0	35.6	2
Context									
Foraging/breeding habitat			24.41			47.53		36.0	
Dispersal habitat			43.00	4		25.41	4	34.2	4
Ecological Corridors				6			6		6
Role of site location to species overall population in the state				1			1		1
Absence of threats				5			5		5
Species mobility capacity				7			7		7
Site Context Score				35			25		30
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**1.88**			**1.34**		**1.61**

	Greenridge AU6 12.3.20 Non-remnant								
	AU Koala density	Site 972-973			Site 960-961				Average Score
Species Stocking Rate (SSR)	0.4			Score			Score		
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10		10
Species usage of the site (habitat type & evidenced usage)				5			5		5
Approximate density (per ha)		0.17		10	0.17		10		10
Role/importance of species population on site*				5			5		5
Total SRR score (out of 70)				30			30		30
Max SRR Score				*70*			*70*		*70*
SRR Score (out of 4)				**1.71**			**1.71**		**1.71**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.06	1.83	1.63	2.19	2.01	2.24	1.98	0.53	*1.81*
Site Context Score (out of 3)	2.06	1.78	1.82	2.01	1.96	1.61	2.38	1.61	*1.88*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.83*	*5.90*	*4.31*	*7.91*	*6.54*	*7.56*	*6.94*	*3.85*	*6.14*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES								11.88	
Size Weighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.0***	***0.0***	***3.8***	***3.85***

TABLE A6.23 GREENRIDGE AU6 RE 12.3.20 NON-REMNANT WITHOUT OFFSET QUALITY FOR KOALA

START SCORE: 4

Assessment Unit - Regional Ecosystem	Greenridge AU6 12.3.20 Non-remnant								
Site Reference	Benchmark 12.3.20	Site 972-973			Site 960-961			Average % benchmark	Average Score
		Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	0	0.0	0	100	100.0	5	50.0	3
Native plant species richness - trees	4	0	0.0	0	1	25.0	2.5	12.5	0
Native plant species richness - shrubs	4	0	0.0	0	2	50.0	2.5	25.0	2.5
Native plant species richness - grasses	2	0	0.0	0	1	50.0	2.5	25.0	2.5
Native plant species richness - forbs	8	3	37.5	2.5	5	62.5	2.5	50.0	2.5
Tree canopy height	16	0	0.0	0	8	50.0	3	25.0	3
Tree subcanopy height	8	0	0.0	0	2	25.0	3	12.5	0
Tree canopy height (average of emergent, canopy, sub-canopy)	12	0	0.0	0	5	41.7	3	20.8	0
Tree canopy cover (EDL)	70	0	0.0	0	12.5	17.9	2	8.9	0
Subcanopy cover	20	0	0.0	0	0	0.0	0	0.0	0
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	0.0	0	6.25	13.9	2	6.9	0
Shrub canopy cover	15	0	0.0	0	1	6.7	0	3.3	0
Native grass cover	20	0	0.0	0	19	95.0	5	47.5	1
Organic litter	30	20.8	69.3	5	20	66.7	5	68.0	5
Number of large trees (ha)	165	0	0.0	0	0	0.0	0	0.0	0
Coarse woody debris (m/ha)	890	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	95		0	95		0	95.0	0
Quality and availability of food and foraging habitat: Koala				0			0		0
Quality and availability of shelter: Koala				1			0		1
Site Condition Score				8.5			30		17.5
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**0.26**			**0.90**		**0.53**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		7.75	2	>200	10
Connectivity									
Foraging/breeding habitat			0			4.31		2.2	
Dispersal habitat			61.79	2		9.46	0	35.6	2
Context									
Foraging/breeding habitat			24.41			47.53		36.0	
Dispersal habitat			43.00	4		25.41	4	34.2	4
Ecological Corridors				6			6		6
Role of site location to species overall population in the state				1			1		1
Absence of threats				5			5		5
Species mobility capacity				7			7		7
Site Context Score				35			25		30
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**1.88**			**1.34**		**1.61**

	Greenridge AU6 12.3.20 Non-remnant							Average Score
	AU Koala density	Site 972-973			Site 960-961			
Species Stocking Rate (SSR)	0.4			Score			Score	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10	10
Species usage of the site (habitat type & evidenced usage)				5			5	5
Approximate density (per ha)		0.17		10	0.17		10	10
Role/importance of species population on site*				5			5	5
Total SRR score (out of 70)				30			30	30
Max SRR Score				*70*			*70*	*70*
SRR Score (out of 4)				**1.71**			**1.71**	**1.71**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 3)	2.21	1.47	0.60	2.19	1.55	2.19	1.98	0.53	*1.59*
Site Context Score (out of 3)	2.04	1.74	1.79	1.98	1.90	1.61	2.33	1.61	*1.85*
Species Stocking Rate Score (out of 4)	3.71	2.29	0.86	3.71	2.57	3.71	2.57	1.71	*2.49*
Habitat Quality score (out of 10)	*7.96*	*5.50*	*3.25*	*7.89*	*6.02*	*7.51*	*6.88*	*3.85*	*5.84*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES								11.88	
Size Weighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.0***	***3.8***	***3.85***

TABLE A6.24 GREENRIDGE AU6 RE 12.3.20 NON-REMNANT WITH OFFSET QUALITY FOR KOALA

START SCORE: 7

Assessment Unit - Regional Ecosystem	Greenridge AU6 12.3.20 Non-remnant								
Site Reference	Benchmark 12.3.20	Site 972-973			Site 960-961			Average % benchmark	Average Score
		Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	0	0.0	5	100	100.0	5	50.0	5
Native plant species richness - trees	4	0	0.0	5	1	25.0	5	12.5	5
Native plant species richness - shrubs	4	0	0.0	5	2	50.0	5	25.0	5
Native plant species richness - grasses	2	0	0.0	5	1	50.0	5	25.0	5
Native plant species richness - forbs	8	3	37.5	5	5	62.5	5	50.0	5
Tree canopy height	16	0	0.0	5	8	50.0	5	25.0	5
Tree subcanopy height	8	0	0.0	5	2	25.0	5	12.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	0	0.0	5	5	41.7	5	20.8	5
Tree canopy cover (EDL)	70	0	0.0	5	12.5	17.9	5	8.9	5
Subcanopy cover	20	0	0.0	5	0	0.0	5	0.0	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	0.0	5	6.25	13.9	5	6.9	5
Shrub canopy cover	15	0	0.0	5	1	6.7	5	3.3	5
Native grass cover	20	0	0.0	5	19	95.0	5	47.5	5
Organic litter	30	20.8	69.3	5	20	66.7	5	68.0	5
Number of large trees (ha)	165	0	0.0	5	0	0.0	5	0.0	5
Coarse woody debris (m/ha)	890	0	0.0	5	0	0.0	5	0.0	5
Non-native plant cover	0	95		10	95	0.0	10	95.0	10
Quality and availability of food and foraging habitat: Koala				10			10		10
Quality and availability of shelter: Koala				10			10		10
Site Condition Score				90			90		90.0
MAX Site Condition Score				*100*			*100*		*100*
Site Condition Score - out of 3				**2.70**			**2.70**		**2.70**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Koala habitat (foraging/breeding/dispersal)			>200	10		7.75	2	>200	10
Connectivity									
Foraging/breeding habitat			0			4.31		2.2	
Dispersal habitat			61.79	2		9.46	0	35.6	2
Context									
Foraging/breeding habitat			24.41			47.53		36.0	
Dispersal habitat			43.00	4		25.41	4	34.2	4
Ecological Corridors				6			6		6
Role of site location to species overall population in the state				1			1		1
Absence of threats				11			11		10
Species mobility capacity				7			7		7
Site Context Score				41			31		36
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3				**2.20**			**1.66**		**1.93**

	Greenridge AU6 12.3.20 Non-remnant								
	AU Koala density	Site 972-973			Site 960-961				Average Score
Species Stocking Rate (SSR)	**0.4**			Score			Score		
Presence detected on or adjacent to site (neighbouring property with connecting habitat)				10			10		10
Species usage of the site (habitat type & evidenced usage)				5			5		5
Approximate density (per ha)		0.17		10	0.17		10		10
Role/importance of species population on site*				10			10		10
Total SRR score (out of 70)				35			35		35
Max SRR Score				*70*			*70*		*70*
SRR Score (out of 4)				**2.00**			**2.00**		**2.00**

Final habitat quality score (weighted)	Tabooba AU1 RE12.8.16 remnant	Tabooba AU2 RE12.8.16 Advanced Regrowth	Tabooba AU3 RE12.8.16 Young Regrowth	Tabooba AU4 RE12.8.14 Remnant	Tabooba AU5 RE12.8.14 Advanced Regrowth	Greenridge AU4 RE12.3.20 Remnant	Greenridge AU5 RE12.3.20 Regrowth	Greenridge AU6 RE12.3.20 Non-	Average/ Final
Site Condition score (out of 3)	2.63	2.55	2.33	2.34	2.34	2.70	2.40	2.70	*2.50*
Site Context Score (out of 3)	2.25	2.20	2.17	2.20	2.22	1.77	2.65	1.93	*2.16*
Species Stocking Rate Score (out of 4)	3.71	3.71	2.57	3.71	3.71	3.71	3.71	2.00	*3.31*
Habitat Quality score (out of 10)	*8.59*	*8.46*	*7.07*	*8.25*	*8.28*	*8.18*	*8.77*	*6.63*	*7.95*
Assessment Unit area (ha)	49.8	145.02	48.1	50.62	19.8	28.7	4.77	11.88	*358.69*
Total offset area (ha) for this MNES								11.88	
Size Weighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.0***	***0.0***	***6.6***	***6.63***

APPENDIX 7

GREY-HEADED FLYING-FOX OFFSET AREAS HABITAT QUALITY ASSESSMENT TABLES

Table A7.1 **TABOOBA AU1 RE 12.8.16 REMNANT START QUALITY FOR GREY-HEADED FLYING-FOX**

START SCORE: 6

Assessment Unit - Regional Ecosystem	Tabooba AU 1 - RE12.8.16 remnant								
Site Reference	Benchmark	Site 472-473			Site 474-475			Average % benchmark	Average Score
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	100.0	5	100.0	5
Native plant species richness - trees	7	6	85.7	2.5	6.0	85.7	2.5	85.7	2.5
Native plant species richness - shrubs	7	9	128.6	5	10.0	142.9	5	135.7	5
Native plant species richness - grasses	7	10	142.9	5	16.0	228.6	5	185.7	5
Native plant species richness - forbs	29	31	106.9	5	34.0	117.2	5	112.1	5
Tree canopy height	20	15	75.0	5	18.0	90.0	5	82.5	5
Tree subcanopy height	8	8	100.0	5	10.0	125.0	5	112.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	14	11.5	82.1	5	14.0	100.0	5	91.1	5
Tree canopy cover (EDL)	41	44.1	107.6	5	83.0	202.4	3	155.0	5
Subcanopy cover	17	17.5	102.9	5	1.0	5.9	0	54.4	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	30.8	106.2	5	42.0	144.8	5	125.5	5
Shrub canopy cover	4	0	0.0	0	0.0	0.0	0	0.0	0
Native grass cover	45	22	48.9	1	27.2	60.4	3	54.7	3
Organic litter	21	3.4	16.2	3	6.2	29.5	3	22.9	3
Number of large eucalypt trees (ha)	33	10	30.3	5	14.0	42.4	5	36.4	5
Coarse woody debris (m/ha)	336	18	5.4	0	170.0	50.6	5	28.0	2
Non-native plant cover	0	40		10	15.0		5	27.5	10
			Value	**Score**		**Value**	**Score**	**Average**	**Average Score**
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.29	5		0.28	5	0.29	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			3	10		3	10	3	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			2	5		2	5	2	5
Site Condition Score				71.5			73.5		75.5
MAX Site Condition Score				*130*			*130*		*130*
Site Condition Score - out of 4									**2.32**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			1094.79			1094.79		1094.8	
Regrowth			722.0	10		722.0	10	722.0	10
Connectivity									
No. active GHFF camps within 20km			2	2		2	2	2.0	2
Context									
% GHFF foraging habitat within 20 km			32.2	4		32.1	4	32.1	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			1	2		1	2	1.0	2
Absence of threats				4			5		5
Site Context Score				22			23		23
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.23**

	Tabooba AU 1 - RE12.8.16 remnant								
	Benchmark	Site 472-473			Site 474-475			Average % benchmark	Average Score
Species Stocking Rate (SSR)	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	33	10	30.3	4	14.0	42.4	4	36.4	4
Timing of GHFF Biological Resources				9.25			9.25		9.25
Species Stocking Rate Score				13.25			13.3		13.3
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**1.99**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.32	2.18	2.20	2.31	2.22	2.46	2.18	0.51	2.05
Site Context Score (out of 3)	1.23	1.10	1.10	1.55	1.42	1.77	1.98	1.34	1.44
Species Stocking Rate Score (out of 3)	1.99	2.02	1.69	2.10	1.80	1.85	1.39	0.00	1.60
Habitat Quality score (out of 10)	*5.54*	*5.30*	*4.99*	*5.96*	*5.44*	*6.08*	*5.55*	*1.85*	5.09
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES	49.80								
Size Weighting	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***5.54***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***5.54***

Table A7.2 **TABOOBA AU1 RE 12.8.16 REMNANT QUALITY WITHOUT OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITHOUT OFFSET: 6

