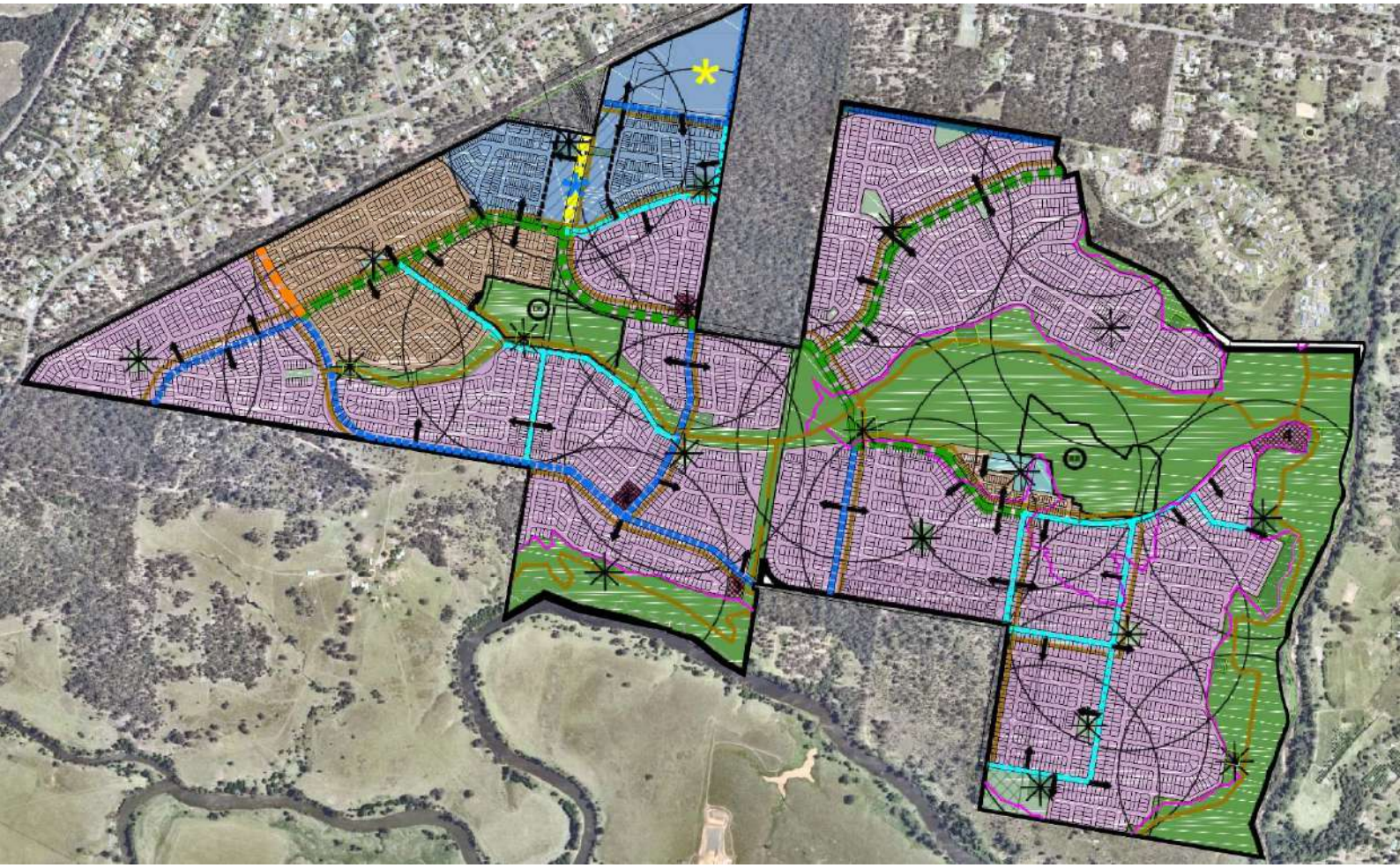

Annual Compliance Report EPBC 2016/7724

4 December 2020 – 3 December 2021

Riverside Celestino

Teviot Road, Jimboomba, Queensland
Celestino Pty Ltd
Year 1

1 March 2022

SHG Ref: 8107

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Document Control

Document: 4 December 2020 – 3 December 2021 Annual Compliance Report, Riverside Celestino – Teviot Road, Jimboomba – Year 1 (EPBC 2016/7724), Issue A, prepared by Saunders Havill Group Pty Ltd for Celestino Pty Ltd, dated 1 March 2022.

Document Issue

Issue	Date	Prepared By	Checked By
A – Client Draft	16.02.2022	AW	SM / BM
B	01.03.2022	AW	SM

Prepared by

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Reports and plans by others may be included in this document.

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Figures

Tables

Acronyms and References

ACR	Annual Compliance Report
DAM	Declared Area Map
DAWE	Department of Agriculture, Water and the Environment (Cth)
DNRME	Department of Natural Resources, Mines and Energy (Qld) (now DOR)
DOR	Department of Resources (Qld)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
GHFF	Grey-headed Flying-fox
ha	hectares
kilometres	km
LCC	Logan City Council
m	metres
OMP	Offset Management Plan
PMAV	Property Map of Assessable Vegetation
QTFN	Queensland Trust for Nature
SAT	Spot Assessment Technique
SHG	Saunders Havill Group
VMA	*Vegetation Management Act 1999* (Qld)

OMP	Offset Management Plan for EPBC 2016/7724, prepared by Queensland Trust for Nature (April 2019)
Year 1 OAMR	Aroona Station Offset Area Management Report – Baseline Year 1 2016/7724, prepared by Queensland Trust for Nature (January 2022)

1. Introduction

This Annual Compliance Report (ACR) Year 1 (4 December 2020 – 3 December 2021) has been prepared on behalf of Celestino Pty Ltd (the Proponent) for the Riverside Celestino Development (EPBC 2016/7724) located on Teviot Road, Jimboomba.

In accordance with the approval granted on the 28 September 2020 under the *Environment Protection and Biodiversity Act 1999* (EPBC Act), this ACR has been prepared in response to Condition 25 which states:

> *"The approval holder must prepare a compliance report for each 12 month period following the date of commencement of the action, or otherwise in accordance with an annual date that has been agreed to in writing by the Minister. The approval holder must*
>
> a. *Publish each compliance report on the website within 60 business days following the relevant 12 month period;*
> b. *Notify the Department by email that a compliance report has been published on the website and provide the weblink for the compliance report within 5 business days of the date of the publication;*
> c. *Keep all compliance reports publicly available on the website until this approval expires;*
> d. *Exclude or redact sensitive ecological data from compliance reports published on the website; and*
> e. *Where any sensitive ecological data has been excluded from the version published, submit the full compliance report to the Department within 5 business days of publication."*

1.2. Reporting Period

This ACR details the status and compliance of the Project for the 12 month reporting period between the 4 December 2020 to 3 December 2021.

The ACR must be published on the Proponent's website and notification provided to the Department of Agriculture, Water and the Environment (DAWE) (the Department) within 60 business days of the 12 month anniversary of the commencement of the action.

1.3. EPBC Approval

Celestino Pty Ltd, as the Proponent of the Project (reference EPBC 2016/7724) was issued with an approval by the Department on the 28 September 2020, subject to conditions. A variation to the approval was made and approved by the delegate of the Minister on 23 December 2021. The variation included the removal of condition 5 and replacement with a new condition, addition of condition 5A and removal of notes 1, 2 and 3. Refer to **Appendix A** for the EPBC Act approval and variation.

Key details related to EPBC 2016/7724 approval are provided in **Table 1.**

Table 1: Approval Details

Commonwealth Reference	EPBC 2016/7724
Approval Holder	Celestino Pty Ltd
ABN	74 165 629 783
Project Name on the Approval	Residential Development, Teviot Road, Jimboomba, 17 km north of Beaudesert, Queensland (EPBC 2016/7724)

Approved Action	To construct a residential development on Lot 800 on SP247625, Lots 101, 102, 104, 105 and 106 on SP254145 on Teviot Road, Jimboomba, 17 km north of Beaudesert, Queensland.
Controlling Provision(s)	Listed threated species and communities (sections 18 & 18A) Commonwealth actions (section 28)
Approval Date	28 September 2020
Expiry Date of the Approval	31 August 2050
Date of Commencement of the Action	4 December 2020
Address	Teviot Road, Jimboomba
Local Government Area	Logan City Council (LCC)

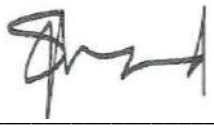
1.4. Site Context

Contextually, the Project is located on Teviot Road, Jimboomba, in Queensland, approximately 40 kilometres (km) southwest of Brisbane City, and 17 km north of Beaudesert within the Logan City region. The application site is approximately 553 hectares (ha) in area. The action will result in the removal of 330.8 hectares (ha) of habitat deemed critical for the Koala and Grey-headed flying Fox (GHFF). A further 3.5 ha is considered to be functionally lost as a result of the development. Notably, the development site will include over 150 ha of mixed open and greenspace precinct, including approximately 98 ha of conservation corridor for the preservation of the Koala and Grey-headed Flying Fox. Refer to **Figure 1** for the site context.

1.5. Declaration of Accuracy

This declaration has been signed by the approval holder.

In making this declaration, I am aware that sections 490 and 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I no knowledge of that authorisation being revoked at the time of making this declaration.

Signed 

Full name (please print) Sam Maynard

Position (please print) Principal Environmental Scientist / Associate Partner

Organisation (please print including ABN/ACN if applicable) Saunders Havill Group ABN 24 144 972 949

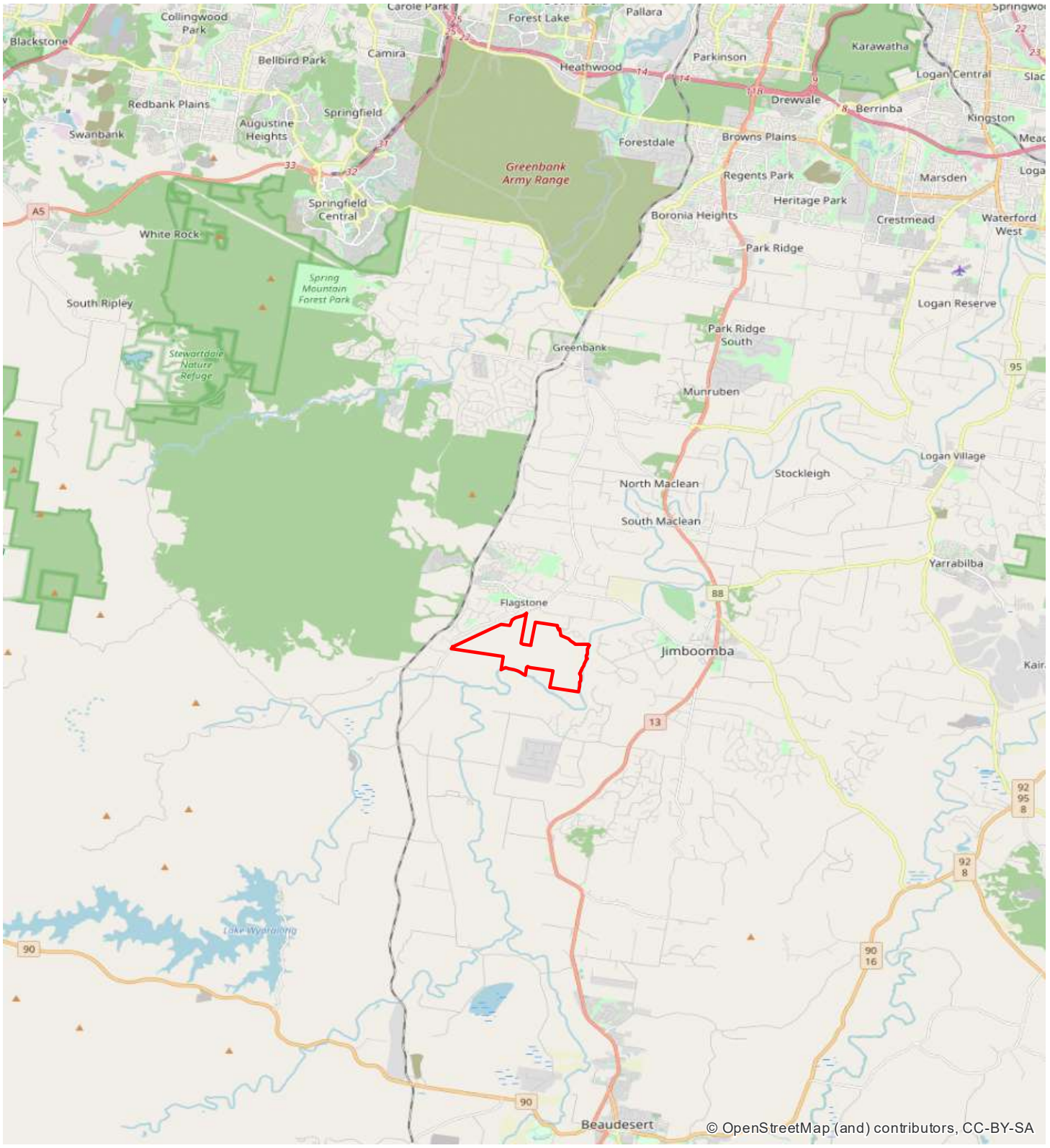
Date 01 / 03 / 2022

1.6. Overview of Key Activities and Achievements

The action commenced on 4 December 2020 which is when the Aroona Station offset site was legally secured through Voluntary Declaration (VDEC) under the *Vegetation Management Act 1999* (VMA). No clearing or construction activities occurred

on the impact site within the reporting period. Key activities conducted within the 2020-2021 compliance period relate to baseline surveys and maintenance completed on the offset site. Key activities and findings include:

- Establishment of monitoring assessment plots.
- Baseline habitat quality transects at assessment plots within each operational management unit (OMU) – Remnant (OMU-1), Regrowth (OMU-2) and Cleared (OMU-3).
- Grey-headed Flying Fox foraging habitat assessment – the number and condition of grey-headed flying fox winter or spring flowering foraging species was assessed at each transect location.
- Spot Assessment Technique (SAT) surveys conducted across the site to determine baseline Koala activity.
- Mapping of weeds across the site and identification of high priority areas for weed management, particularly Lantana.
- Monitoring of non-native predators and herbivores using camera trapping to determine relative abundance index (RAI) and occupancy across the site.
- Opportunistic scat analysis of non-native predators. Scat analysis indicates Koala does not form part of non-native predator diet.
- Installation of fauna friendly stock exclusion fencing around OMU-3 where it did not sufficiently exclude cattle.
- Use of cattle grazing in OMU-1 and OMU-2 to reduce fuel loads.
- No Koala injuries or mortalities caused by non-native predators or cattle were recorded on the offset site.
- One (1) ecological burn was conducted on the offset site to reduce fuel hazard.
- Ecological firebreaks were inspected and maintained at regular intervals throughout the 2020-2021 reporting year.



Legend

Referral area

Figure 1

Site Context

File ref. 8107 E Figure 1 Site Context A
Date *16/04/2020*
Project *Riverbend*

0 1 2 4 6 km

N

Scale (A4): 1:200,000 [GDA 1994 MGA Z56]

CELESTINO

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Layer Source: © State of Queensland (Department of Natural Resources, Mines and Energy) 2020

2. Current Status of the Project

2.1. Conditions 1 to 4 - Development Actions

No development activities occurred on the impact site within the 2020-2021 reporting period.

2.2. Condition 5 - Offset Site Legally Secured

As required by Condition 5 of the EPBC Act approval (refer Table 3 below for further detail), the Aroona Station Offset site, which is located at Alpers Road, Mount Mort, Queensland, was legally secured via a Voluntary Declaration under the *Vegetation Management Act 1999* (VMA) by the Proponent on 4 December 2020. The site is within the Scenic Rim Regional Council (SRRC) Local Government Area and is located over several lots including 233/CH311908, 31/CH312311, 218/CH311734, 64/CC552, 2/RP31144, 222/CH311798, 30/CH312310, 28/CH312274, 24/CH312032, 44/CC32, 45/CC32, 111/CC553, and 13/CH311894, totalling 847.98 ha (refer **Figure 2** for offset site context).

The Chief Executive of the Queensland Department of Natural Resources, Mines and Energy (DNRME), now Department of Resources (DOR), declared the Aroona Station Offset area in a Declared Area Map (DAM 2010/13666) as an area of high nature conservation value in accordance with section 19F(1) of the VMA. The Offset is shown as Category A on a Property Map of Assessable Vegetation (PMAV) (PMAV 2020/013752) and is subject to management provisions of the Offset Management Plan EPBC 2016/7724, prepared by QTFN, April 2019 (Offset Area Management Plan). Refer to **Appendix B** for the Aroona Station offset voluntary declaration package and **Appendix C** for copy of the OMP.

A deed was signed by both the Proponent and third party offset provider, Queensland Trust for Nature (QTFN) who wholly own the Offset land. Under this deed, QTFN are to carry out management of the Offset in accordance with the Offset Management Plan.

2.3. Condition 6 - Baseline Offset Surveys

As required by condition 6 of the EPBC approval, baseline surveys for the entire Aroona Station Offset site were completed across the offset site. The Aroona Station Offset Area Management Report Baseline Year 1 EPBC 2016/7724, prepared by Queensland Trust for Nature (January 2022) (OAMR) was completed for this reporting period and is included as **Appendix D**. Results of the surveys are summarised in the subsections below.

2.3.1 Conditions 6a and 6b - Habitat Quality

In accordance with approval **conditions 6a and 6b**, vegetation attributes were assessed across the site using the modified version of the Queensland State Governments *"Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy"* Version 1.2 April 2017. The site was broadly categorised into three Operational Management Units (OMU) including Remnant (OMU-1), Regrowth (OMU-2) and Cleared (OMU-3). OMUs are made up of assessment units relating to the regional ecosystems and vegetation classes within the offset area and are used to manage offset objectives across the site. Vegetation plots were established within each assessment unit to determine baseline vegetation values across the site.

OMU-1 was described as a reasonable condition, classed as 'nearly fully functional ecosystems' with condition scores ranging from 71.5 to 81.25 out of 100. OMU-2 ranged from average to degraded condition with significant potential for rehabilitation. Site condition scores ranged from 58 to 61 out of 100. OMU-3 was mostly cleared with only scattered trees, with a site condition score of 5 out of 100, indicating widespread revegetation is required to restore habitat quality.

Specific management actions are proposed within each OMU. Within OMU-1 and OMU-2, Rehabilitation actions are conducted in accordance with the Aroona Weed Management Strategy and the Aroona Fire Management Plan whereas OMU-3 will focus on revegetation to create habitat for the Koala and Grey-headed Flying Fox. All revegetation actions within OMU-3 are planned for the 2022 planting season (Autumn).

2.3.2 Condition 6c - Grey-Headed Flying Fox Habitat

In accordance with **condition 6c**, the number and condition of grey-headed flying fox winter or spring flowering foraging species was assessed across each assessment plot.

A range of eucalypt species were identified across the offset site which enables year round flowering. Therefore, the site is considered to fulfil the GHFF lifecycle. *Corymbia intermedia* and *Eucalyptus tereticornis* were the most dominant flowering forage tree. One GHFF individual was observed foraging on-site during the surveys. Assessment results of flowering trees and monitoring are provided in Section 2.2 of the Appendix Area Management Report.

2.3.3 Condition 6d - Koala Species Stocking Rate

In accordance with **condition 6d**, the Koala baseline species stocking rate was determined using the following parameters:

- Species presence on or adjacent to the site
- Species usage of the site
- Approximate density of the species on the site
- Role/importance of species population on site

Spot Assessment Technique (SAT) surveys were conducted across the site in 2019 to determine species stocking rate. A total of 14 SAT surveys were performed across the site of which only six contained scats. Within OMU-1, activity ranged between 3% and 16%, between 3% and 13% within OMU-2 and 0% within OMU-3. However, opportunistic surveys did detect Koala evidence in the form of scats within all OMUs including paddock trees in OMU3. Assessment results are provided in detail Section 2.3 of the Appendix Area Management Report.

2.3.4 Condition 6e - Weed Cover

In accordance with **condition 6e**, baseline weed cover was determined across the site in 2021. Weed presence was recorded at each transect location and photo points were established at each site. Woody weeds *Lantana camara* (Lantana) and *Schinus terebinthifolius* (Broad-leaved Pepper) were spatially mapped across the site at one hectare scale.

Lantana was recorded at all transects and Broad-leaved Pepper at over 50% of transects. Weed management will focus on reducing Lantana, Broad-leaved Pepper and Cats Claw Creeper in the endangered blue gum alluvial flats (RE12.3.3) and the foothills. Assessment results are provided in detail Section 2.4 of the Appendix Area Management Report.

2.3.5 Condition 6f - Non-native Predators and Herbivores

In accordance with **condition 6f**, the number and abundance of non-native predators and non-native herbivores was determined across the offset site. Monitoring has been conducted across the site since 2018 consisting of 40-day camera trapping and opportunistic scat searches. Camera trapping is performed biannually to account for seasonal variations with surveys conducted in Summer 2019, Winter 2020, Summer 2020 and Winter 2021. Activity and abundance of non-native predators was determined through the use of two metrics:

- Relative abundance index (RAI)
- Occupancy – proportion of camera trapping stations at which a predator was detected

Camera trapping detected wild dogs, foxes, feral cats and feral pigs. Recorded numbers have demonstrated slight fluctuations over time with presence consistently demonstrated across the property. Search for predator scats is conducted bimonthly

across the site and locations of scats are GPS located. Scat analysis indicates no presence of Koala in pest species diet with diets consisting of a mix of native and introduced mammals. A pest management contractor has been engaged with biannual monitoring to continue. Assessment results are provided in detail in Section 2.5 of the OAMR (refer **Appendix D**).

2.3.6 Condition 6g - Koala Mortalities

In accordance with **condition 6g**, Koala mortalities were determined across the site as caused by non-native predators. No Koala mortalities caused by non-native predators were recorded in the 2020-2021 reporting period.

2.4. Condition 7 – Reporting

This ACR report provides a response to **condition 7**, providing offset baseline survey results.

2.5. Conditions 8 to11 – Reporting

The **conditions 8 to 11** requires reporting of outcomes at the year 5 milestone of the offset management plan therefore are not relevant to this report. Section 2.8 of this ACR outlines ongoing actions to achieve milestone targets under these conditions.

2.6. Conditions 12 and 13 - Stock Management

In accordance with approval **condition 12**, fauna friendly stock exclusion fencing is required to be installed around OMU3. Condition 14 requires an analysis of how cattle grazing at the Aroona Offset Site has facilitated or impacted the achievement of outcomes prescribed under conditions 15-18.

Fauna friendly fencing was installed around OMU-3 where existing fences did not sufficiently exclude cattle. Cattle grazing was conducted over the site for the purpose of fuel hazard management in accordance with the OMP and **condition 13**. Cattle were excluded from revegetation areas to ensure revegetation is not impacted at all. Fuel hazard assessments were conducted bi-annually (January and August) with higher fuel hazard ratings identified in 2021. Weather conditions prevented a planned ecological burn from occurring in the mountain paddock. As a result, cattle were used to reduced fuel loads while ensuring access to the vulnerable revegetation areas was prevented in accordance with condition 13(b).

2.7. Condition 14 – Stock grazing impacts

Analysis was conducted under **condition 14(a)-(d)** to review how cattle grazing has facilitated or impacted the offset outcomes sought. Table 9 of the QTFN site report provided in the Appendix provides the duration, frequency, locations and nature of grazing land use across the offset site. Bi- annual monitoring of the fuel load is conducted, site monitoring has identified higher fuel load ratings following recent rainfall and generating the need to use stock for load reduction where conditions may not have provided safe burn conditions.

No evidence of Koala injury or mortality as a result of cattle grazing was recorded and no corrective actions is necessary.

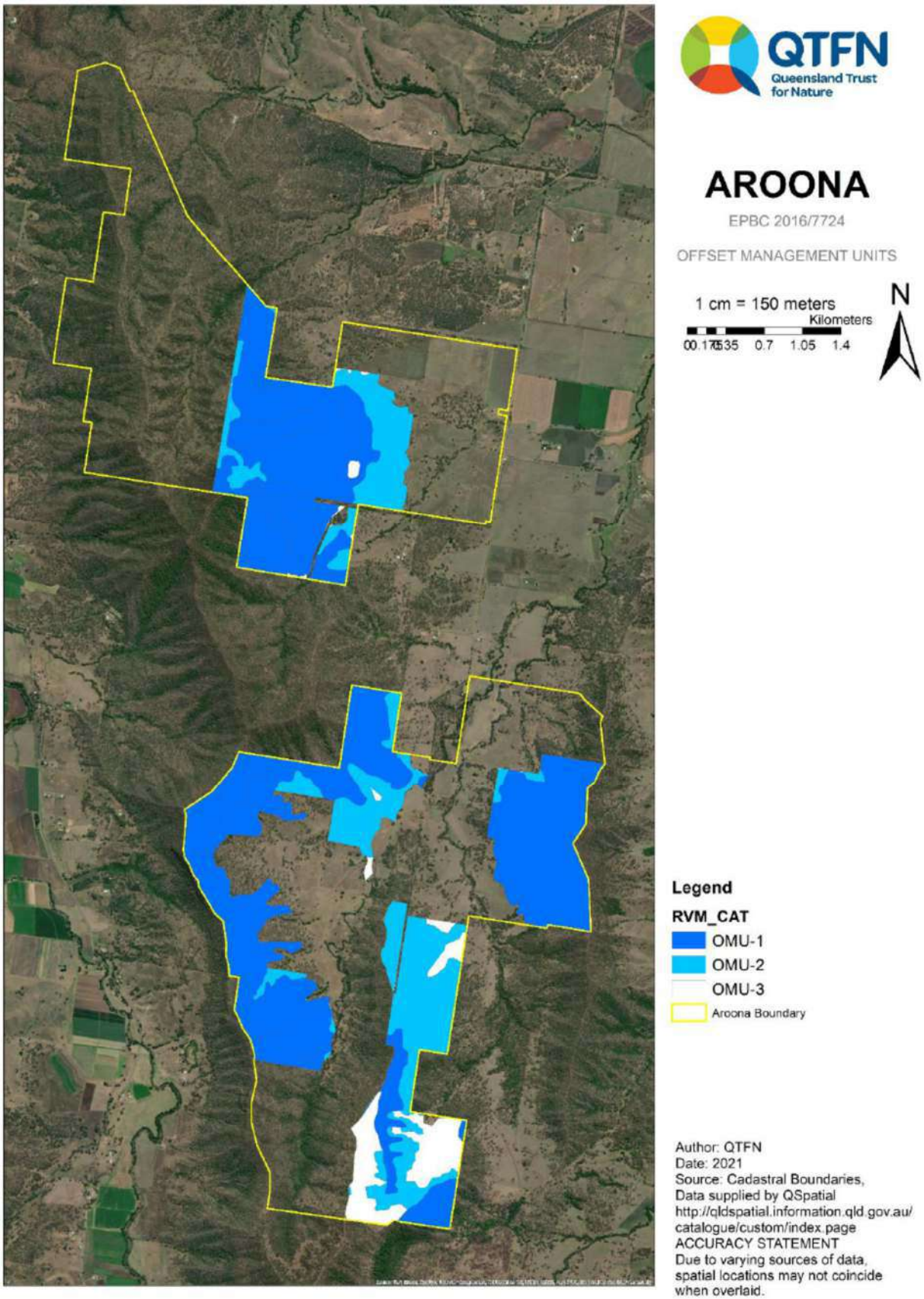
2.8. Conditions 15 to 18 - Ecological Management

Under conditions 15 – 18 and the additional objective reaching the year 5 targets of the Offset improvement conditions, a number of works have been performed or are scheduled for the coming year along with ongoing revegetation works. These have been summarised as follows:

- Two ecological burns were conducted on Aroona Station in the 2020-2021 reporting period of which one was conducted within the offset site. The burn was conducted by Firesticks Alliance and was characterised as a cool, mosaic burn.
- Targeted and scheduled movements of a single group of cattle have been utilised to reduce the fuel load in limited areas but excluded at all times from revegetation zones.
- A weed contractor has been engaged to commence removal of Lantana and Broad-Leaved Pepper in high priority areas, including blue gum alluvial flats (RE 12.3.3) (**condition 10**).
- Long term non-native predator management has been underway on the property since 2018, with the most recent contractor engaged in summer 2020. Non-native predator management is informed by ongoing monitoring via cameras and scats (**condition 8**).
- Ceres tags (GPS location devices attached to cattle) are to be used to increase the accuracy and timeliness of monitoring cattle movements and safeguarding fenced areas.

Fuel hazard assessments demonstrated moderate to very high fuel loads with approximately 50% exceeding a 'high' hazard score. Firebreak trails were inspected and maintained throughout the year.

Figure 2: Aroona Station Offset site context – extract from QTFN OAMR Year 1



3. EPBC Conditions and Compliance

Table 2 documents the compliance with EPBC Act conditions for the Project for the Year 1 reporting period, being 4 December 2020 to 3 December 2021. The compliance assessment relates to the approval conditions in force at the time of the one-year anniversary.

Table 2: Compliance Audit of EPBC 2016/7724 Conditions for Riverside Celestino

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
Part A – Conditions Specific to the action			
Development Area			
1	a. The approval holder must not clear more than 330.8 ha of Koala habitat and Grey-headed Flying-fox foraging habitat within the development area; and must confine any clearing to the areas designated as 'Remnant', 'Regrowth' and 'Non-remnant' shaded in solid blue, green and cream as shown in Attachment A.	Compliant	Clearing did not commence on the impact site during the 2020-2021 reporting period. A total of 0 ha of Koala habitat and Grey-headed Flying-fox foraging habitat has been cleared since the commencement of the action.
	b. Ensure that only minor clearing and nature trails are permitted within the on-site conservation corridor, provided that they do not impact Koalas or Grey-headed Flying-foxes, or clear any Koala food trees or Grey-headed Flying-fox winter or spring flowering foraging species.	Compliant	No clearing was conducted on the impact site within the 2020-2021 reporting period.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
2	For the protection of the Koala and the Grey-headed Flying-fox, the approval holder must not clear more than a total of 300 ha of Koala habitat and Grey-headed Flying-fox foraging habitat within the development area until the Offset Strategy required under condition 5(c) has been approved in writing by the Minister.	Compliant	No clearing was conducted on the impact site within the 2020-2021 reporting period.
3	For the protection of the Koala and the Grey-headed Flying-fox at the development area, the approval holder must: a. Ensure that a fauna spotter/catcher is present during all clearing and construction activities and given sufficient authority to ensure that such activities do not cause injury or death of Koalas;	Compliant	No clearing was conducted on the impact site within the 2020-2021 reporting period.
	b. Clear in accordance with the Nature Conservation (Koala) Conservation Plan 2017 approved under the Nature Conservation Act 1992 (Qld) so as to allow Koalas to safely move out of clearing area and into connected areas of Koala habitat, and implement all provisions for sequential clearing;	Compliant	The site is located within a PDA and would not ordinarily be required to adhere to the Nature Conservation (Koala) Conservation Plan 2017, however, as it is conditioned as a part of the approval, works will be performed in accordance with the plan. No clearing was conducted on the impact site within the 2020-2021 reporting period.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	c. Install temporary Koala exclusion fencing around any area of construction work, immediately after clearing and prior to the commencement of construction in that area, so as to prevent Koalas entering any area where construction is taking place. The Koala exclusion fencing around any construction area must remain in place until construction activities within that fenced construction area are completed;	Compliant	No clearing or construction was conducted on the impact site within the 2020-2021 reporting period.
	d. Implement measures to prevent domestic and feral dogs from entering the development area and adjacent Koala habitat during clearing and construction to minimise the risk to Koalas of predation by domestic and feral dogs at the development area and within the on-site conservation corridor. Such measures must include (but are not limited to) prohibition of workers bringing domestic dogs into the development area and adjacent Koala habitat;	Compliant	No clearing or construction was conducted on the impact site within the 2020-2021 reporting period.
	e. Implement traffic calming measures and ensure that the speed of all vehicles on construction roads in the development area is no greater than 40 km/h at any time	Compliant	No clearing or construction was conducted on the impact site within the 2020-2021 reporting period.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	(except an emergency) so as to minimise the risk to Koala of vehicle strike;		
	f. Construct roads consistent with Queensland's fauna sensitive road design guidelines to minimise the risks to Koalas of vehicle strike. In particular, on roads flanking the on-site conservation corridor or adjacent Koala habitat or waterways, or which cross waterways, safe fauna movement solutions, fauna exclusion/koala proof fencing and local traffic management measures must be implemented in accordance with Queensland's Koala sensitive Design Guideline; and	Compliant	No clearing or construction was conducted on the impact site within the 2020-2021 reporting period.
	g. Install prominent Koala awareness signage consistent with Queensland's wildlife signing guidelines prior to opening to public motorists, any road where the presence of listed threatened species is known or expected, such as on roads flanking the on-site conservation corridor or adjacent to fauna movement solutions.	Compliant	No clearing or construction was conducted on the impact site within the 2020-2021 reporting period.
4	For the on-going protection and rehabilitation of Koala habitat and Grey-headed Flying-fox foraging habitat throughout the on-site conservation corridor, the approval holder must:	Compliant	No clearing or construction was conducted on the impact site within the 2020-2021 reporting period. However, an environmental corridor meeting the required specifications of the approval is included in the development design.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	a. Ensure the width of the on-site conservation corridor is at least 100 metres wide to function effectively and minimise edge effects; and		
	b. Manage and restore the on-site conservation corridor for the period of effect of the approval, or until such time that the Department agrees in writing that it is satisfied with written evidence that the Council has accepted ownership of and responsibilities to manage the on-site conservation corridor. If by 31 January 2045, Council has not accepted the ownership of and responsibilities to manage the on-site conservation corridor, the approval holder must submit in writing an alternative on-going management arrangement for the on-site conservation corridor to the Minister for approval.		No clearing or construction was conducted on the impact site within the 2020-2021 reporting period. However, an environmental corridor meeting the required specifications of the approval is included in the development design.
Environmental offset requirements			
5	To compensate for the clearing of 330.8 ha of Koala habitat and Grey-headed Flying-fox foraging habitat, and the functional loss of 3.5 ha of Koala habitat, the approval holder must: a. Legally secure at least 847.98 ha of land at the Aroona Offset Site and commence	Compliant	The Aroona Station offset site located at Alpers Road, Mount Mort, Queensland, was legally secured via a Voluntary Declaration under the *Vegetation Management Act 1999* (VMA) by the Proponent on 4 December 2020. The site is located over several lots including 233/CH311908, 31/CH312311, 218/CH311734, 64/CC552, 2/RP31144, 222/CH311798, 30/CH312310, 28/CH312274, 24/CH312032, 44/CC32, 45/CC32, 111/CC553, and 13/CH311894, totalling 847.98 ha.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	management activities prior to undertaking any clearing at the development area.		The Chief Executive of the then Queensland Department of Natural Resources, Mines and Energy (now Department of Resources, DOR) declared the Aroona Station Offset area in a Declared Area Map (DAM 2010/013666) as an area of high nature conservation value in accordance with section 19F(1) of the VMA. The Offset is shown as Category A on a Property Map of Assessable Vegetation (PMAV) (PMAV 2020/013752) and is subject to management provisions of the Offset Management Plan EPBC 2016/7724, prepared by QTFN, April 2019 (Offset Area Management Plan). A deed was signed by both the Proponent and third party offset provider, Queensland Trust for Nature (QTFN) who wholly own the Offset land. Under this deed, QTFN are to carry out management of the Offset in accordance with the Offset Management Plan.
	b. Within 20 business days of legally securing at least 847.98 ha of land at the Aroona Offset Site, provide the Department with: i. written evidence demonstrating that the Aroona Offset Site has been legally secured; ii. legal security documentation; iii. offset attributes; and iv. shapefiles of the Aroona Offset Site.	Compliant	The Department was notified on 21 December 2020 through e-mail correspondence that the offset site has been legally secured through a voluntary declaration.
5A	To compensate for the remaining 8% of residual impacts to Koala not offset by securing and managing the Aroona Offset Site, the approval holder must, within 12 months of the date of this approval, submit a Conservation Strategy (the Strategy) for the Minister's approval. The Strategy must:	Compliant	The *EPBC Indirect Offset Strategy: Jimboomba Residential Development Project* was accepted by the Department on 22 December 2021 which is within the within the first 12 months of the approval. The Department considers the strategy to meet the requirements of the conditions as varied in the approval. Refer to **Appendix E** for the notification letter from DAWE approving the Indirect Offset Strategy and **Appendix F** for a copy of the Indirect Offset Strategy.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	a. explain how the financial contribution to be made by the approval holder to implement the Strategy has been determined; b. describe the conservation project(s) that comprise the Strategy, including: i. outcomes to be achieved by implementing the conservation projects(s); ii. a timetable of project activities, deliverables and financial contributions to be made by the approval holder; and iii. the institution or person(s) responsible for project implementation. c. demonstrate that the Strategy: i. where appropriate, is consistent with the EPBC Act Environmental Offsets Policy; ii. is consistent with relevant conservation advices, recovery plans and threat abatement plans for Koala; and iii. is likely to achieve a conservation gain for Koala. d. specify arrangements to periodically report to the Department on the implementation of the Strategy and achieving conservation gains for Koala.		
Baseline survey information			
6	By the end of year 1, the approval holder must complete baseline surveys of the entire Aroona	Compliant	QTFN conducted baseline habitat quality surveys across the Aroona Station offset site during the 2020-2021 reporting period. The methodology and results are summarised in Chapter 2 (page 11) of the Aroona Station

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	Offset Site. The baseline surveys must be conducted by a suitably qualified field ecologist in accordance with a scientifically valid, robust, and repeatable methodology, and include the following: a. The detailed baseline habitat quality assessment data for each operational management unit as provided in the preliminary documentation; b. The vegetation condition attributes for each Regional Ecosystem; c. The number and condition of Grey-headed Flying-fox winter or spring flowering foraging species across each assessment plot at the Aroona Offset Site.; d. The Species Stocking Rate; e. The extent of weed cover; f. The number or abundance of non-native predators and non-native herbivores across, and where possible surrounding, the Aroona Offset Site; g. The number of Koala mortalities attributable to non-native predators; and h. The baseline conditions in respect of each of the outcomes specified in conditions 8-18.		Offset Area Management Report – Baseline Year 1 2016/7724, prepared by Queensland Trust for Nature (January 2022) (refer **Appendix D**).
7	Within three (3) months of the end of year 1, the approval holder must publish all survey data	Compliant	The Year 1 ACR and accompanying reports including the Aroona Station Offset Area Management Report – Baseline Year 1 (QTFN, 2022) will be published on the approval holder's website by 3 March 2022 at the below link:

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	(including survey methodology and dates) from the baseline surveys required under condition 6 including a program to monitor and report on progress against the ecological outcomes specified in conditions 8-18 on the website and provide a copy of this information to the Department.		<https://www.celestino.net.au/developments/riverbend/>
Pest and weed management			
8	The approval holder must demonstrate a 90% reduction in the number or abundance of non-native predators and non-native herbivores by the end of year 5, relative to the number or abundance identified during the baseline surveys, and ensure that the number or abundance of non-native predators and non-native herbivores are then maintained at, or reduced below, the year 5 number or abundance for the rest of the period of effect of the approval.	Not Applicable	The Year 5 milestone has not occurred.
9	Within 6 months of the end of year 5 and thereafter within 6 months of each fifth anniversary of the date when the Aroona Offset Site is legally secured, the approval holder must publish the outcomes of condition 8 and provide a copy of the outcomes to the Department within 5 business days of being published.	Not Applicable	The Year 5 milestone has not occurred.
10	The approval holder must demonstrate the extent of weed cover across the whole Aroona Offset Site is:	Not Applicable	The Year 5 milestone has not occurred.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	a. Less than 25% by the end of year 5; and b. Less than 5% by the end of year 10, and then maintained for the remaining period of effect of this approval.		
11	Within 6 months of the end of year 5 and thereafter within 6 months of each fifth anniversary of the date when the Aroona Offset Site is legally secured, the approval holder must publish the outcomes of condition 10 and provide a copy of the outcomes to the Department within 5 business days of being published.	Not Applicable	The Year 5 milestone has not occurred.
Stock Management			
12	The approval holder must install fauna friendly stock exclusion fencing around Operational management unit 3 by the end of year 1.	Compliant	Fauna friendly stock exclusion fencing was installed around OMU-3 where existing fences did not sufficiently exclude cattle. A local contractor was engaged to complete the works, who demonstrated professionalism and high quality services. Refer to Section 2.7.2 of the Aroona Station Offset Area Management Report – Baseline Year 1 2016/7724 (refer **Appendix D**).
13	To facilitate the outcomes prescribed under conditions 15 -18, the approval holder must: a. Only permit grazing at the Aroona Offset Site for the purposes of bushfire hazard reduction. b. Ensure that all livestock are excluded from Operational management unit 3 for a minimum of 5 years, or until a suitably qualified independent expert has	Compliant	Where fuel hazard assessments scored high and very high, cattle were moved into offset areas (excluding OMU-3) until the fuel hazard was reduced. Only one grazing period was conducted between fuel hazard assessments. In early 2021, cattle were rotated across paddocks as single mobs to reduce initial fuel loads and assist site preparation of fence construction. Cattle are excluded from revegetation areas. No evidence of Koala injury or mortality caused by cattle grazing was recorded. In the event that it occurs in the future, cattle will be removed from the offset area and the cause of interaction will be investigated. Revegetation zones will be monitored for cattle encroachment. However, to date no impact has been recorded due to cattle exclusion fencing.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	determined that planted Koala and Grey-headed Flying-fox feed trees are of sufficient size to withstand impact from cattle. c. The approval holder must provide the Department with a report from the suitably qualified independent expert verifying that planted Koala and Grey-headed Flying-fox feed trees are of sufficient size to withstand impact from cattle. d. Ensure that any grazing is managed so as to prevent the risk of injury or mortality of Koalas.		If target vegetation composition is negatively affected by cattle grazing, implement adaptive management actions which may include: additional cattle exclusion areas, additional re-vegetation / rehabilitation in areas negatively affected by cattle grazing, reduce intensity of grazing for fuel reduction purposes, and exclude cattle from the offset area.
14	Before each annual anniversary of the date when the Aroona Offset Site is legally secured, until the end of year 5, and thereafter before each fifth anniversary of the date when the Aroona Offset Site is legally secured, the approval holder must submit to the Department a monitoring report in respect of the period since the period covered by the previous report or since the date when the Aroona Offset Site was legally secured, which includes: a. An analysis of how cattle grazing at the Aroona Offset Site has facilitated and/or impacted the achievement of outcomes prescribed under conditions 15 -18;	Compliant	A Baseline Offset Area Management Report (refer **Appendix D**) was completed by QTFN which includes details of cattle grazing activity across the site and Koala mortality. No Koala injuries or mortalities were recorded during the 2020-2021 reporting period. During Year 1, cattle were used in OMU-1 and OMU-2 to reduce fuel hazard loads across the site. Cattle were excluded from revegetation areas.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	b. Frequency, duration and location of grazing, and stock density for each grazing period; c. Details of any injury or mortality of individual Koalas; d. The timing and frequency of monitoring undertaken; and e. Details of corrective actions already undertaken and/or proposed to be undertaken in the event of injury or mortality of individual Koalas as a result of grazing, and/or if monitoring demonstrates the outcomes under 15-18 are not achievable.		
Habitat Quality Improvement			
15	The approval holder must undertake ecological work which contributes to improvement of the condition of the Regional Ecosystems and facilitates natural regeneration at the Aroona Offset Site.	Compliant	Year 1 baseline surveys were conducted by QTFN across the Aroona Station offset site to determine baseline habitat quality condition within each defined operational management unit (OMU-1 Remnant, OMU-2 Regrowth and OMU-3 Cleared). Year 1 focused predominantly on establishing baseline habitat quality data for the site and identifying areas of high priority for weed and pest management. The Weed Strategy 2020-2025 outlines the principles and approach to weed management at a property wide scale. Results from the Year 1 survey will inform the approach for the next five years. A contractor has been engaged to complete weed control in high priority areas targeting Lantana, Broad-leaved Pepper and Cats' Claw Creeper in high priority areas. A contractor has been engaged to manage non-native predators across the site as presence of wild dog, foxes, feral cat and pigs were confirm on-site.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
			During Year 1, cattle were used in OMU-1 and OMU-2 to reduce fuel hazard loads across the site. Cattle were excluded from revegetation areas.
16	The approval holder must encourage natural regeneration and achieve the following outcomes in Operational management unit 1: a. Average recruitment of woody perennial species in the ecologically dominant layer greater than 75% of the benchmark for relevant Regional Ecosystems present by the end of year 5, and subsequently maintain or exceed that rate of recruitment for the remainder of the period of effect of the approval. b. The Diameter at Breast Height of trees increases as follows: i. Average Diameter at Breast Height of trees has increased by at least 2.5 cm by the end of year 5 relative to the baseline habitat quality assessment data. ii. Average Diameter at Breast Height of trees has increased by at least 5 cm by the end of year 10 relative to the baseline habitat quality assessment data. iii. Average Diameter at Breast Height of trees has increased by at least 7.5 cm by the end of year 15 relative to the baseline habitat quality assessment data.	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	iv. The number of large trees must be >100% of the benchmark for relevant Regional Ecosystems present by the end of year 20 and this proportion must be subsequently maintained or exceeded for the remainder of the period of effect of the approval.		
	c. Tree canopy height must be maintained at >70% of the benchmark for relevant Regional Ecosystems present for the period of effect of the approval.	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.
	d. Average tree canopy cover must be maintained at >50% - <200% of the benchmark for relevant Regional Ecosystems present for the period of effect of the approval.	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.
	e. A 50% increase, relative to the baseline habitat quality assessment data, in Koala density by the end of year 10.	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.
	f. A 100% increase, relative to the baseline habitat quality assessment data, in Koala density by the end of year 20, and subsequently maintain or exceed that	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	average Koala density for the remainder of the period of effect of the approval		
	g. An average of at least 6 (or maximum number allowed in the Regional Ecosystem present) different Grey-Headed Flying-fox winter or spring flowering foraging species present in each assessment plot by the end of year 5, and subsequently maintain or exceed this outcome for the remainder of the period of effect of the approval.	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.
17	The approval holder must encourage natural regeneration and achieve the following outcomes in Operational management unit 2: a. Average recruitment of woody perennial species in the ecologically dominant layer must be maintained or exceeded at greater than 75% of the benchmark for relevant Regional Ecosystems present for the remainder of the period of effect of the approval.	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.
	b. The Diameter at Breast Height of trees increases as follows: i. Average Diameter at Breast Height of trees has increased by at least 2.5 cm by the end of year 5 relative to the baseline habitat quality assessment data.	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	ii. Average Diameter at Breast Height of trees has increased by at least 5 cm by the end of year 10 relative to the baseline habitat quality assessment data. iii. Average Diameter at Breast Height of trees has increased by at least 7.5 cm by the end of year 15 relative to the baseline habitat quality assessment data. iv. The number of large trees must be 50-100% of the benchmark for relevant Regional Ecosystems present by the end of year 20 and this proportion must be subsequently maintained or exceeded for the remainder of the period of effect of the approval.		
c.	Average tree canopy height at > 70% of the benchmark for Regional Ecosystems present by the end of year 5, and subsequently maintain the average tree canopy height in that range for the remainder of the period of effect of the approval.	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.
d.	Average tree canopy cover must be maintained at >50% - <200% of the benchmark for relevant Regional Ecosystems present for the period of effect of the approval.	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	e. A 50% increase, relative to the baseline habitat quality assessment data, in Koala density by the end of year 10.	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.
	f. A 100% increase, relative to the baseline habitat quality assessment data, in Koala density by the end of year 20, and subsequently maintain or exceed that average Koala density for the remainder of the period of effect of the approval.	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.
	g. An average of at least 6 (or maximum number allowed in the Regional Ecosystem present) different Grey-headed Flying-fox winter or spring flowering foraging species present in each assessment plot by the end of year 5, and subsequently maintain or exceed this outcome for the remainder of the period of effect of the approval.	Not Applicable	Year 1 focused on establishing baseline habitat quality data for the site therefore is not applicable for Year 1. Management measures are proposed to occur from Year 2 onwards.
Habitat Creation			
18	The approval holder must achieve the following outcomes in Operational management unit 3: a. Recreate the relevant pre-clearing Regional Ecosystem as identified in the baseline survey by planting 69.16 hectares of new	Not Applicable	Revegetation is scheduled to occur within OMU-3 in Autumn 2022.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	Koala habitat and Grey-headed Flying-fox foraging habitat.		
b.	Complete all planting and direct seeding of new Koala Habitat and Grey-headed Flying-fox foraging habitat by the end of year 2.	Not Applicable	Revegetation is scheduled to occur in Autumn 2022 within OMU-3.
c.	Average recruitment of woody perennial species in the ecologically dominant layer greater than 20% of the benchmark for relevant Regional Ecosystems present by the end of year 5.	Not Applicable	Revegetation is scheduled to occur in Autumn 2022 within OMU-3. Monitoring will occur at specific monitoring interval periods following revegetation to assess habitat quality attributes of OMU-3.
d.	Average recruitment of woody perennial species in the ecologically dominant layer at greater than 75% of the benchmark for relevant Regional Ecosystems present by the end of year 10, and subsequently maintain or exceed that rate of recruitment for the remainder of the period of effect of the approval.	Not Applicable	Revegetation is scheduled to occur in Autumn 2022 within OMU-3. Monitoring will occur at specific monitoring interval periods following revegetation to assess habitat quality attributes of OMU-3.
e.	The Diameter at Breast Height of trees increases as follows: i. Average Diameter at Breast Height of trees has increased by at least 2.5 cm by the end of year 5 relative to the baseline habitat quality assessment data.	Not Applicable	Revegetation is scheduled to occur in Autumn 2022 within OMU-3. Monitoring will occur at specific monitoring interval periods following revegetation to assess habitat quality attributes of OMU-3.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	ii. Average Diameter at Breast Height of trees has increased by at least 5 cm by the end of year 10 relative to the baseline habitat quality assessment data. iii. Average Diameter at Breast Height of trees has increased by at least 7 .5 cm by the end of year 15 relative to the baseline habitat quality assessment data. iv. The average Diameter at Breast Height trees must be at least 50% of the benchmark for large trees for relevant Regional Ecosystems present by the end of year 20 and this proportion must be subsequently maintained or exceeded for the remainder of the period of effect of the approval.		
	f. Average tree canopy cover at >10% of the benchmark for relevant Regional Ecosystems present by the end of year 10, and subsequently maintain or exceed 10% of the benchmark for relevant Regional Ecosystems for the remainder of the period of effect of the approval.		
	g. Average tree canopy height at >25% of the benchmark for relevant Regional Ecosystems present at the site by the end of year 10, and subsequently maintain or		

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	exceed that tree canopy height for the remainder of the period of effect of the approval.		
	h. An increase in Koala density, relative to the baseline habitat quality assessment data, by the end of year 10.		
	i. Koala density by the end of year 20, must at a minimum achieve the baseline Koala density for Operational Management Unit 1, as identified in the baseline habitat quality assessment data.		
	j. An average of at least 6 different Grey-headed Flying-fox winter or spring flowering foraging species present in each assessment plot by the end of year 10, and subsequently maintain or exceed this diversity of foraging species for the remainder of the period of effect of the approval.		
19	The approval holder must engage a suitably qualified field ecologist to undertake an assessment at the end of each of year 5, year 10, year 15, and year 20 as to whether each outcome required under conditions 8-18 has been, or is likely to be achieved in accordance with the condition requirements, and provide advice	Compliant	QTFN are contracted to conduct monitoring assessments of the Aroona Station offset site.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	of any circumstance/s which they consider is/are affecting the achievement of each outcome. The findings of each assessment must be documented and published on the website within 3 months of the end of the particular period at the end of which the assessment is undertaken and be provided to the Department within 5 business days of being published.		
20	If, at any time during the period of effect of the approval, the Minister is not satisfied that any of the requirements and/or outcomes under the conditions of approval, including (but not limited to) conditions 8--18, have been or are likely to be achieved or maintained, the Minister may require the approval holder to submit a corrective action plan for the Aroona Offset Site for the Minister's approval, or to monitor, manage, avoid, mitigate, offset, record and/or report on, impacts to the Koala and/or the Grey-headed Flying-fox. a. The Minister may set a timeframe in which the corrective action plan must be submitted and suitable for approval, may require that the corrective action plan be prepared and/or reviewed by an suitably qualified independent expert and may specify consequences for the approval holder if the corrective action plan is not suitable for approval within the specified timeframe.	Not Applicable	Corrective action was not requested during the reporting period. The project is considered to have satisfied the Year 1 requirements of the EPBC Approval.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	b. The approval holder must implement the corrective action plan approved by the Minister in writing.		
Part B – Standard administrative conditions			
Notification of the commencement of the action			
21	The approval holder must notify the Department in writing of: a. the date of commencement of the action within 5 business days after the date of commencement of the action; b. the date of commencement of clearing within 5 business days after the date of commencement of clearing; and c. the date of commencement of construction within 5 business days after the date of commencement of construction.	Compliant	In response to 21a, the action was considered to have commenced with the commencement of offset activities for the development. The Aroona Station offset site was legally secured on 4 December 2020 and the Department was notified within 20 business days via e-mail correspondence on 21 December 2020 (see response to condition 5b). While no specific correspondence was provided to the Department for the commencement of the action the date the offset site was legally secured was taken as the commencement date by the Proponent. This date has been used for the annual compliance reporting period which spans from 4 December 2020 to 3 December 2021. Correspondence with the Department has confirmed not providing a specific commencement of the action may be considered an administrative issue and is unlikely to result in further actions (refer **Appendix G** for letter). In response to 21b, commencement of clearing activities occurred on the impact site on 19 January 2022. The Department was notified on 19 January 2022 through e-mail correspondence. In response to 21c, construction has not commenced on-site.
22	If the commencement of the action does not occur within 5 years from the date of this approval, then the approval holder must not commence the action without the prior written agreement of the Minister.	Not Applicable	The action commenced on 4 December 2020; therefore, this condition is no longer relevant.
Compliance records			

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
23	The approval holder must maintain accurate and complete compliance records.	Compliant	All records substantiating all activities associated with or relevant to the conditions of approval are maintained by the Proponent. If required by the Minister, these records can be made available to allow a third-party audit of the Project.
24	If the Department makes a request in writing, the approval holder must provide electronic copies of compliance records to the Department within the timeframe specified in the request. *Note: Compliance records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, and or used to verify compliance with the conditions. Summaries of the result of an audit may be published on the Department's website or through the general media.*	Not Applicable	Compliance records were not requested by the Department during the reporting period.
Annual compliance reporting			
25	The approval holder must prepare a compliance report for each 12 month period following the date of commencement of the action, or otherwise in accordance with an annual date that has been agreed to in writing by the Minister. The approval holder must: a. Publish each compliance report on the website within 60 business days following the relevant 12 month period; b. Notify the Department by email that a compliance report has been published on the website and provide the weblink for the compliance report within 5 business days of the date of publication;	Compliant	The Year 1 ACR will be published on the approval holder's website by 3 March 2022 at the below link: <https://www.celestino.net.au/developments/riverbend/>

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	c. Keep all compliance reports publicly available on the website until this approval expires; d. Exclude or redact sensitive ecological data from compliance reports published on the website; and e. Where any sensitive ecological data has been excluded from the version published, submit the full compliance report to the Department within 5 business days of publication.		
Reporting non-compliance			
26	The approval holder must notify the Department in writing of any: incident; or non-compliance with the conditions. The notification must be given as soon as practicable, and no later than 2 business days after becoming aware of the incident or non-compliance. The notification must specify: a. Any condition which is or may be in breach; b. A short description of the incident and/or non-compliance; and c. The location (including co-ordinates), date, and time of the incident and/or non-compliance. In the event the exact information cannot be provided, provide the best information available	Not Applicable	No non-compliances occurred during the reporting period.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
27	The approval holder must provide to the Department the details of any incident or non-compliance with the conditions as soon as practicable and no later than 10 business days after becoming aware of the incident or non-compliance, specifying: a. Any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future; b. The potential impacts of the incident or non-compliance; and c. The method and timing of any remedial action that will be undertaken by the approval holder.	Not Applicable	No non-compliances occurred during the reporting period.
Independent audit			
28	The approval holder must ensure that independent audits of compliance with the conditions are conducted as requested in writing by the Minister.	Not Applicable	A request for an independent audit of the Project was not made by the Minister during the reporting period.
29	For each independent audit, the approval holder must: a. Provide the name and qualifications of the independent auditor and the draft audit criteria to the Department; b. Only commence the independent audit once the audit criteria have been approved in writing by the Department; and	Not Applicable	A request for an independent audit of the Project was not made by the Minister during the reporting period.