Assessment Unit - Regional Ecosystem	Tabooba AU 1 - RE12.8.16 remnant								
Site Reference	Benchmark	Site 472-473			Site 474-475			Average %	
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	100.0	5	100.0	5
Native plant species richness - trees	7	6	85.7	2.5	6.0	85.7	2.5	85.7	2.5
Native plant species richness - shrubs	7	9	128.6	5	10.0	142.9	5	135.7	5
Native plant species richness - grasses	7	10	142.9	5	16.0	228.6	5	185.7	5
Native plant species richness - forbs	29	31	106.9	5	34.0	117.2	5	112.1	5
Tree canopy height	20	15	75.0	5	18.0	90.0	5	82.5	5
Tree subcanopy height	8	8	100.0	5	10.0	125.0	5	112.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	14	11.5	82.1	5	14.0	100.0	5	91.1	5
Tree canopy cover (EDL)	41	44.1	107.6	5	83.0	202.4	3	155.0	5
Subcanopy cover	17	17.5	102.9	5	1.0	5.9	2	54.4	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	30.8	106.2	5	42.0	144.8	5	125.5	5
Shrub canopy cover	4	0	0.0	0	0.0	0.0	0	0.0	0
Native grass cover	45	22	48.9	1	27.2	60.4	3	54.7	3
Organic litter	21	3.4	16.2	3	6.2	29.5	3	22.9	3
Number of large trees (ha)	33	10	30.3	10	14.0	42.4	10	36.4	10
Coarse woody debris (m/ha)	336	18	5.4	0	170.0	50.6	5	28.0	2
Non-native plant cover	0	40		3	15.0		5	27.5	3
			Value	**Score**		**Value**	**Score**	**Average**	**Average Score**
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.29	5		0.28	5	0.3	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			3	10		3	10	3.0	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			2	5		2	5	2.0	5
Site Condition Score				69.5			78.5		73.5
MAX Site Condition Score				*130*			*130*		*130*
Site Condition Score - out of 4									**2.26**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			1094.79			1094.79		1094.8	
Regrowth			722.0	10		722.0	10	722.0	10
Connectivity									
No. active GHFF camps within 20km			2	2		2	2	2.0	2
Context									
% GHFF foraging habitat within 20 km			32.2	4		32.1	4	32.1	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			1	2		1	2	1.0	2
Absence of threats				3.5			4		5
Site Context Score				21.5			22		23
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.23**

	Tabooba AU 1 - RE12.8.16 remnant								
	Benchmark	Site 472-473			Site 474-475			Average %	
Species Stocking Rate (SSR)	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Average Score
Abundance of large trees	33	10	30.3	6	14.0	42.4	6	36.4	6
Timing of GHFF Biological Resources				9.25			9.25		9.25
Species Stocking Rate Score				15.25			15.3		15.3
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**2.29**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.26	1.66	0.31	2.31	1.58	2.11	2.18	0.51	1.62
Site Context Score (out of 3)	1.23	1.10	0.96	1.55	1.42	1.77	1.98	1.21	1.40
Species Stocking Rate Score (out of 3)	2.29	1.72	0.00	2.10	1.80	1.85	1.39	0.00	1.39
Habitat Quality score (out of 10)	*5.78*	*4.48*	*1.27*	*5.96*	*4.80*	*5.73*	*5.55*	*1.71*	4.41
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES	49.80								
Size Weighting	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***5.78***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***5.78***

Table A7.3 **TABOOBA AU1 RE 12.8.16 REMNANT QUALITY WITH OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITH OFFSET: 6

Assessment Unit - Regional Ecosystem	Tabooba AU 1 - RE12.8.16 remnant								
Site Reference	Benchmark	Site 472-473			Site 474-475			Average %	
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100.0	100.0	5	100.0	5
Native plant species richness - trees	7	6	85.7	2.5	6.0	85.7	2.5	85.7	2.5
Native plant species richness - shrubs	7	9	128.6	5	10.0	142.9	5	135.7	5
Native plant species richness - grasses	7	10	142.9	5	16.0	228.6	5	185.7	5
Native plant species richness - forbs	29	31	106.9	5	34.0	117.2	5	112.1	5
Tree canopy height	20	15	75.0	5	18.0	90.0	5	82.5	5
Tree subcanopy height	8	8	100.0	5	10.0	125.0	5	112.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	14	11.5	82.1	5	14.0	100.0	5	91.1	5
Tree canopy cover (EDL)	41	44.1	107.6	5	83.0	202.4	5	155.0	5
Subcanopy cover	17	17.5	102.9	5	1.0	5.9	2	54.4	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	30.8	106.2	5	42.0	144.8	5	125.5	5
Shrub canopy cover	4	0	0.0	5	0.0	0.0	5	0.0	5
Native grass cover	45	22	48.9	3	27.2	60.4	5	54.7	5
Organic litter	21	3.4	16.2	5	6.2	29.5	5	22.9	5
Number of large trees (ha)	33	10	30.3	10	14.0	42.4	10	36.4	10
Coarse woody debris (m/ha)	336	18	5.4	5	170.0	50.6	5	28.0	5
Non-native plant cover	0	40		5	15.0		5	27.5	5
			Value	Score		Value	Score	Average	Average Score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores (/10)			0.29	5		0.28	5	0.3	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness (/20)			3	10		3	10	3.0	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness (/20)			2	10		2	10	2.0	5
Site Condition Score				90.5			92.5		87.5
MAX Site Condition Score				*130*			*130*		*130*
Site Condition Score - out of 4									**2.69**
Site Context			Value	Score		Value	Score	Average	Average Score
Size of patch (ha)									
Remnant			1094.79			1094.79		1094.8	
Regrowth			722.0	10		722.0	10	722.0	10
Connectivity									
No. active GHFF camps within 20km			2	2		2	2	2.0	2
Context									
% GHFF foraging habitat within 20 km			32.2	4		32.1	4	32.1	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			1	2		1	2	1.0	2
Absence of threats *				9			9		10
Site Context Score				27			27		28
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.50**

	Tabooba AU 1 - RE12.8.16 remnant								
	Benchmark	Site 472-473			Site 474-475			Average %	
Species Stocking Rate (SSR) **	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Average Score
Abundance of large trees	33	10	30.3	6	14.0	42.4	6	36.4	6
Timing of GHFF Biological Resources				9.25			9.25		9.25
Species Stocking Rate Score				15.25			15.3		15.3
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**2.29**

Final habitat quality score (weighted)	**Tabooba AU1 RE 12.8.16 Remnant**	**Tabooba AU2 RE 12.8.16 Advanced**	**Tabooba AU2 RE 12.8.16 Young**	**Tabooba AU4 RE 12.8.14 Remnant**	**Tabooba AU5 RE 12.8.14 Advanced**	**Greenridge AU4 RE 12.3.20 Remnant**	**Greenridge AU5 RE 12.3.20 Regrowth**	**Greenridge AU6 RE 12.3.20 Non-remnant**	**Average/ Final**
Site Condition score (out of 4)	2.69	2.77	2.63	2.46	2.55	2.69	2.62	2.92	2.67
Site Context Score (out of 3)	1.50	1.50	1.50	1.82	1.82	2.04	2.25	2.14	1.82
Species Stocking Rate Score (out of 3)	2.29	2.32	1.69	2.40	2.10	2.15	1.39	2.10	2.05
Habitat Quality score (out of 10)	*6.48*	*6.58*	5.82	*6.68*	*6.48*	*6.88*	*6.25*	*7.17*	6.54
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES	49.80								
Size Weighting	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***6.48***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***6.48***

Table A7.4 **TABOOBA AU2 RE 12.8.16 ADVANCED REGROWTH START QUALITY FOR GREY-HEADED FLYING-FOX**

START SCORE: 5

Assessment Unit - Regional Ecosystem	Tabooba AU2 - RE 12.8.16 Advanced Regrowth														
Site Reference	Benchmark	Site 470-471			Site 683-684			Site 685-686			Site 734-735			Average % benchmark	Average Score
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition															
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	50	50.0	3	100	100.0	5	87.5	5
Native plant species richness - trees	7	3	42.9	2.5	5	71.4	2.5	5	71.4	2.5	6	85.7	2.5	67.9	2.5
Native plant species richness - shrubs	7	5	71.4	2.5	3	42.9	2.5	4	57.1	2.5	1	14.3	0	46.4	2.5
Native plant species richness - grasses	7	9	128.6	5	8	114.3	5	3	42.9	2.5	5	71.4	2.5	89.3	2.5
Native plant species richness - forbs	29	29	100.0	5	32	110.3	5	15	51.7	2.5	18	62.1	2.5	81.0	2.5
Tree canopy height	20	10	50.0	3	16	80.0	5	8	40.0	3	10	50.0	3	55.0	3
Tree subcanopy height	8	5	62.5	3	8	100.0	5	3	37.5	3	4	50.0	3	62.5	3
Tree canopy height (average of emergent, canopy, sub-canopy)	14	7.5	53.6	3	12	85.7	5	5.5	39.3	3	7.0	50.0	3	57.1	3
Tree canopy cover (EDL)	41	23.5	57.3	5	43.5	106.1	5	3	7.3	0	35	85.4	5	64.0	5
Subcanopy cover	17	6	35.3	2	7	41.2	2	3	17.6	2	11.5	67.6	5	40.4	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	14.8	50.9	5	25.3	87.1	5	3.0	10.3	2	23.3	80.2	5	57.1	5
Shrub canopy cover	4	1.5	37.5	3	4.5	112.5	5	0	0.0	0	19	475.0	3	156.3	5
Native grass cover	45	3.2	7.1	0	43	95.6	5	61	135.6	5	2.8	6.2	0	61.1	3
Organic litter	21	10.8	51.4	5	5	23.8	3	2	9.5	0	0.8	3.8	0	22.1	3
Number of large eucalypt trees (ha)	33	8	24.2	5	12	36.4	5	12	36.4	5	6	18.2	5	28.8	5
Coarse woody debris (m/ha)	336	175	52.1	5	177	52.7	5	94	28.0	2	79	23.5	2	39.1	2
Non-native plant cover	0	5		5	20		5	35		10	15		5	18.8	5
			Value	Score		Value	Score		Value	Score		Value	Score	Average	Average score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.43	5		0.51	8		0.51	8		0.43	5	0.47	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			2	5		4	10		4	10		4	10	3.50	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			2	5		3	10		3	10		3	10	2.75	10
Site Condition Score				66			86			68			60.5		71.00
MAX Site Condition Score				*130*			*130*			*130*			*130*		*130*
Site Condition Score - out of 4															**2.18**
Site Context			Value	Score		Value	Score		Value	Score		Value	Score	Average	Average score
Size of patch (ha)															
Remnant			1472.92			1472.92			1472.92			1472.92		1472.9	
Regrowth			343.6	10		343.6	10		343.6	10		343.6	10	343.6	10
Connectivity															
No. active GHFF camps within 20km			3	4		2	2		2	2		2	2	2.3	2
Context															
% GHFF foraging habitat within 20 km			31.9	4		31.6	4		31.6	4		31.3	4	31.6	4
Ecological Corridors				0			0			0			0		0
Role of site location to species overall population in the state															
No. of active ≥ level three GHFF camps within a 20km			2	4		1	2		1	2		1	2	1.3	2
Absence of threats				3.5			3			3			3.5		2.5
Site Context Score				25.5			21			21			21.5		20.5
MAX Site Context Score				*56*			*56*			*56*			*56*		*56*
Site Context Score - out of 3															**1.10**

	Tabooba AU2 - RE 12.8.16 Advanced Regrowth														
	Benchmark	Site 470-471			Site 683-684			Site 685-686			Site 734-735			Average % benchmark	Average Score
Species Stocking Rate (SSR)	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	33	8	24.2	2	12	36.4	4	12	36.4	4	6	18.2	2	28.8	4
Timing of GHFF Biological Resources				9.25			10			9.25			9.25		9.44
Species Stocking Rate Score				11.3			14.0			13.3			11.3		13.4
MAX Species Stocking Rate Score				*20*			*20*			*20*			*20*		*20*
SRR Score - out of 3															**2.02**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.32	2.18	2.20	2.31	2.22	2.46	2.18	0.51	2.05
Site Context Score (out of 3)	1.23	1.10	1.10	1.55	1.42	1.77	1.98	1.34	1.44
Species Stocking Rate Score (out of 3)	1.99	2.02	1.69	2.10	1.80	1.85	1.39	0.00	1.60
Habitat Quality score (out of 10)	5.54	5.30	4.99	5.96	5.44	6.08	5.55	1.85	5.09
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	9.91	356.72
Total offset area (ha) for this MNES	0.00	145.02	0.00	0.00	0.00	0.00	0.00	0.00	
Size Weighting	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***5.30***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***5.30***

Table A7.5 **TABOOBA AU2 RE 12.8.16 ADVANCED REGROWTH QUALITY WITHOUT OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITHOUT OFFSET: 6