Condition Number / Reference	Condition	Is the Project compliant with this condition?	Evidence/ Comments
	c. Submit an audit report to the Department within the timeframe specified in the approved audit criteria.		
30	The approval holder must publish the audit report on the website within 10 business days of receiving the Department's approval of the audit report and keep the audit report published on the website until the end date of this approval.	Not Applicable	A request for an independent audit of the Project was not made by the Minister during the reporting period.
Completion of the action			
31	Within 30 days after the completion of the action, the approval holder must notify the Department in writing and provide completion data.	Not Applicable	The action has not been completed.

4. Appendices

Appendix A

EPBC 2016/7724 Approval and Variation Notice

Appendix B

Aroona Station Voluntary Declaration Package

Appendix C

Offset Management Plan

Appendix D

Offset Area Management Report – Baseline Year 1

Appendix E

Variation Notification Letter from DAWE

Appendix F

Indirect Offset Strategy

Appendix G

Warning Letter from DAWE

Appendix A

EPBC 2016/7724 Approval and Variation Notice

Australian Government
Department of Agriculture, Water and the Environment

APPROVAL

Residential Development, Teviot Road, Jimboomba, 17 km north of Beaudesert, Queensland (EPBC 2016/7724)

This decision is made under sections 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*. Note that section 134(1A) of the **EPBC Act** applies to this approval, which provides in general terms that if the approval holder authorises another person to undertake any part of the action, the approval holder must take all reasonable steps to ensure that the other person is informed of any conditions attached to this approval, and that the other person complies with any such condition.

Details

Person to whom the approval is granted (approval holder)	Celestino Pty Limited
ACN or ABN of approval holder	165 629 783
Action	To construct a residential development on Lot 800 on SP247625, Lots 101, 102, 104, 105, and 106 on SP254145 on Teviot Road, Jimboomba, 17 km north of Beaudesert, Queensland. [See EPBC Act referral 2016/7724]

Approval decision

My decision on whether or not to approve the taking of the action for the purposes of the controlling provision for the action is as follows.

Controlling Provisions

Listed Threatened Species and Communities	
Section 18	Approve
Section 18A	Approve

Period for which the approval has effect

This approval has effect until 31 August 2050.

Decision-maker

Name and position	Anu Datta Acting Assistant Secretary of the Environment Assessments Queensland and Sea Dumping Branch Department of Agriculture, Water and the Environment
Signature	
Date of decision	28 September 2020

Conditions of approval

This approval is subject to the conditions under the EPBC Act as set out in ANNEXURE A.

ANNEXURE A – CONDITIONS OF APPROVAL

Part A – Conditions specific to the action

Development area

1. The approval holder must:

   a. Not **clear** more than 330.8 ha of **Koala habitat** and **Grey-headed Flying-fox foraging habitat** within the **development area**; and must confine any **clearing** to the areas designated as 'Remnant', 'Regrowth' and 'Non-remnant' shaded in solid blue, green and cream or identified as a road crossing as shown in Attachment A.

   b. Ensure that only **minor clearing** and **nature trails** are permitted within the **on-site conservation corridor**, provided that they do not impact **Koalas** or **Grey-headed Flying-foxes**, or **clear** any **Koala food trees** or **Grey-headed Flying-fox winter or spring flowering foraging species**.

2. For the protection of the **Koala** and the **Grey-headed Flying-fox**, the approval holder must not **clear** more than a total of 300 ha of **Koala habitat** and **Grey-headed Flying-fox foraging habitat** within the **development area** until the Offset Strategy required under condition 5(c) has been approved in writing by the **Minister**.

3. For the protection of the **Koala** and the **Grey-headed Flying-fox** at the **development area**, the approval holder must:

   a. Ensure that a **fauna spotter/catcher** is present during all **clearing** and **construction** activities and given sufficient authority to ensure that such activities do not cause injury or death of **Koalas**;

   b. **Clear** in accordance with the *Nature Conservation (Koala) Conservation Plan 2017* approved under the *Nature Conservation Act 1992* (Qld) so as to allow **Koalas** to safely move out of **clearing** area and into connected areas of **Koala habitat**, and implement all provisions for **sequential clearing**;

   c. Install temporary **Koala exclusion fencing** around any area of **construction** work, immediately after **clearing** and prior to the commencement of **construction** in that area, so as to prevent **Koalas** entering any area where **construction** is taking place. The **Koala exclusion fencing** around any **construction** area must remain in place until **construction** activities within that fenced **construction** area are completed;

   d. Implement measures to prevent domestic and feral dogs from entering the **development area** and adjacent **Koala habitat** during **clearing** and **construction** to minimise the risk to **Koalas** of predation by domestic and feral dogs at the **development area** and within the **on-site conservation corridor**. Such measures must include (but are not limited to) prohibition of workers bringing domestic dogs into the **development area** and adjacent **Koala habitat**;

   e. Implement traffic calming measures and ensure that the speed of all vehicles on construction roads in the **development area** is no greater than 40 km/h at any time (except an emergency) so as to minimise the risk to **Koala** of vehicle strike;

   f. Construct roads consistent with **Queensland's fauna sensitive road design guidelines** to minimise the risks to **Koalas** of vehicle strike. In particular, on roads flanking the **on-site**

conservation corridor or adjacent **Koala habitat** or waterways, or which cross waterways, **safe fauna movement solutions**, **fauna exclusion/koala proof fencing** and **local traffic management measures** must be implemented in accordance with **Queensland's Koala-sensitive Design Guideline**; and

g. Install prominent **Koala** awareness signage consistent with **Queensland's wildlife signing guidelines** prior to opening to public motorists, any road where the presence of listed threatened species is known or expected, such as on roads flanking the **on-site conservation corridor** or adjacent to **safe fauna movement solutions**.

4. For the on-going protection and rehabilitation of **Koala habitat** and **Grey-headed Flying-fox foraging habitat** throughout the **on-site conservation corridor**, the approval holder must:

   a. ensure the width of the **on-site conservation corridor** is at least 100 metres wide to function effectively and minimise edge effects; and

   b. manage and restore the **on-site conservation corridor** for the period of effect of the approval, or until such time that the **Department** agrees in writing that it is satisfied with written evidence that the **Council** has accepted ownership of and responsibilities to manage the **on-site conservation corridor**. If by 31 January 2045, **Council** has not accepted the ownership of and responsibilities to manage the **on-site conservation corridor**, the approval holder must submit in writing an alternative on-going management arrangement for the **on-site conservation corridor** to the **Minister** for approval.

Environmental Offset Requirements

5. To compensate for the **clearing** of 330.8 ha of **Koala habitat** and **Grey-headed Flying-fox foraging habitat**, and the functional loss of 3.5 ha of **Koala habitat**, the approval holder must:

   a. **Legally secure** at least 847.98 ha of land at the **Aroona Offset Site** and commence **management activities** prior to undertaking any **clearing** at the **development area**.

   b. Within 20 **business days** of **legally securing** at least 847.98 ha land at the **Aroona Offset Site**, provide the **Department** with written evidence demonstrating that the **Aroona Offset Site** has been **legally secured** (e.g. **legal security documentation**), and **shapefiles** of the **offset attributes**.

   ***Note**: Uses or activities at the **Aroona Offset Site** are not permitted if they are not compatible with the primary purpose of conservation.*

   c. Within 6 months of this approval, submit an Offset Strategy for the **Minister**'s approval, to compensate for residual impacts to **Koala** not addressed by securing and managing the **Aroona Offset Site**. The approved Offset Strategy must be implemented for the period of effect of this approval. The Offset Strategy must:

      i. Be prepared by a **suitably qualified field ecologist**;

      ii. Be prepared in accordance with relevant Commonwealth Government approved conservation advices, recovery plans, and threat abatement plans;

      iii. Demonstrate that the proposed offset area(s) meets the principles of the **EPBC Act Environmental Offsets Policy** and **Environmental Management Plan Guidelines**;

      iv. Include timelines and mechanisms for **legal security** for residual proposed direct offsets (if applicable);

v. Include time bound commitments to ecological outcomes and offset performance and completion criteria (including milestones) for achieving ecological outcomes; and

vi. Detail the management and monitoring actions to be undertaken, or a plan to conduct or fund research to inform the long-term conservation of the **Koala.**

Note 1: *The residual/outstanding offset quantum requirement to compensate for residual impacts to* ***Koala*** *not addressed by securing and managing the* ***Aroona Offset Site*** *has been assessed by the Department to be 8%.*

Note 2*: Additional offsets can be provided through either direct or other compensatory measures (or a combination of the two).*

Note 3*: If a research program is proposed, the research program should at a minimum investigate the compatibility of grazing and regeneration/restoration activities within* ***Koala habitat*** *and* ***Grey-headed Flying-fox foraging habitat*** *(e.g. remnant, regrowth, and restoration areas). An alternative research program may be proposed in accordance with the* ***EPBC Act Environmental Offsets Policy****, subject to the* ***Minister****'s approval.*

d. If a direct offset is proposed under condition 5(c), the approval holder must provide the **Department** with written evidence demonstrating the additional offset has been **legally secured** (e.g. **legal security documentation**), and **shapefiles** of the **offset attributes**, within 20 **business days** of **legally securing** the site.

Baseline survey information

6. By the end of **year 1**, the approval holder must complete baseline surveys of the entire **Aroona Offset Site**. The baseline surveys must be conducted by a **suitably qualified field ecologist** in accordance with a scientifically valid, robust, and repeatable methodology, and include the following:

   a. The detailed **baseline habitat quality assessment data** for each **operational management unit** as provided in the **preliminary documentation**;

   b. The **vegetation condition attributes** for each **Regional Ecosystem**;

   c. The number and condition of **Grey-headed Flying-fox winter or spring flowering foraging species** across each **assessment plot** at the **Aroona Offset Site**.;

   d. The **Species Stocking Rate**;

   e. The **extent of weed cover**;

   f. The **number** or **abundance** of **non-native predators** and **non-native herbivores** across, and where possible surrounding, the **Aroona Offset Site**;

   g. The number of **Koala** mortalities attributable to **non-native predators**; and

   h. The baseline conditions in respect of each of the outcomes specified in conditions 8 – 18.

7. Within three (3) months of the end of **year 1**, the approval holder must **publish** all survey data (including survey methodology and dates) from the baseline surveys required under condition 6 including a program to monitor and report on progress against the ecological outcomes specified in conditions 8–18 on the **website** and provide a copy of this information to the **Department**.

Pest and weed management

8. The approval holder must demonstrate a 90% reduction in the **number** or **abundance** of **non-native predators** and **non-native herbivores** by the end of **year 5**, relative to the **number** or **abundance** identified during the baseline surveys, and ensure that the **number** or **abundance** of

non-native predators and **non-native herbivores** are then maintained at, or reduced below, the **year 5 number** or **abundance** for the rest of the period of effect of the approval.

9. Within 6 months of the end of **year 5** and thereafter within 6 months of each fifth anniversary of the date when the **Aroona Offset Site** is **legally secured**, the approval holder must **publish** the outcomes of condition 8 and provide a copy of the outcomes to the **Department** within 5 **business days** of being **published**.

10. The approval holder must demonstrate the **extent of weed cover** across the whole **Aroona Offset Site** is:

    a. Less than 25% by the end of **year 5**; and

    b. Less than 5% by the end of **year 10**, and then maintained for the remaining period of effect of this approval.

11. Within 6 months of the end of **year 5** and thereafter within 6 months of each fifth anniversary of the date when the **Aroona Offset Site** is **legally secured,** the approval holder must **publish** the outcomes of condition 10 and provide a copy of the outcomes to the **Department** within 5 **business days** of being **published**.

Stock Management

12. The approval holder must install **fauna friendly stock exclusion fencing** around **Operational management unit 3** by the end of **year 1**.

13. To facilitate the outcomes prescribed under conditions 15 – 18, the approval holder must:

    a. Only permit grazing at the **Aroona Offset Site** for the purposes of bushfire hazard reduction.

    b. Ensure that all livestock are excluded from **Operational management unit 3** for a minimum of 5 years, or until a **suitably qualified independent expert** has determined that planted **Koala** and **Grey-headed Flying-fox** feed trees are of sufficient size to withstand impact from cattle.

    c. The approval holder must provide the **Department** with a report from the **suitably qualified independent expert** verifying that planted **Koala** and **Grey-headed Flying-fox** feed trees are of sufficient size to withstand impact from cattle.

    d. Ensure that any grazing is managed so as to prevent the risk of injury or mortality of **Koalas**.

14. Before each annual anniversary of the date when the **Aroona Offset Site** is **legally secured**, until the end of **year 5**, and thereafter before each fifth anniversary of the date when the **Aroona Offset Site** is **legally secured**, the approval holder must submit to the **Department** a monitoring report in respect of the period since the period covered by the previous report or since the date when the **Aroona Offset Site** was **legally secured**, which includes:

    a. An analysis of how cattle grazing at the **Aroona Offset Site** has facilitated and/or impacted the achievement of outcomes prescribed under conditions 15 – 18;

    b. Frequency, duration and location of grazing, and stock density for each grazing period;

    c. Details of any injury or mortality of individual **Koalas**;

    d. The timing and frequency of monitoring undertaken; and

e. Details of corrective actions already undertaken and/or proposed to be undertaken in the event of injury or mortality of individual **Koalas** as a result of grazing, and/or if monitoring demonstrates the outcomes under 15 - 18 are not achievable.

Habitat Quality Improvement

15. The approval holder must undertake ecological work which contributes to improvement of the condition of the **Regional Ecosystems** and facilitates natural regeneration at the **Aroona Offset Site**.

16. The approval holder must encourage natural regeneration and achieve the following outcomes in **Operational management unit 1**:

    a. Average **recruitment of woody perennial species** in the **ecologically dominant layer** greater than 75% of the **benchmark** for relevant **Regional Ecosystems** present by the end of **year 5**, and subsequently maintain or exceed that rate of recruitment for the remainder of the period of effect of the approval.

    b. The **Diameter at Breast Height** of trees increases as follows:

        i. Average **Diameter at Breast Height** of trees has increased by at least 2.5 cm by the end of **year 5** relative to the **baseline habitat quality assessment data**.

        ii. Average **Diameter at Breast Height** of trees has increased by at least 5 cm by the end of **year 10** relative to the **baseline habitat quality assessment data**.

        iii. Average **Diameter at Breast Height** of trees has increased by at least 7.5 cm by the end of **year 15** relative to the **baseline habitat quality assessment data**.

        iv. The number of **large trees** must be >100% of the **benchmark** for relevant **Regional Ecosystems** present by the end of **year 20** and this proportion must be subsequently maintained or exceeded for the remainder of the period of effect of the approval.

    c. **Tree canopy height** must be maintained at >70% of the **benchmark** for relevant **Regional Ecosystems** present for the period of effect of the approval.

    d. Average **tree canopy cover** must be maintained at >50% - <200% of the **benchmark** for relevant **Regional Ecosystems** present for the period of effect of the approval.

    e. A 50% increase, relative to the **baseline habitat quality assessment data**, in **Koala density** by the end of **year 10**.

    f. A 100% increase, relative to the **baseline habitat quality assessment data**, in **Koala density** by the end of **year 20**, and subsequently maintain or exceed that average **Koala density** for the remainder of the period of effect of the approval.

    g. An average of at least 6 (or maximum number allowed in the Regional Ecosystem present) different **Grey-Headed Flying-fox winter or spring flowering foraging species** present in each **assessment plot** by the end of **year 5**, and subsequently maintain or exceed this outcome for the remainder of the period of effect of the approval.

17. The approval holder must encourage natural regeneration and achieve the following outcomes in **Operational management unit 2**:

    a. Average **recruitment of woody perennial species** in the **ecologically dominant layer** must be maintained or exceeded at greater than 75% of the **benchmark** for relevant **Regional Ecosystems** present for the remainder of the period of effect of the approval.

    b. The **Diameter at Breast Height** of trees increases as follows:

        i. Average **Diameter at Breast Height** of trees has increased by at least 2.5 cm by the end of **year 5** relative to the **baseline habitat quality assessment data**.

        ii. Average **Diameter at Breast Height** of trees has increased by at least 5 cm by the end of **year 10** relative to the **baseline habitat quality assessment data**.

        iii. Average **Diameter at Breast Height** of trees has increased by at least 7.5 cm by the end of **year 15** relative to the **baseline habitat quality assessment data**.

        iv. The number of **large trees** must be 50-100% of the **benchmark** for relevant **Regional Ecosystems** present by the end of **year 20** and this proportion must be subsequently maintained or exceeded for the remainder of the period of effect of the approval.

    c. Average **tree canopy height** at >70% of the **benchmark** for **Regional Ecosystems** present by the end of **year 5,** and subsequently maintain the average tree canopy height in that range for the remainder of the period of effect of the approval.

    d. Average **tree canopy cover** must be maintained at >50% - <200% of the **benchmark** for relevant **Regional Ecosystems** present for the period of effect of the approval.

    e. A 50% increase, relative to the **baseline habitat quality assessment data, in Koala density** by the end of **year 10.**

    f. A 100% increase, relative to the **baseline habitat quality assessment data**, in **Koala density** by the end of **year 20**, and subsequently maintain or exceed that average **Koala density** for the remainder of the period of effect of the approval.

    g. An average of at least 6 (or maximum number allowed in the **Regional Ecosystem** present) different **Grey-headed Flying-fox winter or spring flowering foraging species** present in each **assessment plot** by the end of **year 5**, and subsequently maintain or exceed this outcome for the remainder of the period of effect of the approval.

Habitat Creation

18. The approval holder must achieve the following outcomes in **Operational management unit 3**:

    a. Recreate the relevant **pre-clearing Regional Ecosystem** as identified in the baseline survey by planting 69.16 hectares of new **Koala habitat** and **Grey-headed Flying-fox foraging habitat**.

    b. Complete all planting and direct seeding of new **Koala Habitat** and **Grey-headed Flying-fox foraging habitat** by the end of **year 2**.

    c. Average **recruitment of woody perennial species** in the **ecologically dominant layer** greater than 20% of the **benchmark** for relevant **Regional Ecosystems** present by the end of **year 5**.

    d. Average **recruitment of woody perennial species** in the **ecologically dominant layer** at greater than 75% of the **benchmark** for relevant **Regional Ecosystems** present by the end of **year 10**,

and subsequently maintain or exceed that rate of recruitment for the remainder of the period of effect of the approval.

e. The **Diameter at Breast Height** of trees increases as follows:

   i. Average **Diameter at Breast Height** of trees has increased by at least 2.5 cm by the end of **year 5** relative to the **baseline habitat quality assessment data**.

   ii. Average **Diameter at Breast Height** of trees has increased by at least 5 cm by the end of **year 10** relative to the **baseline habitat quality assessment data**.

   iii. Average **Diameter at Breast Height** of trees has increased by at least 7.5 cm by the end of **year 15** relative to the **baseline habitat quality assessment data**.

   iv. The average **Diameter at Breast Height** trees must be at least 50% of the **benchmark** for **large trees** for relevant **Regional Ecosystems** present by the end of **year 20** and this proportion must be subsequently maintained or exceeded for the remainder of the period of effect of the approval.

f. Average **tree canopy cover** at >10% of the **benchmark** for relevant **Regional Ecosystems** present by the end of **year 10**, and subsequently maintain or exceed 10% of the **benchmark** for relevant **Regional Ecosystems** for the remainder of the period of effect of the approval.

g. Average **tree canopy height** at >25% of the **benchmark** for relevant **Regional Ecosystems** present at the site by the end of **year 10**, and subsequently maintain or exceed that **tree canopy height** for the remainder of the period of effect of the approval.

h. An increase in **Koala density**, relative to the **baseline habitat quality assessment data**, by the end of **year 10**.

i. **Koala density** by the end of **year 20**, must at a minimum achieve the baseline **Koala density** for **Operational Management Unit 1**, as identified in the **baseline habitat quality assessment data**.

j. An average of at least 6 different **Grey-headed Flying-fox winter or spring flowering foraging species** present in each **assessment plot** by the end of **year 10**, and subsequently maintain or exceed this diversity of foraging species for the remainder of the period of effect of the approval.

19. The approval holder must engage a **suitably qualified field ecologist** to undertake an assessment at the end of each of **year 5**, **year 10**, **year 15**, and **year 20** as to whether each outcome required under conditions 8 – 18 has been, or is likely to be achieved in accordance with the condition requirements, and provide advice of any circumstance/s which they consider is/are affecting the achievement of each outcome. The findings of each assessment must be documented and **published** on the **website** within 3 months of the end of the particular period at the end of which the assessment is undertaken and be provided to the **Department** within 5 **business days** of being **published**.

20. If, at any time during the period of effect of the approval, the **Minister** is not satisfied that any of the requirements and/or outcomes under the conditions of approval, including (but not limited to) conditions 8 – 18, have been or are likely to be achieved or maintained, the **Minister** may require the approval holder to submit a corrective action plan for the **Aroona Offset Site** for the **Minister's**

approval, or to monitor, manage, avoid, mitigate, offset, record and/or report on, impacts to the **Koala** and/or the **Grey-headed Flying-fox**.

a. The **Minister** may set a timeframe in which the corrective action plan must be submitted and suitable for approval, may require that the corrective action plan be prepared and/or reviewed by an **suitably qualified independent expert** and may specify consequences for the approval holder if the corrective action plan is not suitable for approval within the specified timeframe.

b. The approval holder must implement the corrective action plan approved by the **Minister** in writing.

Part B – Standard administrative conditions

Notification of date of commencement of the action

21. The approval holder must notify the **Department** in writing of:

    a. the date of **commencement of the action** within 5 **business days** after the date of **commencement of the action**;

    b. the date of commencement of **clearing** within 5 **business days** after the date of commencement of **clearing**; and

    c. the date of commencement of **construction** within 5 **business days** after the date of commencement of **construction**.

22. If the **commencement of the action** does not occur within 5 years from the date of this approval, then the approval holder must not **commence the action** without the prior written agreement of the **Minister**.

Compliance records

23. The approval holder must maintain accurate and complete **compliance records**.

24. If the **Department** makes a request in writing, the approval holder must provide electronic copies of **compliance records** to the **Department** within the timeframe specified in the request.

*Note: **Compliance records** may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, and or used to verify compliance with the conditions. Summaries of the result of an audit may be published on the **Department**'s website or through the general media.*

Annual compliance reporting

25. The approval holder must prepare a **compliance report** for each 12 month period following the date of **commencement of the action**, or otherwise in accordance with an annual date that has been agreed to in writing by the **Minister**. The approval holder must:

    a. **Publish** each **compliance report** on the **website** within 60 **business days** following the relevant 12 month period;

    b. Notify the **Department** by email that a **compliance report** has been published on the **website** and provide the weblink for the **compliance report** within 5 **business days** of the date of publication;

    c. Keep all **compliance reports** publicly available on the **website** until this approval expires;

d. Exclude or redact **sensitive ecological data** from **compliance reports** published on the **website**; and

e. Where any **sensitive ecological data** has been excluded from the version published, submit the full **compliance report** to the **Department** within 5 **business days** of publication.

***Note**: **Compliance reports** may be published on the **Department's** website.*

Reporting non-compliance

26. The approval holder must notify the **Department** in writing of any: **incident**; or non-compliance with the conditions. The notification must be given as soon as practicable, and no later than 2 **business days** after becoming aware of the **incident** or non-compliance. The notification must specify:

    a. Any condition which is or may be in breach;

    b. A short description of the **incident** and/or non-compliance; and

    c. The location (including co-ordinates), date, and time of the **incident** and/or non-compliance. In the event the exact information cannot be provided, provide the best information available.

27. The approval holder must provide to the **Department** the details of any **incident** or non-compliance with the conditions as soon as practicable and no later than 10 **business days** after becoming aware of the **incident** or non-compliance, specifying:

    a. Any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future;

    b. The potential impacts of the **incident** or non-compliance; and

    c. The method and timing of any remedial action that will be undertaken by the approval holder.

Independent audit

28. The approval holder must ensure that independent audits of compliance with the conditions are conducted as requested in writing by the Minister.

29. For each **independent audit**, the approval holder must:

    a. Provide the name and qualifications of the independent auditor and the draft audit criteria to the **Department**;

    b. Only commence the **independent audit** once the audit criteria have been approved in writing by the **Department**; and

    c. Submit an audit report to the **Department** within the timeframe specified in the approved audit criteria.

30. The approval holder must **publish** the audit report on the **website** within 10 **business days** of receiving the **Department's** approval of the audit report and keep the audit report published on the **website** until the end date of this approval.

Completion of the action

31. Within 30 days after the **completion of the action**, the approval holder must notify the **Department** in writing and provide **completion data**.

Part C - Definitions

In these conditions, except where contrary intention is expressed, the following definitions are used:

Abundance is an index of the **number** detected relative to survey effort. The method used to determine **abundance** must be supported by peer reviewed literature and reliably repeatable so as to provide reliable comparison between baseline and subsequent results.

Aroona Offset Site means the area to be managed as an offset for the impacts on the **Koala habitat** and **Grey-headed Flying-fox foraging habitat**, shown as all the areas marked with bright green boundary lines designated as '20200327_Celestino_BDY' in the map at Attachment B.

Assessment plot means the area within a survey area measuring 100 metre by X 50 metre plot following positioned such that the long edges are parallel to the contour of the land at the location of the plot.

Baseline habitat quality assessment data means the habitat quality scoring which provide the baseline and future scoring for the **Aroona Offset Site** as specified in the Table 9, Table 10, Table 14, Table 15, Table 16, Table 17, Table 18 and Table 19 in the **preliminary documentation**; Offset Site Modified Koala Habitat Assessment Tables in Appendix J of the **preliminary documentation**; and Offset Site Grey-headed Flying-fox Habitat Assessment in Appendix L of the **preliminary documentation**.

Benchmark means the BioCondition attribute benchmark for the **Regional Ecosystem** as defined in the most recent officially released version of *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual* (version 2.2, 2015), Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts.

Business day means a day that is not a Saturday, a Sunday or a public holiday in the state or territory of the action.

Clear/Clearing means the cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ringbarking, uprooting or burning of vegetation (but not including weeds – see the *Australian weeds strategy 2017 to 2027* for further guidance). **Clearing** does not include any relevant prescribed burns or actions undertaken for bushfire management, where required.

Commencement of the action means the first instance of any specified activity associated with the action including **clearing**, **construction** and/or **management activities** at the **Aroona Offset Site**. **Commence the action/Commencement of the action** does not include minor physical disturbance necessary to:

i. Undertake pre-clearance surveys or monitoring programs;

ii. Install signage and /or temporary fencing to prevent unapproved use of the project area so long as these are located where it will have no impact on the **protected matters**;

iii. Protect environmental and property assets from fire, weeds and feral animals, including use of existing surface access tracks;

iv. Install temporary site facilities for persons undertaking pre-commencement activities so long as these are located where they have no impact on the **protected matters**; and

v. Undertake soil sampling or geotechnical investigations provided these cause only minor physical disturbance and are required in advance of formal commencement of site works.

Completion data means an environmental report and spatial data clearly detailing how the conditions of this approval have been met. The **Department**'s preferred spatial data format is **shapefile**.

Completion of the action means the time at which all approval conditions (except condition 28) have been fully met.

Compliance records means all documentation or other material in whatever form required to demonstrate compliance with the conditions of approval in the approval holder's possession or that are within the approval holder's power to obtain lawfully.

Compliance report/s means written reports:

i. Providing accurate and complete details of compliance, **incidents**, and non-compliance with the conditions;

ii. Consistent with the **Department's** *Annual Compliance Report Guidelines* (2014); and

iii. Include a **shapefile** of any clearance of any **protected matters**, or their habitat, undertaken within the relevant 12 month period.

Construction means the erection of a building or structure that is or is to be fixed to the ground and wholly or partially fabricated on-site; the alteration, maintenance, repair or demolition of any building or structure; preliminary site preparation work which involves breaking of the ground (including pile driving); the laying of pipes and other prefabricated materials in the ground, and any associated excavation work; but excluding the installation of temporary fences and signage.

Council means the local government authority responsible for the local government area encompassing Jimboomba, currently Logan City Council, Queensland.

Department means the Australian Government agency responsible for administering the **EPBC Act**.

Development area means the area designated as 'Referral Area' on the map at Attachment A and enclosed by a thick black border.

Diameter at Breast Height is the diameter of a tree's trunk measured at 1.3 metres from the ground.

Ecologically dominant layer means the tree layer making the greatest contribution to the overall biomass of the vegetation community.

Environmental Management Plan Guidelines means the **Department**'s *Environmental Management Plan Guidelines (2014)* or subsequent published revised version.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

EPBC Act Environmental Offsets Policy means the **Department**'s *EPBC Act 1999 Environmental Offsets Policy*, Commonwealth of Australia, 2012.

Extent of weed cover means the proportion (expressed as a percentage) of the total land area in which any square metre contains a non-native plant species known to restrict the movement of **Koala** and/or degrade the quality of **Koala habitat** and/or **Grey-headed Flying-fox foraging habitat**, or its ability to regenerate. Such non-native plant species include *Lantana camera* and *Ligustrum lucidum.*

Fauna exclusion/Koala proof fencing means fencing to guide **Koalas** away from roads and/or guide them towards safe fauna movement structures (such as underpasses) as described in *Fauna Sensitive Road Design: Volume 2 – Preferred Practices* (Queensland Department of Main Roads 2010).

Fauna friendly stock exclusion fencing means fencing designed to prevent access by cattle while providing for the free movement of **Koalas.**

Fauna spotter/catcher means a person licenced under the Queensland *Nature Conservation Act 1992* to detect, capture, care for, assess, and release wildlife disturbed by vegetation clearance activities.

Grey-Headed Flying-fox means the Grey-Headed Flying-fox (*Pteropus poliocephalus*) listed as a threatened species under the **EPBC Act**.

Grey-Headed Flying-fox foraging habitat means areas of vegetation that contain **Grey-headed Flying-fox** foraging trees, including **Grey-headed Flying-fox winter and spring flowering foraging species**.

Grey-headed Flying-fox winter or spring flowering foraging species means tree species which provide flowering resources in winter and spring for the **Grey-headed Flying-fox**.

Incident means any event which has the potential to, or does, impact on one or more **protected matter(s)**.

Independent means does not have any individual, or by employment or family affiliation, conflicting or competing interests with the approval holder; the approval holder's staff, representatives or associated persons; or the project, including any personal, financial, business or employment relationship, other than receiving payment for undertaking the role for which the condition requires and independent person.

Independent audit means an audit conducted by an **independent** and suitably qualified person as detailed in the *Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines* (2019).

Koala means the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) listed as a threatened species under the **EPBC Act**.

Koala density means the number and/or utilisation of **Koala** per unit area as determined in field surveys over the entire **Aroona Offset Site** undertaken by a **suitable qualified field ecologist** using a scientifically robust and repeatable methodology over a timeframe that serves as a sound basis for comparison.

Koala exclusion fencing means fencing which prevents the movement of koalas from one area to another. Suitable examples are found in *Koala Sensitive Design Guideline: A guide to koala sensitive designed measures for planning and development activities, (Queensland Department of Environment and Heritage Protection, 2012)* and in the **Koala referral guidelines**.

Koala food trees means a tree of genera *Angophora, Corymbia, Eucalyptus, Lophostemon* or *Melaleuca*, with a height of more than 4 metres and/or with a trunk circumference more than 31.5 centimetres at 1.3 metres above the ground, the leaves of which are known to be consumed by the **Koala**.

Koala habitat means any forest or woodland containing species that are known **Koala food trees**, or shrubland with emergent **Koala food trees** (as defined in the **Koala referral guidelines**).

Koala referral guidelines means the **Department's** *EPBC Act referral guidelines for the vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory),* Commonwealth of Australia, 2014.

Large trees means living trees with a **Diameter at Breast Height** greater than the **Diameter at Breast Height** threshold specified in the **benchmark** for the relevant **Regional Ecosystem** and measured in accordance with the *Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy* (Version 1.2) (Queensland Department of Environment and Heritage Protection, 2017), or any subsequent version. This may include both eucalypt and non-eucalypt trees depending on the relevant **Regional Ecosystem**.

Legal security/Legally secure/secured/securing means to provide ongoing conservation protection on the title of the land, under an enduring protection mechanism, such as a voluntary declaration under the *Vegetation Management Act 1999* (Qld) or another enduring protection mechanism agreed to in writing by the **Department**.

Legal security documentation means any documentation associated with **legally securing** offset site(s), including (but not limited to) management plans. **Legal security documentation** must include (at a minimum) the following:

a) Details of the **management activities** to be undertaken to achieve the outcomes prescribed under conditions 8 – 18;

b) A commitment that **legal security** of the **Aroona Offset Site** and **management activities** to achieve and maintain the outcomes prescribed under conditions 8 – 18 will be in place for the duration of the impact.

Local traffic management measures means devices that reduce the speed and/or volume of traffic, for example, road closures, chicanes, crosswalks, lighting, signage and rumble strips, as described in **Queensland's fauna sensitive road design guidelines**.

Management activities means activities to be undertaken at the **Aroona Offset Site**, including (but not limited to):

i. Baseline surveys to inform development and implementation of management measures to achieve outcomes;

ii. Perimeter fencing repairs and maintenance;

iii. Planting activities;

iv. Weed management;

v. Stock management/exclusion; or

vi. **Non-native predator** and **non-native herbivore** management.

Minister means the Australian Government Minister administering the **EPBC Act** including any delegate thereof.

Minor clearing means clearing required for the purpose of rehabilitation activities including removal of undergrowth for planting areas, weed management, or erosion and waterway stability works where approved by the Queensland Government in accordance with the **Natural Environment Overarching Site Strategy**.

Natural Environment Overarching Site Strategy means the Riverside Celestino Natural Environment Site Strategy prepared by Saunders Havill Group, approved by Queensland Government on 16 February 2018 (approval no. DEV2016/811), or a subsequent version approved by the Queensland Government.

Nature trails means paths for pedestrian movement made from impermeable surfaces such as crushed sandstone or spaced timber boardwalks.

Non-native predators means any non-native animals known to predate on the **Koala**.

Non-native herbivores means any non-native animals, excluding livestock authorised to be used as a hazard reduction tool within the **Aroona Offset Site,** known to degrade the quality of **Koala habitat** and/or **Grey-headed Flying-fox foraging habitat** and/or prevent its ability to regenerate.

Number means the number of individuals of a species known or estimated to be present in a specified area based on scientifically valid survey and sampling methods.

Offset attributes means an '.xls' file capturing relevant attributes of the **Aroona Offset Site**, including:

i. **EPBC Act** reference number

ii. Physical address of the **Aroona Offset Site**;

iii. Coordinates of the boundary points in decimal degrees;

iv. **Protected matters** that the offset compensates for;

v. Any additional **EPBC Act** listed threatened species and communities that are benefiting from the offset; and

vi. Size of the **Aroona Offset Site** in hectares.

On-site conservation corridor means the on-site conservation corridor within the **development area,** which have been designated to be retained for conservation purposes shown as the yellow hatched area at Attachment A.

Operational management unit includes **Operational management unit 1, Operational management unit 2** and **Operational management unit 3** within the **Aroona Offset Site** as shown at Attachment B.

Operational management unit 1 means the area designated as 'Cat B (572.88)' within the **Aroona Offset Site** shown as dark blue at Attachment B.

Operational management unit 2 means the area designated as 'Cat C (205.94)' within the **Aroona Offset Site** shown as light blue at Attachment B.

Operational management unit 3 means the area designated as 'Cat X (69.16)' within the **Aroona Offset Site** shown as white at Attachment B.

Pre-clearing Regional Ecosystem means the vegetation identified in the **preliminary documentation** as being present in a **Regional Ecosystem** prior to **clearing**.

Preliminary documentation means the Riverside Celestino EPBC Act Preliminary Documentation Final Report, 3 July 2020 including all appendices.

Protected matter means a matter protected under a controlling provision in Part 3 of the **EPBC Act** for which this approval has effect.

Publish means make publicly available on the **website** for the duration of this approval.

Queensland's fauna sensitive road design guidelines means Queensland Department of Main Roads 2010, *Fauna Sensitive Road Design. Volume 2 – Preferred Practices*, or subsequent published revised version.

Queensland's Koala-sensitive Design Guideline means Department of Environment and Science 2019, *Koala-sensitive Design Guideline A guide to koala-sensitive design measures for planning and development activities*, or subsequent published revised version.

Queensland's wildlife signing guidelines means Queensland Department of Transport and Main Roads 2019, *Traffic and Road Use Management, Transport and Main Roads Volume 3 – Signing and Pavement Marking, Part 8: Wildlife Signing Guidelines*, or subsequent published revised version.

Recruitment of woody perennial species means the proportion of the dominant canopy (**ecologically dominant layer**) species with evidence of recruitment and is measured in accordance with the *Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy* (Version 1.2) (Queensland Department of Environment and Heritage Protection, 2017), or any subsequent official version.

Regional Ecosystem/s means a vegetation community in a bioregion that is consistently associated with a particular combination of geology, landform and soil as classified by the Queensland Government under the *Vegetation Management Act 1999* (Qld).

Safe fauna movement solutions means measures to minimise the risk of injury or deaths of **Koalas** during **construction** and subsequently, such as **fauna exclusion/koala proof fencing**, fauna underpasses or overpasses, and/or bridges as described in **Queensland's fauna sensitive road design guidelines**.

Sensitive ecological data means data as defined in the Australian Government Department of the Environment (2016) *Sensitive Ecological Data – Access and Management Policy V1.0.*

Sequential clearing means the provisions specified in *Sequential clearing in Koala district A or B* under the *Nature Conservation (Koala) Conservation Plan 2017* under the *Nature Conservation Act 1992* (Qld). These include provisions for the area which may be **cleared** in any one stage, periods of non-**clearing** between stages, maintaining habitat links and restrictions on **clearing** trees containing **Koalas**.

Shapefile means location and attribute information of the action provided in an ESRI shapefile format. Shapefiles must contain '.shp', '.shx', '.dbf' files and a '.prj' file that specifies the projection/geographic coordinate system used. Shapefiles must also include an '.xml' metadata file that describes the shapefile for discovery and identification purposes.

Species Stocking Rate means the species stocking rate provided in Table 9, Table 10, Table 14, Table 15, Table 16, Table 17, Table 18 and Table 19 in the **preliminary documentation**; species stocking rate provided in Offset Site Modified Koala Habitat Assessment Tables in Appendix J of the **preliminary documentation**; and Offset Site Grey-headed Flying-fox Habitat Assessment in Appendix L of the **preliminary documentation**, which provide the baseline and future species stocking rate scoring for the **Aroona Offset Site.**

Suitably qualified field ecologist means a person who has professional qualifications and at least 3 years' work experience designing and implementing flora and fauna surveys and management plans for the **Koala** and/or the **Grey-headed Flying-fox** using relevant protocols, standards, methods and/or literature.

Suitably qualified independent expert means an **independent** person who has professional qualifications, training, skills and at least 5 years' experience in the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.

Tree canopy cover as defined in the most recent officially released version of *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual* (version 2.2, 2015), Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts.

Tree canopy height as defined in the most recent officially released version of *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual* (version 2.2, 2015), Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts.

Vegetation condition attributes means attributes that indicate vegetation functions for biodiversity, as defined in the most recent officially released version of *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual* (version 2.2, 2015), Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts.

Website means a set of related web pages located under a single domain name attributed to the approval holder and available to the public.

Year 1 means the period within one year from the date when the **Aroona Offset Site** is **legally secured**.

Year 2 means the period within two years from the date when the **Aroona Offset Site** is **legally secured**.

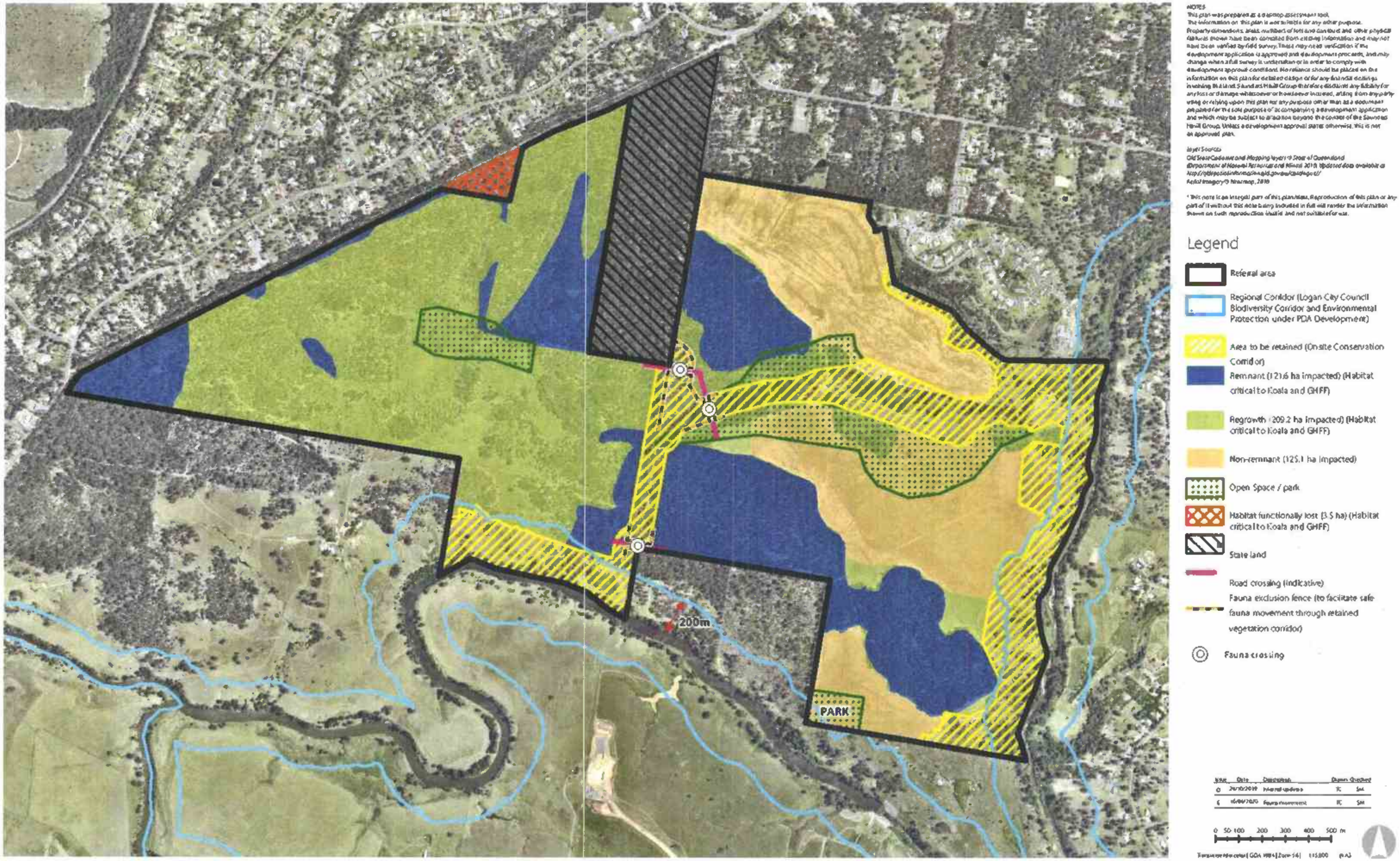
Year 5 means the period within five years from the date when the **Aroona Offset Site** is **legally secured.**

Year 10 means the period within ten years from the date when the **Aroona Offset Site** is **legally secured.**

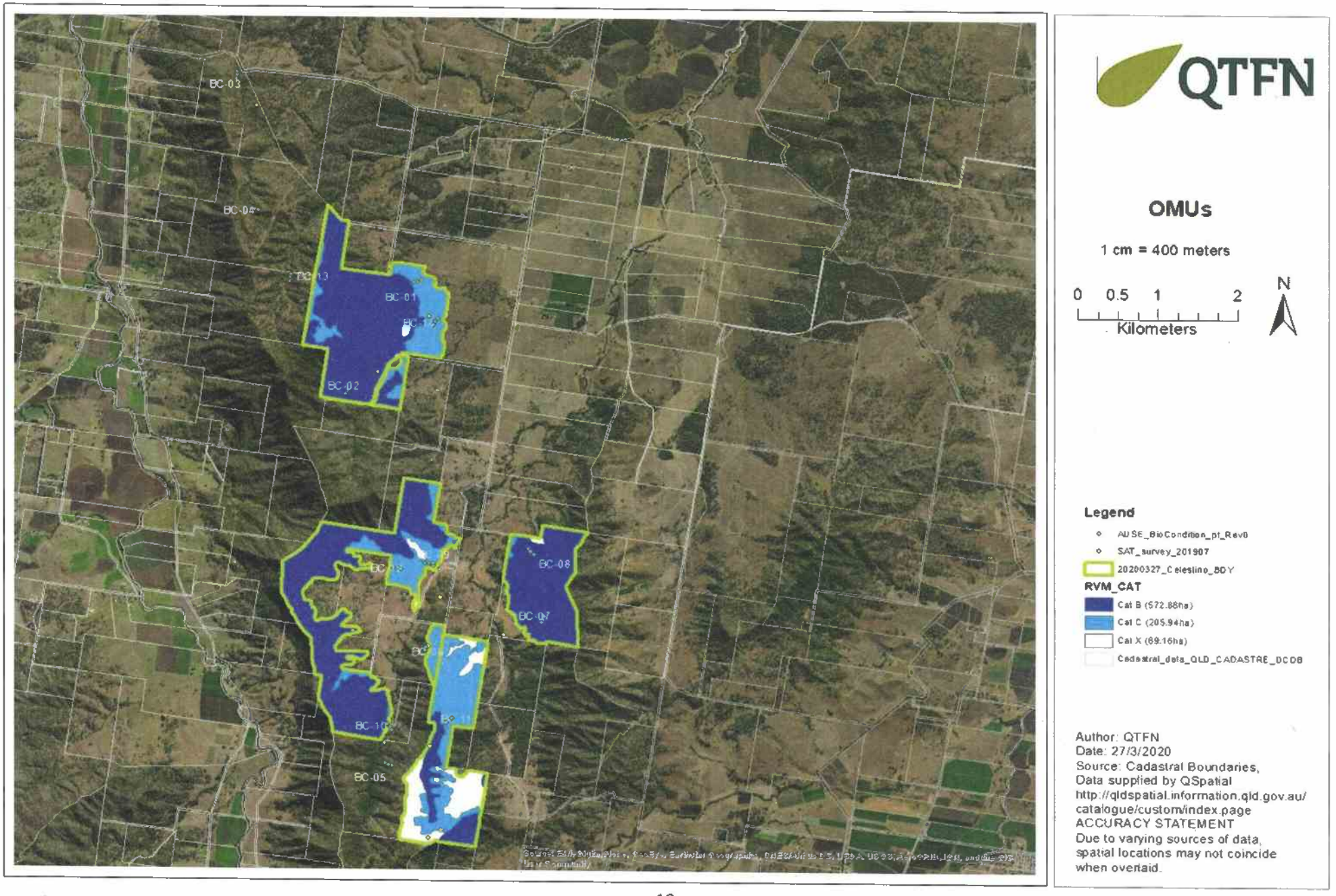
Year 15 means the period within fifteen years from the date when the **Aroona Offset Site** is **legally secured.**

Year 20 means the period within twenty years from the date when the **Aroona Offset Site** is **legally secured.**

Attachment A – Development area (including on-site conservation corridor and habitat critical to the survival of the Koala and Grey-headed Flying-fox)



Attachment B – Aroona Offset Site at 338 Alpers Road, Mount Mort, Queensland



Australian Government
Department of Agriculture, Water and the Environment

VARIATION OF CONDITIONS ATTACHED TO APPROVAL
Residential Development, Teviot Road, Jimboomba,17 km north of Beaudesert, Queensland (EPBC 2016/7724)

This decision to vary conditions of approval is made under section 143 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Approved action

Person to whom the approval is granted	Celestino Pty Limited ACN or ABN: 165 629 783
Approved action	To construct a residential development on Lot 800 on SP247625, Lots 101, 102, 104, 105, and 106 on SP254145 on Teviot Road, Jimboomba 17 km north of Beaudesert, Queensland [See EPBC Act referral 2016/7724]
Expiry date of approval	This approval has effect until 31 August 2050

Variation

Variation of conditions attached to approval	The variation is: Delete condition 5 and replace it with the condition specified below. Add condition 5A as specified below. Delete notes 1, 2 and 3.
Date of effect	This variation has effect on the date the instrument is signed

Person authorised to make decision

Name and position	Kim Farrant Assistant Secretary Environment Assessments (Vic, Tas) and Post Approvals Branch
Signature	
Date of decision	23 December 2021

5. To compensate for the **clearing** of 330.8 ha of **Koala habitat** and **Grey-headed Flying-fox foraging habitat**, and the functional loss of 3.5 ha of **Koala habitat**, the approval holder must:

    a. **Legally secure** at least 847.98 ha of land at the **Aroona Offset Site** and commence **management activities** prior to undertaking any **clearing** at the **development area**.
    b. Within 20 **business days** of **legally securing** at least 847.98 ha of land at the **Aroona Offset Site**, provide the **Department** with:
        i. written evidence demonstrating that the **Aroona Offset Site** has been **legally secured**;
        ii. **legal security documentation**;
        iii. **offset attributes**; and
        iv. **shapefiles** of the **Aroona Offset Site**.

5A. To compensate for the remaining 8% of residual impacts to **Koala** not offset by securing and managing the **Aroona Offset Site**, the approval holder must, within 12 months of the date of this approval, submit a Conservation Strategy (the Strategy) for the **Minister's** approval. The Strategy must:

    a. explain how the financial contribution to be made by the approval holder to implement the Strategy has been determined;
    b. describe the conservation project(s) that comprise the Strategy, including:
        i. outcomes to be achieved by implementing the conservation projects(s);
        ii. a timetable of project activities, deliverables and financial contributions to be made by the approval holder; and
        iii. the institution or person(s) responsible for project implementation.
    c. demonstrate that the Strategy:
        i. where appropriate, is consistent with the **EPBC Act Environmental Offsets Policy**;
        ii. is consistent with relevant conservation advices, recovery plans and threat abatement plans for **Koala**; and
        iii. is likely to achieve a conservation gain for **Koala**.
    d. specify arrangements to periodically report to the **Department** on the implementation of the Strategy and achieving conservation gains for **Koala**.

Appendix B

Aroona Station Voluntary Declaration Package

Voluntary Declaration notice (2020/013666)

s19E – 19K of the Vegetation Management Act 1999

1. Details of request

1.1. **Proponent's name:** Landscapes Queensland Limited

1.2. **Date request received:** 16 November 2020

1.3. **Request:** declaration request to offset clearing associated with a development approval (EPBC 2016/7724) and as an area that contributes to the conservation of the environment

1.4. **Property description:** 108 CC109 & 64 CC552 & 111 CC553 & 216 CH311631 & 218 CH311734 & 219 CH311735 & 222 CH311798 & 233 CH311908 & 24 CH312032 & 28 CH312274 & 30 CH312310 & 31 CH312311 & 2 RP131297 & 2 RP31144 - Ipswich City Council; 44,45 CC32 - Lockyer Valley Regional Council

1.5. **Land tenure:** Freehold

1.6. **Decision reference**: 2020/013666

2. Declaration information

2.1. **Declaration made:**

The Chief Executive of the Department of Natural Resources, Mines and Energy declares the area identified on Declared Area Map DAM (2020/013666) as an area of high nature conservation value in accordance with s19F(1) of the *Vegetation Management Act 1999*.

The chief executive considers the declared area to meet the following criteria under s19G of the *Vegetation Management Act 1999*—

The declared area is an area of high nature conservation value under s19G(1)(b), as the area is one or more of the following:

- ❑ a wildlife refugium;
- ❑ a centre of endemism;
- ❑ an area containing a vegetation clump or corridor that contributes to the maintenance of biodiversity;
- ❑ an area that makes a significant contribution to the conservation of biodiversity;
- ❑ an area that contributes to the conservation value of a wetland, lake or spring stated in the notice mentioned in section 19F(1) of the declaration;
- ✓ another area that contributes to the conservation of the environment.

The documents outlined in 2.2 form part of this declaration.

2.2. **Voluntary declaration documents:**

The following documents are part of this voluntary declaration, and must be read in conjunction with this notice:

- ✓ Declared area map (DAM 2020/013666)

✓ Offset Management Plan – Celestino Pty Ltd: Riverside Jimboomba, EPBC 2016/7724. October 2020, prepared by the Queensland Trust for Nature

2.3. **Property Map of Assessable Vegetation**

In accordance with s20B of the *Vegetation Management Act 1999*, the following Property Map of Assessable Vegetation has been prepared for the declared area.

✓ Declared area PMAV (PMAV 2020/013752).

2.4. **Date of declaration: 4 December 2020**

3. Delegated officer's signature

Andrew Collins
Senior Natural Resource Management Officer
Department of Natural Resources, Mines and Energy

Queensland Government

Author : Genevieve Verrall
File / Ref number : 2020/013666
Unit : Natural Resource Assessment
Phone : 5352 4230

Department of
Natural Resources, Mines and Energy

4 December 2020

Queensland Trust for Nature
C/- Mr Stephen Lacey
GPO Box 162
BRISBANE QLD 4001

Dear Mr Lacey

Re: Certification of a voluntary declaration on 108 CC109 & 64 CC552 & 111 CC553 & 216 CH311631 & 218 CH311734 & 219 CH311735 & 222 CH311798 & 233 CH311908 & 24 CH312032 & 28 CH312274 & 30 CH312310 & 31 CH312311 & 2 RP131297 & 2 RP31144 - Ipswich City Council; 44,45 CC32 - Lockyer Valley Regional Council

This is to advise you that a voluntary declaration on Lots 108 CC109 & 64 CC552 & 111 CC553 & 216 CH311631 & 218 CH311734 & 219 CH311735 & 222 CH311798 & 233 CH311908 & 24 CH312032 & 28 CH312274 & 30 CH312310 & 31 CH312311 & 2 RP131297 & 2 RP31144 - Ipswich City Council; 44,45 CC32 - Lockyer Valley Regional Council has been certified and the declaration of an area of high nature conservation value has been made—consistent with your agreement—by the Department of Natural Resources, Mines and Energy (DNRME) on 4 December 2020. A copy of each of the following certified documents is attached for your records:

- Declaration notice
- Declared area plan
- Declared area PMAV
- Offset Management Plan – Celestino Pty Ltd: Riverside Jimboomba, EPBC 2016/7724. October 2020, prepared by the Queensland Trust for Nature

Additional copies of the certified documents are attached for each registered owner listed on your original application form. These have been sent to you for distribution, as you are the nominated contact on the application form.

If a registered owner requires additional copies of the certified documents, these can be purchased at Department of Natural Resources, Mines and Energy Customer Service Centre.

DNRME Gympie
27 O'Connell Street
Gympie
Locked Mail Bag 383
Gympie 4570 Qld
Website www.dnrme.qld.gov.au
ABN 59 020 847 551

Please note, that in accordance with the declaration, management of the declared area, monitoring the condition of the declared area, and reporting on the condition of the declared area will be required. Please refer to the declaration documents for the specifics regarding such requirements.

This declaration will be noted on the title of the declared area—binding management, monitoring and reporting responsibilities upon current and future owners.

If you wish to discuss this matter further, please contact Genevieve on telephone number 5352 4230 quoting the above reference number.

Yours sincerely

Andrew Collins
Senior Natural Resource Management Officer

Declared Area Map

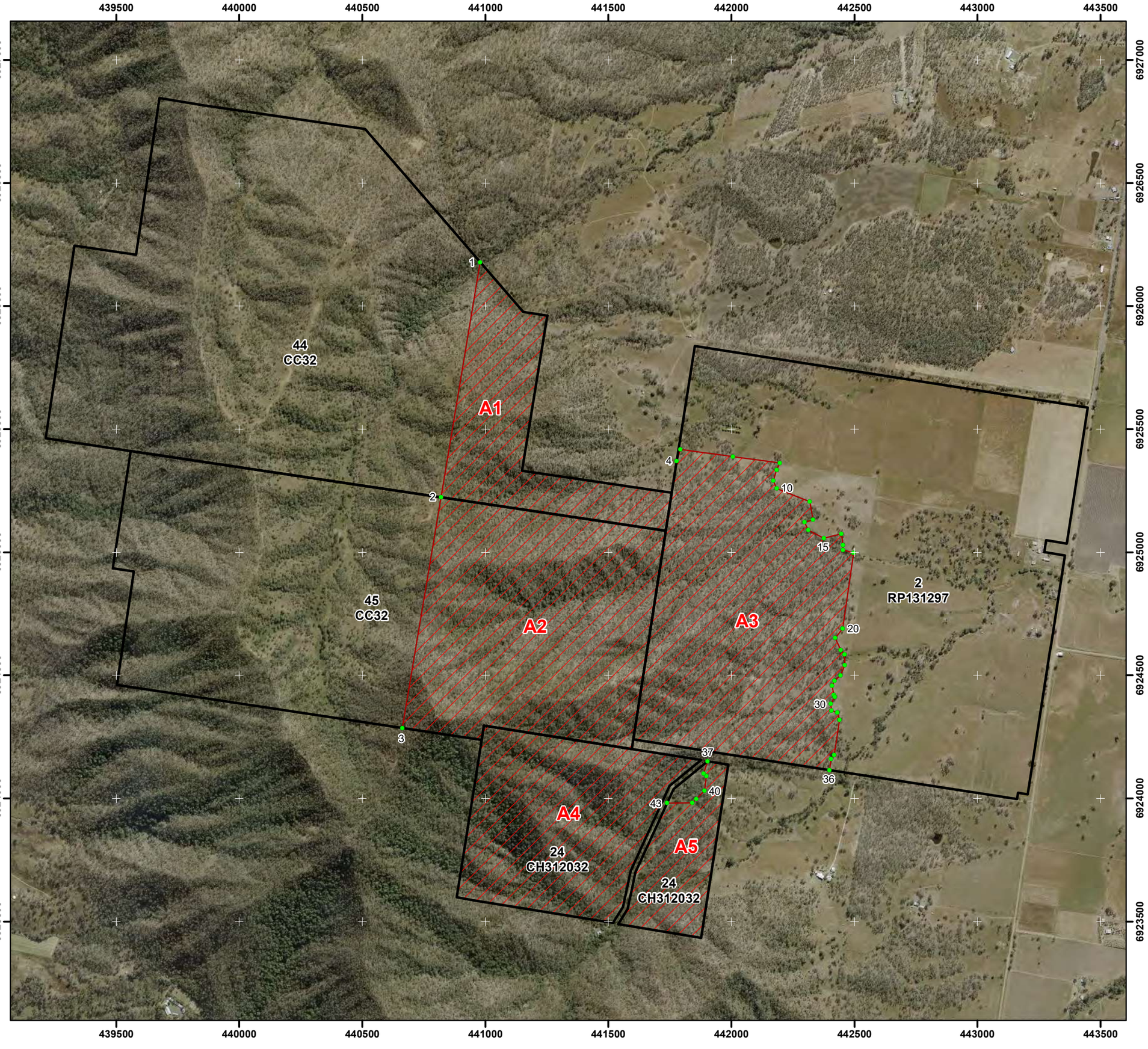
Sheet 1 of 5

DAM 2020/013666

Queensland Government

LOT on PLAN

108CC109, 111CC553, 216CH311631, 218CH311734, 219CH311735, 222CH311798, 233CH311908, 24CH312032, 28CH312274, 2RP131297, 2RP31144, 30CH312310, 31CH312311, 44CC32, 45CC32, 64CC552



0 200 400 600 800 1,000

meters

N

Scale: 1:15000
(original size A3)

LEGEND

- 8 Derived Reference Points
- Subject Lots
- Declared Area (A1 to A19)

This plan must be read in conjunction with Voluntary Declaration Notice 2020/013666

Notes:

Property boundary provided by Department of Natural Resources, Mines and Energy.
The property boundaries shown on this plan are approximate only. They are not an accurate representation of the legal boundaries.

Map Information:
Horizontal Datum: GDA 2020
Projection: Universal Transverse Mercator - Zone 56

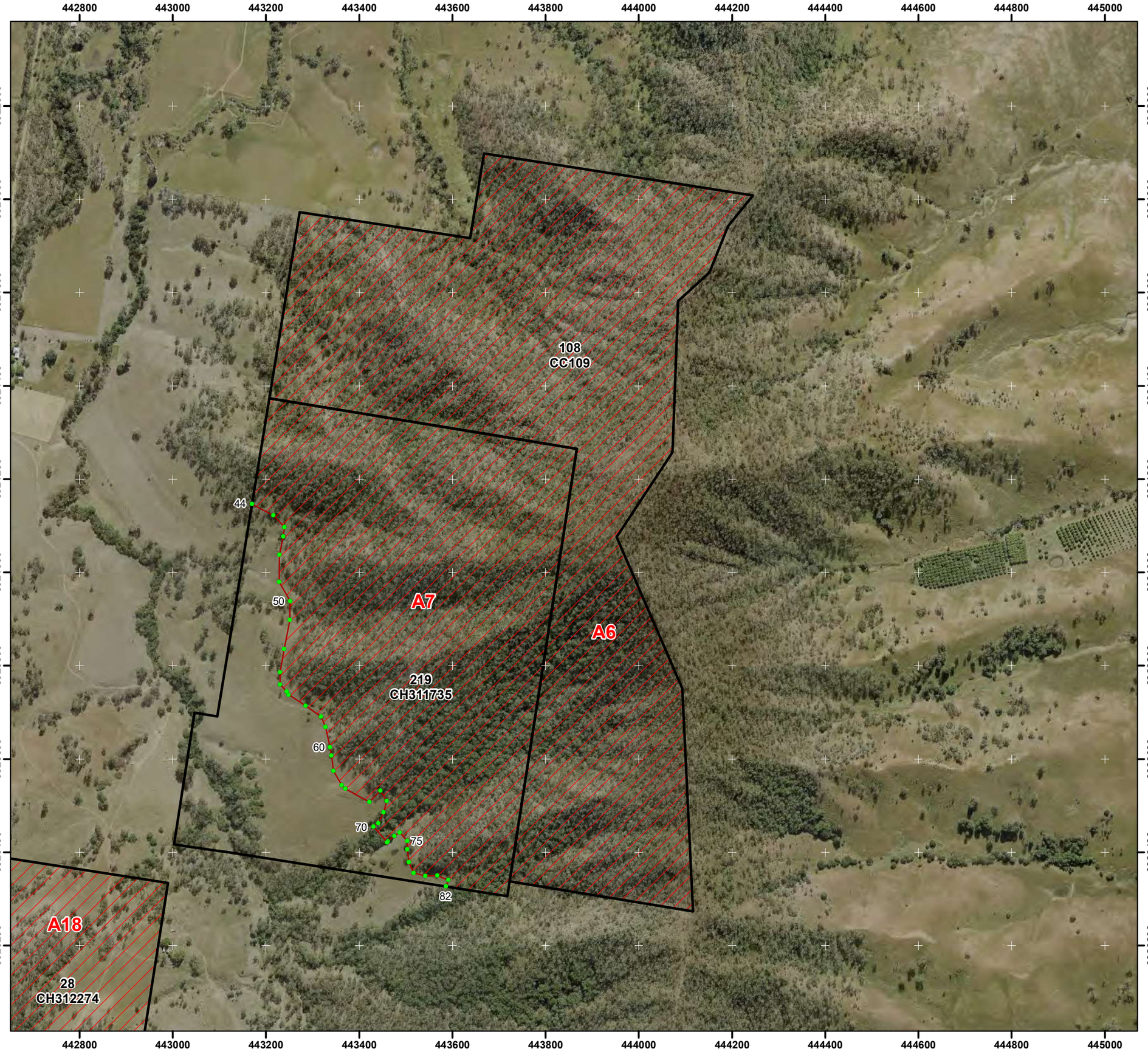
Digital Imagery: ipswich_2020_10cm_mosaic_a.ecw
Imagery Date: 04/05/2020
Imagery Type: Digital Ortho-rectified

While every care is taken to ensure the accuracy of this product, the Department of Natural Resource, Mines and Energy makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability, including without limitation, liability in negligence for all expenses, losses, damages (including indirect or consequential damage) and costs which might incur as a result of the product being inaccurate or incomplete in any way and for any reason. Data must not be used for direct marketing or be used in breach of the privacy laws.

Map Prepared by: LMO
Department of Natural Resources, Mines and Energy
South Region

Map Preparation Date: 01/12/2020

This colour plan must be reproduced in colour.



Declared Area Map

DAM 2020/013666

Queensland Government

LOT on PLAN

108CC109, 111CC553, 216CH311631, 218CH311734, 219CH311735, 222CH311798, 233CH311908, 24CH312032, 28CH312274, 2RP131297, 2RP31144, 30CH312310, 31CH312311, 44CC32, 45CC32, 64CC552

0 100 200 300 400 500
meters

N

Scale: 1:8000
(original size A3)

LEGEND

- 8 Derived Reference Points
- Subject Lots
- Declared Area (A1 to A19)

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Imagery Date: 04/05/2020
Imagery Type: Digital Ortho-rectified

Map Prepared by: LMO
Department of Natural Resources, Mines and Energy
South Region

Map Preparation Date: 01/12/2020

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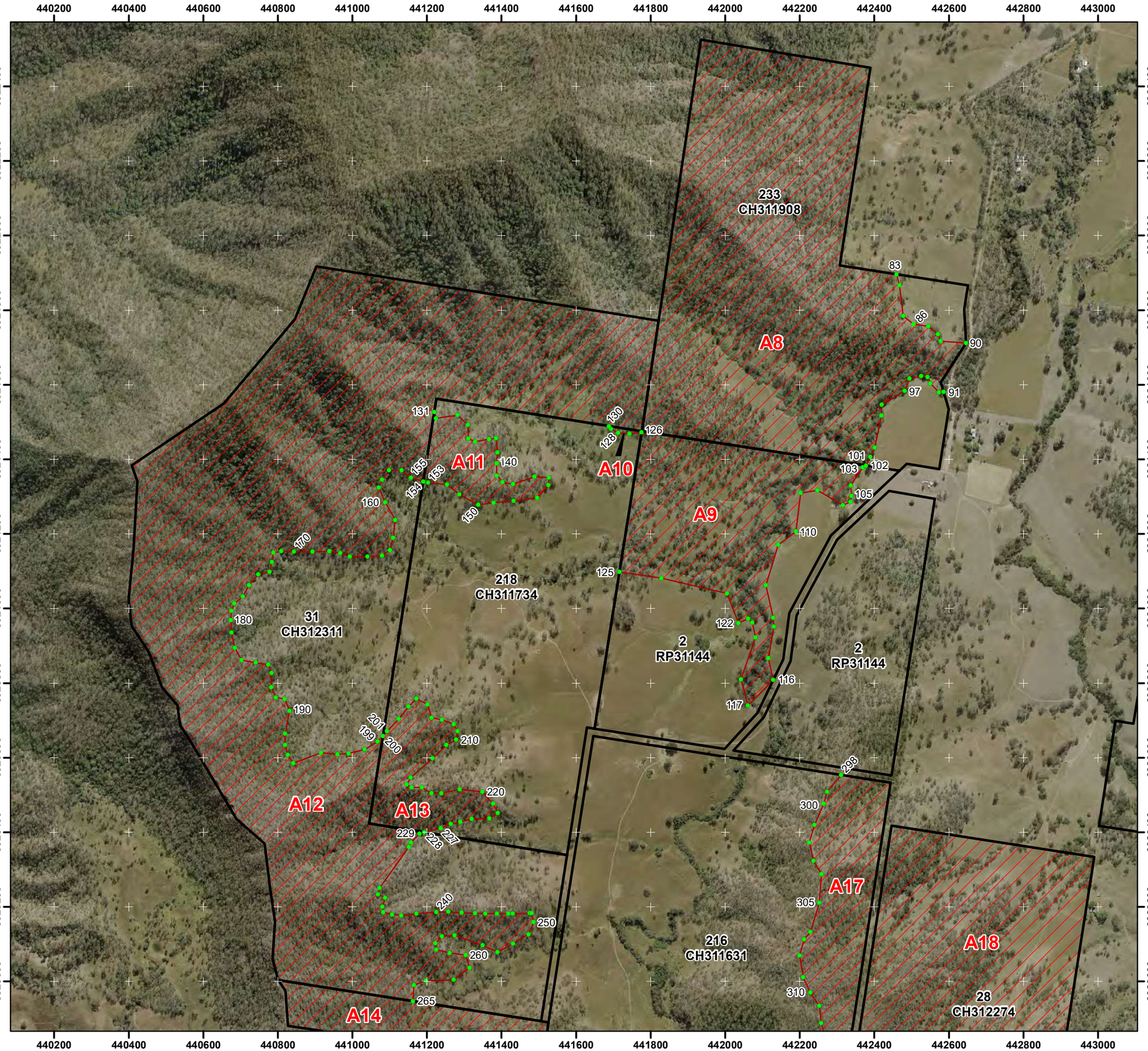

Declared Area Map

Sheet 3 of 5

DAM 2020/013666

Queensland Government

LOT on PLAN

108CC109, 111CC553, 216CH311631, 218CH311734, 219CH311735, 222CH311798, 233CH311908, 24CH312032, 28CH312274, 2RP131297, 2RP31144, 30CH312310, 31CH312311, 44CC32, 45CC32, 64CC552

0 100 200 300 400 500 600 700 800

meters

N

Scale: 1:10000
(original size A3)

LEGEND

- 8 Derived Reference Points
- Subject Lots
- Declared Area (A1 to A19)

This plan must be read in conjunction with Voluntary Declaration Notice 2020/013666

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Digital Imagery: ipswich_2020_10cm_mosaic_a.ecw
Imagery Date: 04/05/2020
Imagery Type: Digital Ortho-rectified

Map Prepared by: LMO
Department of Natural Resources, Mines and Energy
South Region

Map Preparation Date: 01/12/2020

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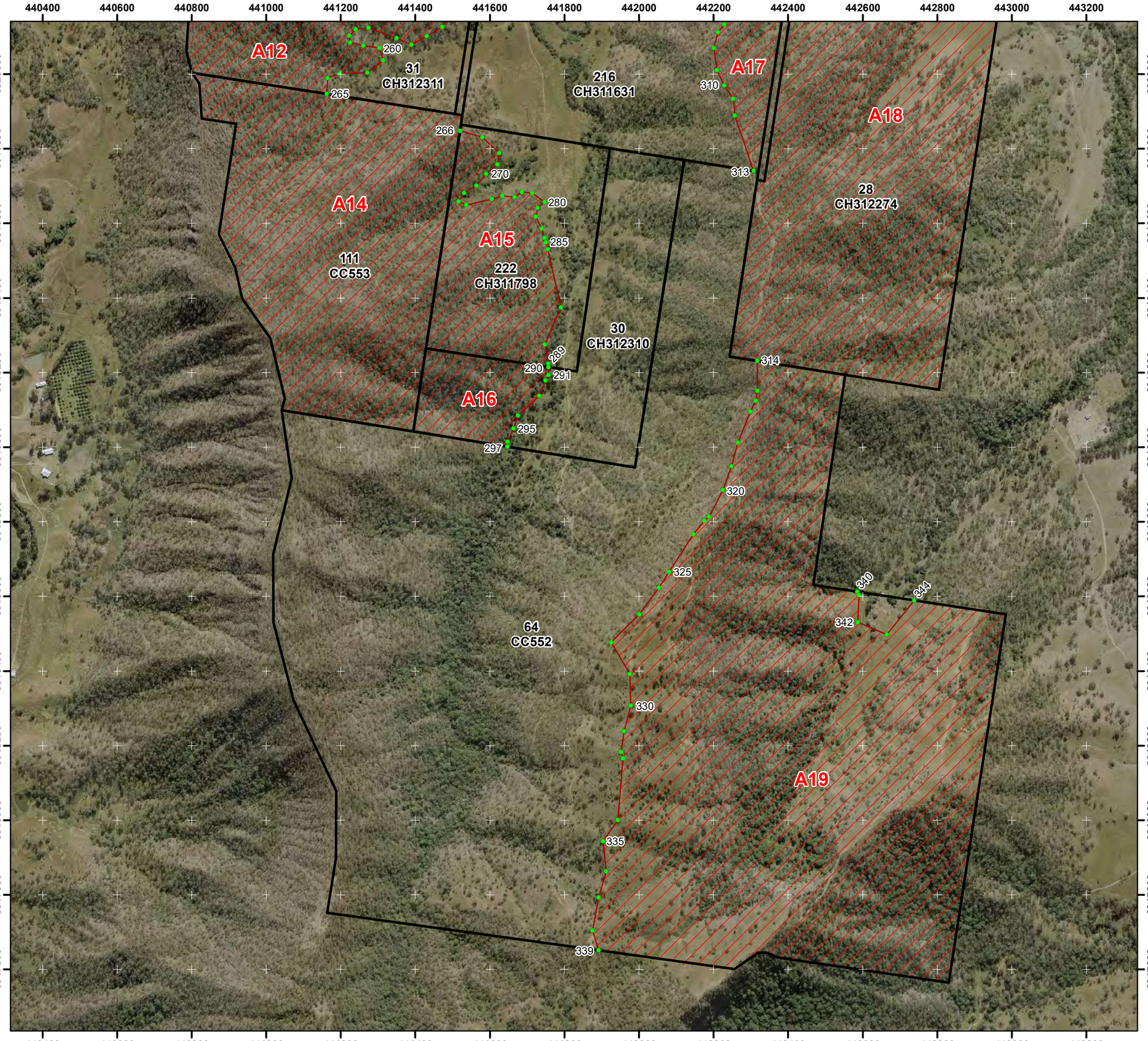

Declared Area Map

DAM 2020/013666

Queensland Government

LOT on PLAN

108CC109, 111CC553, 216CH311631, 218CH311734, 219CH311735, 222CH311798, 233CH311908, 24CH312032, 28CH312274, 2RP131297, 2RP31144, 30CH312310, 31CH312311, 44CC32, 45CC32, 64CC552

0 100 200 300 400 500 600 700 800

meters

N

Scale: 1:10000
(original size A3)

LEGEND

- 8 Derived Reference Points
- Subject Lots
- Declared Area (A1 to A19)

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Imagery Date: 04/05/2020
Imagery Type: Digital Ortho-rectified

Map Prepared by: LMO
Department of Natural Resources, Mines and Energy
South Region

Map Preparation Date: 01/12/2020

This colour plan must be reproduced in colour.

Derived Reference Points

These reference points are provided by the Department of Natural Resources, Mines and Energy and may be used to assist in locating areas delineated on this plan. All reference points continue sequentially when labels not shown.
Horizontal Datum is GDA 2020 Coordinates are in Map Grid of Australia (MGA) - Zone 56

Area	Point	Easting	Northing
A1	1	440980	6926179
A1	2	440820	6925224
A2	3	440663	6924286
A3	4	441778	6925371
A3	5	441793	6925418
A3	6	442006	6925389
A3	7	442198	6925363
A3	8	442185	6925336
A3	9	442171	6925290
A3	10	442185	6925259
A3	11	442319	6925206
A3	12	442332	6925131
A3	13	442298	6925122
A3	14	442312	6925091
A3	15	442376	6925057
A3	16	442448	6925074
A3	17	442454	6925031
A3	18	442453	6925010
A3	19	442497	6924997
A3	20	442453	6924690
A3	21	442422	6924652
A3	22	442445	6924603
A3	23	442460	6924585
A3	24	442462	6924542
A3	25	442443	6924501
A3	26	442419	6924478
A3	27	442410	6924458
A3	28	442417	6924421
A3	29	442421	6924411
A3	30	442405	6924383
A3	31	442407	6924357
A3	32	442431	6924350
A3	33	442440	6924319
A3	34	442419	6924177
A3	35	442406	6924161
A3	36	442399	6924115
A5	37	441903	6924151
A5	38	441887	6924102
A5	39	441899	6924092
A5	40	441891	6924032
A5	41	441858	6923998
A5	42	441842	6923982
A5	43	441739	6923980
A7	44	443170	6921147
A7	45	443216	6921122
A7	46	443240	6921098
A7	47	443237	6921077
A7	48	443229	6921038
A7	49	443228	6920980
A7	50	443252	6920939
A7	51	443251	6920898
A7	52	443239	6920836
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A7	54	443230	6920760
A7	55	443245	6920745
A7	56	443249	6920738
A7	57	443285	6920714
A7	58	443318	6920691
A7	59	443328	6920669
A7	60	443337	6920625
A7	61	443341	6920608
A7	62	443345	6920575
A7	63	443362	6920544
A7	64	443371	6920536
A7	65	443422	6920508
A7	66	443445	6920532
A7	67	443459	6920511
A7	68	443452	6920485
A7	69	443441	6920462
A7	70	443431	6920455
A7	71	443460	6920422
A7	72	443462	6920424
A7	73	443476	6920435
A7	74	443487	6920443
A7	75	443504	6920425
A7	76	443503	6920407
A7	77	443507	6920379
A7	78	443517	6920356
A7	79	443542	6920349
A7	80	443567	6920350
A7	81	443591	6920341
A7	82	443586	6920327
A8	83	442460	6921896
A8	84	442467	6921867
A8	85	442478	6921784
A8	86	442505	6921763
A8	87	442545	6921757
A8	88	442571	6921735
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A9	105	442339	6921302
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A9	108	442248	6921317
A9	109	442202	6921309
A9	110	442190	6921206
A9	111	442143	6921171
A9	112	442110	6921063
A9	113	442129	6920976
A9	114	442131	6920951
A9	115	442116	6920866
A9	116	442129	6920809
A9	117	442061	6920739
A9	118	442043	6920811
A9	119	442081	6920923
A9	120	442073	6920963
A9	121	442062	6920973
A9	122	442036	6920961
A9	123	442005	6921040
A9	124	441829	6921082
A9	125	441716	6921098
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A10	129	441694	6921483
A10	130	441689	6921489
A11	131	441220	6921528
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A11	133	441282	6921519
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A11	135	441311	6921456
A11	136	441330	6921448
A11	137	441367	6921455
A11	138	441386	6921457
A11	139	441389	6921419
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A11	146	441525	6921331
A11	147	441496	6921297
A11	148	441433	6921289
A11	149	441380	6921284
A11	150	441338	6921278
A11	151	441287	6921306
A11	152	441254	6921333
A11	153	441203	6921337
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Declared Area Map

Sheet 5 of 5

DAM 2020/013666

Queensland Government

LOT on PLAN
108CC109, 111CC553, 216CH311631, 218CH311734, 219CH311735, 222CH311798, 233CH311908, 24CH312032, 28CH312274, 2RP131297, 2RP31144, 30CH312310, 31CH312311, 44CC32, 45CC32, 64CC552

This plan must be read in conjunction with Voluntary Declaration Notice 2020/013666

Notes:

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Map Prepared by: LMO
Department of Natural Resources, Mines and Energy
South Region

Map Preparation Date: 01/12/2020

Plan at A3 paper size

Queensland Government

Our Reference: 2020/013752

Information Notice

Property Map of Assessable Vegetation (PMAV)
Section 20B (1) of the *Vegetation Management Act 1999* (VMA)

Introduction

This information notice is about a decision to make a Property Map of Assessable Vegetation (PMAV) under section 20B (1) (a) of the Vegetation Management Act 1999 (VMA).
This PMAV has been made in response to a declaration, under section 19E of the VMA, being made over land described as 108 CC109 & 64 CC552 & 111 CC553 & 216 CH311631 & 218 CH311734 & 219 CH311735 & 222 CH311798 & 233 CH311908 & 24 CH312032 & 28 CH312274 & 30 CH312310 & 31 CH312311 & 2 RP131297 & 2 RP31144 - Ipswich City Council; 44,45 CC32 - Lockyer Valley Regional Council

This decision is able to be internally reviewed if requested by the owner and the details on how to do this are contained in Appendix 1.

Decision and Reasons
In accordance with section 20B (1) (a) VMA the decision has been made to make a PMAV over the declared area. Section 20AL (a) (i) of the VMA states that a category A area is an area that is a declared area. The declared area on lots 108 CC109 & 64 CC552 & 111 CC553 & 216 CH311631 & 218 CH311734 & 219 CH311735 & 222 CH311798 & 233 CH311908 & 24 CH312032 & 28 CH312274 & 30 CH312310 & 31 CH312311 & 2 RP131297 & 2 RP31144 & 44 CC32 & 45 CC32, in its entirety will be shown as a category A area on PMAV 2020/011289. Subsequent updates of the regulated vegetation management map will also show the declared area as a category A area.

Appendix 1: Rights of Review of the Decision

If you do not agree with the decision to make this PMAV, you may make an application for an internal review of the decision under Part 4 of the *Vegetation Management Act 1999*.

Please see the following extract from the *Vegetation Management Act 1999* for:

- your rights of review;
- the time period in which you have to apply for review; and
- how the rights of review are exercised under this Act.

Extract from the Vegetation Management Act 1999 –

Part 4 Reviews and legal proceedings

Division 1 Internal reviews by chief executive

62 Internal review process before external review
Every review of an original decision must be, in the first instance, by way of an application for an internal review of the decision.

63 How to apply for internal review
(1) A person who is given, or is entitled to be given, an information notice about a decision made under this Act may apply for an internal review of the decision.

(2) An application for internal review of a decision must be—
(a) in the approved form; and
(b) made to the chief executive; and
(c) supported by enough information to enable the chief executive to decide the application.

(3) The application **must be made within 20 business days** after—
(a) the day the person is given the information notice about the decision; or
(b) if paragraph (a) does not apply—the day the person otherwise becomes aware of the decision.

(4) The chief executive may extend the time for applying for the internal review.

(5) The application does not stay the decision.

63A Review decision
(1) The chief executive must, within 30 business days after receiving the application—
(a) review the decision (the ***original decision***); and
(b) make a decision (the ***review decision***) to—
(i) confirm the original decision; or
(ii) amend the original decision; or
(iii) substitute another decision for the original decision; and
(c) give the applicant notice (the ***review notice***) of the review decision.

(2) If the review decision is not the decision sought by the applicant, the review notice must comply with the QCAT Act, section 157(2).

(3) However, subsection (2) does not apply if the review decision relates to an original decision under—

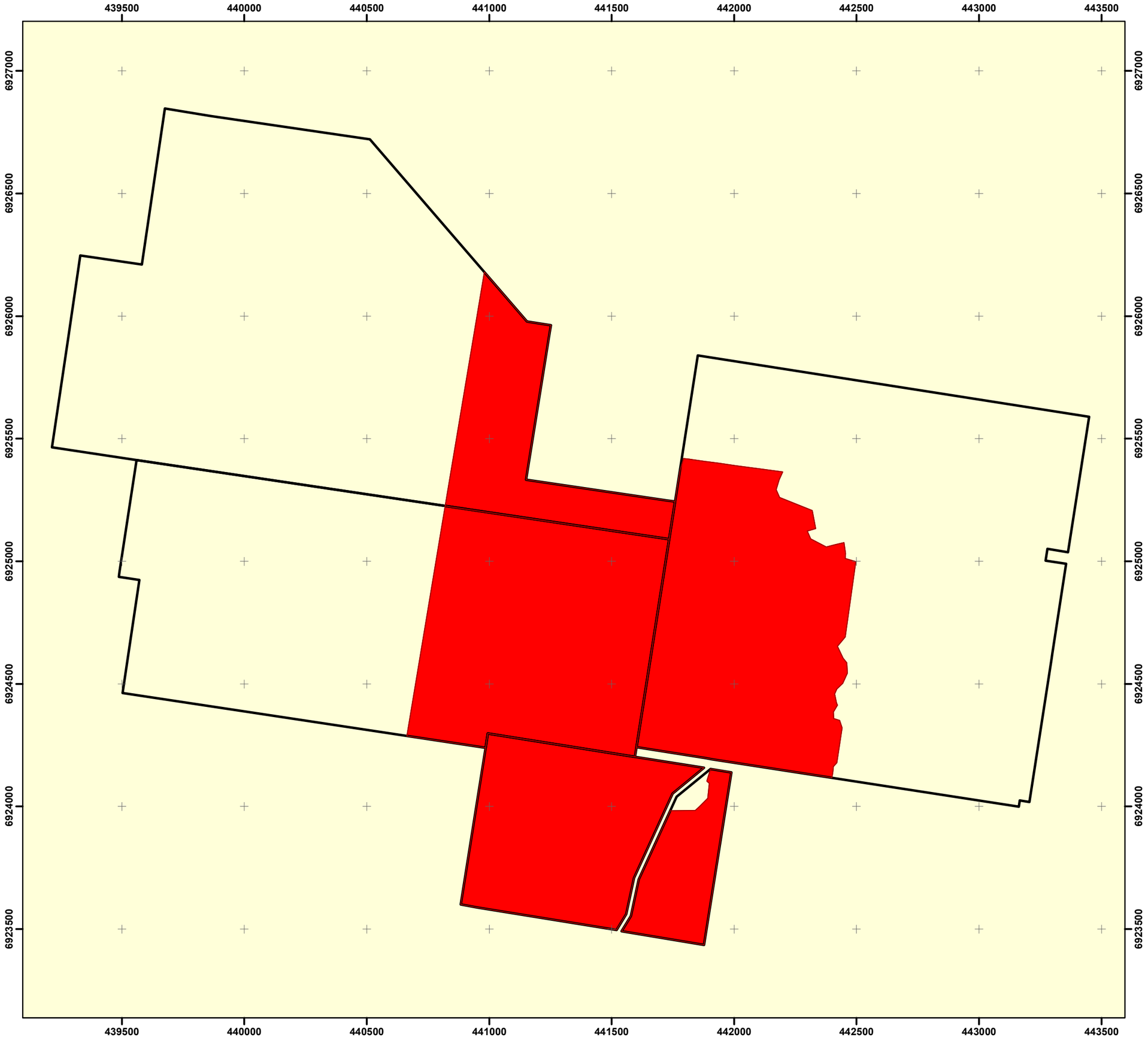
a) section 20O(1)(b) or (2)b or (c), 20R(2) or the provisions as applied under section 20ZC(6); or
b) section 20O(3)(b), 20S(1)(a) or 20ZB(1)(b) or (c).

Division 1A External reviews by QCAT

63B Who may apply for external review

(1) A person who is dissatisfied with a review decision may apply, as provided under the QCAT Act, to QCAT for a review of the review decision.

(2) However, subsection (1) does not apply if the review decision relates to an original decision mentioned in section 63A(3).



Property Map of Assessable Vegetation

Sheet 1 of 2

PMAV 2020/013752

Queensland Government

LOT on PLAN

108CC109, 111CC553, 216CH311631, 218CH311734, 219CH311735, 222CH311798, 233CH311908, 24CH312032, 28CH312274, 2RP131297, 2RP31144, 30CH312310, 31CH312311, 44CC32, 45CC32, 64CC552

0 200 400 600 800 1,000

meters

Scale: 1:15000

(original size A3)

N

LEGEND

- Subject Lot(s)
- Area to which the PMAV does not apply

Vegetation Category Area

- Category A area

Notes:

Property boundaries provided by Department of Natural Resources, Mines and Energy.
The property boundaries on this plan are a spatial representation of the property boundaries.
They are not the legal property boundaries and are subject to change as more accurate information becomes available.
The PMAV does not move with changes to the property boundaries.

Map Information:
Horizontal Datum: GDA 2020
Projection: Universal Transverse Mercator - Zone 56

This PMAV is made under Section 20B of the *Vegetation Management Act 1999* (VMA) as Section 20B(1)(a) of the VMA apply to the area. This PMAV replaces PMAV 2018/004864 for the subject area under Section 20D of the VMA.

Signed for the Chief Executive of the Department of Natural Resources, Mines and Energy by:

Name: Andrew Collins

Title: Senior Natural Resource Management Officer

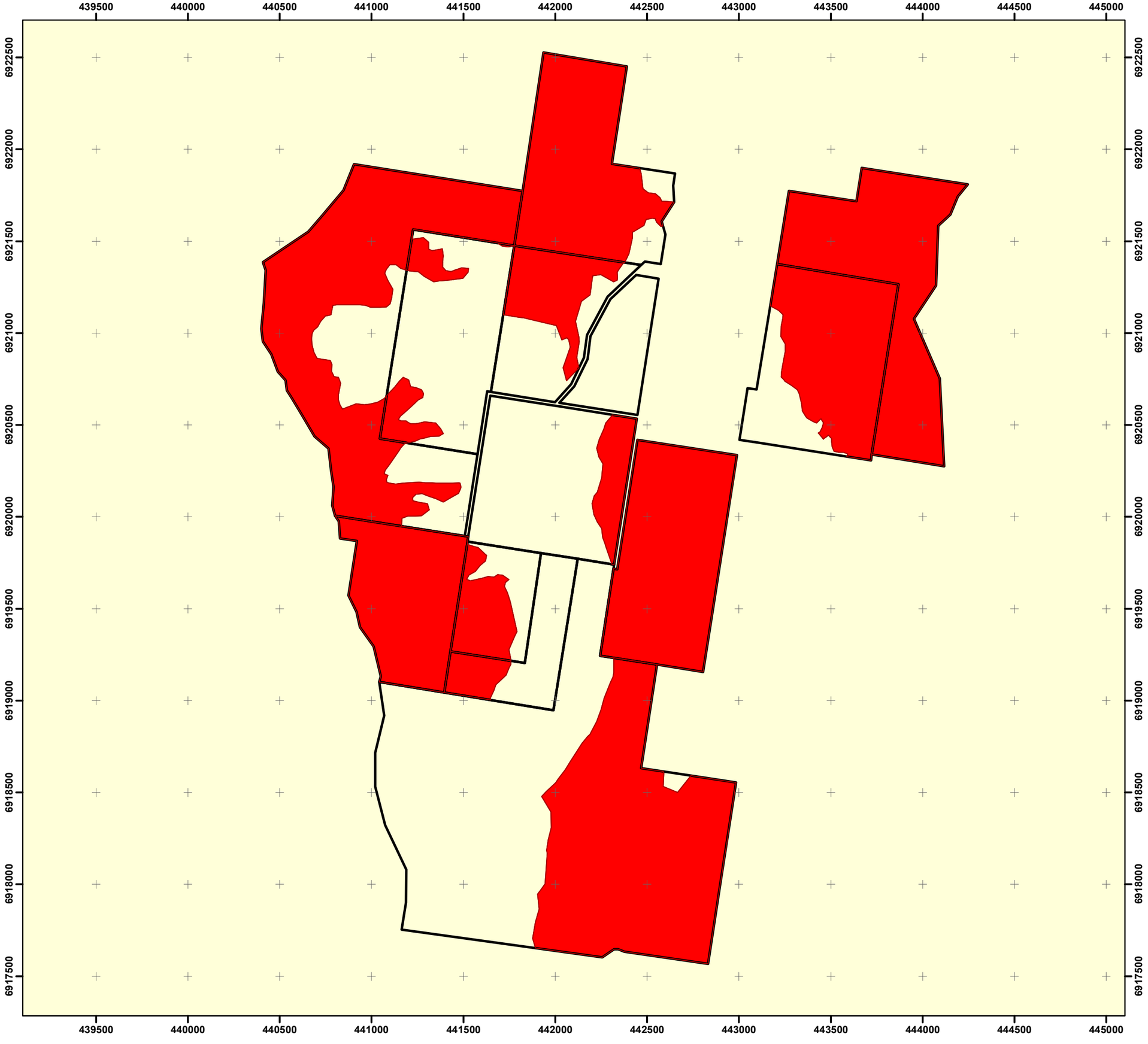
Signature:

Date: 4 December 2020

Map Prepared by: LMO
Department of Natural Resources, Mines and Energy
LMB 383, Gympie, Qld, 4570

Map Preparation Date: 01/12/2020

This colour plan must be reproduced in colour.



Property Map of Assessable Vegetation

Sheet 2 of 2

PMAV 2020/013752

Queensland Government

LOT on PLAN

108CC109, 111CC553, 216CH311631, 218CH311734, 219CH311735, 222CH311798, 233CH311908, 24CH312032, 28CH312274, 2RP131297, 2RP31144, 30CH312310, 31CH312311, 44CC32, 45CC32, 64CC552

0 200 400 600 800 1,000

meters

Scale: 1:20000

(original size A3)

N

LEGEND

Subject Lot(s)

Area to which the PMAV does not apply

Vegetation Category Area

Category A area

Notes:

Property boundaries provided by Department of Natural Resources, Mines and Energy.
The property boundaries on this plan are a spatial representation of the property boundaries.
They are not the legal property boundaries and are subject to change as more accurate information becomes available.
The PMAV does not move with changes to the property boundaries.

Map Information:
Horizontal Datum: GDA 2020
Projection: Universal Transverse Mercator - Zone 56

This PMAV is made under Section 20B of the *Vegetation Management Act 1999* (VMA) as Section 20B(1)(a) of the VMA apply to the area. This PMAV replaces PMAV 2018/004864 for the subject area under Section 20D of the VMA.

Signed for the Chief Executive of the Department of Natural Resources, Mines and Energy by:

Name: Andrew Collins

Title: Senior Natural Resource Management Officer

Signature:

Date: 4 December 2020

Map Prepared by: LMO
Department of Natural Resources, Mines and Energy
LMB 383, Gympie, Qld, 4570

Map Preparation Date: 01/12/2020

This colour plan must be reproduced in colour.

Appendix C

Offset Management Plan

OFFSET MANAGEMENT PLAN

CELESTINO PTY LTD: TEVIOT BROOK/RIVERBEND

EPBC 2016/7724
April 2019

DOCUMENT CONTROL

REPORT TITLE	OFFSET MANAGEMENT PLAN
PROJECT	EPBC 2016/7724: TEVIOT BROOK/ RIVERBEND, TEVIOT BROOK, JIMBOOMBA
OFFSET LOCATION	AROONA, 338 ALPERS ROAD, MT MORT
PROPONENT	CELESTINO PTY LTD

All information within this report is prepared for the exclusive use of Celestino Pty Ltd in relation to EPBC 2016/7724 and is not to be used for any other purpose.

Queensland Trust for Nature accepts no responsibility for any use of or reliance upon the contents of this report by any third party. Reports or plans by others may be included within this Offset Management Plan to support the document.

Version	*Date*	*Prepared*	*Reviewed*	*Comment*
OMP_Celestino_v1	*30/1/2019*	*Felicity Shapland*	*Renee Rossini*	
OMP_Celestino_v2	*5/4/2019*	*Felicity Shapland*	*Nerida Bradley*	

PREPARED BY	FELICITY SHAPLAND	REVIEWED BY	NERIDA BRADLEY
POSITION	ENVIRONMENTAL OFFICER	POSITION	GENERAL MANAGER
SIGNED		SIGNED	
DATE		DATE	

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Tables

Glossary of Terms

Acronym	Description
ACT	Australian Capital Territory
APZ	Asset Protection Zones
CoA	Commonwealth of Australia
DAF	Department of Agriculture and Fisheries
DoE	Department of the Environment (Former DEE; Commonwealth)
DEE	Department of the Environment and Energy (Commonwealth)
DES	Department of Environment and Science (QLD)
DSE	Department of Sustainability and the Environment
EHP	Department of Environment and Heritage Protection (Former DES; QLD)
EPA	Environmental Protection Agency
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GHFF	Grey-headed Flying Fox (*Pteropus poliocephalus*)
GIS	Geographical Information Systems
LVRC	Lockyer Valley Regional Council
MNES	Matters of National Environmental Significance
NC Act	*Nature Conservation Act 1992*
NSW	New South Wales
OMP	Offset Management Plan
OMU	Operational Management Unit
Project	The Teviot Brook/Riverbend Development
Property	Aroona
Qld	Queensland
QTFN	Queensland Trust for Nature
RE	Regional Ecosystem
SEQ	South East Queensland
SRRC	Scenic Rim Regional Council
VM Act	*Vegetation Management Act 1999*

1 Introduction

1.1 Project Background: Teviot Brook/Riverbend development

The Teviot Brook/Riverbend development (herein the Project) is a residential master-planned community, supporting medium and low-density residential uses, a school, a neighbourhood centre and integrated open space and conservation areas. It is consistent with the planning controls under the Greater Flagstone Urban Development Area Development Scheme.

The Greater Flagstone Urban Development Area Development Scheme (PDA Development Scheme) provides for a significant population influx to the region with projections of 120,000 residents accommodated in more than 50,000 dwellings. The proposed action is for the construction and operation of a master planned residential development within a future growth area in South East Queensland. The action consists of converting approximately 550 ha of rural residential land into a residential development, providing new homes for the region as well as supporting facilities such as schools, shopping, and commercial precincts and community open space and sporting grounds.

The vision for the Project is to provide a vibrant mixed-use development for the growing Greater Flagstone community and incorporates educational, commercial, and recreational centres. The site is anticipated to be developed in stages.

The development impacts on MNES (Matters of National Environmental Significance). Offset areas are required to compensate for the residual adverse impacts of the action in relation to impacts on koala *(Phascolarctos cinereus)* and grey-headed flying-fox (*Pteropus poliocephalus*) habitat. This Offset Management Plan (OMP) has been developed in order to comply with conditions of the EPBC Act approval which has been sought for EPBC2016/7724.

1.2 MNES impacts: Koala and Grey Headed Flying Fox

The koala is endemic to Australia and its distribution in Queensland ranges from the east coast (to Cooktown) into central Queensland. Koalas occupy a wide range of habitats, from temperate, sub-tropical and tropical forests, to woodland and semi-arid vegetation communities. The koala is a folivorous marsupial whose distribution is tied to its food source, the Eucalyptus forests in Australia. Koalas can occur in urban and rural settings with more dispersed food and shelter trees, or in regenerating native vegetation, if there are Eucalypt trees present.

A decline in the total population of the listed koala has been shown across its range, and particularly in South-east Queensland (SEQ) (Rhodes *et al.* 2015). In response to the increasing pressures on koalas in SEQ, in 2004 the species was listed as Vulnerable in the South East Queensland Bioregion under the *Queensland Nature Conservation Act 1992* (Queensland NC Act). Then, in 2012, the koala was recognised as a threatened species in Queensland, New South Wales and the Australian Capital Territory under the *Environmental Protection Biodiversity Conservation Act 1999* (EPBC).

The Grey-headed Flying-fox (herein the GHFF) is listed as Vulnerable under the EPBC Act. The GHFF has historically occupied forests and woodlands in the coastal lowlands, tablelands and slopes of south-eastern Australia, from Bundaberg in Queensland to Geelong in Victoria, with rare sightings outside its range. The primary known threat to the survival of the GHFF is loss and degradation of foraging and roosting habitat, as identified in the Draft GHFF Recovery Plan (2017). Conflict with people, including disturbance in camps and mortality from actions to manage commercial fruit crops, is a moderate threat, but is increasing in urban areas.

1.3 Offset Areas: Overview

Management and protection of the proposed offset areas as set out in this OMP will ensure ecological gain for the residual impacts resulting from the Project. It will also ensure long-term ecological function of a broader network of wildlife corridors connected to the offset areas through the Little Liverpool Range, a large continuous and ecologically important habitat covering over 20,500 ha within a State significant corridor (EHP, 2016a).

The proposed offset will permanently secure 872.46ha within the Little Liverpool Range, SEQ (Appendix A).

The proposed offset includes a range of vegetation communities, capturing five Regional Ecosystems, comprising remnant vegetation, high value regrowth and cleared areas undergoing revegetation. It will also provide long-term protection, conservation, and management of three Matters of National Environmental Significance:

- Documented populations of the koala (*Phascolarctos cinereus*) Vulnerable species (under EPBC Act 1999 and Queensland NC Act);
- High quality habitat for the GHFF (*Pteropus poliocephalus*) Vulnerable species (under EPBC Act 1999 and Queensland NC Act); and
- Over 10ha of remnant narrow-leafed ironbark woodland (RE 12.9-10.7, 'Of concern' (VM Act)).

1.4 OMP objective and outcomes

The objective of this Offset Management Plan (OMP) is to summarise existing habitat quality for the koala (*Phascolarctos cinereus*) and GHFF (*Pteropus poliocephalus)* present on the offset area and to recommend land management actions designed to achieve a net gain in koala and GHFF habitat quality.