Assessment Unit - Regional Ecosystem	Tabooba AU2 - RE 12.8.16 Advanced Regrowth														
Site Reference	Benchmark	Site 470-471			Site 683-684			Site 685-686			Site 734-735			Average % benchmark	Average Score
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition															
Recruitment of woody perennial species in EDL	100	100	100.0	3	100	100.0	3	50	50.0	3	100	100.0	3	87.5	3
Native plant species richness - trees	7	3	42.9	2.5	5	71.4	2.5	5	71.4	2.5	6	85.7	2.5	67.9	2.5
Native plant species richness - shrubs	7	5	71.4	2.5	3	42.9	2.5	4	57.1	2.5	1	14.3	0	46.4	2.5
Native plant species richness - grasses	7	9	128.6	2.5	8	114.3	2.5	3	42.9	2.5	5	71.4	2.5	89.3	2.5
Native plant species richness - forbs	29	29	100.0	2.5	32	110.3	2.5	15	51.7	2.5	18	62.1	2.5	81.0	2.5
Tree canopy height	20	10	50.0	3	16	80.0	3	8	40.0	3	10	50.0	3	55.0	3
Tree subcanopy height	8	5	62.5	3	8	100.0	3	3	37.5	3	4	50.0	3	62.5	3
Tree canopy height (average of emergent, canopy, sub-canopy)	14	7.5	53.6	3	12	85.7	3	5.5	39.3	3	7.0	50.0	3	57.1	3
Tree canopy cover (EDL)	41	23.5	57.3	5	43.5	106.1	5	3	7.3	0	35	85.4	5	64.0	5
Subcanopy cover	17	6	35.3	2	7	41.2	2	3	17.6	2	11.5	67.6	2	40.4	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	14.8	50.9	2	25.3	87.1	5	3.0	10.3	2	23.3	80.2	5	57.1	2
Shrub canopy cover	4	1.5	37.5	0	4.5	112.5	0	0	0.0	0	19	475.0	0	156.3	0
Native grass cover	45	3.2	7.1	0	43	95.6	5	61	135.6	5	2.8	6.2	0	61.1	3
Organic litter	21	10.8	51.4	3	5	23.8	3	2	9.5	0	0.8	3.8	0	22.1	3
Number of large trees (ha)	33	8	24.2	5	12	36.4	5	12	36.4	5	6	18.2	5	28.8	5
Coarse woody debris (m/ha)	336	175	52.1	5	177	52.7	5	94	28.0	2	79	23.5	2	39.1	2
Non-native plant cover	0	5		3	20		3	35		3	15		3	18.8	3
			Value	Score		Value	Score		Value	Score		Value	Score	Average	Average score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.43	5		0.51	8		0.51	8		0.43	5	0.47	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			2	5		4	5		4	5		4	10	3.50	5
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			2	5		3	10		3	10		3	10	2.75	10
Site Condition Score				49			65			56			53.5		54.00
MAX Site Condition Score				*130*			*130*			*130*			*130*		*130*
Site Condition Score - out of 4															**1.66**
Site Context			Value	Score		Value	Score		Value	Score		Value	Score	Average	Average score
Size of patch (ha)															
Remnant			1472.92			1472.92			1472.92			1472.92		1472.9	
Regrowth			343.6	10		343.6	10		343.6	10		343.6	10	343.6	10
Connectivity															
No. active GHFF camps within 20km			3	4		2	2		2	2		2	2	2.3	2
Context															
% GHFF foraging habitat within 20 km			31.9	4		31.6	4		31.6	4		31.3	4	31.6	4
Ecological Corridors				0			0			0			0		0
Role of site location to species overall population in the state															
No. of active ≥ level three GHFF camps within a 20km			2	4		1	2		1	2		1	2	1.3	2
Absence of threats				2			1.5			1.5			2		2.5
Site Context Score				24			19.5			19.5			20		20.5
MAX Site Context Score				*56*			*56*			*56*			*56*		*56*
Site Context Score - out of 3															**1.10**

	Tabooba AU2 - RE 12.8.16 Advanced Regrowth														
	Benchmark	Site 470-471			Site 683-684			Site 685-686			Site 734-735			Average % benchmark	Average Score
Species Stocking Rate (SSR)	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	33	8	24.2	2	12	36.4	2	12	36.4	2	6	18.2	2	28.8	2
Timing of GHFF Biological Resources				9.25			10			9.25			9.25		9.44
Species Stocking Rate Score				11.3			12.0			11.3			11.3		11.4
MAX Species Stocking Rate Score				*20*			*20*			*20*			*20*		*20*
SRR Score - out of 3															**1.72**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.26	1.66	0.31	2.31	1.58	2.11	2.18	0.51	1.62
Site Context Score (out of 3)	1.23	1.10	0.96	1.55	1.42	1.77	1.98	1.21	1.40
Species Stocking Rate Score (out of 3)	2.29	1.72	0.00	2.10	1.80	1.85	1.39	0.00	1.39
Habitat Quality score (out of 10)	*5.78*	*4.48*	*1.27*	*5.96*	*4.80*	*5.73*	*5.55*	*1.71*	4.41
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES	49.80								
Size Weighting	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***5.78***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	*5.78*

Table A7.6 **TABOOBA AU2 RE 12.8.16 ADVANCED REGROWTH QUALITY WITH OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITH OFFSET: 6

Assessment Unit - Regional Ecosystem	Tabooba AU2 - RE 12.8.16 Advanced Regrowth													
Site Reference	Benchmark	Site 470-471			Site 683-684			Site 685-686			Site 734-735			Average % benchmark	Average Score
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition															
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	50	50.0	5	100	100.0	5	87.5	5
Native plant species richness - trees	7	3	42.9	2.5	5	71.4	2.5	5	71.4	2.5	6	85.7	2.5	67.9	2.5
Native plant species richness - shrubs	7	5	71.4	2.5	3	42.9	2.5	4	57.1	2.5	1	14.3	0	46.4	2.5
Native plant species richness - grasses	7	9	128.6	5	8	114.3	5	3	42.9	2.5	5	71.4	2.5	89.3	2.5
Native plant species richness - forbs	29	29	100.0	5	32	110.3	5	15	51.7	2.5	18	62.1	2.5	81.0	2.5
Tree canopy height	20	10	50.0	5	16	80.0	5	8	40.0	5	10	50.0	5	55.0	5
Tree subcanopy height	8	5	62.5	5	8	100.0	5	3	37.5	5	4	50.0	5	62.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	14	7.5	53.6	5	12	85.7	5.0	5.5	39.3	5	7.0	50.0	5	57.1	5
Tree canopy cover (EDL)	41	23.5	57.3	5	43.5	106.1	5	3	7.3	5	35	85.4	5	64.0	5
Subcanopy cover	17	6	35.3	5	7	41.2	5	3	17.6	5	11.5	67.6	5	40.4	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	14.8	50.9	5	25.3	87.1	5	3.0	10.3	5	23.3	80.2	5	57.1	5
Shrub canopy cover	4	1.5	37.5	5	4.5	112.5	5	0	0.0	5	19	475.0	5	156.3	5
Native grass cover	45	3.2	7.1	3	43	95.6	5	61	135.6	5	2.8	6.2	3	61.1	5
Organic litter	21	10.8	51.4	5	5	23.8	5	2	9.5	5	0.8	3.8	5	22.1	5
Number of large trees (ha)	33	8	24.2	10	12	36.4	10	12	36.4	10	6	18.2	10	28.8	10
Coarse woody debris (m/ha)	336	175	52.1	5	177	52.7	5	94	28.0	5	79	23.5	5	39.1	5
Non-native plant cover	0	5		5	20		5	35		5	15		5	18.8	10
			Value	Score		Value	Score		Value	Score		Value	Score	Average	Average score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores (/10)			0.43	5		0.51	8		0.51	8		0.43	5	0.47	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness (/20)			2	10		4	10		4	10		4	10	3.50	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness (/20)			2	10		3	10		3	10		3	10	2.75	10
Site Condition Score				88			93			88			80.5		90.00
MAX Site Condition Score				*130*			*130*			*130*			*130*		*130*
Site Condition Score - out of 4															**2.77**
Site Context			Value	Score		Value	Score		Value	Score		Value	Score	Average	Average score
Size of patch (ha)															
Remnant			1472.92			1472.92			1472.92			1472.92		1472.9	
Regrowth			343.6	10		343.6	10		343.6	10		343.6	10	343.6	10
Connectivity															
No. active GHFF camps within 20km			3	4		2	2		2	2		2	2	2.3	2
Context															
% GHFF foraging habitat within 20 km			31.9	4		31.6	4		31.6	4		31.3	4	31.6	4
Ecological Corridors				0			0			0			0		0
Role of site location to species overall population in the state															
No. of active ≥ level three GHFF camps within a 20km			2	4		1	2		1	2		1	2	1.3	2
Absence of threats *				9			9			9			9		10
Site Context Score				31			27			27			27		28
MAX Site Context Score				*56*			*56*			*56*			*56*		*56*
Site Context Score - out of 3															**1.50**

	Tabooba AU2 - RE 12.8.16 Advanced Regrowth													
	Benchmark	Site 470-471			Site 683-684			Site 685-686			Site 734-735			Average % benchmark	Average Score
Species Stocking Rate (SSR) **	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	33	8	24.2	6	12	36.4	6	12	36.4	6	6	18.2	6	28.8	6
Timing of GHFF Biological Resources				9.25			10			9.25			9.25		9.4375
Species Stocking Rate Score				15.3			16.0			15.3			15.3		15.4
MAX Species Stocking Rate Score				*20*			*20*			*20*			*20*		*20*
SRR Score - out of 3															**2.32**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.69	2.77	2.63	2.46	2.55	2.69	2.62	2.92	2.67
Site Context Score (out of 3)	1.50	1.50	1.50	1.82	1.82	2.04	2.25	2.14	1.82
Species Stocking Rate Score (out of 3)	2.29	2.32	1.69	2.40	2.10	2.15	1.39	2.10	2.05
Habitat Quality score (out of 10)	*6.48*	*6.58*	*5.82*	*6.68*	*6.48*	*6.88*	*6.25*	*7.17*	6.54
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES	49.80								
Size Weighting	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***6.48***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	*6.48*

Table A7.7 **TABOOBA AU3 RE 12.8.16 YOUNG REGROWTH START QUALITY FOR GREY-HEADED FLYING-FOX**

START SCORE: 5

Assessment Unit - Regional Ecosystem	- RE 12.8.16 Advan	Tabooba AU3 - RE 12.8.16 Young Regrowth								
Site Reference		Benchmark	Site 687-688			Site 756-757			Average % benchmark	Average Score
	Average Score	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition										
Recruitment of woody perennial species in EDL	5	100	66.7	66.7	3	100	100.0	5	83.4	5
Native plant species richness - trees	2.5	7	5	71.4	2.5	5	71.4	2.5	71.4	2.5
Native plant species richness - shrubs	2.5	7	4	57.1	2.5	3	42.9	2.5	50.0	2.5
Native plant species richness - grasses	2.5	7	7	100.0	5	8	114.3	5	107.1	5
Native plant species richness - forbs	2.5	29	17	58.6	2.5	27	93.1	5	75.9	2.5
Tree canopy height	3	20	15	75.0	5	8	40.0	3	57.5	3
Tree subcanopy height	3	8	5	62.5	3	3	37.5	3	50.0	3
Tree canopy height (average of emergent, canopy, sub-canopy)	3	14	10	71.4	5	5.5	39.3	3.0	55.4	3
Tree canopy cover (EDL)	5	41	28	68.3	5	28	68.3	5	68.3	5
Subcanopy cover	2	17	7	41.2	2	3.5	20.6	2	30.9	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	5	29	17.5	60.3	5	15.75	54.3	5.0	57.3	5
Shrub canopy cover	5	4	0	0.0	0	0	0.0	0	0.0	0
Native grass cover	3	45	63	140.0	5	2	4.4	0	72.2	3
Organic litter	3	21	1	4.8	0	3.8	18.1	3	11.4	3
Number of large eucalypt trees (ha)	5	33	2	6.1	5	4	12.1	5	9.1	5
Coarse woody debris (m/ha)	2	336	277	82.4	5	61	18.2	2	50.3	5
Non-native plant cover	5	0	30	30	10	10	10	5	20.0	5
	Average score			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores	5			0.51	8		0.45	5	0.48	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness	10			4	10		4.0	10	4	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness	10			3	10		2.0	5	2.50	10
Site Condition Score	71.00				78.5			63		71.5
MAX Site Condition Score	*130*				*130*			*130*		*130*
Site Condition Score - out of 4	**2.18**									**2.20**
Site Context	**Average score**			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)										
Remnant				1472.9			1472.9		1472.9	
Regrowth	10			343.5	10		343.5	10	343.5	10
Connectivity										
No. active GHFF camps within 20km	2			2	2		2	2	2	2
Context										
% GHFF foraging habitat within 20 km	4			32.1	4		31.7	4	31.9	4
Ecological Corridors	0				0			0		0
Role of site location to species overall population in the state										
No. of active ≥ level three GHFF camps within a 20km	2			1	2		1	2	1	2
Absence of threats	2.5				2			2.5		2.5
Site Context Score	20.5				20			20.5		20.5
MAX Site Context Score	*56*				*56*			*56*		*56*
Site Context Score - out of 3	**1.10**									**1.10**

	- RE 12.8.16 Advan	Tabooba AU3 - RE 12.8.16 Young Regrowth								
		Benchmark	Site 687-688			Site 756-757			Average % benchmark	Average Score
Species Stocking Rate (SSR)	Average Score	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	4	33	2	6.1	2	4	12.1	2	9.1	2
Timing of GHFF Biological Resources	9.44				9.25			9.25		9.25
Species Stocking Rate Score	13.4				11.3			11.3		11.3
MAX Species Stocking Rate Score	*20*				*20*			*20*		*20*
SRR Score - out of 3	**2.02**				**1.6875**			**1.6875**		**1.6875**

Final habitat quality score (weighted)	**Tabooba AU1 RE 12.8.16 Remnant**	**Tabooba AU2 RE 12.8.16 Advanced Regrowth**	**Tabooba AU2 RE 12.8.16 Young Regrowth**	**Tabooba AU4 RE 12.8.14 Remnant**	**Tabooba AU5 RE 12.8.14 Advanced Regrowth**	**Greenridge AU4 RE 12.3.20 Remnant**	**Greenridge AU5 RE 12.3.20 Regrowth**	**Greenridge AU6 RE 12.3.20 Non-remnant**	**Average/ Final**
Site Condition score (out of 4)	2.32	2.18	2.20	2.31	2.22	2.46	2.18	0.51	2.05
Site Context Score (out of 3)	1.23	1.10	1.10	1.55	1.42	1.77	1.98	1.34	1.44
Species Stocking Rate Score (out of 3)	1.99	2.02	1.69	2.10	1.80	1.85	1.39	0.00	1.60
Habitat Quality score (out of 10)	*5.54*	*5.30*	*4.99*	*5.96*	*5.44*	*6.08*	*5.55*	*1.85*	5.09
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES			48.10					0.00	
Size Weighting	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***4.99***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***4.99***

Table A7.8 **TABOOBA AU3 RE 12.8.16 YOUNG REGROWTH QUALITY WITHOUT OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITHOUT OFFSET: 1

Assessment Unit - Regional Ecosystem	Tabooba AU3 - RE 12.8.16 Young Regrowth								
Site Reference	Benchmark	Site 687-688			Site 756-757			Average %	
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	66.7	66.7	0	100	100.0	0	83.4	0
Native plant species richness - trees	7	5	71.4	2.5	5	71.4	2.5	71.4	2.5
Native plant species richness - shrubs	7	4	57.1	2.5	3	42.9	2.5	50.0	2.5
Native plant species richness - grasses	7	7	100.0	2.5	8	114.3	2.5	107.1	2.5
Native plant species richness - forbs	29	17	58.6	2.5	27	93.1	2.5	75.9	2.5
Tree canopy height	20	15	75.0	0	8	40.0	0	57.5	0
Tree subcanopy height	8	5	62.5	0	3	37.5	0	50.0	0
Tree canopy height (average of emergent, canopy, sub-canopy)	14	10	71.4	0	5.5	39.3	0	55.4	0
Tree canopy cover (EDL)	41	28	68.3	0	28	68.3	0	68.3	0
Subcanopy cover	17	7	41.2	0	3.5	20.6	0	30.9	0
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	17.5	60.3	0	15.75	54.3	0	57.3	0
Shrub canopy cover	4	0	0.0	0	0	0.0	0	0.0	0
Native grass cover	45	63	140.0	0	2	4.4	0	72.2	0
Organic litter	21	1	4.8	0	3.8	18.1	0	11.4	0
Number of large trees (ha)	33	2	6.1	0	4	12.1	0	9.1	0
Coarse woody debris (m/ha)	336	277	82.4	0	61	18.2	0	50.3	0
Non-native plant cover	0	30	30	0	10	10	0		0
			Value	Score		Value	Score	Average	Average Score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.51	0		0.45	0	0.48	0
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			4	0		4.0	0	4.00	0
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			3	0		2.0	0	2.50	0
Site Condition Score				10			10		10
MAX Site Condition Score				*130*			*130*		*130*
Site Condition Score - out of 4									**0.31**
Site Context			Value	Score		Value	Score	Average	Average Score
Size of patch (ha)									
Remnant			1472.9			1472.9		1472.9	
Regrowth			343.5	10		343.5	10	343.5	10
Connectivity									
No. active GHFF camps within 20km			2	2		2	2	2	2
Context									
% GHFF foraging habitat within 20 km			32.1	4		31.7	4	31.9	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			1	2		1	2	1	2
Absence of threats				1			1.5		0
Site Context Score				19			19.5		18
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**0.96**

	Tabooba AU3 - RE 12.8.16 Young Regrowth								
	Benchmark	Site 687-688			Site 756-757			Average %	
Species Stocking Rate (SSR)	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Average Score
Abundance of large trees	33	2	6.1	0	4	12.1	0	9.1	0
Timing of GHFF Biological Resources				0			0		0
Species Stocking Rate Score				0.0			0.0		0.0
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3				**0**			**0**		**0**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced	Tabooba AU2 RE 12.8.16 Young	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.26	1.66	0.31	2.31	1.58	2.11	2.18	0.51	1.62
Site Context Score (out of 3)	1.23	1.10	0.96	1.55	1.42	1.77	1.98	1.21	1.40
Species Stocking Rate Score (out of 3)	2.29	1.72	0.00	2.10	1.80	1.85	1.39	0.00	1.39
Habitat Quality score (out of 10)	*5.78*	*4.48*	*1.27*	*5.96*	*4.80*	*5.73*	*5.55*	*1.71*	4.41
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES			48.10						
Size Weighting	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***1.27***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***1.27***

Table A7.9 **TABOOBA AU3 RE 12.8.16 YOUNG REGROWTH QUALITY WITH OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITH OFFSET: 6

Assessment Unit - Regional Ecosystem	Tabooba AU3 - RE 12.8.16 Young Regrowth								
Site Reference	Benchmark	Site 687-688			Site 756-757			Average %	
	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Average Score
Site Condition									
Recruitment of woody perennial species in EDL	100	66.7	66.7	3	100	100.0	5	83.4	5
Native plant species richness - trees	7	5	71.4	2.5	5	71.4	2.5	71.4	2.5
Native plant species richness - shrubs	7	4	57.1	2.5	3	42.9	2.5	50.0	2.5
Native plant species richness - grasses	7	7	100.0	5	8	114.3	5	107.1	5
Native plant species richness - forbs	29	17	58.6	2.5	27	93.1	5	75.9	2.5
Tree canopy height	20	15	75.0	5	8	40.0	3	57.5	3
Tree subcanopy height	8	5	62.5	3	3	37.5	3	50.0	3
Tree canopy height (average of emergent, canopy, sub-canopy)	14	10	71.4	5	5.5	39.3	5.0	55.4	5
Tree canopy cover (EDL)	41	28	68.3	5	28	68.3	5	68.3	5
Subcanopy cover	17	7	41.2	2	3.5	20.6	2	30.9	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	29	17.5	60.3	5	15.75	54.3	5.0	57.3	5
Shrub canopy cover	4	0	0.0	5	0	0.0	5	0.0	5
Native grass cover	45	63	140.0	5	2	4.4	3	72.2	5
Organic litter	21	1	4.8	3	3.8	18.1	5	11.4	5
Number of large trees (ha)	33	2	6.1	5	4	12.1	5	9.1	5
Coarse woody debris (m/ha)	336	277	82.4	5	61	18.2	2	50.3	5
Non-native plant cover	0	30	30	5	10	10	10	20.0	5
			Value	Score		Value	Score	Average	Average Score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores (/10)			0.51	8		0.45	8	0.48	8
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness (/20)			4	10		4.0	10	4	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness (/20)			3	10		2.0	10	2.50	10
Site Condition Score				81.5			88		85.5
MAX Site Condition Score				*130*			*130*		*130*
Site Condition Score - out of 4									**2.63**
Site Context			Value	Score		Value	Score	Average	Average Score
Size of patch (ha)									
Remnant			1472.9			1472.9		1472.9	
Regrowth			343.5	10		343.5	10	343.5	10
Connectivity									
No. active GHFF camps within 20km			2	2		2	2	2	2
Context									
% GHFF foraging habitat within 20 km			32.1	4		31.7	4	31.9	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			1	2		1	2	1	2
Absence of threats *				9			9		10
Site Context Score				27			27		28
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.50**

	Tabooba AU3 - RE 12.8.16 Young Regrowth								
	Benchmark	Site 687-688			Site 756-757			Average %	
Species Stocking Rate (SSR) **	12.8.16	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	benchmark	Average Score
Abundance of large trees	33	2	6.1	2	4	12.1	2	9.1	2
Timing of GHFF Biological Resources				9.25			9.25		9.25
Species Stocking Rate Score				11.3			11.3		11.3
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3				**1.6875**			**1.6875**		**1.6875**

Final habitat quality score (weighted)	**Tabooba AU1 RE 12.8.16 Remnant**	**Tabooba AU2 RE 12.8.16 Advanced**	**Tabooba AU2 RE 12.8.16 Young**	**Tabooba AU4 RE 12.8.14 Remnant**	**Tabooba AU5 RE 12.8.14 Advanced**	**Greenridge AU4 RE 12.3.20 Remnant**	**Greenridge AU5 RE 12.3.20 Regrowth**	**Greenridge AU6 RE 12.3.20 Non-remnant**	**Average/ Final**
Site Condition score (out of 4)	2.69	2.77	2.63	2.46	2.55	2.69	2.62	2.92	2.67
Site Context Score (out of 3)	1.50	1.50	1.50	1.82	1.82	2.04	2.25	2.14	1.82
Species Stocking Rate Score (out of 3)	2.29	2.32	1.69	2.40	2.10	2.15	1.39	2.10	2.05
Habitat Quality score (out of 10)	*6.48*	*6.58*	*5.82*	*6.68*	*6.48*	*6.88*	*6.25*	*7.17*	6.54
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES			48.10						
Size Weighting	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***5.82***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	*5.82*

Table A7.10 TABOOBA AU4 RE 12.8.14 REMNANT START QUALITY FOR GREY-HEADED FLYING-FOX

START SCORE: 6

Assessment Unit - Regional Ecosystem	Tabooba AU4 - RE 12.8.14 Remnant								
Site Reference	Benchmark	Site 680-681			Site 747-748			Average % benchmark	Average Score
	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	66.7	66.7	3	83.4	5
Native plant species richness - trees	6	8	133.3	5	9	150.0	5	141.7	5
Native plant species richness - shrubs	6	7	116.7	5	4	66.7	2.5	91.7	5
Native plant species richness - grasses	8	9	112.5	5	10	125.0	5	118.8	5
Native plant species richness - forbs	21	26	123.8	5	46	219.0	5	171.4	5
Tree canopy height	22	18	81.8	5	15	68.2	3	75.0	5
Tree subcanopy height	11	10	90.9	5	5	45.5	3	68.2	3
Tree canopy height (average of emergent, canopy, sub-canopy)	16.5	14	84.8	5	10	60.6	3	72.7	5
Tree canopy cover (EDL)	16	35	218.8	3	27	168.8	5	193.8	5
Subcanopy cover	15	14	93.3	5	0	0.0	0	46.7	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	15.5	24.5	158.1	5	13.5	87.1	5	122.6	5
Shrub canopy cover	4	3	75.0	5	1	25.0	3	50.0	5
Native grass cover	58	47	81.0	3	12	20.7	1	50.9	3
Organic litter	30	5	16.7	3	13	43.3	3	30.0	3
Number of large eucalypt trees (ha)	45	22	48.9	5	6	13.3	5	31.1	5
Coarse woody debris (m/ha)	336	128	38.1	2	5	1.5	0	19.8	2
Non-native plant cover	0	10		5	35		10	22.5	5
			Value	**Score**		**Value**	**Score**	**Average**	**Average Score**
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.24	2		0.26	5	0.25	2
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			3.0	10		4	10	3.50	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			2.0	5		2	5	2.00	5
Site Condition Score				75			70.5		75
MAX Site Condition Score				*130*			*130*		*130*
Site Condition Score - out of 4									**2.31**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			125.9			1094.8		610.3	
Regrowth			1690.6	7		721.7	10	1206.1	10
Connectivity									
No. active GHFF camps within 20km			4	4		4	4	4.0	4
Context									
% GHFF foraging habitat within 20 km			31.5	4		32.4	4	32.0	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			3	6		3	6	3.0	6
Absence of threats				5			4.5		5
Site Context Score				26			28.5		29
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.55**

	Tabooba AU4 - RE 12.8.14 Remnant								
	Benchmark	Site 680-681			Site 747-748			Average % benchmark	Average Score
Species Stocking Rate (SSR)	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	45	22	48.9	4	6	13.3	2	31.1	4
Timing of GHFF Biological Resources				10			10		10
Species Stocking Rate Score				14.0			12.0		14.0
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**2.1**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.32	2.18	2.20	2.31	2.22	2.46	2.18	0.51	2.05
Site Context Score (out of 3)	1.23	1.10	1.10	1.55	1.42	1.77	1.98	1.34	1.44
Species Stocking Rate Score (out of 3)	1.99	2.02	1.69	2.10	1.80	1.85	1.39	0.00	1.60
Habitat Quality score (out of 10)	*5.54*	*5.30*	*4.99*	*5.96*	*5.44*	*6.08*	*5.55*	*1.85*	5.09
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES				50.62				0.00	
Size Weighting	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***5.96***	***0.00***	***0.00***	***0.00***	***0.00***	*5.96*

Table A7.11 TABOOBA AU4 RE 12.8.14 REMNANT QUALITY WITHOUT OFFSET FOR GREY-HEADED FLYING-FOX

SCORE WITHOUT OFFSET: 6

Assessment Unit - Regional Ecosystem	Tabooba AU4 - RE 12.8.14 Remnant								
Site Reference	Benchmark	Site 680-681			Site 747-748			Average % benchmark	Average Score
	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	66.7	66.7	3	83.4	5
Native plant species richness - trees	6	8	133.3	5	9	150.0	5	141.7	5
Native plant species richness - shrubs	6	7	116.7	5	4	66.7	2.5	91.7	5
Native plant species richness - grasses	8	9	112.5	5	10	125.0	5	118.8	5
Native plant species richness - forbs	21	26	123.8	5	46	219.0	5	171.4	5
Tree canopy height	22	18	81.8	5	15	68.2	3	75.0	5
Tree subcanopy height	11	10	90.9	5	5	45.5	3	68.2	3
Tree canopy height (average of emergent, canopy, sub-canopy)	16.5	14	84.8	5	10	60.6	3	72.7	5
Tree canopy cover (EDL)	16	35	218.8	3	27	168.8	5	193.8	5
Subcanopy cover	15	14	93.3	5	0	0.0	0	46.7	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	15.5	24.5	158.1	5	13.5	87.1	5	122.6	5
Shrub canopy cover	4	3	75.0	5	1	25.0	3	50.0	5
Native grass cover	58	47	81.0	3	12	20.7	1	50.9	3
Organic litter	30	5	16.7	3	13	43.3	3	30.0	3
Number of large trees (ha)	45	22	48.9	5	6	13.3	5	31.1	5
Coarse woody debris (m/ha)	336	128	38.1	2	5	1.5	0	19.8	2
Non-native plant cover	0	10		5	35		10	22.5	5
			Value	**Score**		**Value**	**Score**	**Average**	**Average Score**
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.24	2		0.26	5	0.25	2
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			3.0	10		4	10	3.50	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			2.0	5		2	5	2.00	5
Site Condition Score				75			70.5		75
MAX Site Condition Score				*130*			*130*		*130*
Site Condition Score - out of 4									**2.31**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average Score**
Size of patch (ha)									
Remnant			125.9			1094.8		610.3	
Regrowth			1690.6	7		721.7	10	1206.1	10
Connectivity									
No. active GHFF camps within 20km			4	4		4	4	4.0	4
Context									
% GHFF foraging habitat within 20 km			31.5	4		32.4	4	32.0	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			3	6		3	6	3.0	6
Absence of threats				4			3.5		5
Site Context Score				25			27.5		29
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.55**