This OMP identifies outcomes focused management actions, which will fulfil a statutory requirement, pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) (EPBC Act), for the provision of koala *(Phascolarctos cinereus)* and GHFF (*Pteropus poliocephalus*) habitat offset.

The outcomes sought by this plan will protect and conserve large, connected areas of koala and GHFF habitat, particularly populations that are genetically diverse and distinct and are free of disease or have very low incidence of disease.

1.5 Structure of the OMP

Section 1: Provides an introduction to the plan, including a description of the offset site (EPBC 2016/7724) and the offset proposition summary.

Section 2: Outlines the implementation objectives for the offset areas, including the proposed outcome and performance indicators for each attribute.

Section 3: Details the property context and suitability as offset for koala and GHFF.

Section 4: Outlines the management framework for the offset areas.

Section 5: Outlines the management actions.

Section 6: Other compensatory measures.

Section 7: Describes the reporting framework.

Section 8: Conclusion.

1.6 Regulatory and policy context

This document has been prepared taking into account the following technical guidelines and legislation:

EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (DEE, 2014);

- *Draft GHFF Recovery Plan* (DEE, 2017);
- *EPBC Act Environmental offsets policy, 2012;*
- Policy statement: Advanced environmental offsets under the *Environment Protection and Biodiversity Conservation Act 1999;*
- *Vegetation Management Act 1999 (legally securing the offset through a Voluntary Declaration under Section 19F);*
- *Queensland Environmental Offsets Act 2014; and*
- *Queensland Environmental Offsets Regulation 2014.*

2 Implementation Objectives

2.1 Overarching objectives

Overall, implementation of this OMP will reduce key threats to the recovery of the koala and GHFF as described in the EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (DoE, 2014) and the Draft GHFF Recovery Plan 2017 (DEE, 2017). The objective of achieving net gain in habitat is described by the EPBC Act Environmental Offsets Policy (Doe, 2012a) and verified through use of the Offsets Assessment Guide (DoE, 2012b).

Management objectives have been developed to align with the requirements of the EPBC Act Environmental Offsets Policy. Actions will result in a net gain of the overall koala habitat quality on the property. The management timeframe is set out in this OMP as twenty (20) years of management, maintenance, monitoring and reporting.

Environmental Offsets Policy Requirement	Delivery
Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter.	The offset area will directly contribute to the ongoing viability of the koala (*Phascolarctos cinereus*) and GHFF (*Pteropus poliocephalus*). Protection and management of the offset area in accordance with the OMP will deliver an overall conservation outcome for a very large area of koala habitat and GHFF habitat which is currently not managed or protected. The offset will improve the viability of the protected matter: • in Category B and C areas from a start quality of 8 to 10; and • in Category X areas from a start quality of 4 to 10.
Suitable offsets must be built around direct offsets but may include other compensatory measures	The offsite offsets will provide over 100% requirement as determined using the EPBC calculator. The offset will be legally secured through a Voluntary Declaration under Section 19F of the Vegetation Management Act 1999. Securing and managing the offset area in accordance with the OMP will permanently protect the area from incompatible land uses and will contribute to the ongoing viability of South-east Queensland's koala and GHFF populations. It will also contribute to the long-term ecological function of a broader network of wildlife corridors connected to the offset areas through the Little Liverpool Range, a large continuous and ecologically important habitat covering over 20,500 ha within a State significant corridor.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter	Assessment against EPBC Act Offsets Assessment Guide determined the probability of annual extinction of the Koala as 0.2%. This measurement was used in the Offset Calculator, ensuring that the level of statutory protection that applies to the protected matter was taken in to account. All threats set out in the Department's SPRAT Database and the EPBC Act referral guidelines for the vulnerable koala have been addressed in the OMP. In relation to GHFF, identified recovery actions have been addressed in the OMP.
Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.	Through permanent protection and long-term management, the offset will deliver a conservation gain that adequately compensates for impacts on koala and habitat arising from the action. The total area to be permanently protected and managed is 872.46ha. This will compensate the 180 adjusted quantum impact hectares. The offset area delivered will satisfy the 90% minimum offset area requirement, delivering 102.36% of the offset. Management actions set out in the OMP are stated as aiming for intensely managed and resourced to ensure very large areas of protected koala and GHFF habitat which substantially exceeds the quality of the habitat originally impacted by the action. The offset area will provide:

	• Large area of well-managed koala and GHFF habitat connected with the Little Liverpool Range, a large continuous and ecologically important habitat covering over 20,500 ha within a State significant corridor. • Legally secured by Voluntary Declaration under Section 19F of the Vegetation Management Act 1999. • Long-term reduction of threats and a net gain in koala population density within the offset area. • Control of introduced predators to reduce impact on koala populations • Reduced risk of koala mortality or injury due to vehicle strike • Low impact hazard reduction grazing to protect the offset area from high intensity fire. • Reduced risk of the spread of koala and vegetation diseases and or pathogens.
Suitable offsets must effectively account for and manage the risks of the offset not succeeding	Confidence in the success of the offset has been assigned a value: • in Category B and C areas, 90%; and • in Category X areas, 70%. These scores are considered reasonably conservative given the detail and intensity of the management actions set out in the OMP. The score is supported by the design and management of the offset within a contiguous landscape with good connectivity of koala and GHFF habitat to the broader landscape. Operational management units have been determined in order to identify management actions suitable to different areas and existing habitat qualities within the overall offset. All OMUs are managed in a way that will achieve habitat score of 10. Risks associated with offset delivery will be mitigated and managed by way of detailed management actions set out in the OMP. Management responses set out in the OMP are clearly framed against stated outcomes being to protect and conserve large, connected areas of koala and GHFF habitat able to support improving populations that are genetically diverse and free or with very low incidence of disease. The 90% score in Category B areas was given to allow for risks primarily relating to natural events such as flood, drought, severe storms etc. The 70% score in Category X areas reflects the potential for risks to have greater impact on revegetated areas.
Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs	Securing the offset under Voluntary Declaration will ensure future owners are prohibited from clearing. Management is required across the whole area to ensure loss of habitat values does not occur through intensification of weeds causing loss of connectivity, destruction of habitat via hot intensive fires, increased risk of mortality or injury by dog attack etc.
Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable	• Efficient and Effective: design of a large, connected offset area and the OMP (particularly use of OMUs) will ensure efficient delivery of management actions over a large area. Proactive management and monitoring will ensure response actions are timely and focused. • Timely: the mix of vegetation qualities and the scale of the offset provides for management to yield conservation gain in as short as possible time. Adaptative management processes will ensure that management actions are able to be adjusted to account for improvements in technologies, processes, academic understanding etc. • Transparent: a clear monitoring and reporting framework has been established as part of the OMP. This provides for regular reporting to the DEE. • Scientifically Robust: the proposed offsite offset area has been assessed by numerous qualified parties, including the Koala Ecology Group (University of Queensland), Ausecology and OWAD Environment Consultants. Ongoing management and monitoring actions will be conducted in collaboration with these

	and other groups to achieve enduring long-term outcomes that are beneficial for the local koala and GHFF population. As part of our own monitoring and reporting on the outcomes of the offset, we will feed into ongoing scientific research into the impact and effectiveness of a range of koala and GHFF recover actions • Reasonable: The offset is reasonable being equivalent to the significant residual impact on koala habitat. The offset design has been based upon achieving conservation outcomes for the Little Liverpool Range. The proposed offsite offset will provide greater connectivity within the Little Liverpool Range and enhance food and habitat necessary to support koala and GHFF populations.
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	The OMP contains a detailed monitoring and reporting framework. The reporting framework sets out stated outcomes and associated performance indicators. These provide clear benchmarks as to the success or failure of actions. Response actions are also set out and these will also be reported. Contractual requirements as between the proponent and the Queensland Trust for Nature (which will manage the offset) will account for compliance with the approval conditions. QTFN is a not for profit organisation and its strategic purpose is permanent conservation and protection of strategic wildlife corridors. Critical to demonstrating that we are aligning with this strategic goal is showing that we are delivering offset areas in a way that achieves conservation gain. As part of our reporting, we will provide information to the DEE that will transparently demonstrate our compliance with the offset approval conditions and our progress towards successful delivery of the stated offset outcomes and habitat quality improvements.

2.2 Summary of outcomes

Koala habitat attributes are identified using the Koala Habitat Assessment Tool (DEE, 2014). Many of the koala habitat attributes will also support recovery of GHFF. Attributes identified using the Koala Habitat Assessment Tool are:

- Occurrence
- Vegetation composition
- Habitat connectivity
- Attack by feral animals
- Vehicle strike
- Barriers to dispersal
- Fire (in particular high intensity fire)
- Introduction of spread of disease or pathogens
- Recovery value

Table 2-1 summarises the outcomes and performance indicators to be implemented throughout this OMP by attribute and where it applies to either koala or GHFF. Detailed management actions for each set out in Appendix B that provides detailed management actions by attribute, considering monitoring and reporting, corrective action etc.

Attribute	Koala	GHFF	Proposed outcome	Performance indicator
Occurrence	✓		• Net gain in koala population density. • Koala occurrence on currently cleared areas.	• Koala density surveys undertaken and documented within stated timeframes. • Large offset areas are legally secured under section 19F of the VM Act.
Vegetation composition	✓		• Vegetation resembling the pre-clearance Regional Ecosystem/s established across offset areas. • Koala movement in offset areas not impacted by weed cover. • All vegetation layers have excellent and continually improving structure and floristic diversity. • Presence and recruitment of koala food and shelter trees. • No threat of habitat degradation from clearing, development or other incompatible land uses. • Domestic livestock excluded from offset area (other than for hazard reduction purposes).	• Minimum plant survival rate of 80% is required during the establishment phase. • Livestock are excluded from offset area other than for the purposes of hazard reduction actions. • *Lantana camara* and s*chinus terebinthifolius* cover is reduced across the offset area, and weeds are not impacting on the movement of koalas across the site and not negatively impacting on recruitment of koala food and shelter trees. • Large offset areas are legally secured under section 19F of the VM Act.
Connectivity	✓	✓	• Large, connected landscapes are well managed and legally protected. • No threat of habitat degradation from clearing, development or other incompatible land uses. • Domestic livestock excluded from offset area (other than for hazard reduction purposes).	• Offset areas are legally secured under section 19F of the VM Act. • Area is part of a contiguous landscape >500 ha.
Feral animals	✓		• No koala mortality or injury by feral animal attack.	• Management and reduction in abundance of feral animals • No increase in relative feral animal abundance index from baseline.

Attribute	Koala	GHFF	Proposed outcome	Performance indicator
				• No recorded injury or death from feral animal attacks within the offset area.
Vehicle strike	✓		• No koala mortality or injury due to vehicle strike within the offset areas and surrounding roads.	• No recorded injury or death from vehicle strike within the offset area. • No recorded injury or death from vehicle strike on surrounding roads.
Barriers to dispersal	✓	✓	• Large, connected landscapes are well managed and legally protected. • No threat of habitat degradation from clearing, development or other incompatible land uses. • Vegetation resembling the pre-clearance Regional Ecosystem/s established across offset areas. • Koala movement in offset areas not impacted by weed cover. • All vegetation layers have excellent and continually improving structure and floristic diversity. • Presence and recruitment of koala food and shelter trees. • Domestic livestock excluded from offset area (other than for hazard reduction purposes).	• Offset areas are legally secured under section 19F of the VM Act. • Minimum plant survival rate of 80% is required during the establishment phase. • Livestock are excluded from offset area other than for the purposes of hazard reduction actions. • *Lantana camara* and s*chinus terebinthifolius* cover is reduced across the offset area, and weeds are not impacting on the movement of koalas across the site and not negatively impacting on recruitment of koala food and shelter trees. • Large offset areas are legally secured under section 19F of the VM Act.
Fire	✓	✓	• No high-intensity fires occur within the offset area. • No koala mortality or injury resulting from fire.	• No recorded high-intensity fires in the offset area. • No recorded injury or death from fire. • Implementation of Fire Management Plan reduces fuel levels. • Vegetation composition not negatively affected by fire regime. • Minimise the risk of koala mortality within the offset area due to prescribed burning.

Attribute	Koala	GHFF	Proposed outcome	Performance indicator
Disease	✓		• Reduced incidence of koala disease within offset area from baseline survey. • Baseline surveys indicate no identification of vegetation diseases and pathogens within the offset area.	• Incidence of koala disease maintained below or at baseline level. • Approved koala translocations are free from disease. • Reduction in incidence of koala feed trees exhibiting disease.
Recovery values for 'Coastal' interim recovery objectives	✓		• Protect and conserve large, connected areas of koala habitat, particularly large, connected areas that support koalas that are: - Of sufficient size to be genetically robust or - Free of disease or have very low incidence of disease or - Breeding • Maintain corridors and connective habitat that allow movement of koalas between large areas of habitat.	• Large offset areas are legally secured under section 19F of the VM Act. • Offset areas provide connectivity with surrounding koala habitat. Habitat is part of a contiguous landscape of >500ha.

3 Property context and offset suitability

3.1 Property location and description

The offsets are located within a 2000-hectare cattle farming property known as "Aroona" (Appendix C). The property was donated to the Queensland Trust for Nature in 2015. The Trust continues to operate the cattle grazing enterprise, which it will adapt in order to implement this OMP (*Table 3-1*).

Aroona is located approximately 20km south of the town of Grandchester (Appendix A). It lies within the Franklinvale catchment of the Moreton Basin sub-region of the South East Queensland bioregion. The property contains a mix of rocky outcrops along steep ridges, undulating hills, and alluvial flats. Aroona is situated within the Little Liverpool Range, a continuous and ecologically important tract of vegetation, covering over 20,500ha within a State Significant corridor (EHP, 2016a). The Little Liverpool range is connected to Main Range National Park, which is part of the World Heritage Gondwana Rainforest of Australia and extends 70 kilometres from the New South Wales border to the north of Cunningham's Gap (DEH, 2000).

Land use in the area is primarily agriculture and animal husbandry; consequently, the lower slopes have been fragmented and substantially degraded.

Table 3-1 – property details

Property details	
Property name:	Aroona
Tenure:	Freehold
Property Address:	338 Alpers Road, Mount Mort
Primary Local Government Area:	Ipswich City Council & Lockyer Valley Regional Council
Planning Scheme Zone:	ICC: Rural B and Rural E; LVRC: Rural Uplands
Offset area (ha):	Total offset area: 872.46ha (Appendix C)
Offset Area title references:	Part or whole of lots: • 233/CH311908 • 31/CH312311 • 218/CH311734 • 64/CC552 • 2/RP31144 • 216/CH311631 • 222/CH311798 • 30/CH312310 • 28/CH312274 • 24/CH312032 • 2/RP131297 • 44/CC32 • 45/CC32 • 207/CH311631 • 219/CH311735 • 108/CC109 • 13/RP21558 • 6/RP21558

Property details	
Landholder details	
Registered Owner/s on Title: Landscapes Queensland Ltd CAN 630 495 340 as trustee for Queensland Trust for Nature. ABN 66 583 550 652.	
Phone Number: [redacted]	**Mobile phone:** [redacted]
Email: [redacted]	**Contact person (if required):** [redacted]
Postal Address: GPO Box 162, Brisbane, QLD 4001	

3.2 Suitability as an offset

The property is suitable for the implementation of this OMP and will deliver a tangible and measurable benefit for the Koala (*Phascolarctos cinereus*) and GHFF (*Pteropus poliocephalus)*. Targeted land management actions will be implemented to result in a net gain in koala and GHFF habitat quality. Permanent legal protection of the offset areas from incompatible land uses will contribute to the ongoing viability of koala and GHFF in South-east Queensland. The offset will be legally secured through a Voluntary Declaration under Section 19F of the *Vegetation Management Act 1999*. Appendix C shows the proposed offset area.

The location of the offset areas within the property will form two non-adjoining parcels within the property. Each area is sufficiently large to provide sustainable habitat independently, and the areas are connected by vegetated corridors which will allow animal to move across the landscape.

The offset areas comprise of a mix of five regional ecosystems, one of which is listed as 'of concern' under the *VM Act 1999* (Table 3-2). Vegetation within the offset area is classified as either:

- Category B/remnant
- Category C/regrowth
- Category X/cleared and pasture areas

Table 3-2 – Vegetation within the offset areas

Regional Ecosystem	Vegetation Management Act Class	Biodiversity Status	Short Description
12.3.7	Least concern	Of concern	*Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana* +/- Melaleuca spp. fringing woodland
12.8.14	Least concern	No concern at present	*Eucalptus eugenioides, E. biturbinata, E. melliodora +/- E. tereticornis, Corymbia intermedia* woodland on Cainozoic igneous rocks
12.8.9	Least concern	No concern at present	*Lophostemon confertus open forest on Cainozoic igneous rocks*
12.8.17	Least concern	No concern at present	*Eucalyptus melanophloia +/- E. crebra, E. tereticornis, Corymbia tessellaris woodland on Cainozoic igneous rocks*

Regional Ecosystem	Vegetation Management Act Class	Biodiversity Status	Short Description
12.9-10.7/12.9-10.17a	Of concern	Of concern	*Eucalyptus crebra +/- E. tereticornis, Corymbia tessellaris, Angophora* spp., *E. melanophloia* woodland on sedimentary rocks *Lophostemon confertus* or *L. suaveolens* dominated open forest usually with emergent Eucalyptus and/or Corymbia species. Occurs in gullies and southern slopes on Cainozoic and Mesozoic sediments.
12.8.16/12.8.17/12.8.9	See above	See above	See above
12.8.17/12.8.16	See above	See above	See above
12.8.17/12.8.16/12.8.9	See above	See above	See above
Cat B/Non-remnant	N/A	N/A	N/A
Cleared/pasture	N/A	N/A	N/A

3.2.1 Koala habitat values

Property wide field surveys conducted by Ausecology ecological consultants in April and June 2016 confirmed suitability of Aroona for koala offset. Further confirmation has occurred through work conducted by the Trust and associated parties including ongoing regular scat surveys and deploying koala scat detection dogs in the greater area. Live koalas have been identified, however no density survey has been undertaken within the offset area. The field surveys included tertiary and quaternary vegetation surveys, fauna habitat assessments, a night survey, high-level weed surveys and BioCondition Assessments in accordance with Eyre *et al.* (2015). Further detail in relation to the field surveys is presented in the report *Property Management Plan for the 'Aroona' Property, Mount Mort, Queensland* (Ausecology, 2016b).

Using the Koala habitat assessment scoring – EPBC Referral Guidelines (DoE, 2014) **a score of 4** was calculated for the currently cleared areas and **a score of 8** for the vegetated areas. Additional management action will allow for further improvement of the habitat quality score for the. Justification for the Koala Habitat Assessment tool is found in Appendix F.

The combined results of the ecological assessments confirm that the offset areas contain high value habitat for koalas, and that it is therefore suitable for the purpose of functioning as a koala offset area.

3.2.2 Threats to koala habitat

Various threats to koala habitat were identified based on ecological field study (Ausecology 2016a). These threats directly relate to attributes outlined in the koala habitat assessment tool and include:

- Koala occurrence – relating to presence of koalas in the landscape;
- Vegetation composition - Potential risk of future clearing due Regulated Vegetation Management classification (Category X) and associated permissible land uses;
- Habitat connectivity - Habitat fragmentation due to historic clearing/logging on the property;
- Attack by feral animals - Presence of feral pest animal such as foxes (*Vulpes vulpes*), wild dogs (*Canis lupis familiaris*) and cats (*Felis catus*) based on database records and recorded koala mortality possibly due to have been dog/fox.
- Vehicle strike - Potential for vehicle strike along Alpers Road and internal tracks;

- Barriers to dispersal - Weed incursion currently suppressing recruitment of koala food and shelter trees as well as restricting movement of koalas in some areas of the property;
- Fire High intensity fires directly and indirectly threatening koala survival;
- Introduction of spread of disease or pathogens – including chlamydia and myrtle rust; and
- Recovery value.

The OMP actions described in Appendix B aims to enhance koala habitat quality via the reduction of the threat level from each of the above-mentioned processes. Additional threats cited by the *EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)* (DoE, 2014) will be addressed.

3.2.3 GHFF habitat values

The GHFF (*Pteropus poliocephalus*) is a canopy-feeding frugivore and nectivore. Patterns of use of food trees are complex and unpredictable, meaning the core habitat for GHFF is difficult to define (Duncan *et al.* 1999). This species has no adaptations for enduring periods of food shortage and migrates in response to the location and frequency of blossoms (Eby 1991; Eby and Lunney 2002; Spencer *et al.* 1991). They are known to commute daily to foraging areas, usually no more than 15km away from their roost site (Tidemann and Nelson 2004), though they are capable of night flights to feeding areas over 50km away (Eby, 1991; Parry-Jones and Augee, 1992). Heavy blossoming can result in the establishment of large colonies (e.g. 80,000 individuals in Parry-Jones and Augee, 1992), and high quality and abundant supply of food in a single location can modify the generally vagrant behaviour of the species, particularly in urban areas (Parry-Jones and Augee, 2001). GHFF also eat cultivated fruits, causing direct losses to horticulturalists (Ullio, 2002), however they prefer the nectar and pollen from native trees and attack commercial crops only when native sources are scarce (DEHP, 2017)

The GHFF is listed as vulnerable under the provisions of both the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Queensland Nature Conservation Act 1992* (NC Act). The species has a large established range between Bundaberg in Queensland to Melbourne in Victoria (DEHP, 2017). A decline of the total population has been shown across the range from survey conducted in 1989 and during 1998-2001. The rate of decline is estimated at 30% (DEHP, 2001).

The GHFF habitat was assessed in line with the impact assessment which examined the presence of eucalypts and food trees throughout the site. The offset site contains a variety of suitable food trees in large numbers. Habitat assessment produced by the Department of Environment, Heritage, Water and the Arts (Canberra) in 2008 (Eby and Law, 2008) confirms the offset area contains high value GHFF habitat, with large numbers and variety of suitable food trees. Habitat was ranked as four categories, based on the presence of high-quality habitat trees. Their Rank 1 and 2 habitat categories (highest) account for 1,444,000ha and 533,000ha respectively within South-east Queensland. By aligning the maps provided by these authors (Figure 6.7, Eby and Law, 2008) and the location of the offset, the proposed area includes both Rank 1 and Rank 2 habitat (Eby and Law, 2008). Justification for the improvement of GHFF habitat within the offset area is outlined in Appendix G.

High quality food sources for the species are productive, reliable and produce for lengthy periods of time. Eby and Law (2008) ranked all Eucalypts according to these parameters. Table 3-2 includes all those plants ranked as high quality, whether this species exists within the offset area, and the specific Regional Ecosystems (RE) that each occurs within.

*Table 3-3 Significant food plants included in the blossom diet of GHFF. Those with long-term data identified as highly significant plants marked with **. List of relevant regional ecosystems (RE) present within the offset area with food plants confirmed present (P) or planted during revegetation activities (R).*

Species	RE tree is present within	Present in OMU
FABACEAE		
***Castanospermum australe*	-	-
PROTEACEAE		
***Banksia integrifolia*	-	R
Grevillea robusta	-	-
MYRTACEAE		
Corymbia citriodora	12.3.3	P[1]
***C. gummifera*	-	-
C. intermedia	12.3.3 12.8.17 12.8.14	P
C. maculata	-	-
***C. variegata*	-	P
Eucalyptus andrewsii	-	-
E. camaldulensis	-	-
E. deanei	-	-
E. moluccana	12.3.3 12.8.14	R
E. pilularis	-	-
E. robusta	-	R
E. saligna	-	-
E. seeana	-	-
***E. siderophloia*	12.3.3 12.8.14	P
***E. tereticornis*	12.3.3 12.3.7 12.8.14 12.8.16 12.8.17	P
Malaleuca quinquinervia	-	-
Syncarpia glomulifera	-	-
***Lophostemon confertus*	12.8.9	P

1. *Corymbia citriodora* sub. sp. *variegata* is present on-site, but it is not the sub-species specified by Eby & Law (2008) as the highest-quality food source *C. citriodora* sub. sp. *citriodora*

The offset area is a potential food resource for five colonies, located between 8 and 15km away from the offset area (DEHP, 2016b). The suitability of the property as offset for GHFF habitat was determined through field surveys undertaken by Ausecology in April and June 2016. These surveys included tertiary and quaternary vegetation surveys and BioCondition Assessments in accordance with Eyre *et al.* (2015), and identified features of GHFF habitat as present, including a wide variety of eucalypt trees which flower at different times of the year in substantial quantities (Ausecology, 2016a).

3.2.4 Threats to GHFF habitat

The Draft GHFF Recovery Plan (DEE, 2017) lists multiple threats to GHFF populations. Threats that are identified on the offset area or assumed based on the ecological field study (Ausecology 2016a) include:

- Habitat fragmentation due to historic clearing/logging on the property creates competition for food sources;
- High intensity fires indirectly threatening GHFF through the destruction of food resources; and
- Entanglement in barbed-wire fences.

Additional threats cited by the Draft Recovery Plan include shooting and culling to protect commercial fruit trees, camp disturbance and electrocution from powerlines. These are not included as identified management actions in the OMP as they do not occur within the offset area. There are no commercial fruit trees and no powerlines. Camps have not been identified and relocation of a camp would be inconsistent with the land use and management of the property.

4 Management Framework

This section will outline the management framework to be implemented for the duration of the management period of twenty (20 years).

In order to address the area-based management objectives the offset areas have been delineated into Operational Management Units (OMUs), each with a defined set of management actions designed to progress the unit towards the objectives in the most efficient way possible, with the common objective to achieve a net gain in koala and GHFF habitat quality.

Critical elements of the OMP are:

- Legal protection of the existing remnant and mature regrowth koala and GHFF habitat from incompatible land management practices such as vegetation clearing, logging and grazing.
- Assisted natural regeneration of existing vegetation though active management of key threatening processes such as fire, weeds and feral pests; and
- Revegetation and management of existing cleared areas to deliver a self-sustaining forest within the management period that is representative of pre-clearing Regional Ecosystems including the presence of koala and GHFF food and shelter trees.

The management actions will result in a net gain of the overall habitat quality for koala and GHFF. The actions will take twenty (20) years of active management, maintenance, monitoring and reporting, if best practice implementation is followed. Operational scheduling is outlined in Appendix B, and tabulated in calendar format in Appendix D.

4.1 Management Approach

The delivery of the offset is over three main vegetation types, which are broken down into Operational Management Units (OMUs) to reflect the different actions required to reach the outcome (Appendix D). The OMUs reflect the Regulated Vegetation Management Maps:

- OMU-01/OMU-02: Remnant/Category B vegetation and Regrowth/Category C Vegetation
- OMU-03: Cleared pasture/Category X vegetation

Maps of the OMUs presented across the offset area are located in Appendix E.

4.1.1 OMU-01/OMU-02

Overall, the Cat B (remnant vegetation) is in average condition as per the 2016 ecological assessments (Ausecology, 2016a), resulting in a score of “2” for BioCondition Assessments. The management actions will aim the enhance this score to a “1” for the complete area. Specific actions include weed control, with a particular focus on *Lantana camara* (lantana), ecological burns, and fire management through the installation and maintenance of fire breaks and hazard reduction actions.

The Cat C (non-remnant) vegetation contains mid to high levels of weed infestation, with the condition average to degraded as per 2016 ecological assessments (Ausecolgy, 2016a), resulting in a score of "2" or "3" for BioCondition Assessments. The management actions will aim to enhance this score to a "1" for the complete area and for these vegetation communities to reach remnant status. This will be achieved through undertaking weed control actions (particularly focusing on *Lantana camara* (lantana) and *Schinus terebinthifolius* (broad-leaved pepper tree) treatment, which should increase the regeneration of the vegetation community associated species. In addition, management actions will include ecological burns, and fire management through the installation and maintenance of fire breaks and potentially undertaking hazard reduction actions.

4.1.2 OMU-03

OMU-03 was mapped as non-remnant, dominated by cleared grazing paddocks with limited natural regeneration. The focus of management actions in this OMU will aim to increase the tree coverage across the site with particular focus on koala and GHFF food and habitat trees. Other management actions to be undertaken in this OMU are weed control, with a particular focus on *Lantana camara* (lantana) and *Schinus terebinthifolius* (broad-leaved pepper tree), protecting the area against a fire through the installation and maintenance of firebreaks and conducting hazard reduction burns in surrounding OMUs. No ecological burns are recommended in this area, since this will negatively impact on the recently planted trees and shrubs.

Specific outcomes for OMU-03 include:

- Increase the tree coverage across the site with a particular focus on koala food and habitat trees
- Increase the connectivity between currently vegetated areas thereby facilitating the increased movement of koalas between the vegetated areas in the short-term and providing food and shelter trees in the medium to long-term.
- Reduce the density of lantana through increased tree and shrub competition.

Table 4-1 provides a description of the OMUs, as well as an overview of the management objectives for each. Specific management actions designed to achieve the OMU objectives are detailed in Section 5.

Table 4-1 OMU description and management actions. Avg. = average, Deg. = degraded.

OMU	Total Area (ha)	VM Act Description	Regional Ecosystems present	BioCond [1]	Koala habitat quality score [2]		GHFF habitat quality score [3]		How we will improve habitat within the OMU for koala and GHFF
					Current	Future	Current	Future	
01/02	799.69	Cat B/Cat C	12.3.7 12.8.9 12.8.17 12.9-10.7 12.8.16	Avg. (score 2-3)	8	10	H	VH	- Prevent the threat of **habitat degradation** (loss of food resources and shelter) for koala and GHFF by: - Maintaining and enhancing the existing **vegetation community** (see Table D-2) - Preventing the spread of extensive high intensity **wild fires** (see Table D-7) - Prevent the threat of **habitat fragmentation** by: - Fostering greater landscape-level **connectivity** (see Table D-3) for koala and GHFF throughout the Little Liverpool Range - Removing barriers to **dispersal** for koala (primarily weeds) and GHFF (primarily barbed fences) (see Table D-6) - Reduce mortality in resident koala by: - Controlling **feral animals** (see Table D-4) - Preventing the spread of **disease** (see Table D-8) - Preventing **vehicle strikes** (see Table D-5) - Preventing **wild fire** (see Table D-7)
OMU	**Total Area (ha)**	**VM Act Description**	**Regional Ecosystems present**	**BioCond [1]**	**Koala habitat quality score [2]**		**GHFF habitat quality score [3]**		**How we will improve habitat within the OMU for koala and GHFF**
					Current	**Future**	**Current**	**Future**	
03	72.77	Cat X	Previously primarily 12.3.7/12.8.16 and 12.8.17	NA	4	10	L	VH	- Ameliorate threat from past **habitat degradation** (loss of food resources and shelter) for koala and GHFF by: - Maintaining and enhancing the existing **vegetation community** (see Table B-2) by revegetating to existing RE12.3.7 - Preventing the spread of **wild fires** (see Table B-7) - Ameliorate threat from past **habitat fragmentation** by: - Revegetating to further promote landscape-level **connectivity** (see Table B-3) for koala and GHFF throughout the Little Liverpool Range. - Fostering **dispersal** for koala and GHFF by improving the **vegetation community** (see Table B-2)

*1 2016 ecological assessments (Ausecology, 2016a) *2 Justification of scores in Appendix F *3 Justification of scores in Appendix G

4.2 Adaptive management

Given the extended management timeline, it is not possible or intended that this OMP will provide a detailed prescription of management actions. This OMP has been based on the current state of knowledge of species ecology and best practice habitat management approaches for koala and GHFF habitat.

It is anticipated that new techniques will become available over the course of the management period to monitor vegetation composition, koala absence/presence and abundance, weed presence etc. To account for this an adaptive management approach has been adopted to ensure future research and practise development can be integrated into management and monitoring actions. This will ensure best practice techniques can be adopted contemporaneously in a way that ensures delivery and measurement of stated offset outcomes.

Adaptive management refers to a way of managing natural resources where management actions are regularly reviewed and, if necessary, modified based on monitored changes in environmental condition and/or changes in base knowledge which underpins the original management approach.

Figure 4-1 Adaptive management process (CSIRO)

5 Management actions

This section will summarise on-ground management actions to be undertaken within the offset area in order to achieve the offset objectives. This section will provide high level guidance, it will not go into very specific day-to-day activities or best practice techniques. On-ground management actions will be designed around the different requirements of each OMU to achieve the required gain in habitat quality for both species.

5.1 Vegetation management

In the context of broader offset management, management of vegetation would focus on maintaining or enhancing the offset values of the vegetated areas. As per Section 4.1. the site is divided into three broad groups: remnant, regrowth and cleared (revegetated) areas, based on structural features. The following broad vegetation management activities will be conducted across all OMU's:

- Retain live trees and shrubs (only to be cleared for property maintenance and thinning as necessary to remove weeds, protect property, establish and maintain boundary fencing, and to establish and maintain firebreaks and fire trails in accordance with an Offset Area Fire Management Plan);
- Retain stags and dead shrubs;
- Retain fallen logs, leaf litter and other woody debris.

5.1.1 Revegetation activities

Revegetation will occur in cleared areas to create self-sustaining vegetation resembling the pre-clearance Regional Ecosystem/s present on the site. Plant species appropriate for the REs are listed in Appendix H. Revegetation will exclude areas of infrastructure, gazetted roads, and tracks. Maintenance of the planted areas will be conducted according to the schedule:

- Watering of planted trees immediately following planting, where required, to improve early stage survival in dry conditions;
- Application of broad-spectrum herbicide (glyphosate) around planted trees to reduce competition from grasses and broad-leaf weeds and improve survival and performance of planted trees;
- Undertaking survival assessments across all planted areas to identify areas of low survival;
- Infill area preparation and planting in identified areas of low survival to enhance successful vegetation establishment across the site;
- Annual firebreak and access track slashing prior to fire season to provide improved access for fire management and response activities.

5.1.2 Weed Management

Weeds were observed to be generally low in abundance throughout the Offset Area, except for *Lantana camara* (lantana) and broad-leaved pepper (*Schinus terebinthifolius*). *Lantana camara* and *Schinus terebinthifolius* are of concern to achieving the offset objectives and weed control efforts should focus on the removal of these species during optimum growing conditions Table 5-1).

It is recommended to start the *Lantana camara* control in the following order (in order of priority):

1. Cleared areas that are being revegetated and/or show significant regeneration.
2. Easy to access areas with low to medium infestations (start with areas with low infestation levels before moving to areas of medium infestation levels), to ensure that these areas are not getting worse in the future. Based on the landscape attributes, easy to access creek lines (which provide the best koala habitat based on the presence of *Eucalyptus tereticornis*) are to be treated first before treating other easy to access areas.+
3. The remaining areas which will be harder to access. For the harder to access areas, creeklines with *Eucalyptus tereticornis* trees present should have precedence above the other remaining areas.

Infestations of *Schinus terebinthifolius* limited to creeklines of offset area. Recommended guidelines for the removal of *Schinus terebinthifolius* include the following:

1. Areas of low to medium infestation fringing creeklines to ensure these areas are not getting worse in the future. Based on landscape attributes, start towards the head of the catchment and work downstream.
2. Remaining/highly infested areas treated second. Creeklines containing *Eucalyptus tereticornis* placed in higher priority.

Table 5-1 Management details for Lantana camara and Schinus terebinthifolius

Management Objective	OMU	Operational details	Calendar month	Calendar month	Procedures or guidelines
Lantana camara	**1**	In order of priority as per Section 4.2.1.2	Jan	Jul	DAF weed species sheet and guidelines Herbicide label SEQ restoration framework: manual
	2		Feb	Aug	
	3		Mar	Sep	
			Apr	Oct	
			May	Nov	
			Jun	Dec	
Schinus terebinthifolius	**2**	In order of priority as per Section 4.2.1.2	Jan	Jul	DAF weed species sheet and guidelines Herbicide label SEQ restoration framework: manual
	3		Feb	Aug	
			Mar	Sep	
			Apr	Oct	
			May	Nov	
			Jun	Dec	

5.1.3 Pest animal control

Baseline monitoring will be undertaken on the property and a relative abundance index calculated for wild dogs and foxes. Potential mortality by fox/dog has been recorded on the site in June 2017 at long 152.415808 and lat -27.863353. An adult male koala was discovered deceased in apparently healthy condition. Where post control surveys indicate that there has been a recurrence of wild dogs and/or foxes on the site, control measures will be actioned using methods (e.g. controlled shooting and/or baiting) as determined by a pest control professional in consideration of these monitoring results.

5.1.4 Fire management

Three strategies are related to fire management at the offset site:

- Conduct ecological burns
- Undertake hazard reduction action through burning/grazing
- Fire exclusion

The Sections below briefly summarise each of the above strategies. The offset will be regularly assessed for fire fuel loads with guidelines of maximum fuel loads presented in the Fire Management Plan (QTFN, 2018).

5.1.5 Ecological burning

Table 5-2 summarises the fire management guidelines recommended by the Queensland Government in relation to ecological burning for the Regional Ecosystem present at the site. These are mostly in line with the fire interval, intensity and strategy as per Fire Management Plan (QTFN, 2018).

Table 5-2 Queensland government Regional Ecosystem fire management guidelines

Regional Ecosystem	Queensland Government fire management guidelines
12.3.3	**SEASON**: Summer to late-autumn. **INTENSITY**: Low. **INTERVAL**: 3-6 years. **STRATEGY**: Aim to burn 40-60% of any given area. Spot ignition in cooler or moister periods encourages mosaics. **ISSUES**: Control of weeds is a major focus of planned burning in most areas. Maintain ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas.
12.3.7	**STRATEGY**: Avoid intentionally burning this fringe vegetation. Burn surrounding ecosystems in conditions that would minimise fire incursion. **ISSUES**: Protection relies on broad-scale management of surrounding country. However, fire exclusion is not necessary. *Casuarina cunninghamiana* is sensitive to fire and germination after fire is typically low. Triggers unrelated to fire appear to maintain a healthy ecosystem. Issues with lantana and other weeds may result from fire and other disturbance.
12.8.9	**SEASON**: Late summer to autumn. **INTENSITY**: Moderate to high. **INTERVAL**: Minimum 20 years, maximum unknown, requiring further research. **STRATEGY**: Needs disturbance to maintain RE structure (eucalypt overstorey, rainforest dominated but mixed species understorey). It is unlikely that mosaic burns will be achievable because fire would most likely be of higher intensity (i.e., likely to be a wildfire) and is only likely to occur at long intervals (at least 20+ years) during prolonged dry periods. In exceptional circumstances, different localities containing this ecosystem could be burnt to ensure a continuum of habitat availability across the broader landscape. Using this strategy maximises the probability of spatial mosaics in the landscape. **ISSUES**: Operationally there will be many areas of wet sclerophyll that cannot be safely burnt, and will only burn in wildfire. There is evidence that suggests that infrequent high intensity fires sustain the eucalypt overstorey. Wet sclerophyll has been shown to be a moving ecotone between vine forest and moist/dry sclerophyll.
12.8.14	**SEASON**: Summer to winter. a. Summer to winter. **INTENSITY**: Plan for low to moderate. Unplanned occasional high intensity wildfire will occur. a: Low to moderate. **INTERVAL**: 4-8 years maintains a healthy grassy system. 8-20 years for shrubby elements of understorey. a: 4-25 years. **STRATEGY**: Aim for 40-60% mosaic burn. Needs disturbance to maintain RE structure (eucalypt overstorey with open understorey of predominantly non-rainforest species). a: Aim for 40-60% mosaic burn. Burn with soil moisture and with a spot ignition strategy so that a patchwork of burnt/unburnt country is achieved. **ISSUES**: Typically lower rainfall than other moist RE types, but prefers sheltered slopes and gullies where it maintains moist environment. Frequent fire is needed

Regional Ecosystem	Queensland Government fire management guidelines
	to maintain understorey integrity, keeping more mesic species low in the profile of the understorey so that other species can compete. A grassy system is especially important for species such as the eastern bristlebird and its habitat. It is essential that wildfires are not the sole source of fire in this ecosystem. High intensity fires occur periodically through time, however frequent low to moderate intensity fires will create the disturbance required to keep the understorey diverse. A follow-up burn soon after a high intensity wildfire can be considered to reduce germinating mesic species. This RE contains a number of rare and threatened plant species (e.g., Plectranthus suaveolens and Sophora fraseri) which require appropriate fire management. a: The fire regime should maintain a mosaic of grassy and shrubby understoreys. Control of weeds is a major focus of planned burning in most areas. Careful thought should be given to maintaining ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas. Variability in season and fire intensity is important, as well as spot ignition in cooler or moister periods to encourage mosaics.
12.8.16	**SEASON**: Summer to late-autumn. **INTENSITY**: Low. **INTERVAL**: 3-6 years. **STRATEGY**: Aim to burn 40-60% of any given area. Spot ignition in cooler or moister periods encourages mosaics. **ISSUES**: A grassy system is especially important for species such as the eastern bristlebird and its habitat. Control of weeds is a major focus of planned burning in most areas. Maintain ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas.
12.8.17	**SEASON**: Summer to late-autumn. **INTENSITY**: Low. **INTERVAL**: 3-6 years. **STRATEGY**: Aim to burn 40-60% of any given area. Spot ignition in cooler or moister periods encourages mosaics. **ISSUES**: Control of weeds is a major focus of planned burning in most areas. Maintain ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas.
12.9-10.7	**SEASON**: Summer to winter. **INTENSITY**: Low to moderate. **INTERVAL**: 4-25 years. **STRATEGY**: Aim for 40-60% mosaic burn. Burn with soil moisture and with a spot ignition strategy so that a patchwork of burnt/unburnt country is achieved. **ISSUES**: The fire regime should maintain a mosaic of grassy and shrubby understoreys. Control of weeds is a major focus of planned burning in most areas. Careful thought should be given to maintaining ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas. Variability in season and fire intensity is important, as well as spot ignition in cooler or moister periods to encourage mosaics.
12.9-12.17a	**SEASON**: Summer to winter. b: Summer to winter. **INTENSITY**: Plan for low to moderate. Unplanned occasional high intensity wildfire will occur. b: Low to moderate. **INTERVAL**: 4-8 years maintains a healthy grassy system. 8-20 years for shrubby elements of understorey. b: 4-25 years. **STRATEGY**: Aim for 40-60% mosaic burn. Needs disturbance to maintain RE structure (eucalypt overstorey with open understorey of predominantly non-rainforest species). Any moist sclerophyll that is relatively open with a mixture of grasses and shrubs should be a priority for fire management to retain RE structure. b: Aim for 40-60% mosaic burn. Burn with soil moisture and with a spot ignition strategy so that a patchwork of burnt/unburnt country is achieved. **ISSUES**: Frequent fire is needed to maintain understorey integrity, keeping more mesic species low in the profile of the understorey so that other species can compete. It is essential that wildfires are not the sole source of fire in this ecosystem. High intensity fires occur periodically through time, however frequent low to moderate intensity fires will create the disturbance required to keep the understorey diverse. A follow-up burn soon after a high intensity wildfire can be considered to reduce germinating mesic species. This RE may contain a high number of rare and threatened plant species which require appropriate fire management. b: The fire regime should maintain a mosaic of grassy and shrubby understoreys. Control of weeds is a major focus of planned burning in most areas. Careful thought should be given to maintaining ground litter and fallen timber habitats by burning only with sufficient soil moisture. The RE occurs on shallow rocky soils however, so there tends to be no moisture holding capacity. Burning should aim to produce fine scale mosaics of unburnt areas. Variability in season and fire intensity is important, as well as spot ignition in cooler or moister periods to encourage mosaics.

Ecological burns are to be undertaken during optimum burning conditions to ensure a slow cool burn. The appropriate permits will need to be applied for before starting a burn. It is recommended to burn the areas in a mosaic pattern wherever possible. Before undertaking a burn, the site will need to be prepared, which can involve, but is not limited to the following (not in order of priority):

- Install and/or upgrade fire breaks (using a grader and/or dozer depending on the terrain);
- Clear the firebreaks of any significant debris (using rake hoes, blowers etc);
- Clear any trees in proximity to fire breaks that have the potential to fall onto the fire breaks during a fire thereby potentially blocking safe access
- Rake around any significant habitat trees that have dead wood at the base where fire can travel up the trunk;
- Rake around dead stags that can provide habitat for fauna;

The level of raking required as mentioned above depends on the size of the area to be burned.

5.1.6 Hazard reduction actions

Instead of conducting a full ecological burn through a larger area of the offset, hazard reduction action can be undertaken to reduce the locally abundant fire fuel loads and in turn reducing the risk of a high intensity wildfire spreading throughout the offset. Hazard reduction actions will be conducted through a combination of ecological burns or grazing. A hazard reduction action could be used to reduce the risk of any fire getting into the fire exclusion zones, such as the revegetation areas.

Triggers for when hazard reduction actions are required will be determined using the Overall Fuel Hazard Assessment Guide (DSE, 2010). Fuel hazard assessments will be undertaken on a twice-yearly basis by a qualified environmental manager, with hazard reduction actions occurring if the Overall Fuel Hazard is determined to be High, Very High, or Extreme. Grazing will be used as a tool until it has been assessed that fuel loads have been reduced to Low or Moderate according to the Overall Fuel Hazard Assessment. The use of grazing as a hazard reduction action will not occur in OMU-3 until koala and GHFF food and habitat trees are established as determined by a suitably qualified environmental manager.

5.1.7 Fire exclusion

Fire is to be excluded from a few areas across the property as per list below:

- For Regional Ecosystem 12.3.7 it is recommended to avoid intentionally burning this fringe vegetation. Surrounding vegetation communities can be burnt to minimise fire incursion. Although fire does not necessarily need to be excluded, a fire could exacerbate the Lantana camara weed infestation issues.
- Revegetated areas. Areas where revegetation is being undertaken contain trees that are not sufficiently well grown to withstand an ecological burn/wildfire. It is recommended to protect these revegetation areas from fire through various operational actions:
  - Regularly monitor fire fuel load;
  - Install and maintain fire breaks in and around the revegetation zones;
  - Slash tracks regularly to keep grass load (and therefore fuel load) load along tracks;
  - Conduct a hazard reduction burn in surrounding area.
- Asset Protection Zones (APZ) such as sheds/farm buildings, infrastructure such as boars and watering points and dwellings.

6 Other Compensatory Measures

The offset for the EPBC 2016/7724 referral is designed to a high-quality offset for both koala and GHFF. At the completion of the management period QTFN will secure the offset areas as part of the Aroona Nature Refuge under the provision of the *Nature Conservation Act*, with ongoing management and monitoring actions based on this OMP.

Coordinating research and education

The Little Liverpool Range Initiative was set up to encourage sustainable management of the Range's conservation values through a coordinated network of land managers. The Initiative's key stakeholders are the Ipswich City Council, QTFN, Spicers Gainsdale Resorts, the UQ Threatened Species Research Centre, the Rural Fire Brigade and local landholders.

To ensure the sustainability of the threatened species populations, it is critical to implement a range of recovery actions to improve their habitat. By leveraging excellent on-ground outcomes for a relatively small amount of funds, we are able to maximise the positive impact of collective conservation land management.

7 Offset Area Reporting

The offset area reporting consists of three main components:

- Operational reporting;
- Reporting of monitoring results; and
- Final reporting.

7.1 Operational reporting

Any on-ground activities undertaken on the offset area is to be recorded, in the form of a Daily Work Report, either by QTFN staff or its contractors. It is recommended to spatially represent these activities in order to visualise the work undertaken. The following work should be recorded and spatially represented (with additional suggestions made):

- Weeds sprayed: recording species, location and number of hectares treated (using a 100x100m grid system across the property). The recording of the herbicide used to control the weed is a requirement under the ACDC Act.
- Tracks graded and/or slashed. Tracks are to be numbered and divided into 100m sections, so exact locations can be recorded.
- Revegetation actions undertaken on spatially represented revegetation areas.
- Ecological burns and hazard reductions burns.

Operational activities are to be presented in the Offset Area Assessment Report (for the individual offset agreements).

7.2 Reporting of monitoring results

All monitoring results are to be presented in the Offset Area Assessment Report on an annual basis as per the offset agreement. After the active management period of the 10-year timeframe, this report is to be prepared every five years for the maintenance management period. Reports are to be submitted to Celestino Pty Ltd within three months of the anniversary of the completion of the initial baseline survey.

The report should include the following as a minimum:

- Koala survey results (survey report and spatial representation of all findings (including opportunistic sightings).
- BioCondition Assessments results will be presented and compared against the Queensland Herbarium benchmarks as well as the baseline survey results. Koala food and habitat tree presence will be detailed.
- Location, extent and associated purpose of any vegetation clearing within the offset area will be detailed and spatially represented (firebreaks, fencelines etc).
- Changes to site connectivity will be detailed and spatially represented.

- Wild dog, feral cat and fox observations (opportunistic or scientific) will be detailed in the report and spatially represented.
- All koala injuries/deaths from interaction with wild dogs/feral cats and foxes, as well as vehicles strikes will be detailed and spatially represented. Vehicle strike incidents will also be reported to the Local Government authority (currently Beaudesert Regional Council) and the relevant State Government (currently the Queensland Government Department of Environment and Science).
- Any hazard reduction actions and/or incidences of wildfires to be detailed and spatially represented.
- Any signs of koalas affected by any disease to be recorded.

7.3 Final reporting

The final reporting for the offset agreement, to meet the conditions of the EPBC Act approval, is to be undertaken at the end of the agreed period. In addition to the standard reporting requirements as per Section 3, it will include an assessment using the Commonwealth Koala Habitat Assessment Tool (according to EPBC Act Referral Guidelines for the vulnerable koala). A final score is to be calculated and compared to the baseline score. As agreed with the Commonwealth Government, the koala assessment score will need to be a score of "10".

8 Conclusion

This OMP has been developed with the objective to summarise existing habitat quality for the koala (*Phascolarctos cinereus*) and grey-headed flying fox (*Pteropus poliocephalus*) present on the offset area and to recommend land management actions designed to achieve a net gain in koala and GHFF habitat quality.

The cleared areas offer an opportunity to achieve the most significant increase in koala and GHFF habitat quality since currently there are no food and shelter trees present. Revegetating this area with the appropriate vegetation will provide for future koala and GHFF habitat and an increase in connectivity and context. Weed control, fire management and feral animal management across the property also represent significant programs of work to be undertaken under the OMP. These combined actions will result in improvements to the quality of the koala and GHFF habitat compared to baseline levels, as well as a significant reduction in risk to the resident populations in the long term.

Implementation of management actions specified in this OMP should result in a significant discernible increase in the quality of koala and GHFF habitat. The OMP has been written in a way that it allows for adaptive management when monitoring indicates that the target outcomes are not in line with expectations. The management term proposed in the OMP is twenty (20) years.