	Tabooba AU4 - RE 12.8.14 Remnant								
	Benchmark	Site 680-681			Site 747-748			Average % benchmark	Average Score
Species Stocking Rate (SSR)	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	45	22	48.9	4	6	13.3	2	31.1	4
Timing of GHFF Biological Resources				10			10		10
Species Stocking Rate Score				14.0			12.0		14.0
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**2.1**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.26	1.66	0.31	2.31	1.58	2.11	2.18	0.51	1.62
Site Context Score (out of 3)	1.23	1.10	0.96	1.55	1.42	1.77	1.98	1.21	1.40
Species Stocking Rate Score (out of 3)	2.29	1.72	0.00	2.10	1.80	1.85	1.39	0.00	1.39
Habitat Quality score (out of 10)	*5.78*	*4.48*	*1.27*	*5.96*	*4.80*	*5.73*	*5.55*	*1.71*	4.41
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES				50.62					
Size Weighting	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***5.96***	***0.00***	***0.00***	***0.00***	***0.00***	*5.96*

Table A7.12 **TABOOBA AU4 RE 12.8.14 REMNANT QUALITY WITH OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITH OFFSET: 7

Assessment Unit - Regional Ecosystem	Tabooba AU4 - RE 12.8.14 Remnant								
Site Reference	Benchmark	Site 680-681			Site 747-748			Average % benchmark	Average Score
	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	66.7	66.7	5	83.4	5
Native plant species richness - trees	6	8	133.3	5	9	150.0	5	141.7	5
Native plant species richness - shrubs	6	7	116.7	5	4	66.7	5	91.7	5
Native plant species richness - grasses	8	9	112.5	5	10	125.0	5	118.8	5
Native plant species richness - forbs	21	26	123.8	5	46	219.0	5	171.4	5
Tree canopy height	22	18	81.8	5	15	68.2	5	75.0	5
Tree subcanopy height	11	10	90.9	5	5	45.5	5	68.2	5
Tree canopy height (average of emergent, canopy, sub-canopy)	16.5	14	84.8	5	10	60.6	5	72.7	5
Tree canopy cover (EDL)	16	35	218.8	3	27	168.8	5	193.8	5
Subcanopy cover	15	14	93.3	5	0	0.0	5	46.7	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	15.5	24.5	158.1	5	13.5	87.1	5	122.6	5
Shrub canopy cover	4	3	75.0	5	1	25.0	5	50.0	5
Native grass cover	58	47	81.0	3	12	20.7	3	50.9	3
Organic litter	30	5	16.7	5	13	43.3	5	30.0	5
Number of large trees (ha)	45	22	48.9	10	6	13.3	5	31.1	5
Coarse woody debris (m/ha)	336	128	38.1	5	5	1.5	5	19.8	5
Non-native plant cover	0	10		5	35		5	22.5	5
			Value	Score		Value	Score	Average	Average Score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores (/10)			0.24	2		0.26	5	0.25	2
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness (/20)			3.0	10		4	10	3.50	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness (/20)			2.0	5		2	5	2.00	5
Site Condition Score				85			83		80
MAX Site Condition Score				*130*			*130*		*130*
Site Condition Score - out of 4									**2.46**
Site Context			Value	Score		Value	Score	Average	Average Score
Size of patch (ha)									
Remnant			125.9			1094.8		610.3	
Regrowth			1690.6	7		721.7	10	1206.1	10
Connectivity									
No. active GHFF camps within 20km			4	4		4	4	4.0	4
Context									
% GHFF foraging habitat within 20 km			31.5	4		32.4	4	32.0	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			3	6		3	6	3.0	6
Absence of threats *				9			9		10
Site Context Score				30			33		34
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.82**

	Tabooba AU4 - RE 12.8.14 Remnant								
Species Stocking Rate (SSR) **	Benchmark	Site 680-681			Site 747-748			Average % benchmark	Average Score
	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	45	22	48.9	6	6	13.3	4	31.1	6
Timing of GHFF Biological Resources				10			10		10
Species Stocking Rate Score				16.0			14.0		16.0
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**2.4**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.69	2.77	2.63	2.46	2.55	2.69	2.62	2.92	2.67
Site Context Score (out of 3)	1.50	1.50	1.50	1.82	1.82	2.04	2.25	2.14	1.82
Species Stocking Rate Score (out of 3)	2.29	2.32	1.69	2.40	2.10	2.15	1.39	2.10	2.05
Habitat Quality score (out of 10)	*6.48*	*6.58*	*5.82*	*6.68*	*6.48*	*6.88*	*6.25*	*7.17*	6.54
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES				50.62					
Size Weighting	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***6.68***	***0.00***	***0.00***	***0.00***	***0.00***	*6.68*

Table A7.13 TABOOBA AU5 RE 12.8.14 ADVANCED REGROWTH START QUALITY FOR GREY-HEADED FLYING-FOX

START SCORE: 5

Assessment Unit - Regional Ecosystem	Tabooba AU5 - 12.8.14 Advanced Regrowth								
Site Reference	Benchmark	Site 736-737			Site 751-752			Average % benchmark	Average Score
	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	6	8	133.3	5	8	133.3	5	133.3	5
Native plant species richness - shrubs	6	9	150.0	5	7	116.7	5	133.3	5
Native plant species richness - grasses	8	9	112.5	5	9	112.5	5	112.5	5
Native plant species richness - forbs	21	27	128.6	5	48	228.6	5	178.6	5
Tree canopy height	22	12	54.5	3	10	45.5	3	50.0	3
Tree subcanopy height	11	6	54.5	3	5	45.5	3	50.0	3
Tree canopy height (average of emergent, canopy, sub-canopy)	16.5	9	54.5	3	7.5	45.5	3	50.0	3
Tree canopy cover (EDL)	16	44	275.0	3	40.5	253.1	3	264.1	3
Subcanopy cover	15	5	33.3	2	10.5	70.0	5	51.7	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	15.5	24.5	158.1	5	25.5	164.5	5	161.3	5
Shrub canopy cover	4	2	50.0	5	1	25.0	3	37.5	3
Native grass cover	58	29	50.0	3	16	27.6	1	38.8	1
Organic litter	30	1	3.3	0	6	20.0	3	11.7	3
Number of large eucalypt trees (ha)	45	10	22.2	5	4	8.9	5	15.6	5
Coarse woody debris (m/ha)	336	176	52.4	5	146	43.5	2	47.9	2
Non-native plant cover	0	20		5	20		5	20.0	5
			Value	Score		Value	Score	Average	Average Score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.31	5		0.21	2	0.26	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			4	10		3	10	3.50	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			2	5		2	5	2	5
Site Condition Score				76			69		72
MAX Site Condition Score				*130*			*130*		*130*
Site Condition Score - out of 4									**2.22**
Site Context			Value	Score		Value	Score	Average	Average Score
Size of patch (ha)									
Remnant			1472.9			1472.9		1472.9	
Regrowth			343.5	10		343.5	10	343.5	10
Connectivity									
No. active GHFF camps within 20km			5	6		2	2	3.5	4
Context									
% GHFF foraging habitat within 20 km			32.2	4		31.9	4	32.1	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			4	8		1	2	2.5	6
Absence of threats				3			3		2.5
Site Context Score				31			21		26.5
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.42**

	Tabooba AU5 - 12.8.14 Advanced Regrowth								
	Benchmark	Site 736-737			Site 751-752			Average % benchmark	Average Score
Species Stocking Rate (SSR)	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	45	10	22.2	2	4	8.9	2	15.6	2
Timing of GHFF Biological Resources				10			10		10
Species Stocking Rate Score				12.0			12.0		12.0
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**1.8**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.32	2.18	2.20	2.31	2.22	2.46	2.18	0.51	2.05
Site Context Score (out of 3)	1.23	1.10	1.10	1.55	1.42	1.77	1.98	1.34	1.44
Species Stocking Rate Score (out of 3)	1.99	2.02	1.69	2.10	1.80	1.85	1.39	0.00	1.60
Habitat Quality score (out of 10)	*5.54*	*5.30*	*4.99*	*5.96*	*5.44*	*6.08*	*5.55*	*1.85*	5.09
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES					19.80			0.00	
Size Weighting	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***5.44***	***0.00***	***0.00***	***0.00***	***5.44***

Table A7.14 TABOOBA AU5 RE 12.8.14 ADVANCED OFFSET QUALITY WITHOUT OFFSET FOR GREY-HEADED FLYING-FOX

SCORE WITHOUT OFFSET: 5

Assessment Unit - Regional Ecosystem	Tabooba AU5 - 12.8.14 Advanced Regrowth								
Site Reference	Benchmark	Site 736-737			Site 751-752			Average % benchmark	Average Score
	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	6	8	133.3	5	8	133.3	5	133.3	5
Native plant species richness - shrubs	6	9	150.0	2.5	7	116.7	2.5	133.3	2.5
Native plant species richness - grasses	8	9	112.5	2.5	9	112.5	2.5	112.5	2.5
Native plant species richness - forbs	21	27	128.6	2.5	48	228.6	2.5	178.6	2.5
Tree canopy height	22	12	54.5	3	10	45.5	3	50.0	3
Tree subcanopy height	11	6	54.5	3	5	45.5	3	50.0	0
Tree canopy height (average of emergent, canopy, sub-canopy)	16.5	9	54.5	3	7.5	45.5	3	50.0	3
Tree canopy cover (EDL)	16	44	275.0	5	40.5	253.1	5	264.1	5
Subcanopy cover	15	5	33.3	2	10.5	70.0	2	51.7	2
Tree canopy cover (average of emergent, canopy, sub-canopy)	15.5	24.5	158.1	5	25.5	164.5	5	161.3	2
Shrub canopy cover	4	2	50.0	0	1	25.0	0	37.5	0
Native grass cover	58	29	50.0	3	16	27.6	1	38.8	1
Organic litter	30	1	3.3	0	6	20.0	3	11.7	3
Number of large trees (ha)	45	10	22.2	5	4	8.9	5	15.6	5
Coarse woody debris (m/ha)	336	176	52.4	5	146	43.5	2	47.9	2
Non-native plant cover	0	20		3	20		3	20.0	3
			Value	Score		Value	Score	Average	Average Score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.31	5		0.21	2	0.26	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			4	5		3	5	3.50	5
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			2	5		2	5	2.00	5
Site Condition Score				56.5			51.5		51.5
MAX Site Condition Score				*130*			*130*		*130*
Site Condition Score - out of 4									**1.58**
Site Context			Value	Score		Value	Score	Average	Average Score
Size of patch (ha)									
Remnant			1472.9			1472.9		1472.9	
Regrowth			343.5	10		343.5	10	343.5	10
Connectivity									
No. active GHFF camps within 20km			5	6		2	2	3.5	4
Context									
% GHFF foraging habitat within 20 km			32.2	4		31.9	4	32.1	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			4	8		1	2	2.5	6
Absence of threats				1.5			1.5		2.5
Site Context Score				29.5			19.5		26.5
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.42**

	Tabooba AU5 - 12.8.14 Advanced Regrowth								
	Benchmark	Site 736-737			Site 751-752			Average % benchmark	Average Score
Species Stocking Rate (SSR)	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	45	10	22.2	2	4	8.9	2	15.6	2
Timing of GHFF Biological Resources				10			10		10
Species Stocking Rate Score				12.0			12.0		12.0
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**1.8**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.26	1.66	0.31	2.31	1.58	2.11	2.18	0.51	1.62
Site Context Score (out of 3)	1.23	1.10	0.96	1.55	1.42	1.77	1.98	1.21	1.40
Species Stocking Rate Score (out of 3)	2.29	1.72	0.00	2.10	1.80	1.85	1.39	0.00	1.39
Habitat Quality score (out of 10)	*5.78*	*4.48*	*1.27*	*5.96*	*4.80*	*5.73*	*5.55*	*1.71*	4.41
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES					19.80				
Size Weighting	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***4.80***	***0.00***	***0.00***	***0.00***	***4.80***

Table A7.15 **TABOOBA AU5 RE 12.8.14 ADVANCED REGROWTH QUALITY WITH OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITH OFFSET: 6

Assessment Unit - Regional Ecosystem	Tabooba AU5 - 12.8.14 Advanced Regrowth								
Site Reference	Benchmark	Site 736-737			Site 751-752			Average % benchmark	Average Score
	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	6	8	133.3	5	8	133.3	5	133.3	5
Native plant species richness - shrubs	6	9	150.0	5	7	116.7	5	133.3	5
Native plant species richness - grasses	8	9	112.5	5	9	112.5	5	112.5	5
Native plant species richness - forbs	21	27	128.6	5	48	228.6	5	178.6	5
Tree canopy height	22	12	54.5	5	10	45.5	5	50.0	5
Tree subcanopy height	11	6	54.5	5	5	45.5	5	50.0	5
Tree canopy height (average of emergent, canopy, sub-canopy)	16.5	9	54.5	5	7.5	45.5	5	50.0	5
Tree canopy cover (EDL)	16	44	275.0	3	40.5	253.1	3	264.1	3
Subcanopy cover	15	5	33.3	5	10.5	70.0	5	51.7	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	15.5	24.5	158.1	5	25.5	164.5	5	161.3	5
Shrub canopy cover	4	2	50.0	5	1	25.0	5	37.5	5
Native grass cover	58	29	50.0	3	16	27.6	3	38.8	3
Organic litter	30	1	3.3	5	6	20.0	5	11.7	5
Number of large trees (ha)	45	10	22.2	10	4	8.9	5	15.6	5
Coarse woody debris (m/ha)	336	176	52.4	5	146	43.5	5	47.9	5
Non-native plant cover	0	20		5	20		5	20.0	5
			Value	Score		Value	Score	Average	Average Score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores (/10)			0.31	5		0.21	2	0.26	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness (/20)			4	10		3	10	3.50	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness (/20)			2	5		2	5	2.00	5
Site Condition Score				88			80		83
MAX Site Condition Score				*130*			*130*		*130*
Site Condition Score - out of 4									**2.55**
Site Context			Value	Score		Value	Score	Average	Average Score
Size of patch (ha)									
Remnant			1472.9			1472.9		1472.9	
Regrowth			343.5	10		343.5	10	343.5	10
Connectivity									
No. active GHFF camps within 20km			5	6		2	2	3.5	4
Context									
% GHFF foraging habitat within 20 km			32.2	4		31.9	4	32.1	4
Ecological Corridors				0			0		0
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			4	8		1	2	2.5	6
Absence of threats *				9			9		10
Site Context Score				37			27		34
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.82**

	Tabooba AU5 - 12.8.14 Advanced Regrowth								
	Benchmark	Site 736-737			Site 751-752			Average % benchmark	Average Score
Species Stocking Rate (SSR) **	12.8.14	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	45	10	22.2	6	4	8.9	4	15.6	4
Timing of GHFF Biological Resources				10			10		10
Species Stocking Rate Score				16.0			14.0		14.0
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**2.10**

Final habitat quality score (weighted)	**Tabooba AU1 RE 12.8.16 Remnant**	**Tabooba AU2 RE 12.8.16 Advanced Regrowth**	**Tabooba AU2 RE 12.8.16 Young Regrowth**	**Tabooba AU4 RE 12.8.14 Remnant**	**Tabooba AU5 RE 12.8.14 Advanced Regrowth**	**Greenridge AU4 RE 12.3.20 Remnant**	**Greenridge AU5 RE 12.3.20 Regrowth**	**Greenridge AU6 RE 12.3.20 Non-remnant**	**Average/ Final**
Site Condition score (out of 4)	2.69	2.77	2.63	2.46	2.55	2.69	2.62	2.92	2.67
Site Context Score (out of 3)	1.50	1.50	1.50	1.82	1.82	2.04	2.25	2.14	1.82
Species Stocking Rate Score (out of 3)	2.29	2.32	1.69	2.40	2.10	2.15	1.39	2.10	2.05
Habitat Quality score (out of 10)	*6.48*	*6.58*	*5.82*	*6.68*	*6.48*	*6.88*	*6.25*	*7.17*	6.54
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES					19.80				
Size Weighting	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***6.48***	***0.00***	***0.00***	***0.00***	*6.48*

Table A7.16 **GREENRIDGE AU4 RE 12.3.20 REMNANT START QUALITY FOR GREY-HEADED FLYING-FOX**

START SCORE: 6

Assessment Unit - Regional Ecosystem	Greenridge AU4 - RE 12.3.20 Remnant											
Site Reference	Benchmark	Site 931-932			Site 964-965			Site 966-967			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition												
Recruitment of woody perennial species in EDL	100	50	50.0	3	100	100.0	5	100	100	5	83.3	5
Native plant species richness - trees	4	3	75.0	2.5	2	50.0	2.5	7	175	5	100.0	5
Native plant species richness - shrubs	4	1	25.0	2.5	2	50.0	2.5	4	100	5	58.3	2.5
Native plant species richness - grasses	2	3	150.0	5	1	50.0	2.5	4	200	5	133.3	5
Native plant species richness - forbs	8	4	50.0	2.5	6	75.0	2.5	5	62.5	2.5	62.5	2.5
Tree canopy height	16	18	112.5	5	15	93.8	5	25	156.25	5	120.8	5
Tree subcanopy height	8	5	62.5	3	8	100.0	5	15	187.5	5	116.7	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	11.5	95.8	5	11.5	95.8	5	20	166.7	5	119.4	5
Tree canopy cover (EDL)	70	99.5	142.1	5	73.6	105.1	5	83	118.6	5	122.0	5
Subcanopy cover	20	1.5	7.5	0	8	40.0	2	34	170	5	72.5	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	50.5	112.2	5	40.8	90.7	5	58.5	130.0	5	111.0	5
Shrub canopy cover	15	0.5	3.3	0	7	46.7	3	11	73.3	5	41.1	3
Native grass cover	20	16.2	81.0	3	31.0	155.0	5	61.8	309	5	181.7	5
Organic litter	30	47	156.7	5	38	126.7	5	30	100	5	127.8	5
Number of large eucalypt trees (ha)	165	124	75.2	10	130	78.8	10	58	35.2	5	63.0	10
Coarse woody debris (m/ha)	890	260	29.2	2	315.0	35.4	2	165	18.5	2	27.7	2
Non-native plant cover	0	1		10	0		10	5		5	2.0	10
			Value	Score		Value	Score		Value	Score	Average	Average score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.29	5		0.44	5		0.44	5	0.39	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			1.0	5		1.0	5		4	10	2	5
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			1.0	5		1.0	5		3	10	1.7	5
Site Condition Score				70.5			75			84.5		80.0
MAX Site Condition Score				*130*			*130*			*130*		*130.0*
Site Condition Score - out of 4												**2.5**
Site Context			**Value**	**Score**		**Value**	**Score**		**Value**	**Score**	**Average**	**Average score**
Size of patch (ha)												
Remnant			781.3			781.3			781.3		781.3	
Regrowth			105.0	10		105.0	10		105.0	10	105.0	10
Connectivity												
No. active GHFF camps within 20km			7.0	8		7.0	8		6	6	6.7	8
Context												
% GHFF foraging habitat within 20 km			17.2	2		17.1	2		17.1	2	17.1	2
Ecological Corridors				6			6			6		6
Role of site location to species overall population in the state												
No. of active ≥ level three GHFF camps within a 20km			1.0	2		1.0	2		1	2	1.0	2
Absence of threats				6			6			3.5		5
Site Context Score				34			34			29.5		33.00
MAX Site Context Score				*56*			*56*			*56*		*56*
Site Context Score - out of 3												**1.77**

	Greenridge AU4 - RE 12.3.20 Remnant											
	Benchmark	Site 931-932			Site 964-965			Site 966-967			Average % benchmark	Average Score
Species Stocking Rate (SSR)	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	165	124.0	75.2	6.0	130	78.8	8.0	58	35.2	4	63.05	6
Timing of GHFF Biological Resources				4.5			4.5			10		6.33
Species Stocking Rate Score				10.5			12.5			14.0		12.3
MAX Species Stocking Rate Score				*20*			*20*			*20*		*20*
SRR Score - out of 3												**1.85**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.32	2.18	2.20	2.31	2.22	2.46	2.18	0.51	2.05
Site Context Score (out of 3)	1.23	1.10	1.10	1.55	1.42	1.77	1.98	1.34	1.44
Species Stocking Rate Score (out of 3)	1.99	2.02	1.69	2.10	1.80	1.85	1.39	0.00	1.60
Habitat Quality score (out of 10)	*5.54*	*5.30*	*4.99*	*5.96*	*5.44*	*6.08*	*5.55*	*1.85*	5.09
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES						28.70		0.00	
Size Weighting	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***6.08***	***0.00***	***0.00***	*6.08*

Table A7.17 **GREENRIDGE AU4 RE 12.3.20 REMNANT QUALITY WITHOUT OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITHOUT OFFSET: 6

Assessment Unit - Regional Ecosystem	Greenridge AU4 - RE 12.3.20 Remnant											
Site Reference	Benchmark	Site 931-932			Site 964-965			Site 966-967			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition												
Recruitment of woody perennial species in EDL	100	50	50.0	3	100	100.0	3	100	100	3	83.3	3
Native plant species richness - trees	4	3	75.0	2.5	2	50.0	2.5	7	175	5	100.0	5
Native plant species richness - shrubs	4	1	25.0	2.5	2	50.0	2.5	4	100	5	58.3	2.5
Native plant species richness - grasses	2	3	150.0	2.5	1	50.0	2.5	4	200	2.5	133.3	2.5
Native plant species richness - forbs	8	4	50.0	0	6	75.0	2.5	5	62.5	2.5	62.5	2.5
Tree canopy height	16	18	112.5	5	15	93.8	5	25	156.25	5	120.8	5
Tree subcanopy height	8	5	62.5	5	8	100.0	5	15	187.5	5	116.7	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	11.5	95.8	5	11.5	95.8	5	20	166.7	5	119.4	5
Tree canopy cover (EDL)	70	99.5	142.1	5	73.6	105.1	5	83	118.6	5	122.0	5
Subcanopy cover	20	1.5	7.5	2	8	40.0	5	34	170	5	72.5	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	50.5	112.2	5	40.8	90.7	5	58.5	130.0	5	111.0	5
Shrub canopy cover	15	0.5	3.3	0	7	46.7	3	11	73.3	5	41.1	3
Native grass cover	20	16.2	81.0	3	31.0	155.0	5	61.8	309	5	181.7	5
Organic litter	30	47	156.7	3	38	126.7	3	30	100	5	127.8	3
Number of large trees (ha)	165	124	75.2	10	130	78.8	10	58	35.2	10	63.0	10
Coarse woody debris (m/ha)	890	260	29.2	2	315.0	35.4	2	165	18.5	2	27.7	2
Non-native plant cover	0	1		5	0		5	5		3		5
			Value	Score		Value	Score		Value	Score	Average	Average Score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.3	5		0.4	5		0.4	5	0.4	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			1.0	5		1.0	5		4	10	2.0	5
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			1.0	5		1.0	5		3	10	1.7	5
Site Condition Score				58.5			66			83		68.5
MAX Site Condition Score				*130*			*130*			*130*		*130.0*
Site Condition Score - out of 4												**2.1**
Site Context			Value	Score		Value	Score		Value	Score	Average	Average Score
Size of patch (ha)												
Remnant			781.3			781.3			781.3		781.3	
Regrowth			105.0	10		105.0	10		105.0	10	105.0	10
Connectivity												
No. active GHFF camps within 20km			7.0	8		7.0	8		6	6	6.7	8
Context												
% GHFF foraging habitat within 20 km			17.2	2		17.1	2		17.1	2	17.1	2
Ecological Corridors				6			6			6		6
Role of site location to species overall population in the state												
No. of active ≥ level three GHFF camps within a 20km			1.0	2		1.0	2		1	2	1.0	2
Absence of threats				5			5			2.5		5
Site Context Score				33			33			28.5		33.0
MAX Site Context Score				*56*			*56*			*56*		*56*
Site Context Score - out of 3												**1.77**

	Greenridge AU4 - RE 12.3.20 Remnant											
Species Stocking Rate (SSR)	Benchmark	Site 931-932			Site 964-965			Site 966-967			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	165	124.0	75.2	8	130	78.8	8.0	58	35.2	6	63.05	6
Timing of GHFF Biological Resources				4.5			4.5			10		6.33
Species Stocking Rate Score				12.5			12.5			16.0		12.3
MAX Species Stocking Rate Score				*20*			*20*			*20*		*20*
SRR Score - out of 3												**1.85**

Final habitat quality score (weighted)	**Tabooba AU1 RE 12.8.16 Remnant**	**Tabooba AU2 RE 12.8.16 Advanced Regrowth**	**Tabooba AU2 RE 12.8.16 Young Regrowth**	**Tabooba AU4 RE 12.8.14 Remnant**	**Tabooba AU5 RE 12.8.14 Advanced Regrowth**	**Greenridge AU4 RE 12.3.20 Remnant**	**Greenridge AU5 RE 12.3.20 Regrowth**	**Greenridge AU6 RE 12.3.20 Non-remnant**	**Average/ Final**
Site Condition score (out of 4)	2.26	1.66	0.31	2.31	1.58	2.11	2.18	0.51	1.62
Site Context Score (out of 3)	1.23	1.10	0.96	1.55	1.42	1.77	1.98	1.21	1.40
Species Stocking Rate Score (out of 3)	2.29	1.72	0.00	2.10	1.80	1.85	1.39	0.00	1.39
Habitat Quality score (out of 10)	*5.78*	*4.48*	*1.27*	*5.96*	*4.80*	*5.73*	*5.55*	*1.71*	4.41
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES						28.70			
Size Weighting	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***5.73***	***0.00***	***0.00***	***5.73***

Table A7.18 **GREENRIDGE AU4 RE 12.3.20 REMNANT QUALITY WITH OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITH OFFSET: 7