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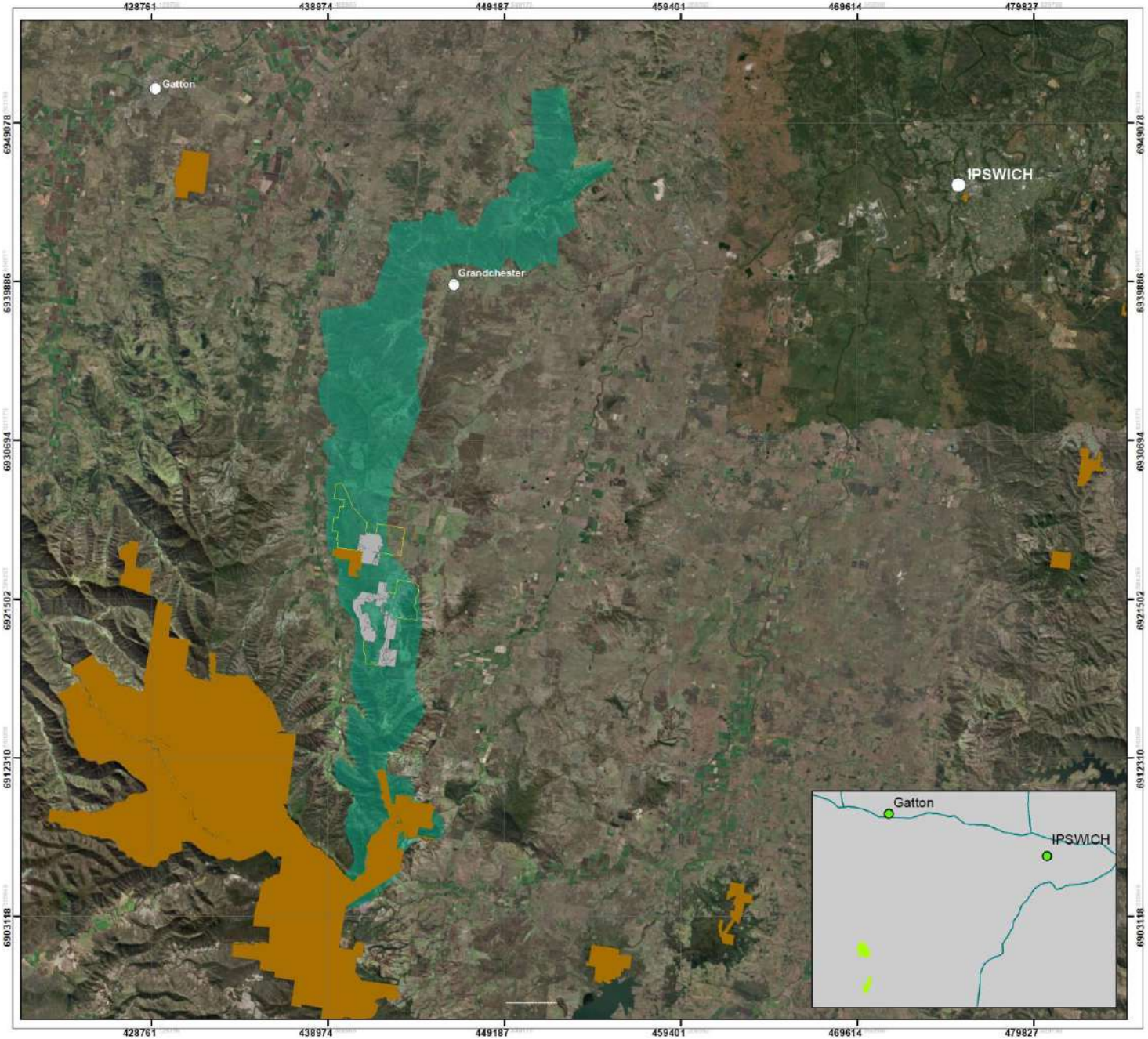
Appendix A – Locality map



QTFN

EPBC 2016_7724
Proposed offset area
Locality

0 2.75 5.5 11
Kilometers

N

1 cm = 2,033 meters
when printed at A3

Legend

- Proposed EPBC 2016_7724
- Aroona Station Boundary
- Protected area
- Little Liverpool Range

Author: QTFN
Date: 30/1/2019
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

Appendix B – Attribute Tables

Koala Occurrence

Table B-1 describes factors relating to the **koala occurrence** attribute on the offset area.

Koala occurrence refers to whether evidence is present that koalas have used the site over a particular time period and/or within a particular distance from the site. Based on scat evidence at least one koala that has used the site within the last 2 years. However, for the cleared areas, it is anticipated that koalas could traverse these, but these won't be used for foraging. The objective of this OMP across all OMUs in relation to koala occurrence is to improve koala occurrence score over the long-term for the currently vegetated areas, and to increase the koala occurrence score for the currently cleared areas through active revegetation and regrowth management.

Table B-1 Koala occurrence

Attribute	Koala occurrence
Outcome	▪ Net gain in koala population density on the property. ▪ Koala occurrence on currently cleared areas.
Actions	▪ Conduct a baseline koala density survey within the offset area within 12 months of the offset area being legally secured using best practice methodologies, such as the Spot Assessment Technique and line transect surveys (Phillips and Callaghan, 2011). ▪ Repeat the koala density/occurrence surveys undertaken within the offset area at least once in every 5-year period commencing on the date the baseline koala density survey is conducted. ▪ Koala density surveys to be undertaken by a suitably qualified ecologist with extensive experience with koala surveys. ▪ Legally secure the offset area by way of voluntary declaration under the *Vegetation Management Act 1999*.
Performance Indicators	▪ Koala density surveys undertaken and documented within stated timeframes. ▪ Offset area is legally secured as an area of High Conservation Value under section 19F of the *Vegetation Management Act 1999*
Monitoring	▪ Record opportunistic koala sightings inclusive of scat findings (location and date).
Reporting	▪ Incorporate the koala density survey results within the relevant Offset Area Assessment Report (in the year conducted). ▪ Incorporate opportunistic koala sightings into Offset Area Assessment Reports. ▪ Submit all Offset Area Assessment Reports to Celestino Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Celestino Pty Ltd via email to [email].
Corrective action	▪ If koala densities are not maintained or are significantly reduced, then an assessment needs to be undertaken by a koala expert in relation to the potential cause/s and remediation actions undertaken where feasible through the implementation of adaptive management.
Management Period	▪ 20 years

Vegetation Composition

The attribute vegetation composition (table B-2) refers to the presence of vegetation (forest or woodland) with a specific number of known koala food tree species.

Table B-2 Vegetation Composition

Attribute	Vegetation composition
Outcome	▪ Vegetation resembling the pre-clearance Regional Ecosystem/s established across offset areas. ▪ Koala movement in offset areas not impacted by weed cover. ▪ All vegetation layers have excellent and continually improving structure and floristic diversity. ▪ Presence and recruitment of koala food and shelter trees. ▪ No threat of habitat degradation from clearing, development or other incompatible land uses. ▪ Domestic livestock excluded from offset area (but for hazard reduction purposes).
Actions	▪ Incorporate offset area into property Fire Management Plan within 6 months of the offset area being legally secured. ▪ Install fire breaks/trails in accordance with the Fire Management Plan. ▪ Retain all vegetation in remnant and mature regrowth areas except where necessary for the removal of weeds, to establish and maintain fencing around the offset area perimeter, establish and maintain fire breaks/trails as per Fire Management Plan, or to reduce or remove health and safety risk to persons and/or infrastructure. ▪ Hazard reduction action will take place to reduce fuel loads based on Overall Fuel Hazard Assessment ▪ Undertake baseline Tertiary Vegetation Condition Assessments, including photo point monitoring. ▪ Implement a revegetation program in cleared areas using best practice techniques with tree and shrub species representative of the pre-clearance Regional Ecosystem including koala food and shelter trees (see Appendix F for proposed species list). ▪ Implement a weed management plan, with a particular focus on weeds declared under the Biosecurity Act 2014, as well as weeds with potential to impact on koala movement and structural vegetation composition (mainly *Lantana camara* and *schinus terebinthifolius*). ▪ Legally secure the offset area by way of voluntary declaration under the *Vegetation Management Act 1999*.
Performance Indicators	▪ Minimum plant survival rate of 80% is required during the establishment phase. ▪ Livestock are excluded from offset area other than for the purposes of hazard reduction actions. ▪ Lantana camara and Schinus terebinthifolius cover is reduced across the offset area, and weeds are not impacting on the movement of koalas across the site and not negatively impacting on recruitment of koala food and shelter trees. ▪ Large offset areas are legally secured under section 19F of the VM Act.

Attribute	Vegetation composition
Monitoring	▪ Tertiary Vegetation Condition Assessments at least twice in the 20 year management period. ▪ Weed surveys (during spring or summer to optimise weed detection). ▪ Photo monitoring. ▪ Fuel hazard monitoring will occur on a twice yearly basis by suitably qualified environmental manager.
Reporting	▪ Monitoring results to be recorded in Offset Area Assessment Report. ▪ Submit all Offset Area Assessment Reports to Celestino Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Celestino Pty Ltd via email to [email].
Corrective action	▪ If tree height and foliar projective cover monitoring indicate tree growth less than performance indicators, implement additional weed control, fertiliser, amelioration or other management actions necessary to stimulate tree growth. ▪ If weed survey indicates weed cover is not reduced since previous survey, weed control program to be expanded/adapted to improve outcomes.
Management Period	▪ 20 years

Habitat Connectivity

Habitat connectivity refers to the offset area in a landscape context and whether the offset area is part of a contiguous landscape of a certain hectare size without barriers for koala or GHFF movement.

Table B-3 Habitat connectivity

Attribute	Habitat connectivity
Outcome	▪ Large, connected landscapes are well managed and legally protected. ▪ No threat of habitat degradation from clearing, development or other incompatible land uses. ▪ Domestic livestock excluded from offset area (but for hazard reduction purposes).
Actions	▪ Retain all vegetation in remnant and mature regrowth areas except where necessary for the removal of weeds, to establish and maintain fencing around the offset area perimeter, establish and maintain fire breaks/trails as per Fire Management Plan, or to reduce or remove health and safety risk to person and/or infrastructure. ▪ Implement a revegetation program in the cleared areas using best practice techniques using tree and shrub species representative of the pre-clearance Regional Ecosystem including koala food and shelter trees (see Appendix F for proposed species list). ▪ Legally secure the offset area by way of voluntary declaration under the *Vegetation Management Act 1999.*
Performance Indicators	▪ Offset area is legally secured as an area of High Conservation Value under section 19F of the *Vegetation Management Act 1999.*
Monitoring	▪ Monitor for any (illegal) clearing in the area (highly unlikely) or any natural events that might impact on habitat connectivity.
Reporting	▪ Submit all Offset Area Assessment Reports to Celestino Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Celestino Pty Ltd via email to [email].
Corrective action	▪ Report any suspected illegal clearing to the Queensland Department of Environment and Science.
Management Period	▪ 20 years

Key Existing threats

Various threatening processes have been identified or are anticipated to be impacting on the recovery of the koala species and/or have the potential to result in an actual decline of the current population. The EPBC Act Referral Guidelines (DEE, 2014) mention the following primary threats for the coastal koala population:

- Loss, fragmentation and degradation of habitat, including barriers to dispersal.
- Mortality due to vehicle strikes, dog (*Canis familiaris*) attacks and disease.
- High-intensity fire.

Based on ecological investigations and knowledge of the local area, the following additional threat has been identified:

- Mortality due to feral cat (*Felis catus*) and/or fox (*Vulpes vulpes*) attacks.

Mortality due to introduced predators, including wild dogs, feral cats and fox attacks.

Table B-4 to Table B- detail each of the identified threats, the outcome required to achieve the overall offset objective, and management actions, monitoring and reporting required to significantly reduce the impact of each individual threat.

Threat: Attack by feral animals

Table B-4 Threat to koala from feral animal attack

Attribute	Attack by (feral) animals
Outcome	▪ No koala mortality or injury by feral animal attack.
Actions	▪ Conduct a baseline survey to establish feral animal abundance and location on the property. This can be undertaken through the use of remote motion-activated cameras and/or identification of scats. ▪ Implement feral animal control program. The control program and techniques (trapping, baiting, shooting) will be informed based on the results of the abundance surveys. Where practical, and to increase the effectiveness of a control program, the landholder will seek to coordinate control programs with comparable activities being undertaken by neighbouring landholders. ▪ Conduct follow-up monitoring and implement further control efforts if feral animals recur. Implement adaptive management techniques if initial control techniques are not working effectively. ▪ Install appropriate hazard signage informing that the offset area is under feral control. ▪ Set-up a community engagement program including but not limited to interpretive signs, fact sheets and community presentations with the aim to raise community awareness and encourage responsible pet ownership.
Performance Indicators	▪ Management and reduction in abundance of feral animals ▪ No increase in relative feral animal abundance index from baseline. ▪ No recorded injury or death from feral animal attacks within the offset area.
Monitoring	▪ Monitoring of the presence of feral pest animals through the use of remote motion-activated cameras; ▪ Survey the site to record the presence/absence of signs of feral animals (sightings, killings and/or scats and tracks). ▪ Establishment and maintenance of register documenting injured/killed koalas and any observed koala/feral animal interactions.
Reporting	▪ Offset Area Assessment Reports to include all feral animal survey data. ▪ Offset Area Assessment Reports to include all records of koala injury or death related to feral animal attacks. ▪ Submit all Offset Area Assessment Reports to Celestino Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Celestino Pty Ltd via email to [email].
Corrective action	▪ Should the initial and ongoing wild dog control measures not result in a reduction of wild dog numbers (compared to baseline survey), feral control program to be expanded/adapted to improve outcomes. ▪ Any incidence of koala injury/mortality resulting from feral animal attack will initiate supplementary monitoring and control measures. ▪ In the event that a koala is found injured, transport immediately to a local vet, or suitably qualified and experienced wildlife carer.
Management Period	▪ 20 years

Threat: Vehicle Strike

Table B-5 Koala injury or mortality due to vehicle strike

Attribute	Koala injury or mortality due to vehicle strike
Outcome	No koala mortality or injury due to vehicle strike within the offset areas and surrounding roads.
Actions	▪ Installation of koala awareness signage to inform traffic in both directions of presence of koalas in the area within 6 months of offset area being legally by way of voluntary declaration under the *Vegetation Management Act 1999*. ▪ Implementation of a slow speed requirement (40km/h) for vehicles traversing the offset area. ▪ Installation of slow speed signage at the main entry points to the offset area.
Performance Indicators	▪ No recorded injury or death from vehicle strike within the offset area. ▪ No recorded injury or death from vehicle strike on surrounding roads.
Monitoring	▪ Record any observed koala injury/mortality on roads/tracks within the offset area.
Reporting	▪ Report any koala injuries/deaths to Local Government authority (e.g. Scenic Rim Regional Council) and relevant State Government department (e.g. currently the Department of Environment and Science) ▪ Incidents to be recorded in Offset Area Assessment Reports. ▪ Submit all Offset Area Assessment Reports to Celestino Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Celestino Pty Ltd via email to [email].
Corrective action	▪ In the event that a koala is found injured, transport immediately to a local vet, or suitably qualified and experienced wildlife carer.
Management Period	▪ 20 years

Threat: Barriers to Dispersal

Table B-6 Barriers to dispersal

Attribute	Barriers to Dispersal
Outcome	▪ Large, connected landscapes are well managed and legally protected. ▪ No threat of habitat degradation from clearing, development or other incompatible land uses. ▪ Vegetation resembling the pre-clearance Regional Ecosystem/s established across offset areas. ▪ Koala movement in offset areas not impacted by weed cover. ▪ All vegetation layers have excellent and continually improving structure and floristic diversity. ▪ Presence and recruitment of koala food and shelter trees. ▪ Domestic livestock excluded from offset area (but for hazard reduction purposes).
Actions	▪ Retain all vegetation in remnant and mature regrowth areas except where necessary for the removal of weeds, to establish and maintain fencing around the offset area perimeter and/or property boundary, establish and maintain fire breaks/trails as per Fire Management Plan, or to reduce or remove health and safety risk to person and/or infrastructure. ▪ Implement a revegetation program in the cleared areas using best practice land management techniques using tree and shrub species representative of the pre-clearance Regional Ecosystem including koala food and shelter trees (see Appendix F for proposed species list). ▪ Implement a weed management plan, with a particular focus on weeds declared under the *Biosecurity Act 2014* and those which may impact koala (mainly Lantana camara). ▪ Legally secure the offset area by way of voluntary declaration under the *Vegetation Management Act 1999*. ▪ Any fencing installed or replaced within the offset area is to be fauna-friendly in design as per the relevant guideline such as Wildlife Friendly Fencing Project (https://www.wildlifefriendlyfencing.com/WFF/Home.html) or Land for Wildlife (n.d.).
Performance Indicators	▪ Offset areas are legally secured under section 19F of the VM Act. ▪ Minimum plant survival rate of 80% is required during the establishment phase. ▪ Livestock are excluded from offset area other than for the purposes of hazard reduction actions. ▪ Lantana camara and Schinus terebinthifolius cover is reduced across the offset area, and weeds are not impacting on the movement of koalas across the site and not negatively impacting on recruitment of koala food and shelter trees. ▪ Large offset areas are legally secured under section 19F of the VM Act.
Monitoring	▪ Tertiary Vegetation Condition Assessments at least twice during the 20 year management period. ▪ Regular weed survey (during spring or summer to optimise weed detection).

	▪ Photo monitoring on an annual basis. ▪ If livestock are kept on the balance of the property, offset area fencing to be monitored on a monthly basis.
Reporting	▪ Monitoring results to be recorded in Offset Area Assessment Reports. ▪ Submit all Offset Area Assessment Reports to Celestino Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Celestino Pty Ltd via email to [email].
Corrective action	▪ If survival counts indicate less than 80% survival, replanting and/or in-fill planting to be carried out. ▪ If tree height and foliar projective cover monitoring indicate tree growth less than performance indicators, implement additional weed control, fertiliser, amelioration or other management actions necessary to stimulate tree growth. ▪ If weed surveys indicate weed cover is not reduced since previous survey, weed control program to be expanded/adapted to improve outcomes.
Management Period	▪ 20 years

Fire (in particular high intensity fire)

Table B-7 Fire

Attribute	High intensity fire
Outcome	▪ No high-intensity fires occur within the offset area. ▪ No koala mortality or injury resulting from fire.
Actions	▪ Incorporate the offset area into the property Fire Management Plan within six (6) months of the offset being legally secured, for the purpose of protecting the offset area from high intensity wildfires as well as for conducting ecological burns with the aim to enhance biodiversity in line with the Regional Ecosystem Description Database fire management guideline. The property Fire Management Plan will be prepared by a suitably qualified professional and will detail: current vegetation condition and fire risk, locations of current and required firebreaks and fire control lines, current fuel loads, recommended actions and timeframes for maintenance of bushfire risk within the context of the adapted Regional Ecosystem Description Database guidelines and biodiversity outcomes sought for the offset area. ▪ Hazard reduction action will take place to reduce fuel loads based on Overall Fuel Hazard Assessment. ▪ Install firebreaks and fire trails (access tracks). ▪ Prescribed burning will be undertaken in consultation with, and under the guidance of the Queensland Rural Fire Brigade and in compliance with the *Fire and Emergency Services Act 1990*. ▪ Inspect firebreaks and access tracks, undertake any maintenance required to achieve compliance with Fire Management Plan.
Performance Indicators	▪ No recorded high-intensity fires in the offset area. ▪ No recorded injury or death from fire. ▪ Implementation of Fire Management Plan reduces fuel levels. ▪ Vegetation composition not negatively affected by fire regime. ▪ Minimise the risk of koala mortality within the offset area due to prescribed burning.
Monitoring	▪ To be informed by the property Fire Management Plan. ▪ Fuel hazard monitoring will occur on a twice yearly basis by suitably qualified environmental manager.
Reporting	▪ Report on prescribed burn results (area covered, any potential negative impact, intensity of burn, learnings) ▪ Report any high intensity (wildfire) to the relevant authorities and report on any impact on the offset area. ▪ Monitoring results and maintenance log will be detailed within the Offset Area Assessment Reports. ▪ Submit all Offset Area Assessment Reports to Celestino Pty Ltd as required.

	▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Celestino Pty Ltd via email to [email].

Corrective action	▪ If a wildfire occurs in the area, the following actions will be taken by the landowner:
	  ▪ Activate property Fire Management Plan
	  ▪ Stay informed through the Rural Fire Service.
	  ▪ Be prepared to engage in fire control.
	▪ Repair any fire breaks and access tracks

Management Period	▪ 20 years

Introduction or spread of disease or pathogens

Table B-8 Introduction or spread of disease or pathogens

Attribute	Introduction or spread or disease or pathogens
Outcome	▪ Reduced incidence of koala disease within offset area from baseline survey. ▪ Baseline surveys indicate no identification of vegetation diseases and pathogens within the offset area.
Actions	▪ Document baseline condition survey to include assessment for signs of *Phytophthora cinnamomi* and Myrtle Rust. ▪ To reduce the risk of introducing Chlamydia and Koala retrovirus into the resident population; uncontrolled translocation of koala is not permitted within the offset area. In the event that regulator-approved translocation of koala is proposed onto the site, the animal(s) is to be assessed by a veterinarian prior to introduction. ▪ Vegetation management activities, which include tree lopping/felling, weed removal, tree planting (including nursery suppliers) are deemed to be high risk in the context of introducing pathogens that may potentially impact koala habitat. As such, any person engaged to undertake these activities must satisfy the landholder that they have undertaken all reasonable steps to prevent the introduction of a pathogen/disease to the site (e.g. vehicle and equipment wash-down prior to site entry). ▪ Enforce biosecurity procedures for all persons and vehicles that may carry vegetation pathogens known to affect koala food and shelter trees. ▪ Monitor the neighbouring habitat in order to identify disease occurrence. ▪ Implement measures such as myrtle rust control in revegetation stock. Certification of nursery, inspection of planting stock, quarantine/destruction of contaminated material, sterilisation of planting equipment and vehicles/wheel washes.
Performance Indicators	▪ Incidence of koala disease maintained below or at baseline level. ▪ Approved koala translocations are free from disease. ▪ Reduction in incidence of koala feed trees exhibiting disease.
Monitoring	▪ Incidence of koalas exhibiting disease to be recorded during any monitoring events within the offset area. ▪ Monitor the neighbouring habitat in order to identify disease occurrence at least once per annum.

Reporting	▪ Baseline data concerning observations around koala and koala habitat diseases and pathogens is to be documented within Offset Area Assessment Report in the year it is conducted. ▪ Confirmation of koala translocation activity within the offset area (if approved) is to be included within Offset Area Assessment Reports. ▪ Incidence of koalas exhibiting symptoms of disease to be reported within Offset Area Assessment Report. ▪ Submit all Offset Area Assessment Reports to Celestino Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Celestino Pty Ltd via email to [email].
Corrective action	▪ Should there be an increase in trees exhibiting disease symptoms and/or evidence of vegetation dieback (as noted during offset area assessments) the following corrective actions will take place ▪ Review of the efficacy of current biosecurity measures; ▪ Review of plant stock/management services suppliers (if applicable) should it be suspected plant pathogens have been introduced via external sources.
Management Period	▪ 20 years

Recovery Value

The 'recovery value' attribute detailed in the Koala habitat assessment tool of the EPBC Act Referral Guidelines (DEE, 2014) is based on the following interim recovery objective: "*Protect and conserve large, connected areas of koala habitat, particularly large, connected areas that support koalas that are*:

- *genetically diverse/distinct; or*
- *free of disease or have a very low incidence of disease; or*
- *breeding (i.e. presence of back young or juveniles).*" (DEE, 2014).

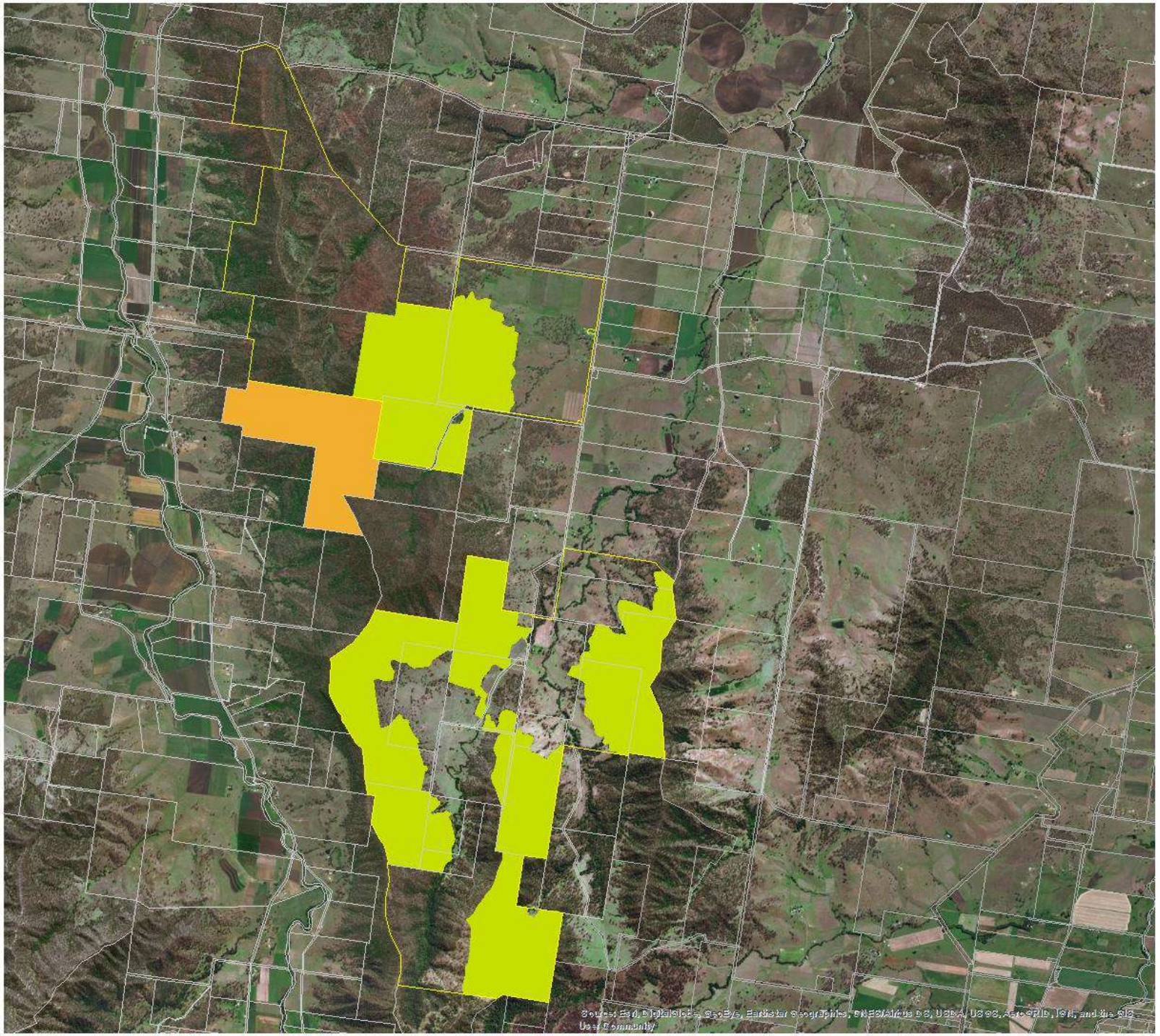
The offset area falls within the Little Liverpool Range, a large tract of remnant vegetation that covers over 20,500 hectares. Due to the extent of remnant vegetation and its connectivity to the regional corridor and Mt Beau Brummel Conservation Reserve, this site likely plays an important role in the survival of koalas in this area.

Table B-8 Recovery value

Attribute	Recovery Value
Outcome	▪ Large, connected areas of koala habitat are legally protected and managed to support koalas that are: genetically diverse/distinct; free from or have a very low incidence of disease; breeding. ▪ No threat of habitat degradation from clearing, development or other incompatible land uses.
Actions	▪ To remove the risk of habitat degradation associated with clearing, development or other incompatible land uses, the entire offset area will be managed for conservation purposes. ▪ Retain all vegetation in remnant and mature regrowth areas except where necessary for the removal of weeds, to establish and maintain fencing around the offset area perimeter, establish and maintain fire breaks/trails as per Fire Management Plan, or to reduce or remove health and safety risk to person and/or infrastructure. ▪ Implement a revegetation program in the cleared areas using tree and shrub species representative of the pre-clearance Regional Ecosystem including koala food and shelter trees (see Appendix F for proposed species list). ▪ Implement a weed management plan, with a particular focus on weeds declared under the *Biosecurity Act 2014*, and weeds impacting koala movement and structural vegetation composition (mainly *Lantana camara*). ▪ Check property for bell minor associated die-back based on significant presence of lantana and some dieback.

	▪ Legally secure the offset area by way of voluntary declaration under the *Vegetation Management Act 1999*. ▪ Install fire breaks/trails in accordance with the Fire Management Plan.
Performance Indicators	▪ Large offset areas are legally secured under section 19F of the VM Act. ▪ Offset areas provide connectivity with surrounding koala habitat.
Monitoring	▪ Monitor all management actions as per previous sections.
Reporting	▪ Submit all Offset Area Assessment Reports to Celestino Pty Ltd as required. ▪ Submit all Offset Area Assessment Reports and any records of non-compliance to Celestino Pty Ltd via email to [email].
Corrective action	▪ Not Applicable
Anticipated term	▪ 20 years

Appendix C - EPBC 2016/7724 proposed map



QTFN

EPBC 2016/7724
Proposed offset area

0 0.5 1 2
Kilometers

N

1 cm = 400 meters

Legend

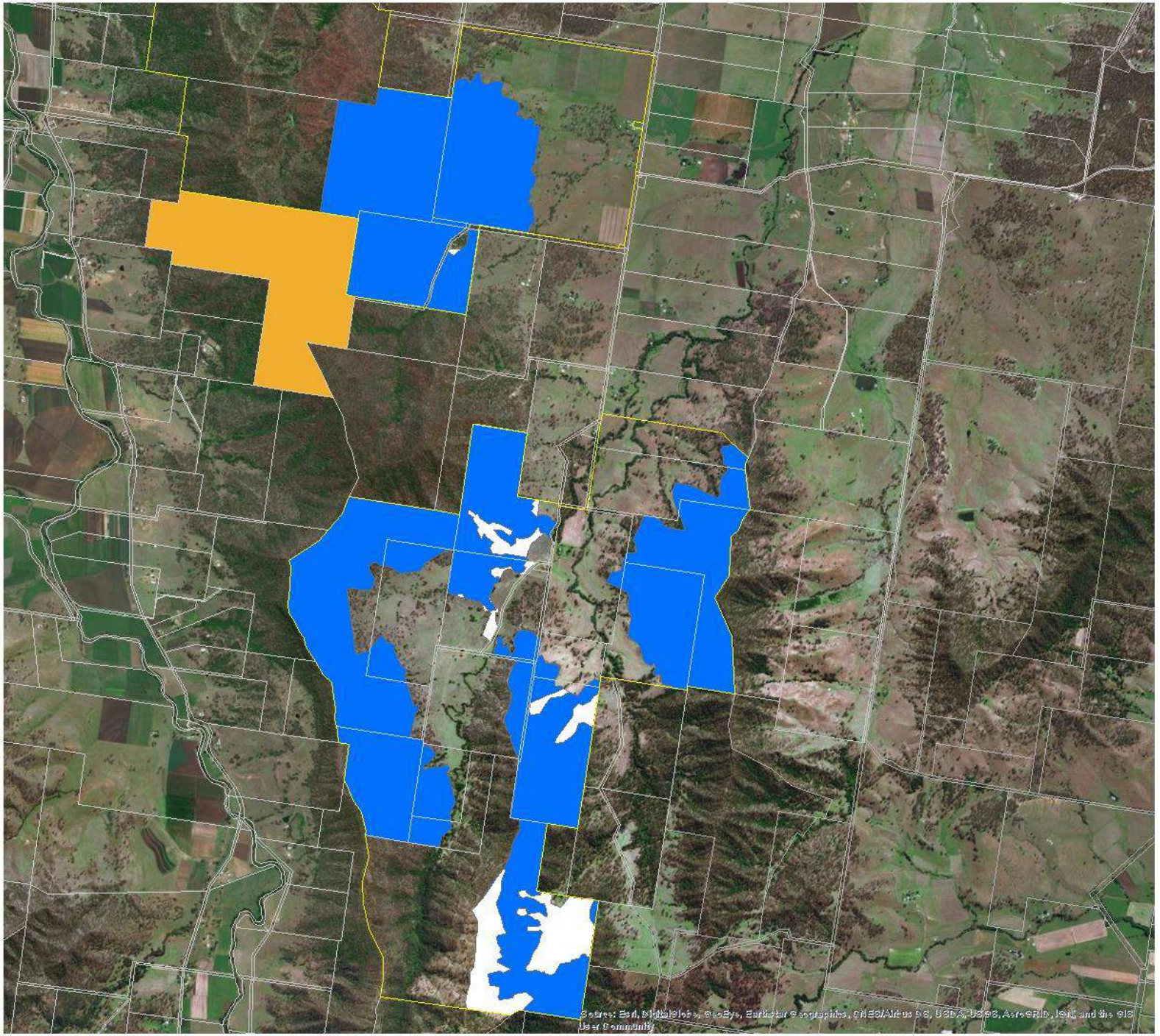
- Aroona Boundary
- Cadastral_data_QLD_CADASTRE_DCDB
- Ipswich Reserves
- Proposed EPBC216/7724 offset area

Author: QTFN
Date: 4/4/2019
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

Appendix D - Tabulated management schedule

Table E-1 – Scheduling of management actions

Appendix E - Operational Management Unit



QTFN

EPBC 2016_7724
Proposed offset area

0 0.3750.75 1.5
Kilometers

N

1 cm = 300 meters

Legend

- Aroona Boundary
- Cadastral_data_QLD_CADASTRE_DCDB
- CatBC_OMU1/OMU2 (799.69ha)
- CatX_OMU3 (72.77ha)
- Ipswich Reserves

Author: QTFN
Date: 4/4/2019
Source: Cadastral Boundaries,
Data supplied by QSpatial
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page
ACCURACY STATEMENT
Due to varying sources of data, spatial locations may not coincide when overlaid.

Appendix F – Justification of koala habitat scores (using the Koala Habitat Assessment Tool)

Koala Habitat Assessment Tool Scoring Justification

The Queensland Trust for Nature does not undertake the assessment for start quality for the impact area. The methodology used for justification is the Koala Habitat Assessment Tool from the EPBC referral guidelines.

Start quality (table 1), future quality without offset (table 2) and future quality with offset (table 3) justifications. These were calculated for both the vegetated and cleared areas, in accordance with the OAMP.

OMU-01/OMU-02:

Table F-1. KHAT Justification OMU 01/OMU02

Attribute (coastal)	Start Quality	Future Quality without offset	Future quality with offset
Total	**8**	**8**	**10**
Koala Occurrence	**SCORE: 2** Desktop indicates: Koala within 2km of offset area (QLD wildlife online species list). Mapped as medium value bushland and low value rehabilitation. On-ground surveys indicate: Scat surveys and nocturnal spotlighting were carried out in 2016. Koala scats were found at over 31% of locations surveyed.	**SCORE: 2** No measurable change in koala occurrence without out the offset.	**SCORE: 2** While abundance will improve, the KHAT score will not change.
Vegetation Structure and Composition	**SCORE: 2** Desktop indicates: Area is mapped as regrowth of varying ages. Aerial imagery for the site shows patches of clearing within offset area.	**SCORE: 2** This score is applied based on 2 or more koala food trees being present. It is noted that density of weed infestation would currently prevent access of koalas to food trees. Regrowth age and scat surveys under regrowth suggests	**SCORE: 2** While structure and composition will improve with management, the KHAT score will not increase.

	On-ground rectification surveys indicate 2 or more koala food trees present.	koalas are not currently utilising smaller age class trees.	
Habitat Connectivity	**SCORE: 2** Part of the Little Liverpool Range, being a State significant biodiversity corridor. No barriers to contiguous habitat (4 lane highway, > 2km exotic grasslands and major rivers)	**SCORE: 2** The offset location will not change and therefore the KHAT score will not change.	**SCORE: 2** While functional connectivity will improve, the KHAT score will not increase.
Key Existing Threats	**SCORE: 1** Desktop searches indicate: - Potential for mortality on adjacent roads and through predation. On-ground surveys indicate: - Observed packs of wild dogs and foxes present in the offset area. - High activity index recorded within offset area and adjacent land. - High wild dog activity year-round presents potential significant threat to a koala population in fragmented landscapes where tree cover requires longer time spent on the ground. - Observed dead apparently healthy male koala adjacent to offset area.	**SCORE: 1** - Substantial likelihood of mortality through predation. - Substantial likelihood of mortality on roads. - Observed packs of wild dogs and foxes present in the offset area. - Without control efforts, considerable risk of increase in wild dog and fox populations and increased mortality risk to koala, especially in fragmented landscapes where lack of trees require longer time spent on the ground. - However, due to lack of qualitative data, this attribute score remains the same.	**SCORE: 2 (+1)** Listed key existing threats to koalas include mortality from vehicle strike or dog attack, both from wild dogs and domesticated pets. There have been no quantitative surveys conducted to determine the abundance and activity index of wild dogs and foxes in the Little Liverpool Range. To ascertain approximate historical abundance, interviews were conducted with neighbouring landholders. A summary of this information is listed in the below points: - For the last 20 years, the wild dog and fox populations have not been managed at Aroona Station, due to the preference of the previous owner to not bait, trap or shoot. - Dog numbers have been high, with packs numbering between 10-15 individuals observed on occasion - Some neighbouring property owners engage in annual baiting programs delivered by local councils, but the engagement in these programs has decreased over the last 10 years - For the past 5 years, dog and fox numbers have remained relatively stable, in low to medium numbers - Occasionally new individuals/packs will arrive in the area and start hunting cattle. These animals are removed on a reactive basis

			Due to the large home ranges and travelling capacity of wild dogs, their numbers fluctuate based on seasonality, neighbouring management techniques and intensity of management and food paucity in the environment. Under the offset management, wild dogs will be monitored closely to ensure that the potential increases (and therefore threats to the koala) are swiftly and effectively managed. Management will include targeted trapping and shooting of known problem individuals, along with coordinated activities with neighbours to ensure the management is maximised in effectiveness. Ideally we would also use the offset as an opportunity to do more research into the dynamics of wild dogs and foxes in a landscape. Anecdotal evidence suggests that maintaining an alpha pack in the landscape reduces the likelihood of rogue individuals, packs and domestic dogs from disturbing the existing structure. It seems that when a dominant pack is present there is reduced variety in primary prey species. Scats collected from Aroona indicate that the majority of wild dog diet is eastern grey kangaroo *Macropus giganteus* and northern brown bandicoot *Isoodon macrourus*. Foxes are shown to eat a wider variety of prey, which has been shown in scat analysis and confirmed in other literature. They have been observed to opportunistically prey upon what is available in a landscape, and their diets include small to medium sized mammals, reptiles, insects and birds. Wildlife cameras at Aroona have shown fox numbers to be prevalent and numerous in the landscape. Foxes are much more agile than dogs and have been observed scaling cliffs and climbing trees, presenting a high likelihood that they will opportunistically predate upon koalas and their young. They are known to predate upon similar sized animals at Aroona. Offset management will focus on reducing the effect of fox predation on koalas and other wildlife, and will be done in conjunction with wild dog management. It has also been observed at other QTFN managed properties that when wild dog numbers have decreased, fox and cat numbers have substantially increased. This potentially presents a greater risk to koala mortality and requires further study.

			Bi-annual monitoring and monthly observations of the offset area will allow for monitoring of wild dogs and foxes present in the offset area. Control events carried out in response to the monitoring will deliver a reduction in wild dogs and foxes and a reduced threat to the koala.
Recovery Value	**SCORE: 1** At a broader spatial scale, habitat forms part of a contiguous range system that is large and connected. Incidence of disease levels are unknown, but chlamydia and retrovirus are likely to occur within the population. The offset area incorporates water courses and riparian vegetation likely to be important refugia for koalas in dry conditions and for maintenance of corridors to allow koalas to move between large areas of habitat. Water courses within the offset area are currently affected by *Lantana camara* and *Schinus terebinthifolius* having significant impacts on the koalas ability to utilise the potential future refugia and move through the landscape, and is affecting the recruitment of koala food trees.	**SCORE: 1** The status quo will not change and therefore the KHAT score will not change.	**SCORE: 2 (+1)** There is no available information about disease (chlamydia and retrovirus) or genetic information for the koalas in the Mt Mort area. A study is in progress at Hiddenvale Nature Refuge, 4 km north of Aroona, however, these results have not been released. There have been no studies for genetic sampling and a paucity of health testing for the koala populations of Ipswich. The work being conducted at Hiddenvale is the first of its kind and so will form the baseline for the area. The closest comparison to the offset site is from surveys that have been conducted at Mount Walker and Ebenezer, 20k m east of Aroona. These areas have a similar landscape matrix to Aroona, containing a mix of woodland ridges with agricultural and grazing areas and so can be used as a comparison for the offset site. Surveys revealed koala activity in these areas appeared low, and visual observation showed individuals with symptoms of chlamydia (dirty tail and/or conjunctivitis). Disease incidence in these areas was observed as relatively common within the population, however, this may be due to the small sample size and it must be noted there was no clinical swabs or samples taken (ICC 2017). The Ipswich City Council Koala Conservation Plan has identified Mount Mort as a Priority Rehabilitation Area (PRA). PRAs have been identified as areas that contain important tracts of remnant vegetation that are in poor condition or fragmented by other land uses. Restoration activities in these areas will have a high impact, connecting fragmented vegetation to Core Habitat Areas (CHAs). Reconnecting habitat is important for improving genetic diversity and resilience. Low genetic diversity makes individuals more prone to disease. Without the offset in place, these areas will continue to form a fragmented landscape where there is a paucity of new genetic material and overall decreased resilience to disease.

Table F-2. KHAT Justification OMU 03

Attribute (habitat coastal)	Start Quality	Future Quality without offset	Future quality with offset
Total	**4**	**4**	**10**
Koala Occurrence	**SCORE: 1** Desktop indicates: - Koala within 2 km of offset area (QLD wildlife online species list). - Mapped as medium value bushland and low value rehabilitation. On-ground surveys indicate: - No scats observed as no trees present. No evidence of koalas utilizing the site.	**SCORE: 1** No measurable change in koala occurrence without out the offset. Can still clear as its Cat X so koala occurrence would stay at 1.	**SCORE: 2 (+1)** With active revegetation and plating of trees, koalas are expected to utilise the offset area. Increase in habitat size and quality.
Vegetation Structure and Composition	**SCORE: 0** Desktop indicates: No vegetation present	**SCORE: 0** Without active revegetation it is expected the score will remain at zero. Use by cattle and active slashing of pastures will prevent natural regeneration and recruitment of koala food and habitat trees.	**SCORE: 2 (+2)** Active revegetation will result in at least 2 koala food trees being present. Revegetation will include full regional ecosystem structural diversity to ensure offset area can be utilized for both food and shelter by koalas.
Habitat Connectivity	**SCORE: 2** Part of the Little Liverpool Range, being a State significant biodiversity corridor. No barriers to contiguous habitat (4 lane highway, > 2 km exotic grasslands and major rivers)	**SCORE: 2** The offset location will not change and therefore the KHAT score will not change.	**SCORE: 2** While functional connectivity will improve, the KHAT score for this attribute cannot increase.
Key Existing Threats	**SCORE: 1** Desktop searches indicate: - Potential for mortality on adjacent roads and through predation. On-ground surveys include:	**SCORE: 1** - Substantial likelihood of mortality through predation. - Substantial likelihood of mortality on roads. - Observed packs of wild dogs and foxes present in the offset area.	**SCORE: 2 (+1)** Listed key existing threats to koalas include mortality from vehicle strike or dog attack, both from wild dogs and domesticated pets. There have been no quantitative surveys conducted to determine the abundance and activity index of wild dogs and foxes in the Little Liverpool Range. To ascertain approximate historical abundance,

	- Observed packs of wild dogs and foxes present in the offset area. - High activity index recorded within offset area and adjacent land. - High wild dog activity year-round presents potential significant threat to koala population in fragmented landscapes where tree cover requires longer time spent on the ground. - Observed dead apparently healthy male koala adjacent to offset area. Potential cause dog/fox predation	- Without control efforts, considerable risk of increase in wild dog and fox populations and increased mortality risk to koala, especially in fragmented landscapes where lack of trees require longer time spent on the ground. - However, due to lack of qualitative data, this attribute score remains the same.	interviews were conducted with neighbouring landholders. A summary of this information is listed in the below points: - For the last 20 years, the wild dog and fox populations have not been managed at Aroona Station, due to the preference of the previous owner to not bait, trap or shoot. - Dog numbers have been high, with packs numbering between 10-15 individuals observed on occasion - Some neighbouring property owners engage in annual baiting programs delivered by local councils, but the engagement in these programs has decreased over the last 10 years - For the past 5 years, dog and fox numbers have remained relatively stable, in low to medium numbers - Occasionally new individuals/packs will arrive in the area and start hunting cattle. These animals are removed on a reactive basis Due to the large home ranges and travelling capacity of wild dogs, their numbers fluctuate based on seasonality, neighbouring management techniques and intensity of management and food paucity in the environment. Under the offset management, wild dogs will be monitored closely to ensure that the potential increases (and therefore threats to the koala) are swiftly and effectively managed. Management will include targeted trapping and shooting of known problem individuals, along with coordinated activities with neighbours to ensure the management is maximised in effectiveness. Ideally we would also use the offset as an opportunity to do more research into the dynamics of wild dogs and foxes in a landscape. Anecdotal evidence suggests that maintaining an alpha pack in the landscape reduces the likelihood of rogue individuals, packs and domestic dogs from disturbing the existing structure. It seems that when a dominant pack is present there is reduced variety in primary prey species. Scats collected from Aroona indicate that the majority of

			wild dog diet is eastern grey kangaroo *Macropus giganteus* and northern brown bandicoot *Isoodon macrourus*. Foxes are shown to eat a wider variety of prey, which has been shown in scat analysis and confirmed in other literature. They have been observed to opportunistically prey upon what is available in a landscape, and their diets include small to medium sized mammals, reptiles, insects and birds. Wildlife cameras at Aroona have shown fox numbers to be prevalent and numerous in the landscape. Foxes are much more agile than dogs and have been observed scaling cliffs and climbing trees, presenting a high likelihood that they will opportunistically predate upon koalas and their young. They are known to predate upon similar sized animals at Aroona. Offset management will focus on reducing the effect of fox predation on koalas and other wildlife, and will be done in conjunction with wild dog management. It has also been observed at other QTFN managed properties that when wild dog numbers have decreased, fox and cat numbers have substantially increased. This potentially presents a greater risk to koala mortality and requires further study. Bi-annual monitoring and monthly observations of the offset area will allow for monitoring of wild dogs and foxes present in the offset area. Control events carried out in response to the monitoring will deliver a reduction in wild dogs and foxes and a reduced threat to the koala.
Recovery Value	**SCORE: 0** Habitat unlikely to be important for achieving the interim recovery objectives for the relevant context, as no vegetation present.	**SCORE: 0** Habitat unlikely to be important for achieving the interim recovery objectives for the relevant context, as no vegetation present.	**SCORE: 2 (+1)** There is no available information about disease (chlamydia and retrovirus) or genetic information for the koalas in the Mt Mort area. A study is in progress at Hiddenvale Nature Refuge, 4 km north of Aroona, however, these results have not been released. There have been no studies for genetic sampling and a paucity of health testing for the koala populations of Ipswich. The work being conducted at Hiddenvale is the first of its kind and so will form the baseline for the area. The closest comparison to the offset site is from surveys that have been conducted at Mount Walker and Ebenezer, 20k m east of Aroona. These areas have a similar landscape matrix to Aroona, containing a

			mix of woodland ridges with agricultural and grazing areas and so can be used as a comparison for the offset site. Surveys revealed koala activity in these areas appeared low, and visual observation showed individuals with symptoms of chlamydia (dirty tail and/or conjunctivitis). Disease incidence in these areas was observed as relatively common within the population, however, this may be due to the small sample size and it must be noted there was no clinical swabs or samples taken (ICC 2017). The Ipswich City Council Koala Conservation Plan has identified Mount Mort as a Priority Rehabilitation Area (PRA). PRAs have been identified as areas that contain important tracts of remnant vegetation that are in poor condition or fragmented by other land uses. Restoration activities in these areas will have a high impact, connecting fragmented vegetation to Core Habitat Areas (CHAs). Reconnecting habitat is important for improving genetic diversity and resilience. Low genetic diversity makes individuals more prone to disease. Without the offset in place, these areas will continue to form a fragmented landscape where there is a paucity of new genetic material and overall decreased resilience to disease.

Table F-3. Justification of EPBC Act Offset Calculator Attributes with respect to OMU (Offset Site)

Impact calculator attribute	OMU-01 & OMU-02	OMU-03	Comment
Time over which loss is averted (years) (Risk related time horizon)	20	20	The time over which loss is averted/risk related time horizon value is the set to the period for which the OMP will be in place, which is 20 years.
Time until ecological benefit (years)	15	15	Conservation gains will be achieved over both the short and long term. Ecological benefit within the offset area will be achieved through the protection of vegetation using a legally binding mechanism on Title through a Voluntary Declaration as an area of high conservation value under the VM Act. Benefit will also be realised through management of the vegetation community (OMU-01 and 02) and realised through targeted rehabilitation of vegetation, meaning that ecological benefit will be achieved in fifteen (15) years.
Start quality of offset	8	4	Justifications refer to Koala Habitat Assessment Tool (Table A9 and Table A10 of this PD)
Future quality without offset	8	4	Justifications refer to Koala Habitat Assessment Tool (Table A9 and Table A10 of this PD)
Future quality with offset	10	10	Justifications refer to Koala Habitat Assessment Tool (Table A9 and Table A10 of this PD)
Risk of loss without offset (%)	10	30	Category B and Category C vegetation are not fully protected under a State Code. The approval process, if followed, could result in Category B and C vegetation being cleared. As a result, ROL cannot be assessed as 0% in these areas. Accepted development vegetation clearing codes (being self-assessable vegetation clearing codes under the Vegetation Management Act) apply to Category B and C vegetation and are available on this site given its rural zoning and historic and ongoing use as a cattle grazing. These include the following codes available at https://www.qld.gov.au/environment/land/vegetation/codes : (a) Managing clearing to improve the operational efficiency of existing agriculture: a self-assessable vegetation clearing code. (b) Managing a native forest practice: A self-assessable vegetation clearing code. (c) Necessary environmental clearing: A self-assessable vegetation clearing code. (d) Managing weeds: A self-assessable vegetation clearing code.

Impact calculator attribute	OMU-01 & OMU-02	OMU-03	Comment
			Given the extent and density of weed infestation in these areas, it is considered that codes (c) and (d) could permit extensive clearing of these areas. Clearing for the purposes of managing weeds allows the clearing of native vegetation, as long as the site is maintained as a functioning regional ecosystem with retained trees having a DBH of over 20 cm. Given a large number of trees within the offset fall short of this size, and are located in areas with high weed infestations, clearing could be classified as a legitimate tool for environmental management. It has been assessed that the application of self-assessable vegetation clearing codes in these areas would result in loss of a significant amount of koala and GHFF food and habitat trees, and prevent the recruitment of juvenile trees. Risk of loss has been assessed at an average of 10% across all B/C areas, although in some areas it is considered ROL would be substantially higher. Category X areas contain no clearing controls under the Vegetation Management Act 1999. Clearing of this area requires no permit, and regrowth and established vegetation in these areas are under significant risk. Category X areas are "exempt from the requirements under the Vegetation Management Act 1999." (Section 20A). Category X areas are also known as 'exempt areas' because activity in Category X areas is not regulated by the Vegetation Management Act 1999. Across the site, existing low scoring koala habitat in areas which have been mapped as Category X are considered at risk of loss of 30%. Note this assessment does not include small areas mapped as Category X in the northern parcel.
Risk of loss with offset (%)	0	0	As part of an offset site, the habitats would be protected from future development and potential risks (e.g. wildfire), and the value of the habitats within the offset area will be protected and enhanced. Once the offset areas have been secured by voluntary declaration, they are recategorised as Category A with risk of losing the koala habitat becoming effectively Zero (0) (refer to Attachment A4 Appendix B).
Raw gain	72.97	21.83	As per EPBC calculator (refer Attachment A5).
Confidence in result (%)	90	70	A high degree of confidence in the conservation outcome is achieved through design and management of the offset within a contiguous landscape with good connectivity of Koala and Grey-headed Flying-fox habitat to the broader landscape. Operational management units have been determined in order to identify management actions suitable to different areas and existing habitat qualities within the overall offset. All OMUs are managed in a way that will achieve habitat score of 10. Confidence in the success of the offset has been assigned a value of 90% for OMU01/02 and 70% for OMU03. This score is considered conservative given the detail and intensity of the management actions set out in the OMP. Risks associated with offset delivery will be mitigated and managed by way of detailed management actions set out in the OMP. Management responses set out in the OMP are

Impact calculator attribute	OMU-01 & OMU-02	OMU-03	Comment
			clearly framed against stated outcomes being to protect and conserve large, connected areas of Koala and Grey-headed Flying-fox habitat able to support improving populations that are genetically diverse and free or with very low incidence of disease. The 90% score in Category B and C areas was given to allow for risks primarily relating to natural events such as flood, drought, severe storms etc. The 70% score in Category X areas reflects the potential for risks to have greater impact on revegetated areas.
Adjusted gain	71.97	15.28	As per EPBC calculator (refer Attachment A5).
Net present value	69.15	14.68	As per EPBC calculator (refer Attachment A5).
% of impact offset	86.61	15.75	As per EPBC calculator (refer Attachment A5). The total 102.36**%** is the sum of all OMUs. A management plan has been prepared for the offset (872.46 ha).This will satisfy >100% of the direct offset area requirement, delivering 102.36%.

Appendix G – Justification of GHFF habitat quality scores

High quality habitat for GHFF

The proposed offset is composed of a range of regional ecosystems, dominated by different trees (Table 3-2) of differing utility to the GHFF. Although there are no confirmed GHFF camps within the offset area, it is within the foraging range of at least five confirmed camps that reside outside of the offset. Thus, mature vegetation in OMUs 01 and 02, and the future revegetated areas of OMU 03, all represent potential foraging areas for the GHFF.

We quantified the quality of each OMU within the proposed offset as they currently stand by following the published methods of Eby and Law (2008). The dominant and sub-dominant tree species in each RE and their importance to the GHFF were used to calculate the average habitat quality value of each RE (Table G-1), then the quality of each OMU as a conglomerate of all relevant REs was calculated as the weighted average of scores (Table G-2).

The Eby and Law (2008) method scores each habitat on a scale between 0 and 1, with 1 being the highest possible quality of habitat for GHFF. The OMUs 01 and 02 provide high quality foraging habitat for GHFF (Table G-2), particularly OMU 01 as it contains a wide range of different REs, some of which have very high habitat quality scores (e.g. 12.3.7 and 12.8.14). The currently cleared state of OMU-03 provides low quality habitat, however it will be revegetated to RE 12.3.7, the highest scoring Regional Ecosystem type for the GHFF (Table G-1). We argue that this will lead to its increase from low quality to very high.

Table G-1. Calculations following the methods of Eby and Law (2008) to quantify the quality of each Regional Ecosystem as GHFF foraging habitat. Sig. denotes plants identified by the authors as significant food plants.

RE	Species	Sig	Score	Dom.	Sub-dom	Habitat score	# food species
12.3.7	*Eucalyptus tereticornis*	Y	0.88	X		0.88	1
	Casuarina cunninghamiana cunninghamiana	N		X			
	Malaleuca viminalis	N		X			
	M. braceata	N			X		
	M. trichostachya	N			X		
	M. linariifolia	N			X		
	Waterhousea floribunda	N			X		
12.8.14	*E. eugeniodes*	N		X		0.71	3
	E. biturbinata	N		X			
	E. melliodora	P	0.39	X			
	E. tetricornis	Y	0.88	X			
	Corymbia intermedia	Y	0.86	X			
	E. crebra	N		X			
12.8.9	*Lophostemon confertus*	P	0.46	X		0.46	1
12.8.17	*E. melanophloia*	P	0.54	X		0.61	5
	E. crebra	N		X			
	E. tereticornis	Y	0.88	X			
	C. tessellaris	P	0.4	X			
	C. intermedia	Y	0.86	X			
	C. clarksoniana	N		X			
	E. melliodora	P	0.39	X			
	Angophora subvelutina	N		X			

RE	Species	Sig	Score	Dom.	Sub-dom	Habitat score	# food species
12.9-10.7	*E. crebra*	N		X		0.61	3
	E. tereticornis	Y	0.88	X			
	C. tessellaris	P	0.4	X			
	E. melanophloia	P	0.54	X			
12.8.16	*E. crebra*	N		X		0.60	3
	E. melliodora	P	0.39	X			
	E. tereticornis	Y	0.88	X			
	E. albens	P	0.54	X			
12.8.16/12.8.17/12.8.9	*E. crebra*	N		X		0.59	9
	E. melliodora	P	0.39	X			
	E. tereticornis	Y	0.88	X			
	E. albens	P	0.54	X			
	E. melanophloia	P	0.54	X			
	E. crebra	N		X			
	E. tereticornis	Y	0.88	X			
	C. tessellaris	P	0.4	X			
	C. intermedia	Y	0.86	X			
	C. clarksoniana	N		X			
	E. melliodora	P	0.39	X			
	Angophora subvelutina	N		X			
	Lophostemon confertus	P	0.46	X			
12.8.17/12.8.16	*E. melanophloia*	P	0.54	X		0.61	8
	E. crebra	N		X			
	E. tereticornis	Y	0.88	X			
	C. tessellaris	P	0.4	X			
	C. intermedia	Y	0.86	X			
	C. clarksoniana	N		X			
	E. melliodora	P	0.39	X			
	Angophora subvelutina	N		X			
	E. crebra	N		X			
	E. melliodora	P	0.39	X			
	E. tereticornis	Y	0.88	X			
	E. albens	P	0.54	X			
12.8.17/12.8.16/12.8.9	*E. melanophloia*	P	0.54	X		0.593333	9
	E. crebra	N		X			
	E. tereticornis	Y	0.88	X			
	C. tessellaris	P	0.4	X			
	C. intermedia	Y	0.86	X			
	C. clarksoniana	N		X			
	E. melliodora	P	0.39	X			
	Angophora subvelutina	N		X			
	E. crebra	N		X			
	E. melliodora	P	0.39	X			
	E. tereticornis	Y	0.88	X			
	E. albens	P	0.54	X			
	Lophostemon confertus	P	0.46	X			

Table G-2. Calculations for the final weighted averages of the quality of habitat within each OMU for the GHFF.

	Final habitat score for OMU	12.3.7	12.8.14	12.8.9	12.8.17	12.9-10.7	12.8.16/12.8.17/12.8.9	12.8.17/12.8.16	12.8.17/12.8.16/12.8.9
OMU-01/OMU-02		0	26.5	19.2	62.5	10.2	56.1	422.6	2.7
OMU-03		0	0	0	0	0	0	0	0
FOOD SCORE		0.9	0.7	0.5	0.6	0.6	0.6	0.6	0.6
% OF OMU-01/OMU-02		0.00	0.04	0.03	0.10	0.02	0.09	0.70	0.00
RELATIVE GHFF SCORE OMU-01	0.60	0.00	0.03	0.02	0.06	0.01	0.06	0.42	0.00

Improving GHFF habitat quality within the proposed offset

In addition to the provision of high quality foraging habitat, threats to GHFF relevant to this proposed offset are currently identified as (Draft Grey-headed Flying-fox Recovery Plan):

- Loss of habitat that provides reliable food sources (referred to here in regard to GHFF and koala as vegetation composition).
- Fragmentation of habitat at a landscape scale meaning GHFF are unable to find sufficient food sources and camp locations within their foraging range (referred to here in regard to GHFF and koala as connectivity).
- Entanglement in fences and netting blocking the free movement of GHFF and increasing mortality (referred to here in regard to GHFF and koala as dispersal).

High quality GHFF habitat provides refuge from these prevailing threats. The proposed offset already provides high quality habitat in OMUs 01 and 02 (see previous section). We argue that we will improve GHFF habitat within the proposed offset across all OMUs from high to very high by:

- Fostering the persistence and health of the existing high-quality habitat within OMU 01 and 02 and improving OMU-03 through revegetation activities, both as elements of improving the vegetation composition (see Table D-2).
- Improving habitat connectivity for the species throughout the Little Liverpool Range by ensuring the protection of areas that already provide high quality foraging grounds (OMUs 01 and 02) and returning OMU-03 to its original Regional Ecosystem type (see Table D-3).
- Removing barriers to dispersal by eliminating all unnecessary barbed wire fences and replacing any necessary fences for the maintenance of the property with wildlife friendly fences (e.g. see www.wildlifefriendlyfencing.com/) (Table D-6).
- Reducing the risk of high intensity wild fires, and their potential to destroy foraging habitat, by enacting a fire management plan and maintaining it for the duration of the offset (Table D-7).

Appendix H - Revegetation plant list

Canopy Species (>30m)

Corymbia citriodora subsp. variegata
C. tessellaris
C. intermedia
C. tessellaris
Eucalyptus crebra
E. acmenoides
E. moluccana
E. melanophloia
E. major
E. siderophloia
E. tereticornis

Midstorey Species (10-30m)

Lophostemon confertus
L. suaveolens
Brachychiton populeneous
Angophora leiocarpa
An. subvelutina
Allocasuarina cunninghamiana
Al. torulosa
Al. littoralis
Al. luehmanii
Melaleuca bracteata
Erythrina vespertilio

Understorey Species (<10m)

Exocarpos cupressiformis
Alphitonia excelsa
Acacia irrorata
A. concurrens
A. disparima
A. falcata
A. fimbriata
A. leiocalyx
A. melanoxylon
A. maidenii
A. salicina
Melaleuca viminalis

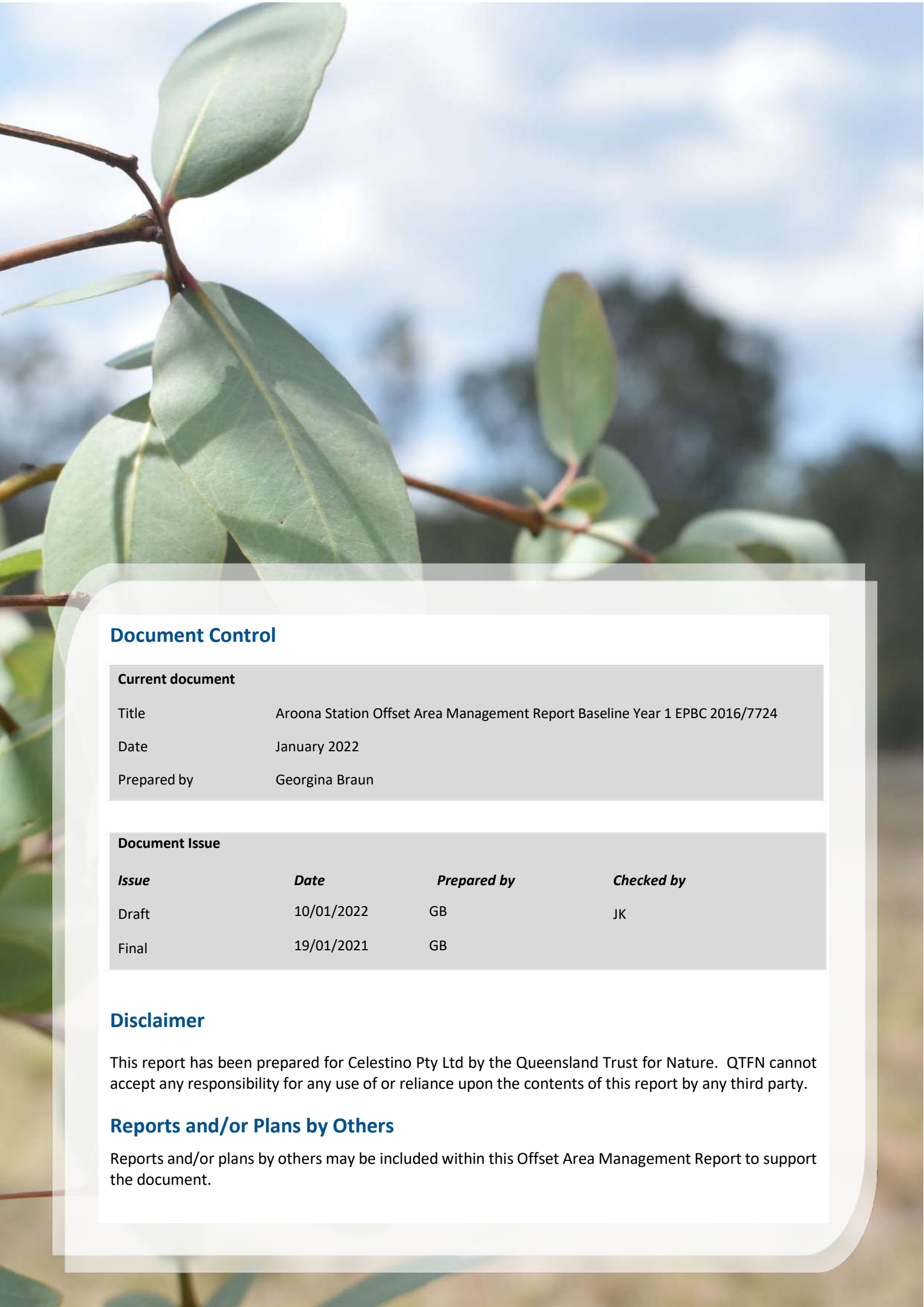
Appendix D

Offset Area Management Report – Baseline Year 1

Aroona Station Offset Area Management Report – Baseline Year 1

EPBC 2016/7724

V2 | January 2022



Document Control

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Disclaimer

This report has been prepared for Celestino Pty Ltd by the Queensland Trust for Nature. QTFN cannot accept any responsibility for any use of or reliance upon the contents of this report by any third party.

Reports and/or Plans by Others

Reports and/or plans by others may be included within this Offset Area Management Report to support the document.

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CHAPTER 1: INTRODUCTION

The purpose of this document is to report on the management actions and outcomes required for the provision of koala (*Phascolarctos cinereus*) habitat offset, by Approval EPBC 2016/7724 issued pursuant to sections 130 and 133 of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC 1999). The focus of the plan is on the protection and enhancement of the koala habitat associated with the secured offset for the Celestino Pty Ltd Riverside Development (EPBC2016/7724). This document will report in accordance with stipulations and requirements laid out in the Offset Area Management Plan.

The structure of the document reflects the requirements of the Department of Agriculture, Water and Environment (DAWE), and details the key threatening processes which could impact on the existing koala population. The chapters that comprise the document report on the overall health of the koala population, vegetation composition, and actions to minimise threats to Koala. The management regime put in place by the Queensland Trust for Nature (QTFN) will enhance existing koala habitat through the exclusion of land practices detrimental to the site and will track improvements and progress in the annual offset report over the active management period.

This report is the first submitted to date since the approval date for the offset (EPBC 2016/7724) on the 28th of September 2020 and commencement of the action. The past and future reporting requirements are listed below.

Milestone	Due Date	Status
Approval of EPBC 2016/7724	28 September 2020	Completed
Legal Security	4 December 2020	Completed
Year 1	4 December + 3 months	Submitted January 2022
Year 2		
Year 3		
Year 4		
Year 5		
Year 6		
Year 7		
Year 8		
Year 9		
Year 10		

1.1 SUMMARY OF COMPLIANCE

This document stands as a compliance report for the agreed upon approval conditions (Table 1) outlined in the EPBC2016/7724 Offset Area Management Plan and final approval conditions.

It is acknowledged that any non-compliance with the conditions must be reported by no later than 48 hours after becoming aware.

Table 1. Compliance summary of approval conditions, relevant for this reporting period.

Approval Condition	Compliant
6. By the end of year 1, the approval holder must complete baseline surveys of the entire Aroona Offset Site. The baseline surveys must be conducted by a suitably qualified field ecologist in accordance with a scientifically valid, robust, and repeatable methodology, and include the following: a. The detailed baseline habitat quality assessment data for each operational management unit as provided in the preliminary documentation; b. The vegetation condition attributes for each Regional Ecosystem; c The number and condition of Grey-headed Flying-fox winter or spring flowering forage species across each assessment plot at the Aroona Offset Site; d. The Species Stocking Rate; e. The extent of weed cover; f. The number or abundance of non-native predators and non-native herbivores across, and where possible surrounding, the Aroona Offset Site; g. The number of Koala mortalities attributable to non-native predators; and h. The baseline conditions in respect of each of the outcomes specified in conditions 8- 18.	Y
8. The approval holder must demonstrate a 90% reduction in the number or abundance of non-native predators and non-native herbivores by the end of year 5, relative to the number or abundance identified during the baseline surveys, and ensure that the number or abundance of non-native predators and non-native herbivores are then maintained at, or reduced below, the year 5 number or abundance for the rest of the period of effect of the approval.	Ongoing
10. The approval holder must demonstrate the extent of weed cover across the whole Aroona Offset Site is: a. Less than 25% by the end of year 5; and b. Less than 5% by the end of year 10, and then maintained for the remaining period of effect of this approval.	Ongoing
12. The approval holder must install fauna friendly stock exclusion fencing around Operational management unit 3 by the end of year 1.	Y
13. To facilitate the outcomes prescribed under conditions 15 -18, the approval holder must: a. Only permit grazing at the Aroona Offset Site for the purposes of bushfire hazard reduction. b. Ensure that all livestock are excluded from Operational management unit 3 for a minimum of	Ongoing

5 years, or until a suitably qualified independent expert has determined that planted Koala and Grey-headed Flying-fox feed trees are of sufficient size to withstand impact from cattle. c. The approval holder must provide the Department with a report from the suitably qualified independent expert verifying that planted Koala and Grey-headed Flying-fox feed trees are of sufficient size to withstand impact from cattle. d. Ensure that any grazing is managed so as to prevent the risk of injury or mortality of Koalas.	
15. The approval holder must undertake ecological work which contributes to improvement of the condition of the Regional Ecosystems and facilitates natural regeneration at the Aroona Offset Site.	Ongoing
16. The approval holder must encourage natural regeneration and achieve the listed outcomes in Operational management unit 1:	Ongoing
17. The approval holder must encourage natural regeneration and achieve the listed outcomes in Operational management unit 2:	Ongoing
18. The approval holder must achieve the listed outcomes in Operational management unit 3.	Ongoing

1.2 SETTING AND LOCALITY

By way of Deed, Celestino Pty Ltd secured delivery of an Offset Area Management Plan and registration of a Voluntary Declaration (under the *Vegetation Management Act 1999* (QLD) (VMA) of a staged offset area imposed by EPBC Approval 2016/7724 as part of the offset for the Celestino Riverside development.

The voluntary declaration was secured on the 4th December 2020 and reporting for EPBC 2016/7724 will include information from 2021 onwards.

1.2.1 Aroona Station Locality

The offset area pertaining to EPBC 2016/7724 is managed as part of a larger conservation property located on Alpers Road, Mount Mort, Queensland comprised of multiple lots; 233/CH311908, 31/CH312311, 218/CH311734, 64/CC552, 2/RP31144, 222/CH311798, 30/CH312310, 28/CH312274, 24/CH312032, 44/CC32, 45/CC32, 111/CC553, and 13/CH311894, totalling approximately 847.06 ha (Map 1). The whole site, henceforth referred to as 'Aroona Station', was gifted to the Queensland Trust for Nature (QTFN) in 2015 with the wish to see the property managed for both its production and conservation value, under a variety of income initiatives.

The tenure of the site is freehold, wholly owned by QTFN. It is included within the Ipswich City Council and Lockyer Valley Regional Council Local Government Areas. On a regional scale, the site is part of the Little Liverpool Range, providing connectivity to Main Range National Park and the Great Eastern Ranges.

The Range stretches for 90km from Laidley, through Mount Mort to Thornton and Mulgowie, and encompasses 20,400ha of land. It is an important wildlife corridor, providing habitat for a number of vulnerable species including the glossy black-cockatoo *(Calyptorhynchus lathami)*, powerful owl *(Ninox strenua)*, grey-headed flying-fox *(Pteropus poliocephalus)* spotted-tailed quoll (*Dasyurus maculatus maculatus)*, brush-tailed rock-wallaby *(Petrogale penicillata)* and koala (*Phascolarctos cinereus*).

Climate data for the area gives a mean maximum and minimum temperature of 26.9°C and 13.1°C respectively for 2021. The average annual rainfall is 795mm (BoM 2021), with the wettest month in January and the driest month in August. The site contains six Regional Ecosystems (REs):

- 12.3.3 Endangered: *Eucalyptus tereticornis* woodland on Quaternary alluvium
- 12.3.7 Least Concern: *Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana +/- Melaleuca spp*. fringing woodland
- 12.8.9 Least Concern: *Lophostemon confertus* open forest on Cainozoic igneous rocks
- 12.8.16 Least Concern: *Eucalyptus crebra +/- E. melliodora, E. tereticornis* woodland on Cainozoic igneous rocks
- 12.8.17 Least Concern: *Eucalyptus melanophloia +/- E. crebra, E. tereticornis, Corymbia tessellaris* woodland on Cainozoic igneous rocks
- 12.9-10.17a Least concern: *Lophostemon confertus* or *L. suaveolens* dominated open forest usually with emergent *Eucalyptus* and/or *Corymbia* species on sedimentary rocks
- 12.9-10.7 Of concern: *Eucalyptus crebra +/- E. tereticornis*, *Corymbia tessellaris*, *Angophora spp*, *E. melanophloia* woodland on sedimentary rocks

The highest point of the site is 670m above sea level on the northern block, close to the border of lot 45 on CC32, and is one of the two peaks of Mount Beau Brummel. The Geological Survey of Queensland 1:100,000 Ipswich Geological Map (DME 2008) lists the geology as:

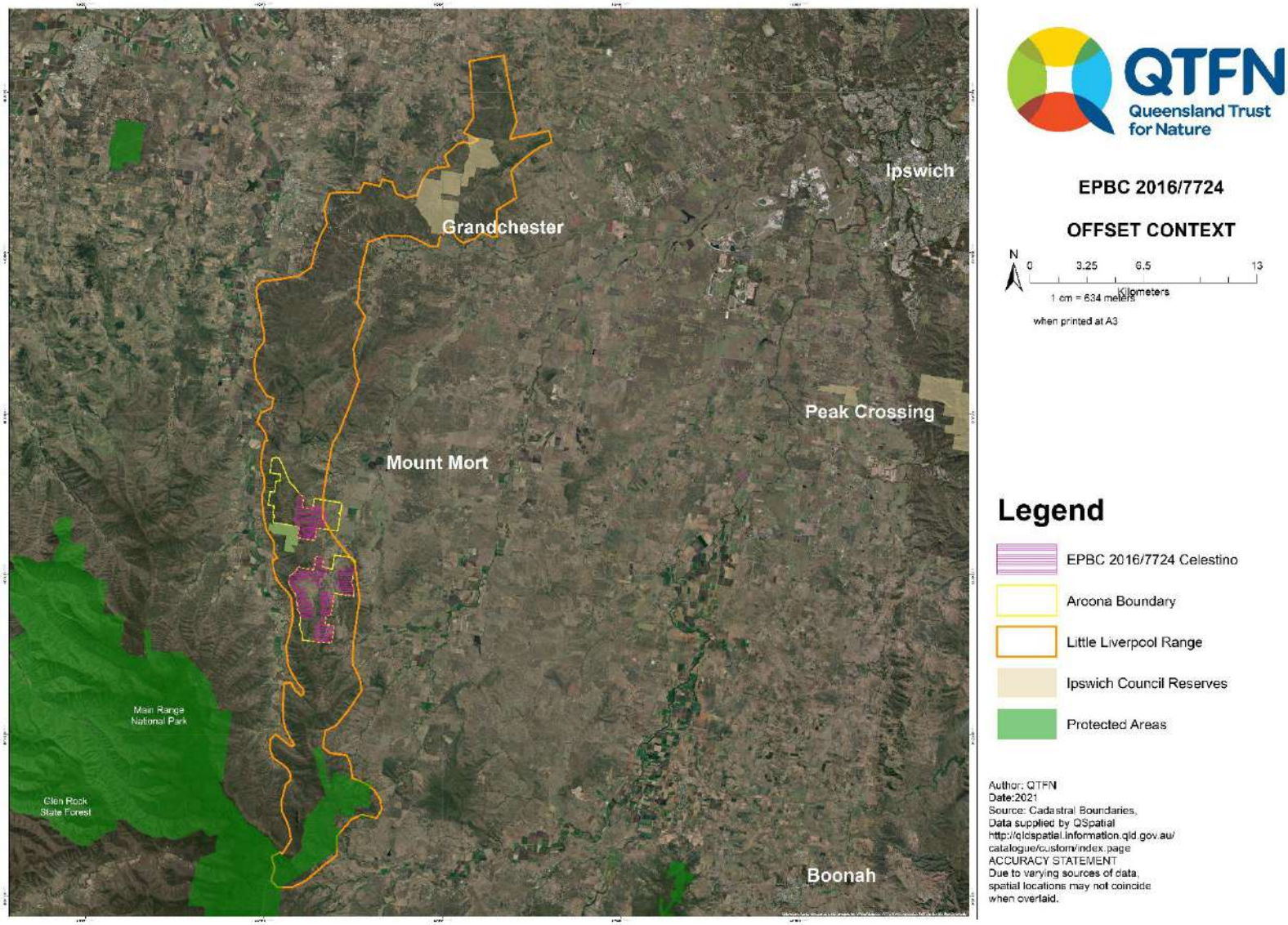
- Qa SEQ: Quaternary; clay, silt, sand, gravel, flood plain alluvium
- Tit SEQ: Tertiary: trachyte (anorthoclase and riebeckite trachyte)
- Jbmk: Jurassic; lithofeldspathic labile and sublabile to quartzose sandstone, siltstone, shale, minor coal, ferruginos oolite marker
- Jbmg: Jurassic; lithic labile and feldspathic labile sandstone

1.3 EPBC 2016/7724 OFFSET AREA ATTRIBUTES

The EPBC 2016/7724 offset area contains multiple parcels within the Aroona Station property, on the northern and southern land parcels (Map 1). The vegetation composition and land use history vary across the property.

The offset area contains remnant vegetation typical of eucalypt orest and dry sclerophyll (RE12.8.9). Surrounding vegetation is consistent with varying ages of mature eucalypt regrowth forest (RE12.8.16/RE12.9-10.7), previously cleared for cattle grazing purposes. The lowland offset areas are typical of alluvial blue gum and melaleuca flats (RE12.3.3/12.3.7). Vegetation remains along creek lines providing important dispersal pathways. However, the flats have been historically cleared for cattle grazing and will benefit from revegetation activities.

Map 1. Offset area in the context of Aroona Station and the Little Liverpool Range



CHAPTER 2: BASELINE ASSESSMENT

This chapter outlines the baseline survey data and methodology in line with the Offset Area Management Plan and the final Approval Conditions set by the relevant parties, notable approval condition 6. Management actions and reporting relevant to each condition will be discussed in the next chapter.

2.1 HABITAT CREATION AND QUALITY IMPROVEMENT

Approval Condition 6

a) The detailed baseline habitat quality assessment data for each operational management unit as provided in the preliminary documentation

b) the vegetation condition attributes for each regional ecosystem.

An ecological assessment was conducted at Aroona in 2016 by AusEcology. The surveys were carried out using the methodology outlined in Offset Management Plan, where BioCcondition plots were established and data relating to the habitat quality of the land-based offset was collected, in line with the modified version of the Queensland State Governments *"Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy"* Version 1.2 April 2017 (the Guideline). These plots, herein referred to as 'Habitat Quality Transects', allowed for the assessment of the offset area and were designed to determine the condition of the vegetation and its suitability as an offset for the koala and the grey-headed flying-fox.

The site was broken up into nine assessment units based on regional ecosystem (RE) and vegetation status (remnant, regrowth and cleared). Fourteen Habitat Quality Transects were established across these assessment units. The transects were distributed in such a way as to provide a representative sample of the RE, and gradient condition states of each AU present on the property.

For the purposes of managing the offset, the land was categorised into three management units, remnant (OMU- 1), regrowth (OMU-2) and cleared (OMU-3) Broadly, condition and management actions required are similar for all REs in remnant status, all REs in regrowth status and all cleared areas. As a result, it was decided to assess habitat quality and potential improvements based on OMUs. Operational management units (OMU's) are made up of assessment units relating to the regional ecosystems and vegetation classes within the offset area Table 2. OMU's are used to demonstrate management actions and impacts across vegetation groups.

Table 2. Offset Site Management and Assessment Units

OMU	VMA Status	Assessment Unit	Number of BC sites	Status	Regional Ecosystems	Benchmarks
OMU-1	Category B/ Remnant	AU-2 AU-3 AU-5	BC2, BC7 BC3 BC5, BC8	Remnant	12.8.9 12.8.16 12.8.17	12.8.9 12.8.16 12.8.17
OMU-2	Category C/ Regrowth	AU-1 AU-4 AU-6 AU-7 AU-8	BC1, BC14 BC4, BC11, BC13 BC6 BC9, BC12 BC10	Mature Regrowth	12.9-10.7 12.8.16 12.8.17 12.3.3 12.3.7	12.9-10.7 12.8.16 12.8.17 12.3.3 12.3.7
OMU-3	Category X/ Cleared	AU-9	Nil	Cleared	Cleared	12.8.16

2.1.1 BASELINE SURVEY RESULTS

OMU1

OMU-1 contained remnant regional ecosystems 12.8.9, 12.8.16 and 12.8.17. Overall, the remnant OMU was in reasonable condition, ranging between 60-80% and classed as 'nearly fully functional ecosystems'. OMU-1 was dominated by the remnant mosaic RE 12.8.16/12.8.17, but there was a lack of diversity in the shrub, grass and forb layer and the widespread presence of invasive weed species. RE 12.8.16 and 12.8.17 are classified as being potentially high suitability for koala habitat (Rhodes et. al 2015). However influential factors like annual rainfall totals, topography, and species composition impact on overall carrying capacity.

Habitat assessments in the remnant OMU showed Tree Canopy Height, EDL recruitment, Canopy Cover and Tree species richness all received the maximum or near maximum score, indicating the vegetation has the potential to provide important koala habitat. The dominant eucalypts present were *Eucalyptus crebra, E. melliodora, E. tereticornis, E. melanophloia, Corymbia tessellaris* and *C. intermedia*. Large tree scores were below maximum. Trees that fall below large tree threshold are considered immature and therefore have capacity to be more susceptible to destruction in wildfires, particularly with a high-level *lantana camara* abundance.

OMU2

Mature regrowth assessment units ranged from average to degraded in condition class, therefore showing significant potential for rehabilitation. Canopy cover met the benchmark for all assessment units, with average percentages: 123.9% for AU-2, 96.3% for AU-3 and 115% for AU-4. Dominant species across these AUs included *Eucalyptus melanophloia, Eucalyptus crebra, Eucalyptus melliodora* and *Eucalyptus tereticornis.* Assessment Unit 06 contained notably a large number of large woody species, but notably less had achieved full growth compared to other regrowth areas. This is likely because these areas had been cleared or managed for agricultural purposes for longer than other regrowth vegetation.

Shrub cover for OMU-2 was notably poor. *Lantana camara* (Lantana)*, Celtis sinensis* (chinese elm) *and Schinus terebinthifolius* (broad-leaved pepper) were prevalent along riparian areas, preventing access of koalas to food and shelter trees.

Improvements in the OMU-2 will be realised through reduced grazing pressure, weed management and ecological burning to increase recruitment of koala and grey headed flying fox food species. Lantana is identified as a significant threat to the ecosystem, koala habitat health and koala movement throughout the site. Securing the offset from incompatible land uses such as clearing will further protect existing vegetation and increase the value of the habitat over time.

OMU3

No habitat transects were carried out within the cleared (VMA Category X) areas as there was no complex vegetation present. These areas consisted of cleared pastures with isolated paddock trees. Of the native paddock trees present, these occur at an approximate density of four trees (of any size, some smaller than able to be utilised by koalas) per hectare, and in some areas this density is even less, meaning average distance travelled between trees is greater than 50m. Whilst the isolated paddock trees do provide koala habitat on their own, the distance between trees means there is significantly more time spent on the ground by koalas, which increases energy resource use by the koala and increases the risk of predation. Generally, trees within the Cat X areas immature regrowth, providing limited habitat potential. The high sparsity, immaturity, and lack of complexity within the Cat X areas means the quality of koala habitat provided is negligible.

Lantana camara was present in all Category X areas, and *L. camara, Schinus terebinthifolius and Celtis sinensis* were present in large infestations in the riparian areas, significantly impacting the ability of koalas to utilise the habitat. All weed species are visible from aerial imagery.

A summary of all the scores for OMU-1, OMU-2 and OMU-3 are presented in Appendix 1. Refer to OMP for Assessment Unit baseline data.

2.1.2 Management Outcomes

OMU 1 AND OMU 2 – Habitat Quality Improvement

All actions outlined in this document contribute to the management of OMU1 and OMU2 to improve habitat quality.

Rehabilitation actions are conducted line with the Aroona Weed Management Strategy and the Aroona Fire Management Plan, detailed in sections 2.5, and 2.8, respectively.

Monitoring transects were established, located in Map 3.

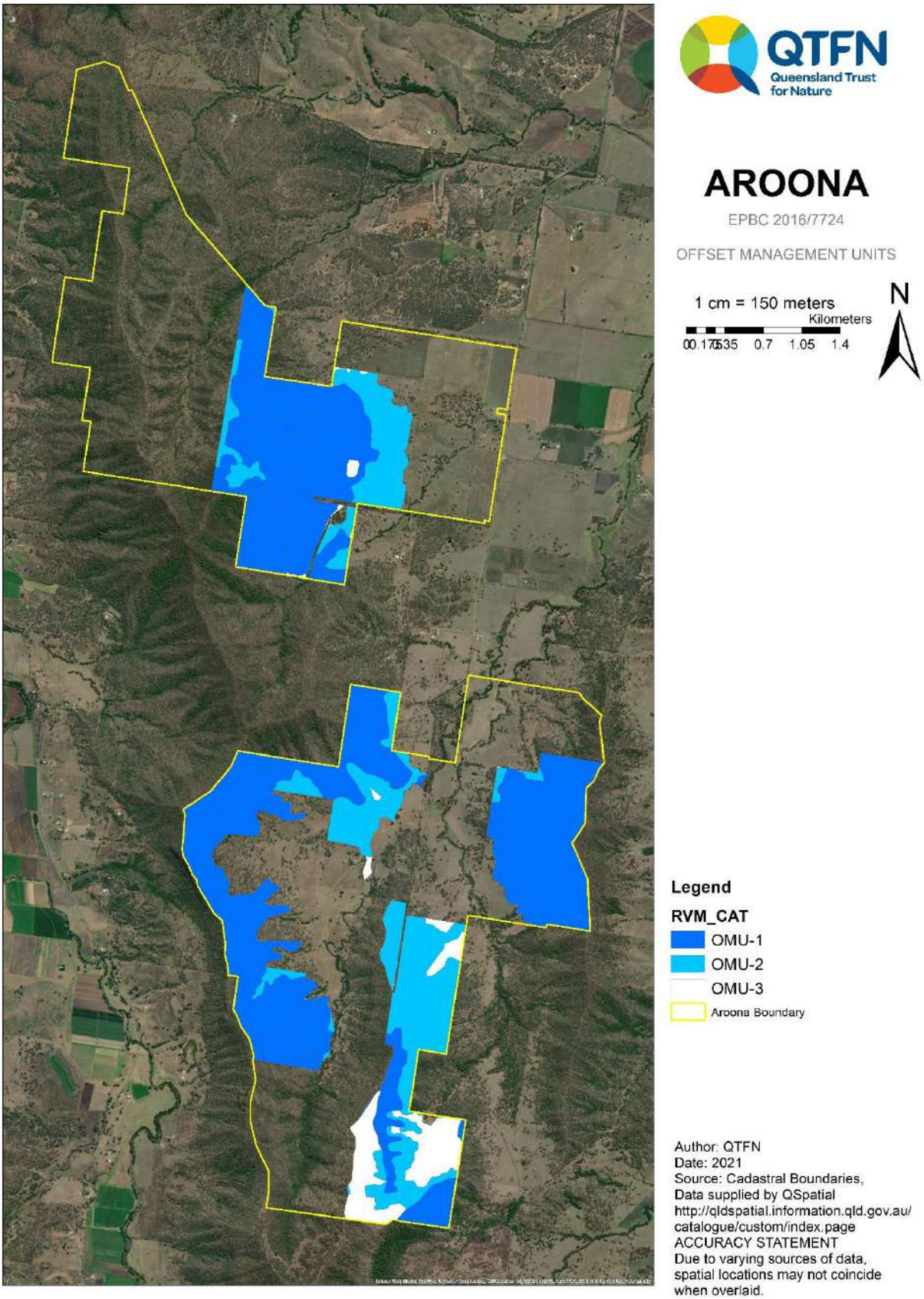
OMU3 – Habitat Creation

Revegetation actions are underway to create habitat for the koala and grey-headed flying fox. All revegetation actions within the offset area are planned for the 2022 planting season (Autumn). Growing of tube stock and seed supply have commenced.

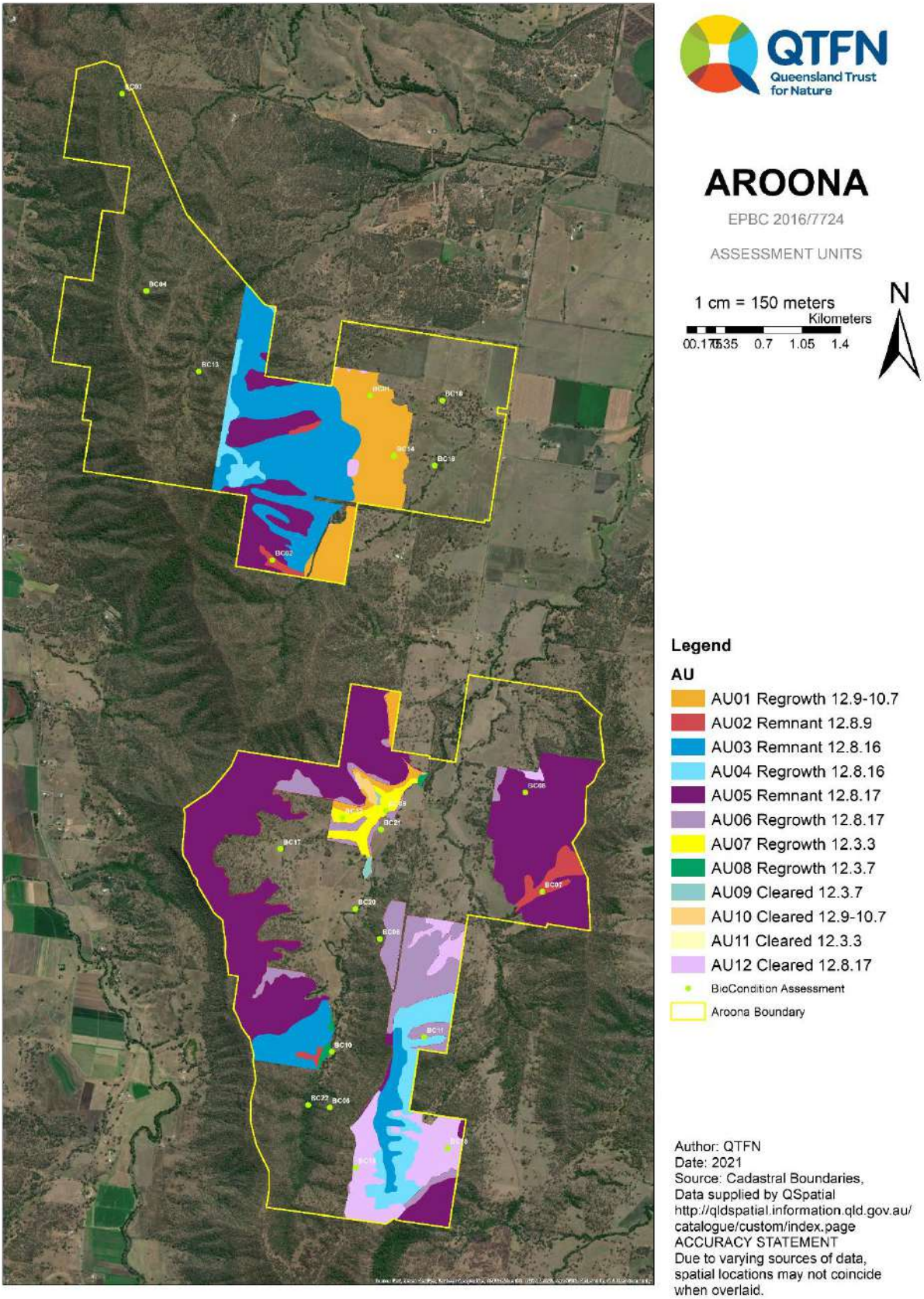
Direct seeding of upland OMU3 sections are scheduled for 2022.

The southern hemisphere has entered a La Niña weather phase. This has resulted in significant rainfall across the offset site, benefiting the offset area considerably. Climate models suggest this La Niña will persist until the late southern hemisphere summer or early autumn 2022. How this phase will impact revegetation operations will be monitored closely and contingency plans implemented relating to approval condition 18b.

Map 2. Offset area management units



Map 3. Assessment units within offset area



2.2 GREY HEADED FLYING FOX FORAGE HABITAT

Approval Condition 6

c) the number and condition of grey-headed flying fox winter or spring flowering foraging species across each assessment plot

Proximity of grey-headed flying fox (GHFF) colonies to the offset site were determined in a desktop analysis using the National Flying-fox Monitoring viewer (DoE) and cross checked using the state mapping for flying-fox roost sites (DES 2019). Flying-fox camps within 30 km of the site are listed in Table 3**.**

Table 3. Grey-headed Flying-fox Camps

Camp name	Level	Proximity to site
Boonah, Bicentennial Park	3	23.5km
Laidley, Laidley Plainlands road	2	24.5km
Gatton, Tenthill creek	2	26.3km

2.2.1 Baseline Survey Data

Trees identified as priority GHFF food tree species were identified within the remnant and regrowth AU (Table 4). These species are listed below and provide year round opportunities for feeding with at least one having the potential to flower at any point in time. Size of these species produced high canopy cover and large tree benchmark scores, indicating they provide substantial habitat for GHFF.

A summary of all the scores for OMU-1, OMU-2 and OMU-3 are presented in Appendix 2.

2.2.2 Management outcomes

The presence of GHFF was recorded in March 2021, observed feeding in a fig tree (Figure 1).

Flowering grey-headed flying fox forage trees were GPS located and recorded throughout the reporting year Map 4. This allowed for a spatial and seasonal representation of food availability in between milestone reporting years (5 yearly).

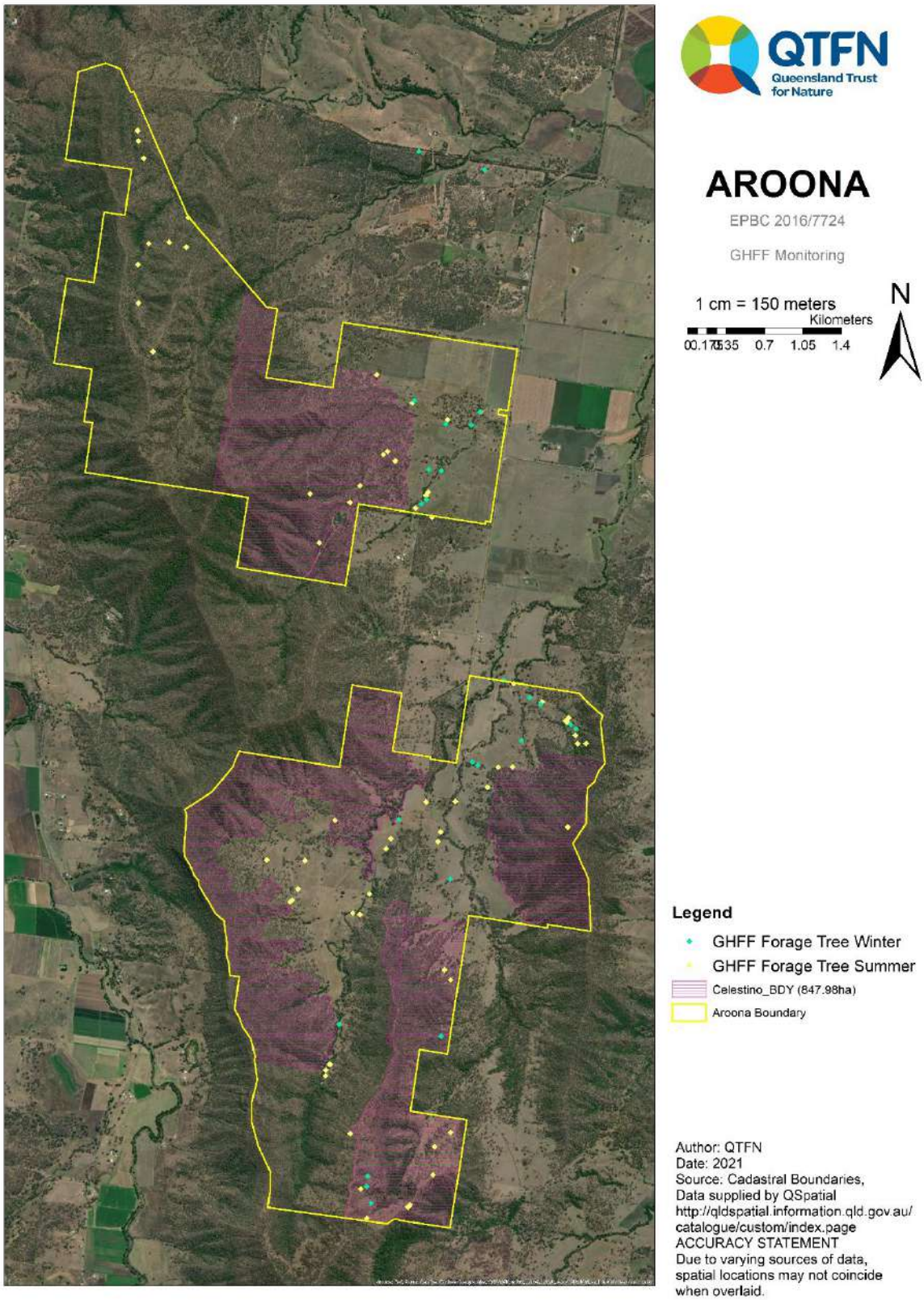
Corymbia intermedia and *Eucalyptus tereticornis* were the most dominant flowering forage tree. This provides year-round coverage as they are a summer and winter forage species respectively.

Figure 1. Grey-headed flying fox observed feeding in fig tree and example of *Corymbia tessellaris* flowering.

Table 4. GHFF Forage Species Calendar (blue shading = literature based flowering times, X = observed flowering in offset area)

Species	OMU 1	OMU 2	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Angophora floribunda	Y	Y												
Lophostemon confertus	Y	Y												
Melia azedarach	Y	Y												
Corymbia intermedia	Y	-	X		X									
Corymbia tessellaris	Y	Y	X											
Eucalyptus crebra	Y	Y								X	X			
Eucalyptus melanophloia	Y	Y	X											
Eucalyptus melliodora	-	Y									X			
Eucalyptus tereticornis	Y	Y							X	X	X			
Ficus coronata	-	Y	X		X									
Ficus opposita	Y	Y												

Map 4. GHFF forage trees in flower across offset area



2.3 SPECIES STOCKING RATE

Approval Condition 6

d) The **Species Stocking Rate;**

The species stocking rate of the koala is an estimate of species carrying capacity of the site at the time of undertaking the survey. This metric is used to represent the sites capacity to support koala populations and the species occupancy.

Species stocking rate is calculated using the following parameters:

- Species presence on or adjacent to the site
- Species usage of the site
- Approximate density of the species on the site
- Role/importance of species population on site

Baseline data was collected from 2016 to 2019 across the offset site using multiple survey methodologies, summarised in Table 5. These surveys will be carried out across the offset area though the lifetime of the offset to report on the effectiveness of management actions and the increase in koala abundance and activity.

Table 5. Koala monitoring methods.

Methodology	Frequency	Characteristic monitored	Result
SAT surveys (Phillips and Callaghan 2011)	Annually	SAT monitoring, recording the presence of koala scats under food and habitat trees. Survey will record activity and abundance of koalas.	Demonstrated increase in koala density and abundance through an increase in scats recorded during SAT
Intensive population surveys using methodology modified from Ellis et al (2015) Method involves capturing, conducting health assessments by a wildlife vet includingage, body mass, reproductive health and signs of koala disease. In addition to capturing individuals, surveying will include nocturnal spotlighting, acoustic listening for male bellowing and camera trapping.	At years 5, 10, 15 and 20	Surveys are designed to detect koala breeding within the offsetarea. Data collected will show evidence of breeding through back/pouch young, used pouches and male bellowing records.	Demonstrated use of the offset site for breeding purposes.

SCAT SURVEY METHOD

Baseline koala activity levels were determined through utilising the Spot Assessment Technique (SAT) (Phillips *et al.* 2011). The SAT method is an industry recognised technique for identifying presence/absence of koala at a site and is specified as an appropriate survey method in the *EPBC Act Referral Guidelines for the Vulnerable Koala*. Results fromthe SAT surveys are compared against current available published scientific literature to identify an estimated Koala carrying capacity (stocking rate) to be determined.

The SAT involves identifying a non-juvenile tree of any species within the subject site that is either observed to have a koala or scats or is known to be a food tree or otherwise important for koalas, and recording any evidence of koala usage of that tree including presence, identifiable scratches or scats. The nearest non-juvenile tree is then identified, and the same data recorded. The next closest non-juvenile tree to the first tree is then assessed and so on, until 30 trees have been surveyed.

The number of trees showing evidence of koala activity is expressed as a percentage of the total number of trees sampled to indicate the frequency of koala usage. Assessment of each tree involves a systematic search for koala scats beneath the tree within a 1 metre (m) radius of the trunk. After approximately two minutes of searching for scats, the base of the trunk is observed for scratches and the crown for koalas (refer Phillips & Callaghan 2011).

The SAT methodology is considered to be an accurate technique for estimating low-density koala populations. Research by Rhodes *et al*. (2015) found koala density in South- East Queensland council areas (excluding areas inland of Ipswich) to be approximately 0.07 koalas/ha based on data collected from 2005 - 2015. Therefore, the SAT survey methodology is considered to provide an accurate determination on koala activity levels in South-East Queensland.

Koala stocking rate scores are calculated using the SAT activity categories taken from the Australian Koala Foundation Koala activity level classification table by Phillips & Callaghan 2011, Table 6.

Table 6. Koala Activity Level Classification (Phillips and Callaghan 2011)

Usage	East Coastal(low)	East Coastal (med-high)	Western (med-high)
Low	<9.5%	<22.5%	<35.8
Moderate	9.5-12.6%	22.5-32.8%	35.8-46.7
High	>12.6%	>32.8	>46.7

2.3.1 Baseline Survey Data

Koala data was collected in 2016 by OWAD Environmental using a koala detection dog. The data collected by OWAD examined occupancy of koalas, showing how much of the property searched contained scats. Of sites searched, 27% contained scats in the northern parcel, and 35% in the southern parcel. Scats were found in both remnant and mature regrowth vegetation.

Additional SAT surveys were conducted in July 2019, showing percentage of trees within single sites where scats were found. Fourteen SATs were conducted at Aroona, across all assessment units in both the northern and southern parcels. Of the surveyed sites, only six contained any koala scat. Of those that did contain scat, the highest activity was recorded at a single site was 16% (i.e. of the 30 trees surveyed at each site, 16% contained scat). The highest activity was recorded in the remnant vegetation and alluvial systems (land zone 3, RE 12.3.3/12.3.7), with limited use across mature regrowth areas.

OMU1

SAT surveys conducted in July 2019 included three remnant areas. All three sites yielded koala occupancy data, with activity from between 3% and 16% at each site, classified as low use under the East-Coast med-high category.

OMU 2

Results from the 2019 SAT survey showed koala occupancy at 3 out of the 7 sites. Activity at sites where koala scat were recorded ranged from between 3% and 13%.