Assessment Unit - Regional Ecosystem	Greenridge AU4 - RE 12.3.20 Remnant											
Site Reference	Benchmark	Site 931-932			Site 964-965			Site 966-967			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition												
Recruitment of woody perennial species in EDL	100	50	50.0	5	100	100.0	5	100	100	5	83.3	5
Native plant species richness - trees	4	3	75.0	2.5	2	50.0	2.5	7	175	5	100.0	5
Native plant species richness - shrubs	4	1	25.0	2.5	2	50.0	2.5	4	100	5	58.3	2.5
Native plant species richness - grasses	2	3	150.0	5	1	50.0	5	4	200	5	133.3	5
Native plant species richness - forbs	8	4	50.0	2.5	6	75.0	2.5	5	62.5	5	62.5	5
Tree canopy height	16	18	112.5	5	15	93.8	5	25	156.25	5	120.8	5
Tree subcanopy height	8	5	62.5	5	8	100.0	5	15	187.5	5	116.7	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	11.5	95.8	5	11.5	95.8	5	20	166.7	5	119.4	5
Tree canopy cover (EDL)	70	99.5	142.1	5	73.6	105.1	5	83	118.6	5	122.0	5
Subcanopy cover	20	1.5	7.5	2	8	40.0	5	34	170	5	72.5	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	50.5	112.2	5	40.8	90.7	5	58.5	130.0	5	111.0	5
Shrub canopy cover	15	0.5	3.3	3	7	46.7	5	11	73.3	5	41.1	5
Native grass cover	20	16.2	81.0	5	31.0	155.0	5	61.8	309	5	181.7	5
Organic litter	30	47	156.7	5	38	126.7	5	30	100	5	127.8	5
Number of large trees (ha)	165	124	75.2	10	130	78.8	10	58	35.2	10	63.0	10
Coarse woody debris (m/ha)	890	260	29.2	5	315.0	35.4	5	165	18.5	5	27.7	5
Non-native plant cover	0	1		10	0		10	5		10	2.0	10
			Value	Score		Value	Score		Value	Score	Average	Average Score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores (/10)			0.3	5		0.4	5		0.4	5	0.4	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness (/20)			1.0	5		1.0	5		4	10	2.0	5
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness (/20)			1.0	5		1.0	5		3	10	1.7	5
Site Condition Score				80.5			82.5			100		87.5
MAX Site Condition Score				*130*			*130*			*130*		*130.0*
Site Condition Score - out of 4												**2.7**
Site Context			Value	Score		Value	Score		Value	Score	Average	Average Score
Size of patch (ha)												
Remnant			781.3			781.3			781.3		781.3	
Regrowth			105.0	10		105.0	10		105.0	10	105.0	10
Connectivity												
No. active GHFF camps within 20km			7.0	8		7.0	8		6	6	6.7	8
Context												
% GHFF foraging habitat within 20 km			17.2	2		17.1	2		17.1	2	17.1	2
Ecological Corridors				6			6			6		6
Role of site location to species overall population in the state												
No. of active ≥ level three GHFF camps within a 20km			1.0	2		1.0	2		1	2	1.0	2
Absence of threats *				10			10			10		10
Site Context Score				38			38			36		38.0
MAX Site Context Score				*56*			*56*			*56*		*56*
Site Context Score - out of 3												**2.04**

	Greenridge AU4 - RE 12.3.20 Remnant											
	Benchmark	Site 931-932			Site 964-965			Site 966-967			Average % benchmark	Average Score
Species Stocking Rate (SSR) **	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	165	124.0	75.2	8.0	130	78.8	8.0	58	35.2	5	63.05	8
Timing of GHFF Biological Resources				4.5			4.5			10		6.33
Species Stocking Rate Score				12.5			12.5			16.0		14.3
MAX Species Stocking Rate Score				*20*			*20*			*20*		*20*
SRR Score - out of 3												**2.15**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.69	2.77	2.63	2.46	2.55	2.69	2.62	2.92	2.67
Site Context Score (out of 3)	1.50	1.50	1.50	1.82	1.82	2.04	2.25	2.14	1.82
Species Stocking Rate Score (out of 3)	2.29	2.32	1.69	2.40	2.10	2.15	1.39	2.10	2.05
Habitat Quality score (out of 10)	*6.48*	*6.58*	*5.82*	*6.68*	*6.48*	*6.88*	*6.25*	*7.17*	6.54
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES						28.70			
Size Weighting	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***6.88***	***0.00***	***0.00***	***6.88***

Table A7.19 **GREENRIDGE AU5 RE 12.3.20 REGROWTH START QUALITY FOR GREY-HEADED FLYING-FOX**

START SCORE: 6

Assessment Unit - Regional Ecosystem	Greenridge AU5 - RE 12.3.20 Regrowth								
Site Reference	Benchmark	Site 974-975			Site 923-924			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	4	8	200.0	5	4	100.0	5	150.0	5
Native plant species richness - shrubs	4	4	100.0	5	5	125.0	5	112.5	5
Native plant species richness - grasses	2	5	250.0	5	3	150.0	5	200.0	5
Native plant species richness - forbs	8	10	125.0	5	7	87.5	2.5	106.3	5
Tree canopy height	16	11	68.8	3	6	37.5	3	53.1	3
Tree subcanopy height	8	7	87.5	5	3	37.5	3	62.5	3
Tree canopy height (average of emergent, canopy, sub-canopy)	12	9	75.0	5	4.5	37.5	3	56.3	3
Tree canopy cover (EDL)	70	57	81.4	5	44.5	63.6	5	72.5	5
Subcanopy cover	20	22	110.0	5	3.5	17.5	2	63.8	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	39.5	87.8	5	24	53.3	5	70.6	5
Shrub canopy cover	15	5.5	36.7	3	2	13.3	3	25.0	3
Native grass cover	20	9.2	46.0	1	37	185.0	5	115.5	5
Organic litter	30	85.2	284.0	3	14	46.7	3	165.3	5
Number of large eucalypt trees (ha)	165	8	4.8	5	10	6.1	5	5.5	5
Coarse woody debris (m/ha)	890	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	5		5	10		5	7.5	5
			Value	Score		Value	Score	Average	Average score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.11	2		0.44	5	0.28	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			1	5		2	5	1.5	5
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			1	5		2	5	1.5	5
Site Condition Score				64			66.5		71.0
MAX Site Condition Score				*130*			*130*		*130.0*
Site Condition Score - out of 4									**2.2**
Site Context			Value	Score		Value	Score	Average	Average score
Size of patch (ha)									
Remnant			654.84			0		327.4	
Regrowth			33.5	10		1.09	0	17.27	10
Connectivity									
No. active GHFF camps within 20km			9	10		8	8	8.5	10
Context									
% GHFF foraging habitat within 20 km			17.51	2		18	2	17.76	2
Ecological Corridors				6			6		6
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			2	4		2	4	2	4
Absence of threats				5			5		5
Site Context Score				37			25		37.00
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.98**

	Greenridge AU5 - RE 12.3.20 Regrowth								
	Benchmark	Site 974-975			Site 923-924			Average % benchmark	Average Score
Species Stocking Rate (SSR)	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	165	8	4.8	2	10	6.1	2	5.5	2
Timing of GHFF Biological Resources				4.5			10		7.25
Species Stocking Rate Score				6.5			12.0		9.3
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**1.39**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.32	2.18	2.20	2.31	2.22	2.46	2.18	0.51	2.05
Site Context Score (out of 3)	1.23	1.10	1.10	1.55	1.42	1.77	1.98	1.34	1.44
Species Stocking Rate Score (out of 3)	1.99	2.02	1.69	2.10	1.80	1.85	1.39	0.00	1.60
Habitat Quality score (out of 10)	*5.54*	*5.30*	*4.99*	*5.96*	*5.44*	*6.08*	*5.55*	*1.85*	5.09
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES							4.77	0.00	
Size Weighting	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***5.55***	***0.00***	***5.55***

Table A7.20 **GREENRIDGE AU5 RE 12.3.20 REGROWTH QUALITY WITHOUT OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITHOUT OFFSET: 6

Assessment Unit - Regional Ecosystem	Greenridge AU5 - RE 12.3.20 Regrowth								
Site Reference	Benchmark	Site 974-975			Site 923-924			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	4	8	200.0	5	4	100.0	5	150.0	5
Native plant species richness - shrubs	4	4	100.0	5	5	125.0	5	112.5	5
Native plant species richness - grasses	2	5	250.0	5	3	150.0	5	200.0	5
Native plant species richness - forbs	8	10	125.0	5	7	87.5	2.5	106.3	5
Tree canopy height	16	11	68.8	5	6	37.5	3	53.1	5
Tree subcanopy height	8	7	87.5	5	3	37.5	3	62.5	3
Tree canopy height (average of emergent, canopy, sub-canopy)	12	9	75.0	5	4.5	37.5	3	56.3	5
Tree canopy cover (EDL)	70	57	81.4	5	44.5	63.6	5	72.5	5
Subcanopy cover	20	22	110.0	5	3.5	17.5	2	63.8	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	39.5	87.8	5	24	53.3	5	70.6	5
Shrub canopy cover	15	5.5	36.7	3	2	13.3	3	25.0	3
Native grass cover	20	9.2	46.0	1	37	185.0	5	115.5	5
Organic litter	30	85.2	284.0	3	14	46.7	3	165.3	5
Number of large trees (ha)	165	8	4.8	5	10	6.1	5	5.5	5
Coarse woody debris (m/ha)	890	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	5		3	10		3	7.5	3
			Value	Score		Value	Score	Average	Average score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0.11	2		0.44	5	0.28	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			1	5		2	5	1.5	5
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			1	5		2	5	1.5	5
Site Condition Score				62			64.5		71.0
MAX Site Condition Score				*130*			*130*		*130.0*
Site Condition Score - out of 4									**2.2**
Site Context			Value	Score		Value	Score	Average	Average score
Size of patch (ha)									
Remnant			654.84			0		327.4	
Regrowth			33.5	10		1.09	0	17.27	10
Connectivity									
No. active GHFF camps within 20km			9	10		8	8	8.5	10
Context									
% GHFF foraging habitat within 20 km			17.51	2		18	2	17.76	2
Ecological Corridors				6			6		6
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			2	4		2	4	2	4
Absence of threats				4			4		5
Site Context Score				36			24		37.00
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.98**

	Greenridge AU5 - RE 12.3.20 Regrowth								
	Benchmark	Site 974-975			Site 923-924			Average % benchmark	Average Score
Species Stocking Rate (SSR)	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	165	8	4.8	2	10	6.1	2	5.5	2
Timing of GHFF Biological Resources				4.5			10		7.25
Species Stocking Rate Score				6.5			12.0		9.3
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**1.39**

Final habitat quality score (weighted)	**Tabooba AU1 RE 12.8.16 Remnant**	**Tabooba AU2 RE 12.8.16 Advanced Regrowth**	**Tabooba AU2 RE 12.8.16 Young Regrowth**	**Tabooba AU4 RE 12.8.14 Remnant**	**Tabooba AU5 RE 12.8.14 Advanced Regrowth**	**Greenridge AU4 RE 12.3.20 Remnant**	**Greenridge AU5 RE 12.3.20 Regrowth**	**Greenridge AU6 RE 12.3.20 Non-remnant**	**Average/ Final**
Site Condition score (out of 4)	2.26	1.66	0.31	2.31	1.58	2.11	2.18	0.51	1.62
Site Context Score (out of 3)	1.23	1.10	0.96	1.55	1.42	1.77	1.98	1.21	1.40
Species Stocking Rate Score (out of 3)	2.29	1.72	0.00	2.10	1.80	1.85	1.39	0.00	1.39
Habitat Quality score (out of 10)	*5.78*	*4.48*	*1.27*	*5.96*	*4.80*	*5.73*	*5.55*	*1.71*	4.41
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES							4.77		
Size Weighting	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***5.55***	***0.00***	***5.55***

Table A7.21 **GREENRIDGE AU5 RE 12.3.20 REGROWTH QUALITY WITH OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITH OFFSET: 6

Assessment Unit - Regional Ecosystem	Greenridge AU5 - RE 12.3.20 Regrowth								
Site Reference	Benchmark	Site 974-975			Site 923-924			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	100	100.0	5	100	100.0	5	100.0	5
Native plant species richness - trees	4	8	200.0	5	4	100.0	5	150.0	5
Native plant species richness - shrubs	4	4	100.0	5	5	125.0	5	112.5	5
Native plant species richness - grasses	2	5	250.0	5	3	150.0	5	200.0	5
Native plant species richness - forbs	8	10	125.0	5	7	87.5	5	106.3	5
Tree canopy height	16	11	68.8	5	6	37.5	5	53.1	5
Tree subcanopy height	8	7	87.5	5	3	37.5	3	62.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	9	75.0	5	4.5	37.5	3	56.3	5
Tree canopy cover (EDL)	70	57	81.4	5	44.5	63.6	5	72.5	5
Subcanopy cover	20	22	110.0	5	3.5	17.5	5	63.8	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	39.5	87.8	5	24	53.3	5	70.6	5
Shrub canopy cover	15	5.5	36.7	5	2	13.3	5	25.0	5
Native grass cover	20	9.2	46.0	5	37	185.0	5	115.5	5
Organic litter	30	85.2	284.0	5	14	46.7	5	165.3	5
Number of large trees (ha)	165	8	4.8	5	10	6.1	5	5.5	5
Coarse woody debris (m/ha)	890	0	0.0	5	0	0.0	5	0.0	5
Non-native plant cover	0	5		10	10		10	7.5	10
			Value	**Score**		**Value**	**Score**	**Average**	**Average score**
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores (/10)			0.11	2		0.44	5	0.28	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness (/20)			1	5		2	5	1.5	5
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness (/20)			1	5		2	5	1.5	5
Site Condition Score				82			83		85.0
MAX Site Condition Score				*130*			*130*		*130.0*
Site Condition Score - out of 4									**2.6**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average score**
Size of patch (ha)									
Remnant			654.84			0		327.4	
Regrowth			33.5	10		1.09	0	17.27	10
Connectivity									
No. active GHFF camps within 20km			9	10		8	8	8.5	10
Context									
% GHFF foraging habitat within 20 km			17.51	2		18	2	17.76	2
Ecological Corridors				6			6		6
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			2	4		2	4	2	4
Absence of threats *				10			10		10
Site Context Score				42			30		42.00
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**2.25**

	Greenridge AU5 - RE 12.3.20 Regrowth								
	Benchmark	Site 974-975			Site 923-924			Average % benchmark	Average Score
Species Stocking Rate (SSR) **	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	165	8	4.8	2	10	6.1	2	5.5	2
Timing of GHFF Biological Resources				4.5			10		7.25
Species Stocking Rate Score				6.5			12.0		9.3
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**1.39**