OMU 3

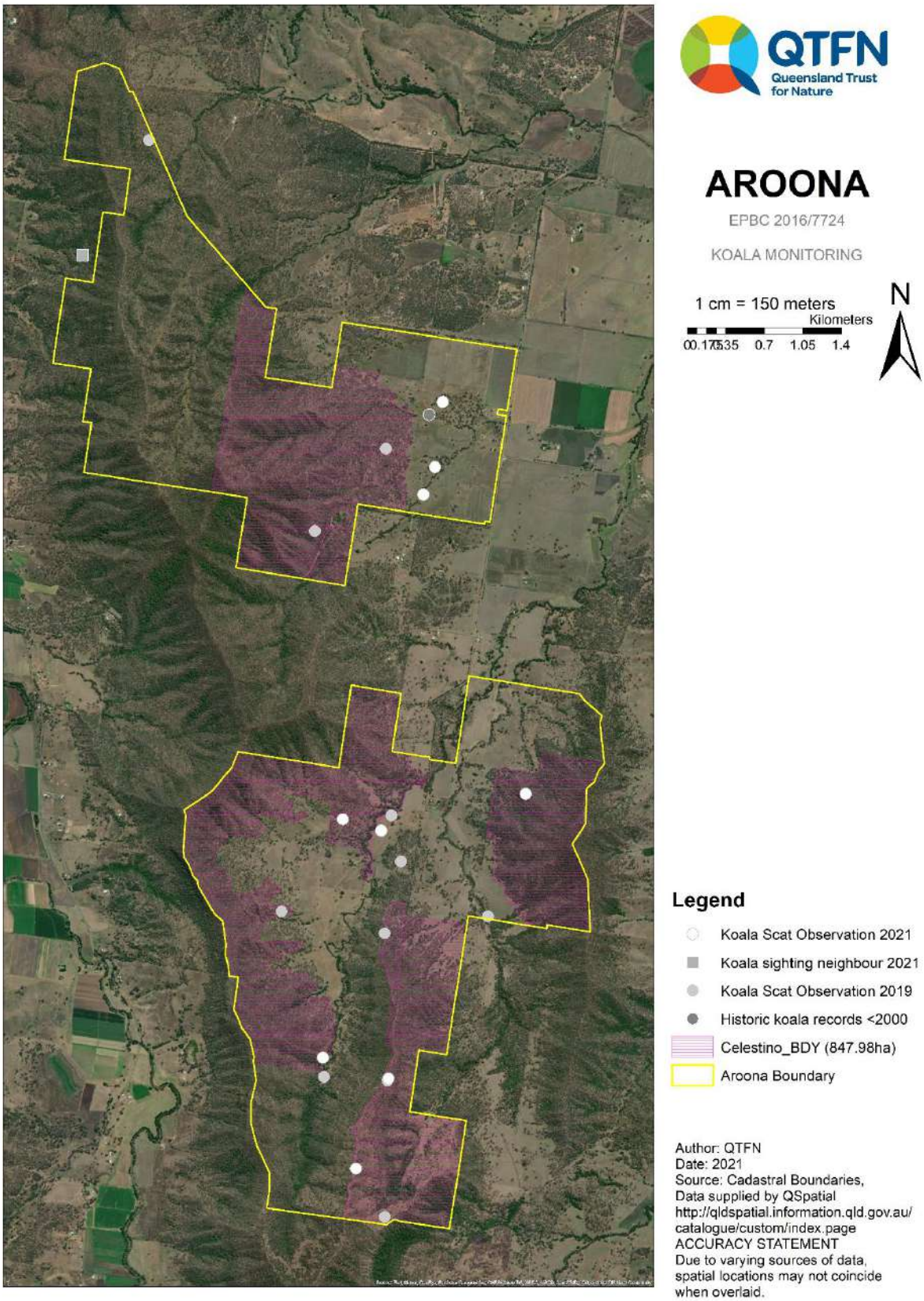
In 2019, SAT surveys were conducted on the isolated paddock trees to test koala usage of these areas. No scats were recorded in any of the Category X areas, likely due to the largely scattered nature of the trees and infestation of weeds around the base of food trees.

2.3.2 Management outcomes

Opportunistic scat surveys were conducted across the reporting period (Map 5).

Koala scat was observed through all of the offset management units, including individual large trees on cleared land. This further demonstrates the importance of these areas within the landscape and the high potential of OMU-3 cleared areas to restore connectivity.

Map 5. Koala occurrence



2.4 EXTENT OF WEED COVER

Approval Condition 6

e) The extent of weed cover

At the commencement of site management, weed extent will be mapped across the property. This will form the basis for the targeted areas for treatment. Monitoring will occur on an annual basis and the extent and abundance of weed cover in OMU-01, OMU-02 and OMU-03 will be measured through the improvement in non-native plant cover, measured through quadrats in Habitat Quality Transects assessments. Milestone surveys in the form of Habitat Quality Transects assessment will measure the success of the weed treatment every 5 years.

Baseline weed assessments were conducted in 2021 and will be conducted annually for the duration of the offset management plan. Permanently marked transects were surveyed according to Nelder *et al* 2015 in a 50 x 10m transect (Map 6). Photo points were recorded at each transect to ensure that the progress of the site could be monitored (Appendix 3).

The target weed species identified as a threatening process to koalas are lantana (*Lantana camara),* broad-leaved pepper (*Schinus terebinthifolius)* and cat's claw creeper (*Macfadyena unguis-cati*). Whilst other weeds were measured for overall ecological health, the focus of the weed management is the control and eradication of these woody weeds, as they have the capacity to prevent koala movement and access to food and shelter trees, particularly in riparian corridors.

Weed coverage is recorded and mapped spatially at a one hectare scale of the property (Map 7). Due to the isolate distribution of cat's claw and Chinese elm, these species are not mapped for coverage.

2.4.1 Baseline Survey Data

EXTENT

Lantana is the predominant threat within the offset area, occurring in all transects with coverage up to 100%. Broad-leaved pepper was recorded at over 50% of the transects, with those in riparian environments reaching coverage of 100%. Chinese elm was recorded at 30% of transects, but remained in low coverage below 20%. Cat's claw was not recorded within the offset area, despite occurring on the property. Weed occurrence is presented in Map 6.

COVERAGE

Lantana varies in density across the offset area, present in all offset management units. Broad-leaved pepper is constrained to creek lines and gullies. The coverage of lantana and broad-leaved pepper, the two weed species with the highest spatial coverage are presented in Map 7. Chinese elm and cat's claw creeper were not mapped spatially due to their isolated nature (i.e. coverage rarely extending beyond one hectare).

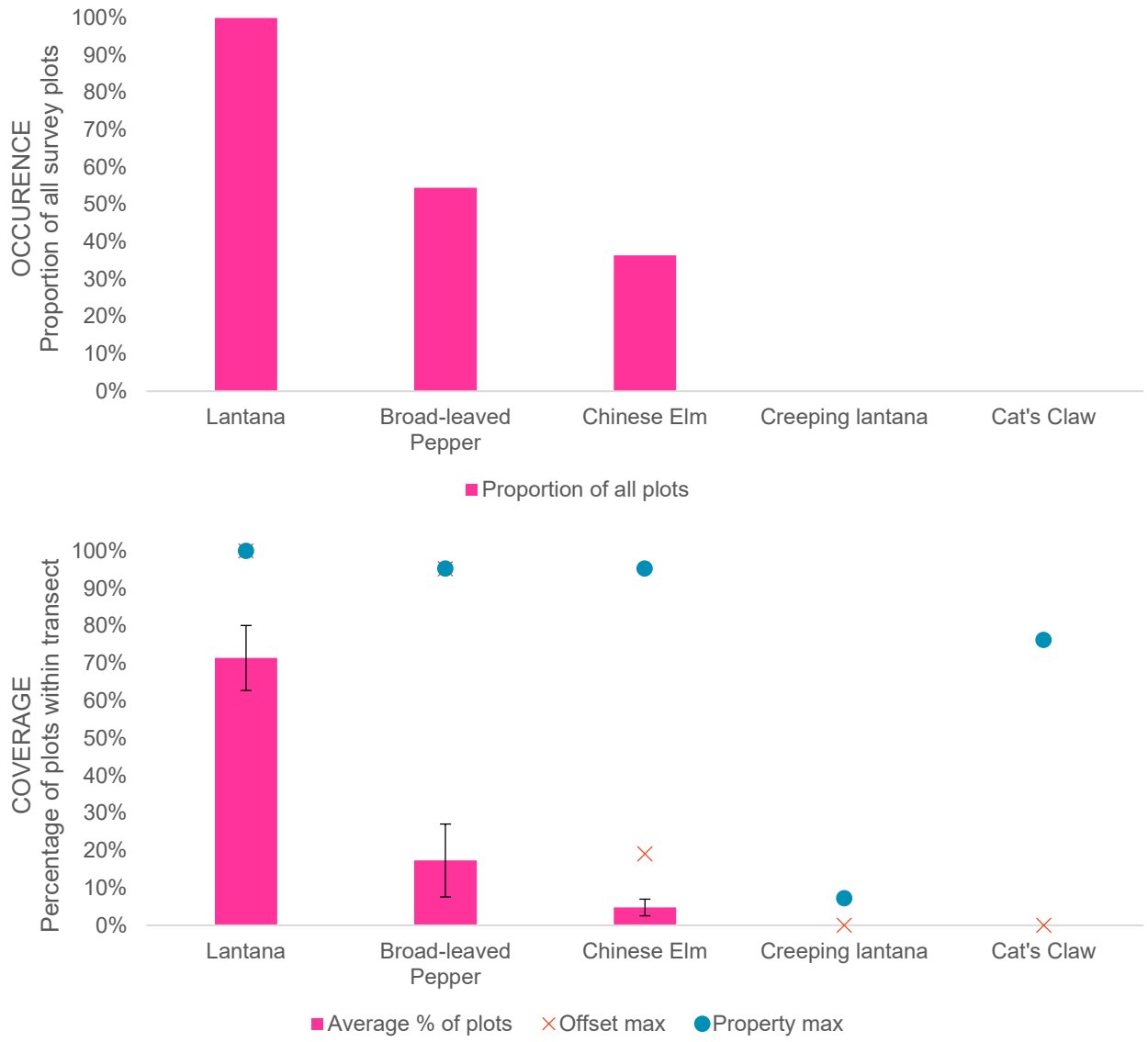
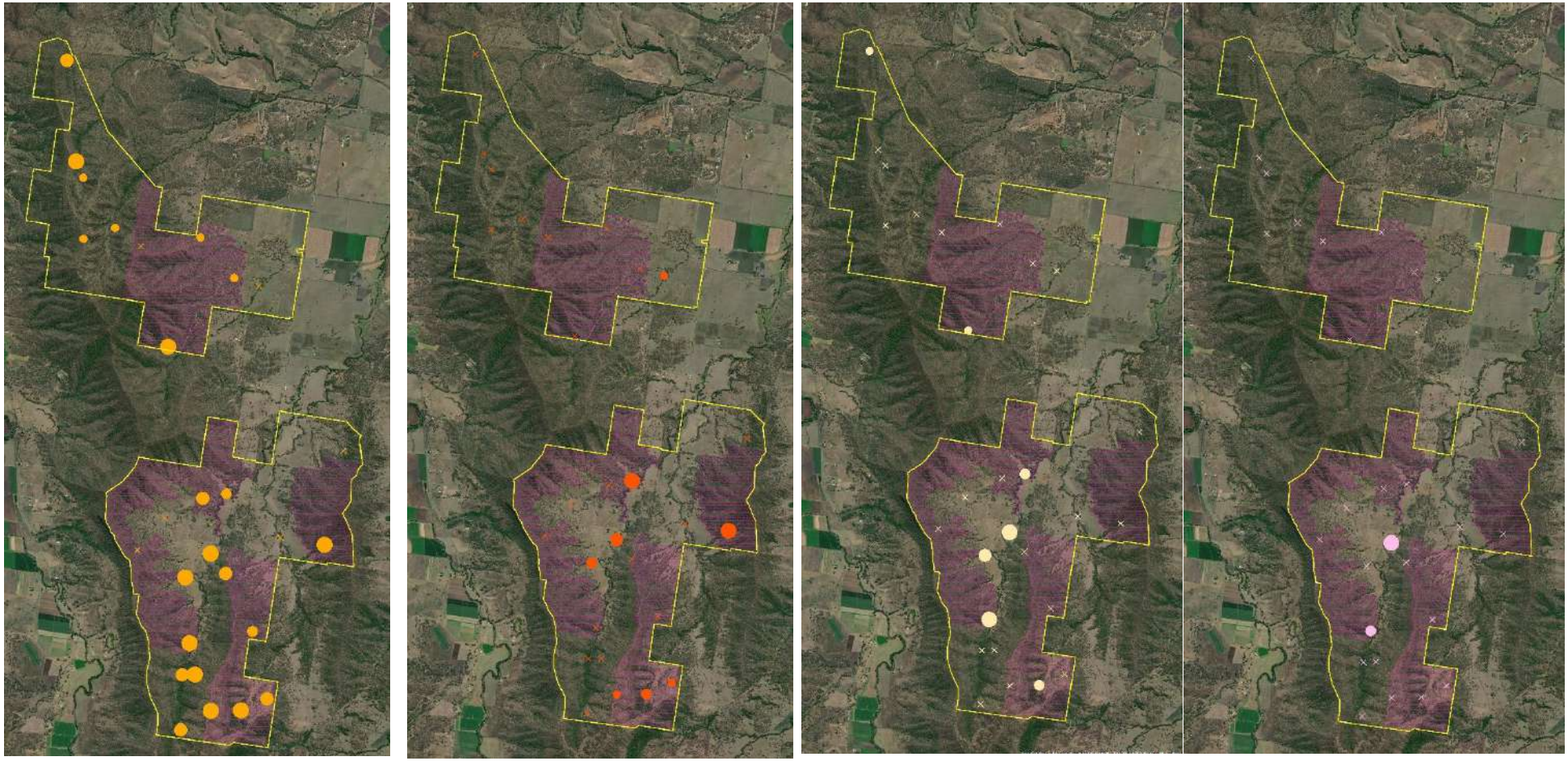


Figure 2. The percentage of the weed transects across EPBC 2016/7724 offset site with weed cover (top), and the average percent coverage of all transects across offset site with maximum coverage across whole of property (blue circle) and offset specific (orange

2.4.2 Management outcomes

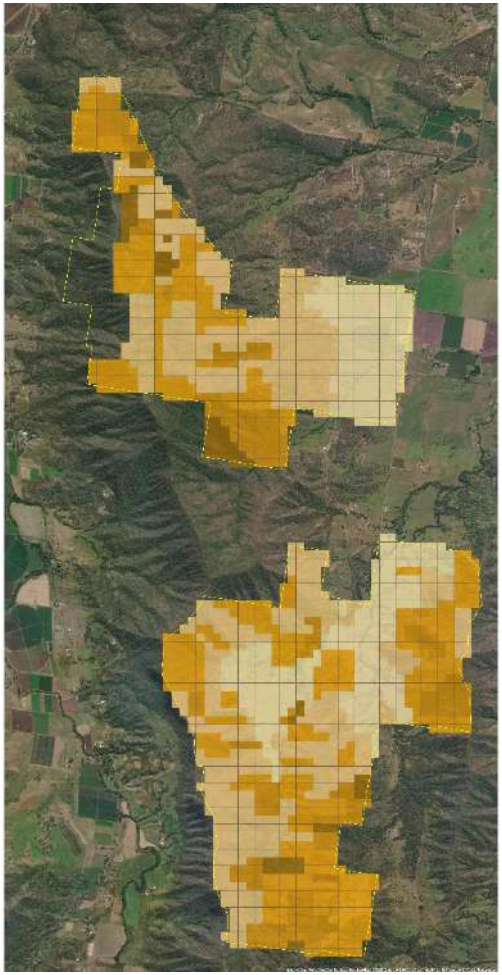
The Weed Strategy 2020-2025 outlines the principles and approach to weed management at a property wide scale. Results from this survey have informed the approach for the next five years. A contractor has been engaged to complete weed control in high priority areas targeting lantana, broad leaved pepper and cats' claw in the endangered blue gum alluvial flats (RE12.3.3), and into the foothills.

Map 6. Baseline weed extent across the property, the larger the circle the higher the density within the transect sampled, x= absent.

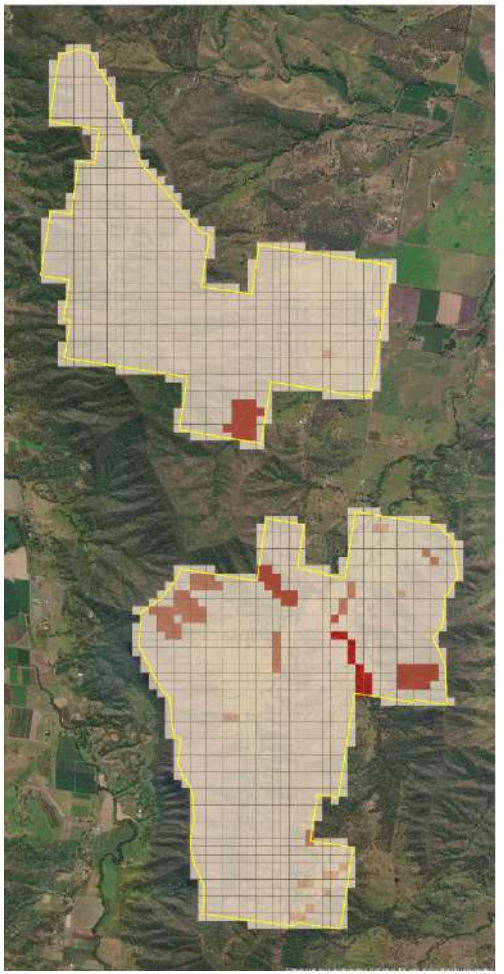


Lantana | Broad-leaved pepper | Chinese Elm | Cat's Claw Creeper

Map 7. Baseline weed coverage across the property, darker shades indicate higher density of weeds.



Lantana



Broad-leaved pepper

**note: Chinese elm and cat's claw are in isolated patches not shown in these maps

2.5 NON-NATIVE PREDATORS AND HERBIVORES

Approval Condition 6

f) The **number** or **abundance** of **non-native predators** and **non-native herbivores** across, and where possible surrounding, the **Aroona Offset Site;**

Approval Condition 8

The approval holder must demonstrate a 90% reduction in the **number** or **abundance** of **non-native predators** and **non-native herbivores** by the end of **year 5**, relative to the number or abundance identified during the baseline surveys, and ensure that the **number** or **abundance** of **non-native predators** and **non-native herbivores** are then maintained at, or reduced below, the **year 5 number** or **abundance** for the rest of the period of effect of the approval.

Wild dogs/dingoes, feral foxes and feral cats are restricted invasive animals under the *Biosecurity Act 2014* (QLD), and do not require specific control measures. The act states, "The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive animals under their control". The adaptive predator control measures, rigorous monitoring and coordinated landscape approach that will be implemented at the offset site go far beyond the minimal requirement of reducing the risks associated with invasive animals.

As part of the management program, baseline monitoring will be undertaken on the property and a relative abundance index (RAI) calculated for wild dogs and foxes. Where post control surveys indicate that there has been a recurrence of wild dogs and/or foxes on the site, control measures will be actioned using methods (e.g. controlled shooting and/or trapping) as determined by a pest control professional in consideration of these monitoring results.

Predator home ranges exceed the Aroona Station property area, and the EPBC 2016/7724 offset area within. Therefore, as predator abundance and activity can be influenced by multiple factors including, seasonality, food availability and neighbouring predator control works, it is important to provide context for the surrounding landscape of the offset area.

Predator management on Aroona Station has occurred since 2018. To date, dingoes (*Canis lupus*), foxes (*Vulpes vulpes*) and cats (*Felis catus*) have all been recorded on-site in camera trapping, from visual sightings or from the collection of scats. A property wide scale assessment was conducted to ensure that detection of predator activity is maximised, to reflect the large home ranges, and best inform management actions. Pursuant to the Offset Management Plan, this will best inform the property wide predator control program. Regardless, specific attention will be paid to individuals observed on camera trap stations directly within the offset area.

Table 7. Average foraging range for three target predators ascertained from the literature (Harden 1985; Meek 1999; Meek & Saunders 2000; Molsher et al. 2005; McNeill et al. 2016), and the camera trap stations that therefore assess the RAI of each species within

Species	Radius	Camera stations with territories that overlap EPBC 2016/7724
Dog (*Canis lupus*)	2 to 3km	a/b/c/d/e/f/g/h/i/j/k/l/m/n/o/p/q
Cat (*Felis catus*)	600 to 1km	a/b/c/d/e/f/g/h/i/j/k/l/m/n/o/p/q
Fox (*Vulpes vulpes*)	~900m	a/b/c/d/e/f/g/h/i/j/k/l/m/n/o/p/q

2.5.1 Baseline Survey Data

Feral predator abundance has been monitored on Aroona Station using two methods since 2018: camera trapping and scat searches.

Camera trap set up

The home-ranges of non-native predators: dogs, foxes and cats in both peri-urban and agricultural are presented in Table 7. Operating under this assumption, we placed a network of 16 camera trapping stations that ensured coverage of the entire property (Map 8). Cameras were deployed for a 40-day trapping interval in each season, and all photos were databased, categorised and analysed using Camelot (©WildLabs, 2018), with an independence threshold of 10min.

Camera trapping is performed biannually to account for seasonal variation in predator behaviour. To demonstrate a significant reduction in non-native predator numbers over time within the offset site, the response variable able to be used are discussed below.

Metric 1 –RELATIVE ABUNDANCE INDEX - a relative measure of abundance based on the frequency and duration of time each predator species is recorded on camera i.e. how many are there relative to survey time.

As ascertaining the exact number of individuals from camera trapping is impossible, relative indexes of abundance are a preferred way to ascertain whether the activity level of any given animal has increased or decreased (under the assumption that lower activity implies potentially lower numbers of animals, or at least lower threat of predation upon koala). To assess the activity of introduced predators for this baseline report, the Relative Abundance Index (RAI) will be used– a metric calculated by Camelot and exported from the program for each 40-day trapping interval and with an independence threshold of 10minutes.

Statistical inferences for RAI contain no variance element, which limits analysis techniques for testing for a significant departure from baseline. This report will establish confidence limits for changes in predator abundance based on the baseline estimates from the 2019 summer and 2020 winter survey season. This is the season that predates offset commencement and management actions. Therefore, this report will consider any estimate of RAI equal to the upper baseline estimate (± 0.1) as no evidence of change, an estimate beyond this but within the confidence limits as conservative evidence of change (*C. lupus* between 0.4-22, *V. vulpes* 0.1 – 1.6, *F. catus* 0.04 -0.3 and *Sus scrofa* 0.1 – 8.9). Any estimate beyond the upper confidence limits ± the variance (standard deviation) of historic data is considered significant evidence of change. The historic data provides context into what natural fluctuations in predator activity have been seen on the property.

At baseline, RAI estimates for each species and their confidence intervals are summarised in Figure 3.

Metric 2 –OCCUPANCY – the proportion of camera trapping stations at which a predator was detected i.e. how many locations that had evidence of predators in the area.

This metric is more on the spatial concentration of predators rather than their number, and whether the hypothetical home range of any captured animal overlaps with the EPBC2016/7724 offset area.

At baseline, occupancy estimates for each species are summarised in Figure 3 and Map 8.

Species observations

Climate and weather conditions influence the occupancy of feral animals. During dry weather periods, animals display a lower occupancy score as they (and their prey) are constrained to water sources. During wet weather periods, the occupancy score is likely to increase as the animals find prey across the landscape. This was evident in the winter of 2021 compared to the dry summer of 2019. Historic data provides an advantage to calculating variance with baseline estimates, as it encapsulates natural variation expected by the local population.

Wild dog and fox numbers have fluctuated over time, but always been present within the property. Wild dog numbers have decreased from the baseline threshold and remain at a stable occupancy level. Camera trap footage demonstrated isolate individuals and no large packs in the winter of 2021.

Fox numbers and occupancy has increased slightly in the winter of 2021, but remain below the threshold. A higher abundance in winter is typical for foxes, in comparison to wild dogs.

One cat was observed in the winter of 2019 and 2020, and two in 2021. Occupancy data shows that across the property, feral cats were observed in only riparian lowland habitats, wild dogs and foxes were observed across the whole property.

Pigs (*Sus scrofa*) have also been observed in the property. Pig abundance and occupancy fluctuates with weather conditions. The year was typical of above average rainfall, attracting pigs to lowland alluvial flats, and providing ample food source. Although the relative abundance of pigs exceeds the baseline threshold, occupancy was constrained to camera traps located near water points. There was minimal evidence of pigs in the revegetation area and no disturbance observed. Management action will be taken.

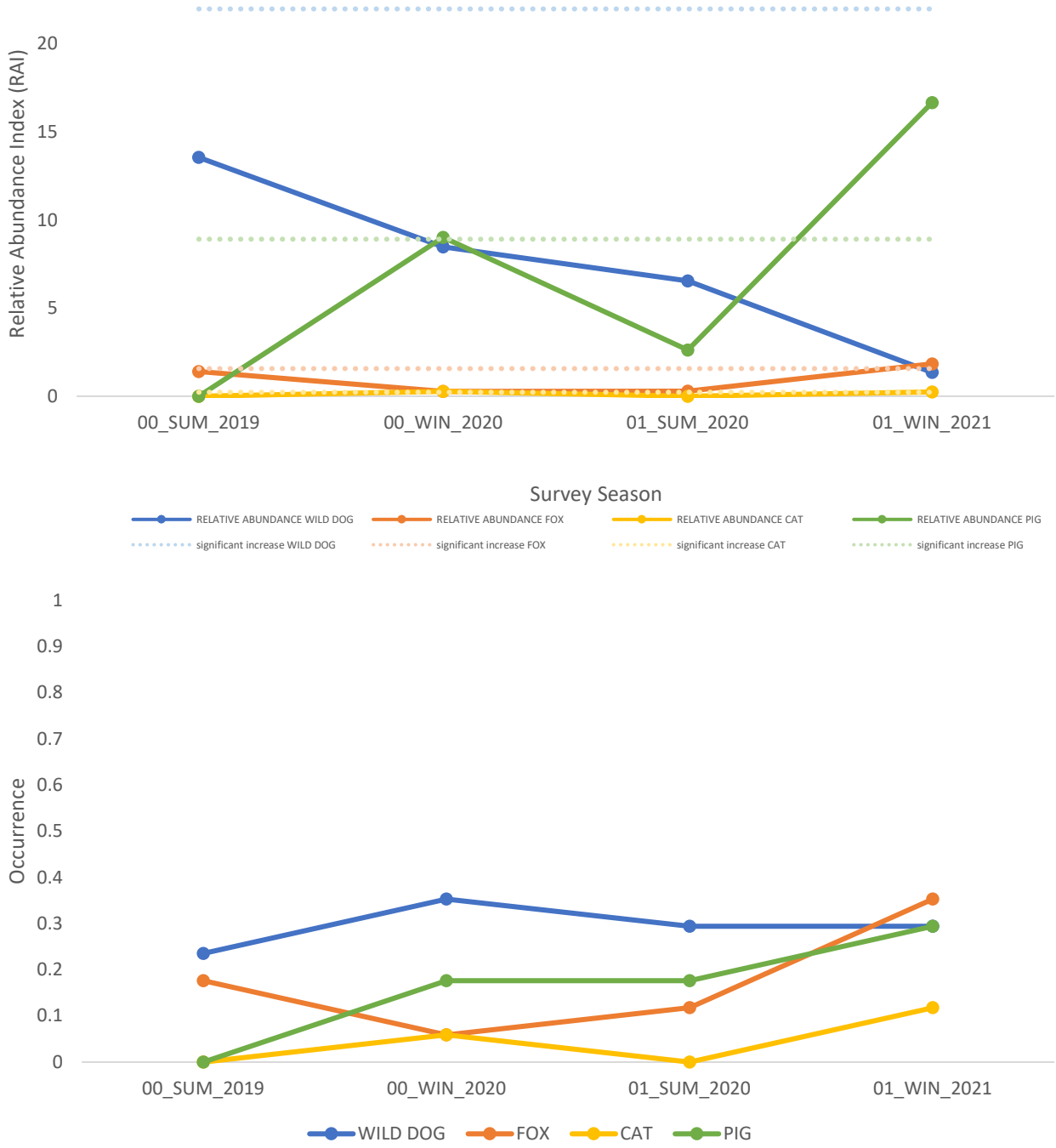


Figure 3. Relative Abundance Index (RAI) and Occupancy of predators across camera traps, and confidence limit threshold to show future deviations from the baseline.

2.5.2 Supplementary scat searches

Throughout the year, predator scat is collected opportunistically across the property. In addition to opportunistic scat collection, scat is collected during bi-monthly traverses of the Aroona Station property, roadsides and creeks. This search effort is in addition to the proposed six-monthly searches for evidence of predators within the offset site to be conducted within the compliance reporting period, after works are commenced on the impact site.

Scats are GPS located and collected for laboratory dietary analysis. Scat identification and dietary analysis gives an indication of species and predation trends over time, but is not considered a metric in relation to accurately monitoring predator abundance.

Predator scat analysis

To date, predator scat analysis shows no presence of koala in any predators diet on Aroona Station. In the past four years, macropods and wallabies have been the main fauna group present in predator scat, followed by small native mammals, birds and reptiles. A number of non-native mammals were found in scat including goat and pigs since 2017.

QTFN have been actively collecting and analysing predator scat on Aroona Station since 2018 (Figure 4).

Predator scats continue to be found across the Aroona Station site and within the EPBC 2016/7724 offset area (Map 8). Although both foxes and dogs remain on the site, predatory scats collected during this reporting period suggest that neither predator is consuming koala, and the diets of most individuals is composed of macropods and vegetation (Table 8).

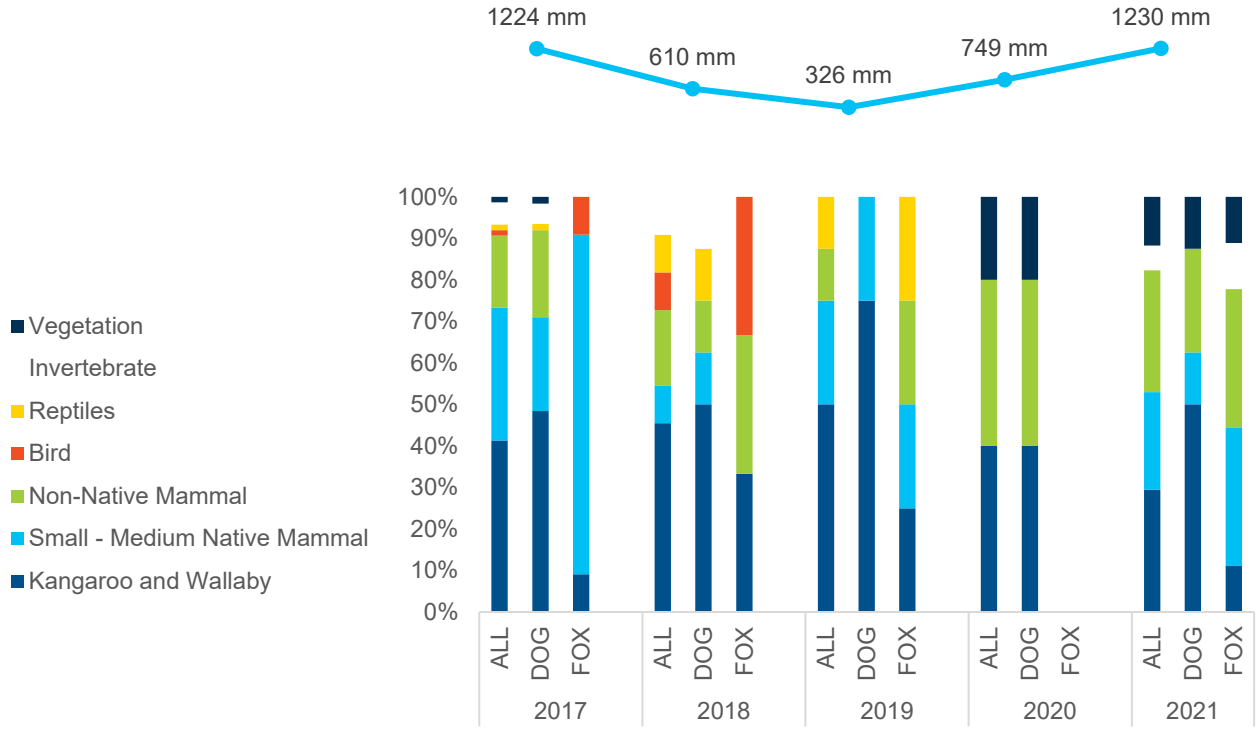


Figure 4. Long term predator diet analysis, percentage of prey type found in scat across years with annual average rainfall (points). i.e. in 2019, all reptile prey was only recorded in fox scat. No fox scats collected in 2020.

Table 8. The types of prey item identified from fox and dog scat collected within the site from June 2020 to April 2021, sorted by the frequency of individual predators whose scat contained each prey type (e.g. Eastern Grey Kangaroo were found in 11% of the 9 scats collected.

Species name	Common name	Frequency
Wallabia bicolor	Swamp wallaby	0.33
Macropus giganteus	Eastern Grey Kangaroo	0.11
Macropus robustus	Eastern Euro	0.11
Isoodon macrourus	Northern brown bandicoot	0.33
Pseudocheirus peregrinus	Common ringtail possum	0.11
	Deer	0.11
Mus musculus	House mouse	0.33
Rattus rattus	Rat	0.11
	Insect	0.11
	Vegetation	0.22

2.5.3 Management outcomes

As of Summer 2020, a contractor has been engaged. Biannual monitoring using camera traps will continue, and the feral animal contractor will target the creek line within the offset area that regularly captures predators and pigs. Management will include trapping seasons and ad hoc removal when required.

The inherent nature of controlling introduced predators over an unfenced site means some years will see an increase in numbers, regardless of measures put in place to control them.

The Little Liverpool Range Initiative held a pest management workshop for landholders in the Range. Landholders have the option to join the range wide monitoring program and led by leading research Prof. Peter Murray and pest fauna contractors.

2.6 KOALA MORTALITIES ATTRIBUTABLE TO NON-NATIVE PREDATORS

Approval Condition 6

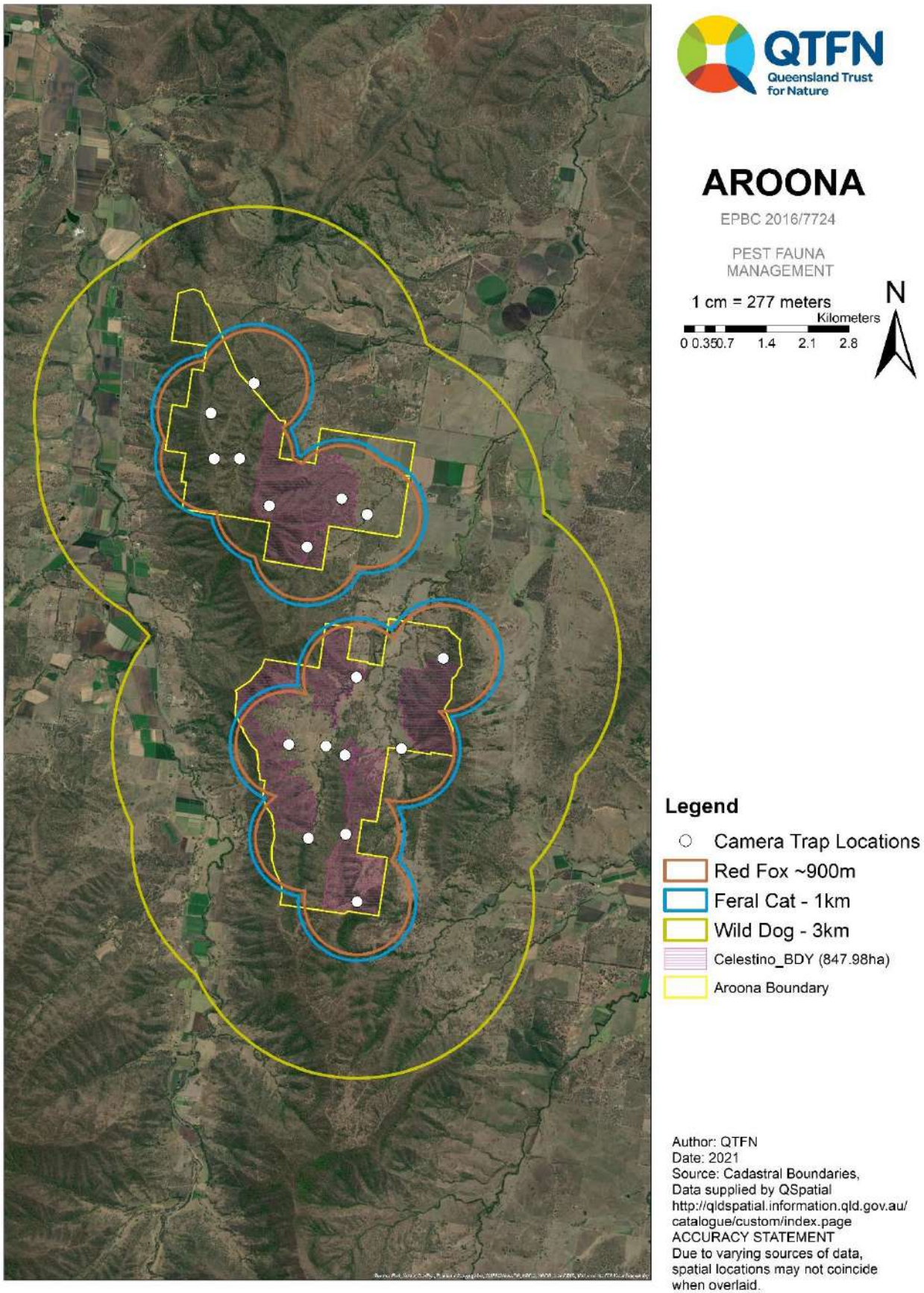
g) The number of **Koala** mortalities attributable to **non-native predators**

No koala mortalities caused by non-native predators was recorded in the last monitoring season.

2.6.1 Management outcomes

An inventory is kept for any incidences relating to koala mortalities attributable to non-native predators.

Map 8. Non-native predators and herbivores monitoring and dispersal distances



2.7 STOCK MANAGEMENT

Approval Condition 12

Install **fauna friendly stock exclusion fencing** around **Operational management 3** by the end of **year 1**.

Approval Condition 14

Monitoring report in respect to an analysis of how cattle grazing at the Aroona Offset Site has facilitated and/or impacted the achievement of outcomes prescribed under conditions 15 -18;

2.7.1 Cattle grazing monitoring

Cattle grazing for the purpose of fuel hazard management was conducted in line with the decision matrix provided in the Offset Management Plan.

Fuel hazard assessments demonstrated that the near surface (grasses) fuel layer contributed the greatest to the high, very high and extreme overall ratings. The biomass in this layer is a significant food source for cattle before it cures and contributes further to fuel loads. When managed correctly, it can be reduced without impact on native recruitment.

Figure 5. Near surface fuel load comparison, left = offset area without cattle, right = not offset area with cattle.

- Frequency, duration and location of grazing, and stock density for each grazing period;

Where fuel hazard assessments scored high and very high, cattle were moved into offset areas until the fuel hazard was reduced. Only one grazing period was conducted between fuel hazard assessments. In early 2021, cattle were rotated across paddocks as single mobs to reduce initial fuel loads and assist site preparation of fence construction. Cattle are excluded from revegetation areas.

A summary is provided in Table 9.

- The timing and frequency of monitoring undertaken; and

Fuel hazard assessments were conducted bi-annually (January and August), Table 9. The year 2021 has experienced above average rainfall contributing to growth in the near surface layer, reflected in the second assessment. Higher fuel hazard ratings are attributed to growth in the near surface fuel layer.

- Details of any injury or mortality of individual koalas;

No evidence of koala injury or mortality caused by cattle grazing was recorded.

- Details of corrective actions already undertaken and/or proposed to be undertaken in the event of injury or mortality of individual koalas as a result of grazing, and/or if monitoring demonstrates the outcomes under 15-18 are not achievable.

In the event that it occurs in the future, cattle will be removed from the offset area and the cause of interaction will be investigated. Revegetation zones will be monitored for cattle encroachment. However, to date no impact has been recorded due to cattle exclusion fencing.

If target vegetation composition is negatively affected by cattle grazing, implement adaptive management actions which may include: additional cattle exclusion areas, additional re-vegetation / rehabilitation in areas negatively affected by cattle grazing, reduce intensity of grazing for fuel reduction purposes, and exclude cattle from the offset area.

2.7.2 Management outcomes

Fauna friendly stock exclusion fencing has been installed around Operational Management Unit 3 areas where existing fences did not sufficiently exclude cattle. A local contractor was engaged to complete the works, whom demonstrated professionalism and high quality services. Example of fencing can be observed in Figure 6.

An ecological burn was planned in the mountain paddock; however, due to weather conditions the burn was unable to be conducted. Cattle were introduced to reduce fuel loads as per the flowchart.

A trial of satellite imagery is being conducted to assess the potential to assist in pasture monitoring. Ceres tags will also be purchased in the upcoming financial year.

No wildlife incidents or mortality have been recorded with the newly installed fences.

Fuel hazard assessments will continue to be conducted.

Figure 6. Example of cattle exclusion fencing

Table 9. Cattle management summary

	January FHA						August FHA					
Paddock	FHA	Cattle Hazard Reduction Triggered	Cattle Moved In	Cattle Moved Out	Head of Cattle	Days grazing	FHA	Cattle Hazard Reduction Triggered	Cattle Moved In	Cattle Moved Out	Head of Cattle	Days grazing
	H	Yes	15/03/2021	30/04/2021	111	46	H	Yes				0
Basils	M	No	15/03/2021	30/04/2021	111	46	H	Yes				0
Desjardin	H	Yes				0	M	No				0
	M	No	18/06/2021	12/08/2021	111	55	H	Yes	20/09/2021	4/12/2021	30	75
Gerhke	H	Yes	18/06/2021	12/08/2021	111	55	VH	Yes	20/09/2021	4/12/2021	30	75
Meiers	M	No				0	H	Yes				0
Mountain	H	Yes				0	H	Yes	9/08/2021	10/10/2021	72	62
	VH	Yes				0	VH	Yes	9/08/2021	10/10/2021	72	62
	M	No				0	H	Yes	9/08/2021	10/10/2021	72	62
	M	No				0	M	No	9/08/2021	10/10/2021	72	62
	VH	Yes				0	VH	Yes	9/08/2021	10/10/2021	72	62
	H	Yes				0	H	Yes	9/08/2021	10/10/2021	72	62
	M	No				0	VH	Yes	9/08/2021	10/10/2021	72	62
Mt Grey	M	No				0	H	Yes				0
Sawmill	M	No				0	M	No				0
Spring	M	No				0	H	Yes	11/10/2021	15/11/2021	36	35
Wensley	H	Yes	30/04/2021	18/06/2021	111	49	H	Yes				0

2.8 FIRE MANAGEMENT

The threats to koalas from fire was addressed in accordance with OMP by referring to the 'Aroona Station Fire Management Plan'.

The Aroona Station Fire Management Plan divides the property into Fire Management Zones: Land Management Zones, Exclusion Zones and Asset Protection Zones. Within the Land Management Zones, the landscape is broken up into subzones or Fire Management Areas (FMAs) according to practicable containment lines. The Fire Management plan details burning intervals recommended for these FMAs.

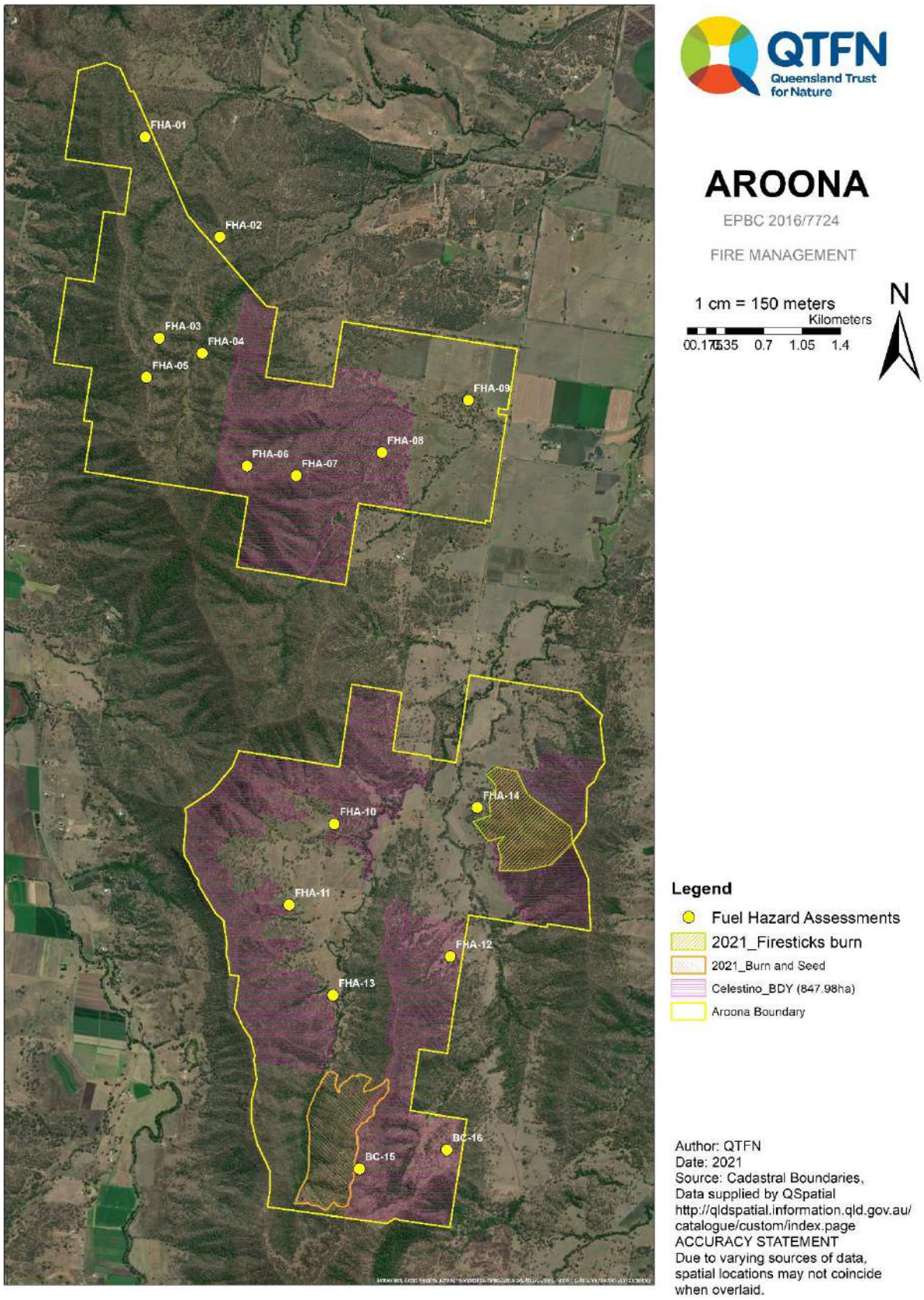
2.8.1 Management outcomes

Two ecological burns were conducted on Aroona Station, one inside the offset area (Map 9). The burn conducted within the offset area was a cultural burn conducted by Firesticks Alliance and was characteristic of a cool, mosaic burn.

Fuel hazard assessments demonstrate moderate to very high fuel loads, with approximately 50% exceeding a 'High' hazard score. Ratings were variable within and across offset management areas.

Fire break trails were inspected and maintained at regular intervals.

Map 9. Fire management within offset area.



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APPENDIX

Appendix 1. Koala Habitat Quality – Operational Management Units

		OMU-1			OMU-2					OMU-3
		AU-02	AU-03	AU-05	AU-01	AU-04	AU-06	AU-07	AU-08	AU-09
		12.8.9	12.8.16	12.8.17	12.9-10.7	12.8.16	12.8.17	12.3.3	12.3.7	
		Remnant	Remnant	Remnant	Regrowth	Regrowth	Regrowth	Regrowth	Regrowth	Cleared
		Average Score	Average Score	Average Score	Average Score	Average Score	Average Score	Average Score	Average Score	Average Score
Site Condition (30 %)	Recruitment of woody perennial species	4	5	2.5	5	5	5	4	5	0
	Native plant species richness - trees	3.75	5	3.75	5	3.33	2.5	5	5	0
	Native plant species richness - shrubs	2.5	0	0	0	1.67	2.5	0	0	0
	Native plant species richness - grasses	5	5	2.5	3.75	4.17	2.5	2.5	2.5	0
	Native plant species richness - forbs	2.5	2.5	2.5	3.75	2.5	2.5	2.5	2.5	0
	Tree canopy height	5	5	5	4	3.67	3	5	5	0
	Tree canopy cover	3.75	5	5	5	5	5	5	5	0
	Shrub canopy cover	5	3	4	4	2	3	1.5	0	0
	Native perennial grass cover	0	1	5	2	5	3	4	3	0
	Organic litter	5	5	5	3	5	5	5	5	0
	Large trees	10	15	15	7.5	5	0	7.5	10	0
	Coarse woody debris	2	5	3.5	2	2	2	3.5	5	0

	Weed cover	3	3	7.5	3	3.67	10	3	3	3
	Quality and availability of food and foraging habitat	10	10	10	5	5	5	5	5	1
	Quality and availability of shelter	10	10	10	5	5	5	5	5	1
	Site condition score	**71.5**	**79.5**	**81.25**	**58**	**58**	**56**	**58.5**	**61**	**5**
	Max score	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Site condition score (out of 3)	**2.15**	**2.39**	**2.44**	**1.74**	**1.74**	**1.68**	**1.755**	**1.83**	**0.15**
Site Context (30 %)	Size of the patch	10	10	10	10	10	10	10	10	10
	Connectedness	5	5	5	5	5	5	5	5	5
	Context	5	5	5	5	5	5	5	5	5
	Ecological corridors	6	6	6	6	6	6	6	6	6
	Role of site location to species overall population in the State	4	4	4	4	4	4	4	4	4
	Threats to the species									
	Site context score	**44**	**44**	**44**	**55**	**44**	**44**	**44**	**44**	**32**
		56	**56**	**56**	**56**	**56**	**56**	**56**	**56**	**56**
	Site context score (out of 3)	**2.36**	**2.36**	**2.36**	**2.95**	**2.36**	**2.36**	**2.36**	**2.36**	**1.71**

	Species usage of the site	15	15	15	15	15	15	15	15	0
	Approximate density	10	10	10	10	10	10	10	10	0
	Role/importance of species population on site	10	10	10	10	10	10	10	10	0
	Species stocking rate score	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**5**
	Species stocking rate score (out of 4)	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**0.29**
	Total (out of 10)	7.07	7.31	7.37	7.26	6.67	6.61	6.68	6.76	2.15
	OMU Average (rounded to nearest whole number)	7.35 (rounded to 7)			6.63 (rounded to 7)			2		

Appendix 2. GHFF Habitat Quality – Operation Management Units

		OMU-1			OMU-2					OMU-3
		AU-02	AU-03	AU-05	AU-01	AU-04	AU-06	AU-07	AU-08	AU-09
		12.8.9	12.8.16	12.8.17	12.9-10.7	12.8.16	12.8.17	12.3.3	12.3.7	
		Remnant	Remnant	Remnant	Regrowth	Regrowth	Regrowth	Regrowth	Regrowth	Cleared
		Average Score	Average Score	Average Score	Average Score	Average Score	Average Score	Average Score	Average Score	Average Score
Site Condition (40 %)	Vegetation Condition	20	20	20	10	10	10	10	10	5
	Species Richness	20	20	20	10	10	20	5	5	0
	Flower Score	8	8	8	8	8	8	10	10	0
	Timing of Biological Shortages	10	10	10	7	10	10	10	10	0
	Quality of Foraging Habitat	5	5	5	5	5	5	5	5	0
	Non-native Plant Cover	5	5	5	5	5	5	5	5	5
	Site condition score	**68**	**68**	**68**	**45**	**48**	**58**	**45**	**45**	**10**
	Max score	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
	Site condition score (out of 3)	**2.72**	**2.72**	**2.72**	**1.80**	**1.92**	**2.32**	**1.80**	**1.80**	**0.40**
Site Context (30%)	Size of the patch									

	Threats to the species	5	5	5	5	5	5	5	5	1
	Site context score	**39**	**39**	**39**	**39**	**39**	**39**	**39**	**39**	**35**
	Max score	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**
	Site context score (out of 3)	**1.95**	**1.95**	**1.95**	**1.95**	**1.95**	**1.95**	**1.95**	**1.95**	**1.75**
Species stocking rate (30%)	GHFF foraging large tree density	6	10	10	4	2	0	6	2	0
	Species stocking rate score	**6**	**10**	**10**	**4**	**2**	**0**	**6**	**2**	**0**
	Max score	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**
	Species stocking rate score (out of 3)	**1.8**	**3**	**3**	**1.2**	**0.6**	**0**	**1.8**	**0.6**	**0**
Total (out of 10)		6.47	7.67	7.67	4.95	4.47	4.27	5.55	4.35	2.15
OMU Average (rounded to										

Appendix 3. Weed Transect Monitoring Photos

Transect #1

Transect #2

Transect #5

Transect #BC02

Transect #BC07

Photo??

Transect #BC09

Transect #BC11

Transect #BC12

Transect #13

Transect #BC14

Transect #BC15

Transect #BC16

Appendix 4. Images from wildlife monitoring cameras

Dogs – *Canis lupus*

Summer

Winter

Fox – *Vulpes vulpes*

Summer

Winter

Cat – *Felis catus*

None recorded

Summer

Winter

Pig – *Sus scrofa*

Summer

Winter

Appendix E

Variation Notification Letter from DAWE

Australian Government

Department of Agriculture, Water and the Environment

Andrew Jennings
Assistant Development Manager
Celestino Pty Limited
642 Great Western Highway
PENDLE HILL NSW 2145

Residential Development, Teviot Road, Jimboomba, 17 km north of Beaudesert, Queensland (EPBC 2016/7724) – Variation to conditions of approval and Indirect Offset Strategy

Dear Mr Jennings

Thank you for your correspondence regarding the variation to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) conditions of approval for the above action, and the associated offset strategy.