Final habitat quality score (weighted)	**Tabooba AU1 RE 12.8.16 Remnant**	**Tabooba AU2 RE 12.8.16 Advanced Regrowth**	**Tabooba AU2 RE 12.8.16 Young Regrowth**	**Tabooba AU4 RE 12.8.14 Remnant**	**Tabooba AU5 RE 12.8.14 Advanced Regrowth**	**Greenridge AU4 RE 12.3.20 Remnant**	**Greenridge AU5 RE 12.3.20 Regrowth**	**Greenridge AU6 RE 12.3.20 Non-remnant**	**Average/ Final**
Site Condition score (out of 4)	2.69	2.77	2.63	2.46	2.55	2.69	2.62	2.92	2.67
Site Context Score (out of 3)	1.50	1.50	1.50	1.82	1.82	2.04	2.25	2.14	1.82
Species Stocking Rate Score (out of 3)	2.29	2.32	1.69	2.40	2.10	2.15	1.39	2.10	2.05
Habitat Quality score (out of 10)	*6.48*	*6.58*	*5.82*	*6.68*	*6.48*	*6.88*	*6.25*	*7.17*	6.54
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES							4.77		
Size Weighting	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***6.25***	***0.00***	***6.25***

Table A7.22 GREENRIDGE AU6 RE 12.3.20 NON-REMNANT START QUALITY FOR GREY-HEADED FLYING-FOX

START SCORE: 2

Assessment Unit - Regional Ecosystem	Greenridge AU6 - RE 12.3.20 Non-remnant								
Site Reference	Benchmark	Site 972-973			Site 960-961			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	0	0.0	0	100	100.0	5	50.0	3
Native plant species richness - trees	4	0	0.0	0	1	25.0	2.5	12.5	0
Native plant species richness - shrubs	4	0	0.0	0	2	50.0	2.5	25.0	2.5
Native plant species richness - grasses	2	0	0.0	0	1	50.0	2.5	25.0	2.5
Native plant species richness - forbs	8	3	37.5	2.5	5	62.5	2.5	50.0	2.5
Tree canopy height	16	0	0.0	0	8	50.0	3	25.0	3
Tree subcanopy height	8	0	0.0	0	2	25.0	3	12.5	0
Tree canopy height (average of emergent, canopy, sub-canopy)	12	0	0.0	0	5	41.7	3	20.8	0
Tree canopy cover (EDL)	70	0	0.0	0	12.5	17.9	2	8.9	0
Subcanopy cover	20	0	0.0	0	0	0.0	0	0.0	0
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	0.0	0	6.25	13.9	2	6.9	0
Shrub canopy cover	15	0	0.0	0	1	6.7	0	3.3	0
Native grass cover	20	0	0.0	0	19	95.0	5	47.5	1
Organic litter	30	20.8	69.3	5	20	66.7	5	68.0	5
Number of large eucalypt trees (ha)	165	0	0.0	0	0	0.0	0	0.0	0
Coarse woody debris (m/ha)	890	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	95		0	95		0	95.0	0
			Value	Score		Value	Score	Average	Average score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0	0		0	0	0.0	0
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			0	0		0	0	0.0	0
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			0	0		0	0	0.0	0
Site Condition Score				7.5			30		16.5
MAX Site Condition Score				*130*			*130*		*130.0*
Site Condition Score - out of 4									**0.5**
Site Context			Value	Score		Value	Score	Average	Average score
Size of patch (ha)									
Remnant			0			0		0.0	
Regrowth			0	0		0	0	0.0	0
Connectivity									
No. active GHFF camps within 20km			9	10		6	6	7.5	8
Context									
% GHFF foraging habitat within 20 km			17.43	2		15.81	2	16.62	2
Ecological Corridors				6			6		6
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			3	6		1	2	2	4
Absence of threats				4			4		5
Site Context Score				28			20		25.00
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.34**

	Greenridge AU6 - RE 12.3.20 Non-remnant								
	Benchmark	Site 972-973			Site 960-961			Average % benchmark	Average Score
Species Stocking Rate (SSR)	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	165	0.0	0.0	0.0	0	0.0	0.0	0.00	0
Timing of GHFF Biological Resources				0			0		0.00
Species Stocking Rate Score				0.0			0.0		0.0
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**0.00**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.32	2.18	2.20	2.31	2.22	2.46	2.18	0.51	2.05
Site Context Score (out of 3)	1.23	1.10	1.10	1.55	1.42	1.77	1.98	1.34	1.44
Species Stocking Rate Score (out of 3)	1.99	2.02	1.69	2.10	1.80	1.85	1.39	0.00	1.60
Habitat Quality score (out of 10)	*5.54*	*5.30*	*4.99*	*5.96*	*5.44*	*6.08*	*5.55*	*1.85*	5.09
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES								11.88	
Size Weighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***1.85***	***1.85***

Table A7.23 **GREENRIDGE AU6 RE 12.3.20 NON-REMNANT QUALITY WITHOUT OFFSET FOR GREY-HEADED FLYING-FOX**

SCORE WITHOUT OFFSET: 2

Assessment Unit - Regional Ecosystem	Greenridge AU6 - RE 12.3.20 Non-remnant								
Site Reference	Benchmark	Site 972-973			Site 960-961			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	0	0.0	0	100	100.0	5	50.0	3
Native plant species richness - trees	4	0	0.0	0	1	25.0	2.5	12.5	0
Native plant species richness - shrubs	4	0	0.0	0	2	50.0	2.5	25.0	2.5
Native plant species richness - grasses	2	0	0.0	0	1	50.0	2.5	25.0	2.5
Native plant species richness - forbs	8	3	37.5	2.5	5	62.5	2.5	50.0	2.5
Tree canopy height	16	0	0.0	0	8	50.0	3	25.0	3
Tree subcanopy height	8	0	0.0	0	2	25.0	3	12.5	0
Tree canopy height (average of emergent, canopy, sub-canopy)	12	0	0.0	0	5	41.7	3	20.8	0
Tree canopy cover (EDL)	70	0	0.0	0	12.5	17.9	2	8.9	0
Subcanopy cover	20	0	0.0	0	0	0.0	0	0.0	0
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	0.0	0	6.25	13.9	2	6.9	0
Shrub canopy cover	15	0	0.0	0	1	6.7	0	3.3	0
Native grass cover	20	0	0.0	0	19	95.0	5	47.5	1
Organic litter	30	20.8	69.3	5	20	66.7	5	68.0	5
Number of large trees (ha)	165	0	0.0	0	0	0.0	0	0.0	0
Coarse woody debris (m/ha)	890	0	0.0	0	0	0.0	0	0.0	0
Non-native plant cover	0	95		0	95		0	95.0	0
			Value	**Score**		**Value**	**Score**	**Average**	**Average score**
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores			0	0		0	0	0.0	0
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness			0	0		0	0	0.0	0
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness			0	0		0	0	0.0	0
Site Condition Score				7.5			30		16.5
MAX Site Condition Score				*130*			*130*		*130.0*
Site Condition Score - out of 4									**0.5**
Site Context			**Value**	**Score**		**Value**	**Score**	**Average**	**Average score**
Size of patch (ha)									
Remnant			0			0		0.0	
Regrowth			0	0		0	0	0.0	0
Connectivity									
No. active GHFF camps within 20km			9	10		6	6	7.5	8
Context									
% GHFF foraging habitat within 20 km			17.43	2		15.81	2	16.62	2
Ecological Corridors				6			6		6
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			3	6		1	2	2	4
Absence of threats				3.5			3.5		2.5
Site Context Score				27.5			19.5		22.50
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**1.21**

	Greenridge AU6 - RE 12.3.20 Non-remnant								
Species Stocking Rate (SSR)	Benchmark	Site 972-973			Site 960-961			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	165	0.0	0.0	0.0	0	0.0	0.0	0.00	0
Timing of GHFF Biological Resources				0			0		0.00
Species Stocking Rate Score				0.0			0.0		0.0
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**0.00**

Final habitat quality score (weighted)	**Tabooba AU1 RE 12.8.16 Remnant**	**Tabooba AU2 RE 12.8.16 Advanced Regrowth**	**Tabooba AU2 RE 12.8.16 Young Regrowth**	**Tabooba AU4 RE 12.8.14 Remnant**	**Tabooba AU5 RE 12.8.14 Advanced Regrowth**	**Greenridge AU4 RE 12.3.20 Remnant**	**Greenridge AU5 RE 12.3.20 Regrowth**	**Greenridge AU6 RE 12.3.20 Non-remnant**	**Average/ Final**
Site Condition score (out of 4)	2.26	1.66	0.31	2.31	1.58	2.11	2.18	0.51	1.62
Site Context Score (out of 3)	1.23	1.10	0.96	1.55	1.42	1.77	1.98	1.21	1.40
Species Stocking Rate Score (out of 3)	2.29	1.72	0.00	2.10	1.80	1.85	1.39	0.00	1.39
Habitat Quality score (out of 10)	*5.78*	*4.48*	*1.27*	*5.96*	*4.80*	*5.73*	*5.55*	*1.71*	4.41
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES								11.88	
Size Weighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***1.71***	***1.71***

Table A7.24 GREENRIDGE AU6 RE 12.3.20 NON-REMNANT QUALITY WITH OFFSET FOR GREY-HEADED FLYING-FOX

SCORE WITH OFFSET: 7

Assessment Unit - Regional Ecosystem	Greenridge AU6 - RE 12.3.20 Non-remnant								
Site Reference	Benchmark	Site 972-973			Site 960-961			Average % benchmark	Average Score
	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition									
Recruitment of woody perennial species in EDL	100	0	0.0	5	100	100.0	5	50.0	5
Native plant species richness - trees	4	0	0.0	5	1	25.0	5	12.5	5
Native plant species richness - shrubs	4	0	0.0	5	2	50.0	5	25.0	5
Native plant species richness - grasses	2	0	0.0	5	1	50.0	5	25.0	5
Native plant species richness - forbs	8	3	37.5	5	5	62.5	5	50.0	5
Tree canopy height	16	0	0.0	5	8	50.0	5	25.0	5
Tree subcanopy height	8	0	0.0	5	2	25.0	5	12.5	5
Tree canopy height (average of emergent, canopy, sub-canopy)	12	0	0.0	5	5	41.7	5	20.8	5
Tree canopy cover (EDL)	70	0	0.0	5	12.5	17.9	5	8.9	5
Subcanopy cover	20	0	0.0	5	0	0.0	5	0.0	5
Tree canopy cover (average of emergent, canopy, sub-canopy)	45	0	0.0	5	6.25	13.9	5	6.9	5
Shrub canopy cover	15	0	0.0	5	1	6.7	5	3.3	5
Native grass cover	20	0	0.0	5	19	95.0	5	47.5	5
Organic litter	30	20.8	69.3	5	20	66.7	5	68.0	5
Number of large trees (ha)	165	0	0.0	5	0	0.0	5	0.0	5
Coarse woody debris (m/ha)	890	0	0.0	5	0	0.0	5	0.0	5
Non-native plant cover	0	95		10	95	0.0	10	95.0	10
			Value	Score		Value	Score	Average	Average score
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Flower Scores (/10)			0.26	5		0.26	5	0.26	5
Quality and availability of GHFF Habitat: Foraging Habitat Tree Species Richness (/20)			4	10		4	10	4	10
Quality and availability of GHFF Habitat: Significant Foraging Habitat Tree Species Richness (/20)			3	10		3	10	3	10
Site Condition Score				95			95		95.0
MAX Site Condition Score				*130*			*130*		*130.0*
Site Condition Score - out of 4									**2.9**
Site Context			Value	Score		Value	Score	Average	Average score
Size of patch (ha)									
Remnant			19.75			654.84		337.3	
Regrowth			22.02	0		34.02	0	28.0	10
Connectivity									
No. active GHFF camps within 20km			9	10		6	6	7.5	8
Context									
% GHFF foraging habitat within 20 km			17.43	2		15.81	2	16.62	2
Ecological Corridors				6			6		6
Role of site location to species overall population in the state									
No. of active ≥ level three GHFF camps within a 20km			3	6		1	2	2	4
Absence of threats *				9			9		10
Site Context Score				33			25		40.00
MAX Site Context Score				*56*			*56*		*56*
Site Context Score - out of 3									**2.14**

	Greenridge AU6 - RE 12.3.20 Non-remnant								
	Benchmark	Site 972-973			Site 960-961			Average % benchmark	Average Score
Species Stocking Rate (SSR) **	12.3.20	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Abundance of large trees	165	0.0	0.0	0.0	0	0.0	0.0	0.00	4
Timing of GHFF Biological Resources				10			10		10.00
Species Stocking Rate Score				10.0			10.0		14.0
MAX Species Stocking Rate Score				*20*			*20*		*20*
SRR Score - out of 3									**2.10**

Final habitat quality score (weighted)	Tabooba AU1 RE 12.8.16 Remnant	Tabooba AU2 RE 12.8.16 Advanced Regrowth	Tabooba AU2 RE 12.8.16 Young Regrowth	Tabooba AU4 RE 12.8.14 Remnant	Tabooba AU5 RE 12.8.14 Advanced Regrowth	Greenridge AU4 RE 12.3.20 Remnant	Greenridge AU5 RE 12.3.20 Regrowth	Greenridge AU6 RE 12.3.20 Non-remnant	Average/ Final
Site Condition score (out of 4)	2.69	2.77	2.63	2.46	2.55	2.69	2.62	2.92	2.67
Site Context Score (out of 3)	1.50	1.50	1.50	1.82	1.82	2.04	2.25	2.14	1.82
Species Stocking Rate Score (out of 3)	2.29	2.32	1.69	2.40	2.10	2.15	1.39	2.10	2.05
Habitat Quality score (out of 10)	*6.48*	*6.58*	*5.82*	*6.68*	*6.48*	*6.88*	*6.25*	*7.17*	6.54
Assessment Unit area in the offset area (ha)	49.80	145.02	48.1	50.62	19.80	28.70	4.77	11.88	*358.69*
Total offset area (ha) for this MNES								11.88	
Size Weighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	
Weighted Habitat Quality Score	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***7.17***	***7.17***