Officers of the Department have advised me on the proposed variation of conditions which I understand, as a representative of Celestino Pty Limited, you have agreed to. I have also been advised on the offset strategy that would be required under the proposed varied conditions. On this basis, and as a delegate of the Minister for the Environment, I have decided to:

- vary the conditions of approval for EPBC 2016/7724 in accordance with section 143(1)(c) of the EPBC Act. I have attached a copy of the variation notice for your information; and

- approve the *EPBC Indirect Offset Strategy: Jimboomba Residential Development Project,* dated 22 December 2021, as meeting the requirements of the conditions as varied in the attached variation instrument. The approved offset strategy must now be implemented.

The Department implements an active compliance monitoring program. Please ensure that you maintain accurate records of all activities associated with, or relevant to, the conditions of approval, including the implementation of the approved strategy, so that those records can be made available to the Department on request.

Should you require any further information please contact Thomas Smith directly or email the Department's Post Approval Section at postapproval@awe.gov.au.

Yours sincerely

Kim Farrant
Assistant Secretary
Environment Assessments (Vic, Tas) and Post Approvals Branch
Environment Approvals Division

23 December 2021

Attachment: EPBC 2016/7724 variation to conditions of approval.

Appendix F

Indirect Offset Strategy

EPBC Act Indirect Offset Strategy

Jimboomba Residential Development Project
Collaboration between
The University of Queensland and Saunders Havill Group
28 February 2022

Job 8107

Table of Contents

DECLARATION OF ACCURACY

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying the *EPBC Act Indirect Offset Strategy Jimboomba Residential Development (EPBC 2016/7724) 22 December 2021* is complete, current and correct.

2. I am duly authorised to sign this declaration on behalf of the approval holder.

3. I am aware that:

   a. Section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.

   b. 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.

   c. The above offences are punishable on conviction by imprisonment, a fine or both.

Signed

Full name (please print)
Sam Maynard

Organisation (please print)

Saunders Havill Group

Date 01/12/21

1. Introduction

Saunders Havill Group (SHG) and the University of Queensland were engaged by Celestino Pty Ltd to provide a strategy for addressing the residual offset requirement associated with their residential development located at Teviot Road, Jimboomba (EPBC 2016/7724). The action was approved with conditions on 28 September 2020 including a direct offset for impacts to Grey-headed Flying-fox (GHFF) and Koala habitat which addressed 100% of the impact to GHFF and approximately 92% of the impact to Koala habitat. As a result of the shortfall condition 5c requires an offset strategy be provided within 6 months of the approval to compensate for the residual offset requirement. As the residual requirement is less than 10% of the impact, the remaining offset can be provided through either direct or other compensatory measures, such as a research program.

The residual offset requirement will be delivered through a research program carried out by the University of Queensland and funded by Celestino Pty Ltd. The intent of this indirect offsets strategy is to provide sufficient information to address the requirements of condition 5A and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Environmental Offsets Policy. In doing so the strategy includes:

- A cost schedule for implementing the direct offset so that the cost requirements for 'other compensatory measures' can be established through the EPBC Act offsets guide calculator;
- An overview of the research program including objectives, deliverables and project milestones and deliverables; and
- Review of the strategy against EPBC Act Conservation Advice for the Koala and South East Queensland Koala Conservation Strategy 2020 – 2025.

The overall objective of this strategy is to describe the research project that will provide indirect compensation for residual impacts to Koala habitat from the action and show how research outcomes will result in a conservation benefit to Koala populations in Southeast Queensland.

Table 1 cross references sections of this report with the requirements of approval condition 5A.

Table 1: Relevant Approval Conditions and Strategy Cross Reference

Condition	Strategy Section
Condition 5c - 5A. To compensate for the remaining 8% of residual impacts to Koala not offset by securing and managing the Aroona Offset Site, the approval holder must, within 12 months of the date of this approval, submit a Conservation Strategy (the Strategy) for the Minister's approval. The Strategy must:	
Explain how the financial contribution to be made by the approval holder to implement the Strategy has been determined	The financial contribution for 'other compensatory measures' has been calculated using the EPBC Act offsets assessment guide calculator. This requires the cost of the implementing the direct offset to be identified and and added as an input to the guide calculator. Refer to **Section 2** for a detailed breakdown and basis for direct offset costings.

Condition	Strategy Section
Describe the conservation project(s) that comprise the Strategy, including: I. outcomes to be achieved by implementing the conservation projects(s); II. a timetable of project activities, deliverables and financial contributions to be made by the approval holder; and III. the institution or person(s) responsible for project implementation.	Outcomes of the research project including how each outcome will provide a conservation benefit to the Southeast Queensland Koala population is included in **Section 3**. A timeline for delivery of the research program is included in **Section 5**. It is expected all works will be completed within 2 years of commencing of the program. The indirect offset will be carried out through the University of Queensland. The research project will be led by Associate Professor Steve Johnston and Adjunct Associate Professor Al Mucci, both of whom have significant experience in their relevant fields. Refer to **Section 3.4**.
Demonstrate that the Strategy: I. where appropriate, is consistent with the EPBC Act Environmental Offsets Policy; and II. is consistent with relevant conservation advices, recovery plans and threat abatement plans for Koala; and III. is likely to achieve a conservation gain for Koala;	Project consistency with the EPBC Act Environmental Offsets Policy have been addressed in **Section 4**. This project will link with the Southeast Queensland Koala Conservation Strategy and its future endeavours to secure and support Priority Areas for Koalas. The methodologies developed and the datasets obtained will serve as a working model that can be replicated across other regions, either through specific programs or as an additional layer of assessment for projects with the potential to have significant impacts on koalas and their habitat.
Specify arrangements to periodically report to the Department on the implementation of the Strategy and achieving conservation gains for Koala.	Refer to **Section 5.2** for reporting requirements.

2. Indirect Offset Budget Requirement

Under the EPBC Act a minimum of 90% of the offset requirements for any given impact must be met through direct offsets. As noted in Section 1 direct offsets address approximately 92% of the impact on Koala habitat resulting from the residential development located at Teviot Road, Jimboomba. The remaining 8% can be addressed through other compensatory measures, often referred to as indirect offsets. These measures are actions that do not directly offset the impacts on the protected matter but are anticipated to lead to benefits for the impacted protected matter, for example funding for research or educational programs.

Funding for other compensatory measures is quantified through the EPBC Act Offsets Guide calculator. The calculator contains a variable for entering the estimated cost of the direct offset. Where a direct offset does not meet 100% of the impact, this cost is used to calculate a dollar value for the other compensatory measures required in the offset package.

Therefore, in order to identify funding requirements for the indirect offset strategy an estimate of the cost for delivering the direct offset must be calculated. The basis and calculation of the cost to implement the direct offsets is outlined in this section.

2.1. Direct Offset Details

The approved direct offset site is located within a cattle farming property known as "Aroona". Aroona is located approximately 20 km south of the town of Grandchester. It lies within the Franklinvale catchment of the Moreton Basin sub-region of the Southeast Queensland bioregion. The property contains a mix of rocky outcrops along steep ridges, undulating hills, and alluvial flats. Aroona is situated within the Little Liverpool Range, a continuous and ecologically important tract of vegetation, covering over 20,500 ha within a State Significant corridor. The Little Liverpool range is connected to Main Range National Park, which is part of the World Heritage Gondwana Rainforest of Australia and extends 70 kilometres from the New South Wales border to the north of Cunningham's Gap.

The direct offset will permanently secure 847.98 ha within this property. The offset land is composed of a mix of remnant (OMU 1) and non-remnant (OMU 2) vegetation communities that will be rehabilitated through activities such as weed management and feral pest animal control, as well as a small area of cleared paddock (OMU3) that will be revegetated to achieve remnant status over a 20-year period.

The overall cost of the direct offset must address **establishment costs**, including compensating the landowner and legally securing of the land, and **implementation costs** including on-ground rehabilitation activities, and monitoring until the required habitat quality improvements have been achieved. A breakdown of all costs including supporting information has been provided as **Appendix 1 – Establishment Costs Supporting Information** and **Appendix 2 – Management Costs Supporting Information**. A summary of the costs and how they have been calculated is outlined below.

2.2. Direct Offset Establishment Costs

Establishment costs include:

- development of an Offset Management Plan (OMP);
- securing the land through a Voluntary Declaration under the *Vegetation Management Act 1999*; and
- costs associated with acquiring the land.

Allowances have been made for drafting the OMP and lodging the Voluntary Declaration which are considered to be conservative allowances based on SHGs experience dealing with third parties such as legal firms and offset providers (i.e. Queensland Trust for Nature). Costs for acquiring the land are based on the 20-year productivity loss rate for the Moreton Basin sub-region where the site is located. Productivity loss rates are a component of the Queensland Governments environmental offsets calculator and are described as an amount that would provide enough motivation for the individual landholder to be willing to participate in the offset market. The productivity loss rate for the Moreton Basin of $568 per hectare has been taken from Table 4.5.4 of the Queensland Environmental Offsets Policy version 1.10 (refer to **Appendix 1**).

2.3. Direct Offset Implementation Costs

Implementation costs include on ground rehabilitation activities and ongoing monitoring and reporting requirements to meet the EPBC Act conditions of approval. Requirements outlined in the approval conditions include:

- Baseline habitat quality surveys and reporting of all survey data (conditions 6 and 7).
- A 90% reduction in pest fauna species by the end of year 5. Once the reduction has been achieved monitoring and reporting must be undertaken every 5 years to show the reduction is maintained (conditions 8 and 9).
- Reduction in weed cover to less than 25% by the end of year 5 and less than 5% by the end of year 10. Once the reduction has been achieved monitoring and reporting must be undertaken every 5 years to show the reduction is maintained (conditions 10 and 11).
- Installation of fauna friendly stock exclusion fencing around OMU3 (condition 12).
- Encourage natural regeneration in OMU 1 (condition 16) and OMU 2 (condition 17) and carry out habitat recreation in OMU 3 through planting or direct seeding (condition 18) to meet the required habitat outcomes.
- Compliance reports every year until the end of year 5 and then each 5-year anniversary up to year 20 addressing koala injury or mortality, cattle grazing intensity, timing and frequency of monitoring events, etc (condition 14). Additional reporting must be carried out at each 5-year anniversary to assess vegetation against the required habitat outcomes (condition 19).
- Annual compliance reporting – after the initial 5 years of reporting and in the years between the 5-year anniversary reports it is expected that annual compliance reporting would be minimal and only address non-compliances or other issues at the site impacting on habitat values and use by Koala and Grey-headed Flying-fox.

2.3.1 Monitoring Requirements

While key monitoring and reporting requirements occur at 5-year milestones it is anticipated at least one interim monitoring event would be carried out in between these milestones (i.e. year 2, 7, 12 and 17) to assess

habitat rehabilitation progress and adapt management measures where required habitat outcomes are not being met. Monitoring during these years would include detailed Koala and terrestrial habitat transects similar to those completed as part of the preliminary documentation process as well as visual assessment of fences, weed management areas, etc. In years where milestone or interim reporting is not carried out annual monitoring would be undertaken to check site management and rehabilitation progress including visual monitoring of exclusion fencing, weed regrowth and direct seeding success.

Monitoring techniques to be utilised would include:

- Koala Spot Assessment Technique (SAT) surveys (Phillips and Callaghan 2011).
- A version of the Queensland State Governments "Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy" modified to assess koala habitat values.
- Methods outlined in The Queensland Herbarium's Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland Version 3.2.

Habitat outcomes required by the approval conditions are expected to be achieved by year 20 when the site will become a functioning and self-sustaining vegetation community, therefore active management is expected to cease after this period. However, monitoring will still be undertaken bi-annually to assess site maintenance requirements. This is expected to occur for a further 10-year period up to the end of the effect of the approval (2050).

Monitoring costings have been developed based on SHGs experience in carrying out similar ecological monitoring events at large offset and rehabilitation sites.

2.3.2 Management Requirements

Sections 6.2 and 6.3 of the Preliminary Documentation report outlines management activities to achieve the required outcomes at the Aroona site. Activities generally come under the following categories:

- weed management;
- pest animal control;
- bushfire hazard reduction including ecological burns; and
- management of natural regeneration including direct seeding where required.

The relevant sections of the Preliminary Documentation report have been included in **Appendix 2**.

A cost schedule has been developed with the intent of meeting the requirements of conditions 6 through 20 of the approval as well as the management measures outlined in the preliminary documentation report, which were the basis for the habitat improvement benchmarks outlined in the conditions.

Costing for these items have been taken from a number of sources including SHG rates from relevant suppliers (weed and animal pest management) and the DES Estimated Rehabilitation Calculator (ERC) for mine sites. The ERC is a tool provided by the Queensland Government for environmental authority holders to estimate the full cost to decommission, rehabilitate and close a petroleum and gas operation. It provides a range of

rates for standard rehabilitation activities such as weed management, seeding and maintenance. ERC rates were last updated in October 2020.

The approval requires all habitat improvement conditions to be achieved within 20 years of commencement of the offset. Most direct management requirements, such as reduction of weeds to 90% below baseline levels, must be achieved within the first 5 or 10 years of commencing works. Therefore, management costs have been implemented to the end of the 20-year period with some allowance made for minor maintenance to be carried out up to 2050. It is likely that management costs have been overestimated as requirements will reduce over time as the site is established and becomes self-sustaining.

The implementation methodology and cost estimate were provided to an independent third-party to assess that they are fit for purpose. The review found that the documentation and costings is a fair reflection of what is required. A letter from company information from the third party is included as **Appendix 3**.

3. Indirect Offset – The Power of Koala Poo

The full budget requirement for compensatory measures will be used to fund a research project led by the University of Queensland dubbed 'The Power of Koala Poo'. The power-poo concept is an exciting non-invasive technological advancement that will allow a broad range of genetic and reproductive information to be obtained from koala populations non-invasively using Koala faecal pellets.

3.1. Project Outcomes and Conservation Gain

The key outcomes of the Power of Koala Poo research project will be the development of:

- novel non-invasive technology for the assessment of Koala genetics, disease and reproductive status that can be applied to koala populations across Eastern Australia; and
- robust baseline datasets and ongoing monitoring datasets for Koala populations within Jimboomba and the surrounding area.

Population abundance can also be determined through genetic analysis of the faecal pellet data from a site. The ultimate objective of the technology is to be able to make assessments of Koala population health without having to capture a single Koala.

The research project is consistent with the Queensland Government's Southeast Queensland (SEQ) Koala Conservation Strategy 2020-2025 and the recommendations of the Queensland Government Koala Expert Panel. It directly supports Action 4.5 which is to identify koala threats and develop a mapping methodology. It will also indirectly assist with achieving Action 3.1 – identifying priority areas for threat reduction - as well as supporting the alignment of the environmental offset framework initiatives with koala conservation outcomes.

The project will provide a conservation gain for the Koala more broadly by providing standard methods and procedures for genetic and health management using technology that is non-invasive to the koala and relatively cheap to implement. This will assist in the identification of priority areas for Koala management and allow management programs to be tailored to the specific threats in that area.

The full University of Queensland project outline is included as **Appendix 4**. The project outline has been reviewed by the Queensland Department of Environment and Science (DES) who noted that the research proposal is consistent with the SEQ Koala Conservation Strategy action to improve mapping, monitoring and research, and is likely to have useful applications for the assessment of koala population fecundity, genetics, disease load and stress levels. DES will continue to provide advice and feedback on the research project throughout its lifecycle.

3.2. Project Overview

The project will collect Koala faecal pellets from the greater Jimboomba area. Fresh scats are best for successful DNA extraction therefore collection often involves setting up nets underneath habitat tress in areas with known Koala populations. Scats are collected without any interaction with human skin to avoid contamination. They are then treated with an ethanol solution and placed in airtight bags. Scats are kept chilled during field surveys and frozen for storage prior to analysis.

The collected scats will be analysed to establish population level assessments of:

1. high resolution genetic profiles;
2. sex ratio;
3. reproductive status (ovulation and gestation – progesterone, oestrogen, testosterone and prostaglandins);
4. stress markers (cortisol and corticosterone); and
5. chlamydia presence and clinical load.

The project extends previous pilot work that has been endorsed by the Queensland Government through the Advanced Queensland Innovative Partnerships Program: Live Koala Genome Bank.

3.3. Project Outcomes

The research project will deliver three distinct outcomes providing a conservation gain for Koalas. These outcomes are summarised below.

3.3.1 Outcome 1 - Koala on a chip

A SNP-chip (SNP: single nucleotide polymorphism) will be developed, consisting of thousands of genetic markers distributed across the genome. Genetic markers will be added to define subtypes of *Chlamydia pecorum* and KoRV pathogens to advance disease monitoring. This will deliver a standardised suite of publicly accessible genetic markers for koala populations.

3.3.2 Outcome 2 – Develop a technique for non-invasive assessment of Koala reproduction and stress response

As part of a recent state government funded program University of Queensland have developed a reliable non-invasive faecal progestogen metabolite assay that allows monitoring of whether a female koala has recently been mated and ovulated (potentially pregnant). While this assay is currently being used for captive reproductive management, Task 2 seeks to expand the range of reproductive hormones to cover oestrogen, testosterone and prostaglandin metabolites.

Oestrogen is an important hormone in detecting whether koalas are showing reproductive cycles to confirm potential fertility. Testosterone is the major reproductive hormone in male koalas and facilitates the study of male seasonality, fertility and male-male competition for breeding opportunities. Prostaglandin metabolites will be useful to attempt to develop a pregnancy test for koalas to allow for the evaluation of reproductive success.

The study of reproductive hormones overall will provide a measure of fecundity for the population to determine if reproductive rates are adequate to maintain the population or suppressed due to disease, drought, or other environmental stressors.

In addition, University will build on previous research on the measurement of faecal adrenal hormone metabolites in the koala (Johnston et al. 2013 and more recent unpublished data). The aim of developing and refining robust faecal adrenal metabolites (cortisol and corticosterone) assays in the koala will be its applied use as a biomarker to evaluate the potential impact of environmental stressors, disease, drought and bushfires on koala population health.

This will validate faecal hormone metabolite assays for koala oestrogens, prostaglandin and testosterone; in combination with previously established assays of faecal progesterone, cortisol and corticosterone. The assay will be tested using the Jimboomba koala population and other Gold Coast populations for comparison.

3.3.3 Outcome 3 - Application of proven and novel non-invasive technologies to assess genetics, disease and reproductive health of Koalas in the Jimboomba region

Outcome 3 is about implementing the results of outcomes 1 and 2 into real world use. Although the technologies will have broad application to koala conservation throughout Australia more generally, outcome 3 will apply the non-invasive technology specifically to the monitoring of the Jimboomba and surrounding koala populations.

Using faecal samples collected over a 1.5 year period, an integrative analysis of the health of the Jimboomba population (fine scale genetics, demography, disease status (Chlamydia and KoRV status and load) and reproductive potential) will be implemented establishing the efficacy of the Power Poo concept to assess the structure and health of a resident koala population. This work will become a model for the analysis of other koala populations subject to development applications.

3.4. Keys Project Team Members

Pen Pics for each of the key members of the research time are included below. All team members have significant experience in their relevant fields and are considered suitably qualified to carry out the work. As this is a research project including genetics not all members of the team are field ecologists therefore that definition does not apply.

Associate Professor Steve Johnson – Project Coordinator

A/Prof Stephen Johnston is a Reader in Reproduction (40% Teaching; 40% Research and 20% Service) in the School of Agriculture and Food Sciences Studies at the University of Queensland, where he teaches animal reproduction to applied science and science undergraduate and postgraduate students. Stephen was trained as a zoologist specialising in the area of reproductive biology in a broad diversity of species ranging from prawns to tigers but with a major focus on Australian mammals. A/Prof Johnston has published 248 scientific works in basic and applied science disciplines including reproductive anatomy, physiology and behaviour. He was the first person in the world to produce a pouch young following artificial insemination in a marsupial, a

task that he and his colleagues have now carried out successfully in the koala, a total of 34 times. Stephen is also a specialist in the cryopreservation of marsupial spermatozoa and in the assessment of sperm DNA fragmentation, including human and domestic animal spermatozoa. A/Prof Johnston's recent research interests and grant success include studies aimed at a better understanding of the effect of chlamydia on male koala reproduction, heat stress in koalas, sociobiology of koalas, genetic and reproductive management of koalas, wombat captive reproduction, echidna captive breeding, crocodile artificial insemination and prawn aquaculture. He was recently elected Fellow of the Society for Reproductive Biology (2019)

Professor Jenny Seddon - Koala genetics specialist

Jenny is a veterinarian and a molecular geneticist who has established an international reputation in using genetic tools to address ecological questions in support of the conservation of wildlife. She is also interested in disease ecology and using molecular tools to understand the spread of disease and vectors at the urban-rural interface. She teaches genetics and genomics and have introduced innovative teaching activities and authentic assessment and led an OIE (World Organisation for Animal Health) Veterinary Education Twinning Project that is improving veterinary education at a vet school in Viet Nam, empowering their staff and having flow-on impact in the region.

Her research focuses on the application of genetics and genomics to ecological questions. This includes the distribution of genetic variation across landscapes, the impact of current and historical barriers to gene flow and estimating genetic relatedness and its impact on social systems. Research projects have been based mainly on mammals, including koalas, kangaroos, dugongs, dolphins, giraffe and mongooses, but also on other species, such as the cattle tick.

For further information refer to https://researchers.uq.edu.au/researcher/1349.

Doctor Tamara Keeley – Koala faecal endocrinology specialist

Dr. Tamara Keeley is a Postdoctoral Research Fellow with the University of Queensland, School of Agriculture and Food Science. Dr. Keeley is a biologist, specialising in the areas Endocrinology, Reproductive Biology, Physiology, Captive Management, Conservation Science, Behaviour, and Welfare. She has experience working with a large variety of species ranging from livestock to endangered species (both in situ and ex situ); including mammals, marsupials, amphibians and reptiles.

Over the last decade and a half, Tamara have been involved in a wide range of management and research related collaborations and projects through which she has gain experience and knowledge in the areas of animal management and husbandry, reproductive management and assisted reproductive technology, animal physiology, animal behaviour and welfare, genetics, ecology and wildlife recovery and conservation programs. Tamara is known for her expert knowledge in non-invasive hormone analysis techniques and their validation and application to wildlife, companion, laboratory, and production animals for the study of reproduction, welfare and health.

Dr. Keeley's fellowship position at the University of Queensland, is funded by an Advance Queensland Innovation Partnership Grant. This grant is a partnership between the University of Queensland, Queensland University of Technology and Dreamworld to undertake research on captive and wild koalas. This research

program, "A Living Koala Genome Bank" is a concept for capturing genetic variation and restoring population connectivity for the future preservation of local wild population genetics and to test chlamydia vaccine immune response and efficacy. As part of this research program we are developing and testing cost efficient, non-invasive tools for the remote physiological monitoring of wild koalas to improve demographic analysis (via genetic analysis), and the identification of reproductive and disease status (chlamydia).

For further information refer to https://researchers.uq.edu.au/researcher/9623.

Adjunct Associate Professor Albano Mucci – Koala Field Ecologist

Al Mucci has substantial conservation planning and management, intensive koala management, project management of diverse teams, stakeholder management and high cultural competency values. Al is a current member of the Koala Advisory Council for Queensland appointed by the Minister for Environment.

The core expertise of Al Mucci includes:

- Conservation planning and management of iconic wildlife like the koala
- Design and development of studies associated with threatened species, particularly the koala.
- Over 20 years' experience and expertise in the capture, handling and husbandry of koalas.
- Project managing diverse teams, large scale capital projects, scoping and feasibility assessments, business analysis, and project execution to achieve sensitive Indigenous and conservation heritage objectives.
- Managing diverse groups of stakeholders, including Indigenous communities, in politically sensitive environments.
- Preparation of research and analytical reports which decision makers can rely on to inform and manage outcomes.

4. Alignment with Commonwealth and State Koala Conservation Strategies

The research project has been designed to achieve practical conservation outcomes for the Koala that can be employed as important tools for ecologists, conservationists and government agencies for use in future management programs. Once established and cost effectiveness is proven the method could also be used by individual proponents through various development application processes. This section outlines how the project aligns with multiple State and Commonwealth government conservation strategies, in particular the approved conservation advice for the combined population of Queensland, New South Wales and the Australian Capital Territory and the SEQ Queensland Koala Conservation Strategy 2020 – 2025.

Table 3 identifies relevant actions and research priorities and outlines how the research project addresses them. The project outcomes will also have great benefit for koala conservation more broadly and offers the opportunity to standardize procedures for genetic and health management using next generation technology that is non-invasive to the koala. The Queensland Department of Environment and Science (DES) have been consulted on the project and have provided feedback on alignment with the strategy (**Attachment 6**).

Table 3: Alignment with Commonwealth and State Koala Conservation Strategies

Action/Priority	Project alignment
South East Queensland Koala Conservation Strategy 2020 – 2025	
Action 3.1 Identify priority areas for threat reduction - The Queensland Government, in partnership with local government, SEQ Wildlife Hospitals and koala carer groups, will prioritise threat reduction opportunities that address all threats to koalas, including disease, fire, climate change, and attacks by domestic and wild dogs. **Action 4.5** Identify koala threats and develop mapping methodology - The Queensland Government will work with its partners to develop a consistent approach to mapping threats to koalas across SEQ, and implement a systemic mechanism for updating this mapping, to track changes in the level and composition of threats over time. **Action 4.7** Monitoring and evaluation framework - The Queensland Government will work with partners to develop and implement a monitoring, evaluation, review and improvement framework to track the effectiveness of koala conservation measures and inform future policy developments.	The project will facilitate the identification of priority areas for conservation, the improved characterisation of populations and the tracking of conservation efficacy through the development of a method for: - rapidly identifying threats to individual koala populations; - mapping population genetic profiles; and - simultaneously monitoring a range of parameters in a non-invasive and highly repeatable manner. These outcomes will assist the Queensland Government and its partners in identifying communities of most concern and tailoring management actions to address specific stresses on those communities. It will allow us to potentially examine the relationship between disease and health in koala populations.

Action/Priority	Project alignment
EPBC Act Koala Conservation Advice	
Develop and implement an integrated program of koala population monitoring and abundance estimates across the koala's range, with particular focus on those regions for which population size and trends are currently least known. Targeting regions where there were previous surveys but where there are no recent estimates will enable trends to be determined over a broader range of the species.	The project will provide an integrated program for population monitoring. In addition to abundance, it will provide a more holistic assessment of populations in terms of demographics, genetic and disease health, reproductive status and ability to adapt and cope with potential stressors. The project will provide a tool for population level monitoring providing the following outcomes: - Identification of the genetic health of the population, the relationship between genetic diversity and disease and the identification of genes associated with resistance to disease. - An understanding of the genetic profile of the population will be vital to making decisions on the acute and chronic management of koala populations particularly in the event of catastrophic events such as bushfire. - Development of a rapid assessment technique for identifying the level of potential threat to the survival of Koala populations by determining their ability to adapt to environmental stressors The use of non-invasively collected faecal pellets for analysis will also allow a greater distribution of populations to be targeted.
Develop understanding of gene flow and landscape connectivity.	The project has been designed to address this priority specifically. The use of SNP chip technology incorporating thousands of single-nucleotide polymorphisms will provide the resolution and power to allow a greater understanding of gene flow and landscape connectivity. Using SNP technology obtained from faecal pellets will allow the establishment of evolutionary significant units for koala populations, monitor dispersal patterns and establish any evidence of inbreeding.
Maintain or enhance research programs directed at the assessment of the incidence and consequences to populations of disease, and of mechanisms to reduce the impacts of disease.	The project will deliver a standardised suite of publicly accessible genetic markers for koala populations for use now and into the future. The analysis will also be able to establish the genetic diversity of populations, sex ratio and how genetically different a Koala population is to that of other surrounding populations. Many of the fundamental research tools utilised for this project are currently being used by wildlife hospitals and ecologists increasing the likelihood of future adoption by industry.

4.1. Alignment with EPBC Act Environmental Offsets Policy

Appendix A of the EPBC Act Environmental Offsets Policy provides criteria for research and educational programs. These include:

Endeavour to improve the viability of the impacted protected matter

While the research project itself will not directly improve the viability of Koala populations the outcomes will provide tools for comprehensive population monitoring that will facilitate improved management of Koala populations in Southeast Queensland and beyond.

The technologies created will have broad application to koala conservation throughout Australia generally, with a specific focus on the Southeast Queensland and Jimboomba koala populations. Using faecal samples collected from these populations over a 2-year period a process for an integrative analysis of the health of the Jimboomba population (fine scale genetics, demography, disease status and reproductive potential) will be produced establishing the efficacy of the "power poo" concept to assess the structure and health of a resident koala population. This work will become a model for the analysis of other koala populations subject to development applications.

Be targeted toward key research / education activities

This project targets key knowledge gaps, addressing several research priorities outlined in the EPBC Act conservation advice for Koalas (please refer to Table 3) and supports a range of priority actions outlined in the Queensland Government SEQ Koala Conservation Strategy 2020-2025 and recommendations of the Queensland Government Koala Expert Panel.

Be undertaken in a transparent, scientifically robust and timely manner

Research will be undertaken by the University of Queensland and will be completed within 2 years of commencement and builds on existing, scientifically proven technologies.

Reporting requirements outlined in Section 5 of this strategy will ensure research outcomes are transparent and will be made publicly available. All reports will be peer-reviewed prior to being published.

Be undertaken by a suitably qualified individual or organisation in a manner approved by the department

Research will be undertaken by the University of Queensland which is an internationally recognised educational and research institution consistently awarded the maximum five-star rating for research grants and research intensity in the Good Universities Guide. All research team members have significant experience in their fields and are more than qualified to carry out the work (refer to Section 3.4).

The EPBC Act Environmental Offset Policy does not define 'suitably qualified' however under other policies, such as advanced offsets criteria, A suitably qualified person is defined as a person who has professional qualifications, training or skills and at least five (5) years of experience relevant to the nominated subject matters to give authoritative assessment, advice and analysis about performance relevant to the subject matter using relevant protocols, standards, methods and/or literature. All key research team members significantly exceed this requirement (refer to Section 3.4)

Consider best practice research approaches

The project builds on and extends previously funded pilot work that has been endorsed by the Queensland Government through the Advanced Queensland Innovative Partnerships Program: Live Koala Genome Bank. Many of the fundamental research tools utilised for this project are currently being used by wildlife hospitals and ecologists with proven efficacy.

Research programs will be tailored to at least a postgraduate education level

The program will be carried out by senior researchers/academics and a post doctoral fellow at University of Queensland (refer to Section 3.4).

Present findings that can be peer-reviewed

Research findings will be presented in scientific papers like those found in peer-reviewed scientific journals. Finding will be made publicly available.

Publish findings in an internationally recognised peer-reviewed scientific journal or be of a standard that would be acceptable for publication in such a journal.

The findings of this research will be peer-reviewed by independent researchers in scientific fields relevant to the research and made publicly available through publication on the University of Queensland website and other scientific forums. Outcomes may also be submitted to peer reviewed scientific journals or published on State Government websites.

Research outputs should inform future management decisions on the protected matter and, where possible, be readily applicable to other similar matters

The program is consistent with the Queensland Government SEQ Koala Conservation Strategy 2020-2025 and the recommendations of the Queensland Government Koala Expert Panel. The project will facilitate the identification of priority areas for conservation, the improved characterisation of populations and the tracking of conservation efficacy through the development of a method for:

- rapidly identifying threats to individual koala populations;
- mapping population genetic profiles; and
- simultaneously monitoring a range of parameters in a non-invasive and highly repeatable manner.

These outcomes will assist the Queensland Government and its partners in identifying communities of most concern and tailoring management actions to address specific stresses on those communities. It will allow us to potentially examine the relationship between disease and health in koala populations.

The project will deliver a standardised suite of publicly accessible genetic markers for koala populations for use now and into the future. Many of the fundamental research tools utilised for this project are currently being used by wildlife hospitals and ecologists increasing the likelihood of future adoption by industry.

5. Project Delivery

5.1. Project Schedule

The research project will be delivered through three overriding tasks to achieve the outcomes and conservation gains outlined in Section 3. These tasks are:

- Task 1: Deliver a standardised suite of genetic markers for koala populations.
- Task 2: Validate, faecal hormone metabolite assays for oestrogens, prostaglandin and testosterone.
- Task 3: Apply the non-invasive technology specifically to the Jimboomba koala population.

A project schedule including timing, actions and who is responsible for each task is provided in **Table 4**. The project schedule also includes actions to be carried out at commencement, annual review and completion of the research project. These actions encompass release of funds to University of Queensland from Celestino, reporting of research outcomes and compliance reporting to DAWE.

The research project is expected to be completed within 2 years of commencement including the release of all outcomes reports and peer-reviewed papers. Completion criteria for the project are as follows:

- Deliver a standardised suite of publicly accessible genetic markers for koala populations (SNP chip).
- Validation of faecal hormone metabolite assays for koala oestrogens, prostaglandin and testosterone as a viable technique for non-invasive assessment of Koala reproduction and stress response.
- Completion of an integrative analysis of the health of the Jimboomba Koala population.

5.2. Project Reporting

Regular updates will be provided to DAWE to inform them of progress on the status of the research project and release of funding. Reporting will include:

- Initial correspondence informing DAWE of project commencement including proof that $259,855.00 (50%) of the project budget has been provided to UQ from Celestino.
- Progress report submitted within 12 months of commencing the project providing a status update on actions completed, preliminary outcomes and identifying any issues that may delay completion of the project.
- A final report submitted within 2 years of commencing the project providing addressing the completion criteria for each task and final conservation outcomes.

On completion of the project Celestino will provide all research publications and outputs to DAWE and DES at least 5 business days before public release. Publications will be peer reviewed by independent researchers in relevant scientific fields, and made publicly available through publication in one or more internationally recognised scientific journals.

Once the research project has been completed updates will be provided as part of the broader annual EPBC Act reporting for the residential development located at Teviot Road, Jimboomba (EPBC 2016/7724).

Table 4: Project Delivery Schedule

Timing	Task	Actions to be completed	Responsibility
February 2022	**Commence research project**	[redacted] • Inform DAWE of project commencement • Appoint post doc fellow • Submit required permit applications for research work	• Celestino • Celestino • UQ • UQ
	Task 2: Validate faecal hormone metabolite assays	• Identify faecal samples for validation of endocrine analysis techniques	• UQ
November 2022	Task 1: Deliver a standardised suite of genetic markers for koala populations	• Scat sample collection • DNA extraction from at least 1,000 tissue samples • DNA faecal extraction validations • Assemble and map koala SNP markers • Establish and validate koala SNP chip	• UQ • UQ • UQ • UQ • UQ
	Task 2: Validate faecal hormone metabolite assays	• Faecal oestrogen, prostaglandin and testosterone assay validation	• UQ
	Task 3: Apply the method to the Jimboomba koala population	• Commence faecal sample collection of Jimboomba population	• UQ
December 2022	**Review research project progress**	• Draft status report provided to stakeholders • Review status report and submit to DAWE for compliance [redacted]	• UQ • Celestino • Celestino
November 2023	Task 1: Deliver a standardised suite of genetic markers for koala populations	• Analysis and results write up as scientific peer-reviewed papers	• UQ
	Task 2: Validate faecal hormone metabolite assays	• Peer review of the technical procedures and publish outcomes	• UQ
	Task 3: Apply the method to the Jimboomba koala population	• Faecal sample collection of the Jimboomba population • Genotype faecal samples from Jimboomba population • Analysis of all faecal hormone assays and Chlamydia PCR	• UQ • UQ • UQ

Timing	Task	Actions to be completed	Responsibility
December 2023	**Research project completion**	• Final results report for Tasks 1–3 provided to stakeholders • Review final report and submit to DAWE for compliance • Submit peer-reviewed scientific papers to DAWE • Research outcomes presented to the DES • Public release of all peer-reviewed scientific papers	• UQ • Celestino • Celestino • UQ • UQ
Ongoing	**Ongoing use of research outcomes**	• Present results at scientific conferences • Establish and promote repository for SNP technology and make available to other researchers	• UQ/Celestino

6. Appendices

Appendix 1

Establishment Costs Supporting Information

Appendix 2

Management Costs Supporting Information

Appendix 3

Third Party Review of Rehabilitation Method and Costs

Appendix 4

UQ Research Project Outline

Appendix 1

Establishment Costs Supporting Information

4.5.4 Bioregion and subregion data table: on ground cost per hectare and 20-year loss

Bioregion name	Subregion name	On-Ground cost per ha ($)	20-year loss ($)
Brigalow Belt	Anakie Inlier	4000	105
Brigalow Belt	Arcadia	4000	298
Brigalow Belt	Banana - Auburn Ranges	4000	195
Brigalow Belt	Barakula	4000	154
Brigalow Belt	Basalt Downs	4000	416
Brigalow Belt	Belyando Downs	4000	397
Brigalow Belt	Beucazon Hills	4000	272
Brigalow Belt	Bogie River Hills	2000	170
Brigalow Belt	Boomer Range	4000	96
Brigalow Belt	Buckland Basalts	2000	66
Brigalow Belt	Callide Creek Downs	4000	712
Brigalow Belt	Cape River Hills	2000	149
Brigalow Belt	Carnarvon Ranges	2000	55
Brigalow Belt	Claude River Downs	4000	325
Brigalow Belt	Culgoa - Bokhara	4000	458
Brigalow Belt	Dawson River Downs	4000	688
Brigalow Belt	Dulacca Downs	4000	771
Brigalow Belt	Eastern Darling Downs	4000	428
Brigalow Belt	Inglewood Sandstones	4000	91
Brigalow Belt	Isaac - Comet Downs	4000	670
Brigalow Belt	Macintyre - Weir Fan	4000	513
Brigalow Belt	Marlborough Plains	4000	249
Brigalow Belt	Moonie - Barwon Interfluve	4000	388
Brigalow Belt	Moonie R. - Commoron Creek Floodout	4000	582
Brigalow Belt	Mount Morgan Ranges	4000	182
Brigalow Belt	Narrandool	4000	128
Brigalow Belt	Nebo - Connors Ranges	4000	253
Brigalow Belt	Northern Bowen Basin	4000	239

Bioregion name	Subregion name	On-Ground cost per ha ($)	20-year loss ($)
Brigalow Belt	South Drummond Basin	4000	279
Brigalow Belt	Southern Downs	4000	318
Brigalow Belt	Tara Downs	4000	771
Brigalow Belt	Taroom Downs	4000	1055
Brigalow Belt	Townsville Plains	2000	287
Brigalow Belt	Upper Belyando Floodout	4000	335
Brigalow Belt	Warrambool - Moonie	4000	458
Brigalow Belt	Weribone High	4000	385
Brigalow Belt	Woorabinda	4000	112
Brigalow Belt	Wyarra Hills	2000	164
Channel Country	Bulloo	2000	78
Channel Country	Bulloo Dunefields	2000	22
Channel Country	Coongie	2000	45
Channel Country	Cooper - Diamantina Plains	2000	45
Channel Country	Dieri	2000	22
Channel Country	Georgina - Eyre Plains	2000	45
Channel Country	Goneaway Tablelands	2000	22
Channel Country	Lake Pure	2000	22
Channel Country	Noccundra Slopes	2000	22
Channel Country	Simpson Desert	2000	22
Channel Country	Strzelecki Desert	2000	22
Channel Country	Sturt Stony Desert	2000	45
Channel Country	Toko Plains	2000	22
Central Queensland Coast	Byfield	20000	238
Central Queensland Coast	Clarke - Connors Ranges	20000	238
Central Queensland Coast	Debella	20000	434
Central Queensland Coast	Manifold	20000	122

Bioregion name	Subregion name	On-Ground cost per ha ($)	20-year loss ($)
Central Queensland Coast	Proserpine - Sarina Lowlands	20000	835
Central Queensland Coast	Whitsunday	20000	753
Cape York Peninsula	Battle Camp Sandstones	2000	21
Cape York Peninsula	Cape York - Torres Strait	2000	82
Cape York Peninsula	Coastal Plains	2000	255
Cape York Peninsula	Coen - Yambo Inlier	2000	21
Cape York Peninsula	Jardine - Pascoe Sandstones	2000	21
Cape York Peninsula	Laura Lowlands	2000	21
Cape York Peninsula	Northern Holroyd Plain	2000	21
Cape York Peninsula	Starke Coastal Lowlands	2000	23
Cape York Peninsula	Weipa Plateau	2000	50
Desert Uplands	Alice Tableland	2000	74
Desert Uplands	Cape - Campaspe Plains	2000	95
Desert Uplands	Jericho	4000	136
Desert Uplands	Prairie - Torrens Creeks Alluvials	2000	113
Einasleigh Uplands	Broken River	2000	99
Einasleigh Uplands	Georgetown - Croydon	2000	86
Einasleigh Uplands	Herberton - Wairuna	2000	111
Einasleigh Uplands	Hodgkinson Basin	2000	61
Einasleigh Uplands	Kidston	2000	107
Einasleigh Uplands	Undara - Toomba Basalts	2000	217
Gulf Plains	Armraynald Plains	2000	270
Gulf Plains	Claraville Plains	2000	46
Gulf Plains	Donors Plateau	2000	189
Gulf Plains	Doomadgee Plains	2000	75
Gulf Plains	Gilberton Plateau	2000	44
Gulf Plains	Holroyd Plain - Red Plateau	2000	32

Bioregion name	Subregion name	On-Ground cost per ha ($)	20-year loss ($)
Gulf Plains	Karumba Plains	2000	517
Gulf Plains	Mitchell - Gilbert Fans	2000	38
Gulf Plains	Wellesley Islands	2000	87
Gulf Plains	Woondoola Plains	2000	351
Inshore (remote)	East Cape York	50000	0
Inshore (remote)	Karumba-Nassau	50000	0
Inshore (remote)	Wellesley	50000	0
Inshore (remote)	West Cape York	50000	0
Inshore (non-remote)	Lucinda-Mackay Coast	30000	0
Inshore (non-remote)	Shoalwater Coast	30000	0
Inshore (non-remote)	Tweed-Moreton	30000	0
Inshore (non-remote)	Wet Tropic Coast	30000	0
Mitchell Grass Downs	Barkly Tableland	2000	224
Mitchell Grass Downs	Central Downs	2000	262
Mitchell Grass Downs	Flinders	2000	190
Mitchell Grass Downs	Georgina Limestone	2000	69
Mitchell Grass Downs	Kynuna Plateau	2000	157
Mitchell Grass Downs	Southern Wooded Downs	2000	181
Mitchell Grass Downs	Southwestern Downs	2000	224
Mulga Lands	Cuttaburra - Paroo	2000	19
Mulga Lands	Eastern Mulga Plains	4000	28
Mulga Lands	Langlo Plains	4000	19
Mulga Lands	Nebine Plains	4000	19
Mulga Lands	North Eastern Plains	4000	19
Mulga Lands	Northern Uplands	2000	19
Mulga Lands	Urisino Sandplains	2000	26
Mulga Lands	Warrego Plains	2000	52
Mulga Lands	West Balonne Plains	4000	83
Mulga Lands	West Bulloo	2000	26

Bioregion name	Subregion name	On-Ground cost per ha ($)	20-year loss ($)
Mulga Lands	West Warrego	2000	26
New England Tableland	Nandewar Northern Complex	4000	102
New England Tableland	Stanthorpe Plateau	4000	110
New England Tableland	Tenterfield Plateau	4000	123
Northwest Highlands	McArthur	2000	42
Northwest Highlands	Mount Isa Inlier	2000	52
Northwest Highlands	Southwestern Plateaus & Floodouts	2000	88
Northwest Highlands	Thorntonia	2000	88
Offshore	Arafura	50000	0
Offshore	Carpentaria	50000	0
Offshore	Central Reef	50000	0
Offshore	Mackay-Capricorn	50000	0
Offshore	Marion Plateau Province	50000	0
Offshore	Northern Coral Sea Province	50000	0
Offshore	Pompey-Swains	50000	0
Offshore	Queensland Plateau Province	50000	0
Offshore	Ribbons	50000	0
Offshore	Torres Strait	50000	0
Rivers and inland waterways	Inland Waterways	20000	0
Rivers and inland waterways	Rivers	20000	0
Southeast Queensland	Brisbane - Barambah Volcanics	20000	568
Southeast Queensland	Burnett - Curtis Coastal Lowlands	20000	147
Southeast Queensland	Burnett - Curtis Hills and Ranges	20000	176
Southeast Queensland	Burringbar - Conondale Ranges	20000	637

Bioregion name	Subregion name	On-Ground cost per ha ($)	20-year loss ($)
Southeast Queensland	Great Sandy	20000	37
Southeast Queensland	Gympie Block	20000	325
Southeast Queensland	Moreton Basin	20000	568
Southeast Queensland	Scenic Rim	20000	1273
Southeast Queensland	South Burnett	20000	637
Southeast Queensland	Southern Great Barrier Reef	20000	176
Southeast Queensland	Sunshine Coast - Gold Coast Lowlands	20000	494
Southeast Queensland	Woodenbong	20000	597
Wet Tropics	Atherton	20000	637
Wet Tropics	Bellenden Ker - Lamb	20000	637
Wet Tropics	Daintree - Bloomfield	20000	637
Wet Tropics	Herbert	20000	687
Wet Tropics	Innisfail	20000	941
Wet Tropics	Kirrama - Hinchinbrook	20000	372
Wet Tropics	Macalister	20000	637
Wet Tropics	Paluma - Seaview	20000	298
Wet Tropics	Tully	20000	741

Appendix 2

Management Costs Supporting Information

6.2. Management Framework

This section outlines the management framework to be implemented for the duration of the management period. The site will be managed for at least a 20 years period however measures will continue to be implemented until the conservation outcomes have been achieved.

In order to address the area-based management objectives the offset site has been delineated into Operational Management Units (OMUs), each with a defined set of management actions designed to progress the unit towards the objectives in the most efficient way possible, with the common objective to achieve a net gain in koala and Grey-headed Flying-fox (GHFF) habitat.

Critical elements of the OMP are:

- Legal protection of the existing remnant and mature regrowth koala and GHFF habitat from incompatible land management practices such as vegetation clearing, logging and grazing.
- Assisted natural regeneration of existing vegetation though active management of key threatening processes such as fire, weeds and feral pests; and
- Legal protection, revegetation and management of existing cleared areas to deliver a self-sustaining forest within the management period that is representative of pre-clearing Regional Ecosystems including the presence of koala and GHFF food and shelter trees.
- The offset site will be legally secured through a Voluntary Declaration under Section 19F of the *Vegetation Management Act 1999*. Once the conservation outcomes have been achieved the site will be declared a nature refuge and protected in perpetuity.

The management actions will result in a net gain of the overall habitat quality for koala and GHFF. The actions will take twenty (20) years of active management, maintenance, monitoring and reporting, if best practice implementation is followed.

6.2.1 Queensland Biosecurity Act 2014

The Queensland *Biosecurity Act 2014* commenced on 1 July 2016. The Biosecurity Act replaced the Queensland *Land Protection (Pest and Stock Route Management) Act 2002* (LP Act), and ensures a consistent, modern, risk based and less prescriptive approach to biosecurity in Queensland. The Biosecurity Act provides comprehensive biosecurity measures against non-native flora and fauna species, diseases and contaminants. The Queensland Biosecurity Regulation 2016 sets out how the Act is implemented and applied.

Under the Biosecurity Act, the Declared Pest Classes in the LP Act have been replaced by Prohibited Matters and Restricted Matters. Prohibited Matters are diseases and non-native flora and fauna species that are not found in Queensland, though if it were to enter, would seriously impact society, including the economy and the environment. No Prohibited Matters were found in the impact or offset area during the field assessments. Restricted Matters are diseases or non-native flora and fauna species already found in Queensland that may result in adverse effects on a biosecurity consideration if conditions or restrictions under the Act were not imposed.

There are seven categories of Restricted Matter and a species may fall under more than one category. The Restricted Matter Biosecurity Act categories are defined as follows:

- Category 1 & 2 – A person must report Category 1 Restricted Matter to an inspector or authorised person within 24 hours of becoming aware of its presence and must not take any action likely to exacerbate the biosecurity risk.
- Category 3 – A person who has Category 3 Restricted Matter in the person's possession or under the person's control must not distribute or dispose of the Restricted Matter unless the distribution or disposal meets the requirements of the Act.
- Category 4 – A person must not move, or cause or allow to be moved, Category 4 Restricted Matter, unless the moving is for the purposes of its identification by, or at the request of, a relevant entity as defined by the Act.
- Category 5 – A person must not keep in the person's possession or under the person's control Category 5 Restricted Matter, unless the keeping is for the purposes of its identification by, or at the request of, a relevant entity as defined by the Act.
- Category 6 – A person must not give food to a Category 6 Restricted Matter unless the feeding is carried out in preparation for, or in the course of, lawfully baiting, trapping or shooting the Category 6 Restricted Matter.
- Category 7 – A person must kill Category 7 Restricted Matter in their possession and dispose of it through appropriate methods.

Restricted matters identified on the offset site are listened in **Table 11** along with landowner requirements under the Act.

Table 11: Koala Monitoring Methods

Pest Species	Biosecurity Act Category	Legislative Requirement
Lantana camara	Category 3	A person who has Category 3 Restricted Matter in the person's possession or under the person's control must not distribute or dispose of the Restricted Matter unless the distribution or disposal meets the requirements of the Act.
Wild dogs	Category 3	A person who has Category 3 Restricted Matter in the person's possession or under the person's control must not distribute or dispose of the Restricted Matter unless the distribution or disposal meets the requirements of the Act.
	Category 4	A person must not move, or cause or allow to be moved, Category 4 Restricted Matter, unless the moving is for the purposes of its identification by, or at the request of, a relevant entity as defined by the Act.
	Category 6	A person must not give food to a Category 6 Restricted Matter unless the feeding is carried out in preparation for, or in the course of, lawfully baiting, trapping or shooting the Category 6 Restricted Matter.

Under the Biosecurity Act, landholders are also required to comply with the general biosecurity obligation (GBO), which is defined as follows:

- Take all reasonable and practical steps to prevent or minimise each biosecurity risk.
- Minimise the likelihood of the risk causing a biosecurity event and limit the consequences of such an event.
- Prevent or minimise the adverse effects the risk could have and refrain from doing anything that might exacerbate the adverse effects.

It is important to note that there is no obligation for a landowner to eradicate or actively remove a restricted matter from their property. However, they must prevent or minimise the risk of that matter impacting on areas outside of their property.

6.2.2 Management Approach

The delivery of the offset is over three vegetation types, which are broken down into OMUs to reflect the different actions required to reach the outcome. The OMUs reflect the Regulated Vegetation Management Mapping:

- OMU-01: Remnant vegetation
- OMU-02: Regrowth vegetation
- OMU-03: Cleared areas

The distribution of these three main vegetation types on site are shown on **Plan 10**.

6.3. Management Actions

This section will summarise on-ground management actions to be undertaken within the offset area in order to achieve the offset objectives. This section will provide high level guidance, it will not go into very specific day-to-day activities or best practice techniques. On-ground management actions will be designed around the different requirements of each OMU to achieve the required gain in habitat quality for both species.

6.3.1 Koala monitoring

Koala monitoring will be carried out across the offset site to report on the effectiveness of the management actions. The actions associated with koala monitoring will ensure an increase in the quality and availability of koala habitat, a reduction in threats across the site (through removal of weeds and reduction in feral predators) and an overall increase in koala abundance and activity. This increase in koala abundance and activity will be monitored through multiple survey methodologies, summarised in **Table 12**.

Table 12: Koala Monitoring Methods

Methodology	Frequency	Characteristic monitored	Result
SAT surveys (Phillips and Callaghan 2011)	Annually	SAT monitoring, recording the presence of koala scats under food and habitat trees. Survey will record activity and abundance of koalas.	Demonstrated increase in koala density and abundance through an increase in scats recorded during SAT
Intensive population surveys using methodology modified from Ellis et al (1995) and Ellis et al (2015) Method involves capturing, conducting health assessments by a wildlife vet including age, body mass, reproductive health and signs of koala disease. In addition to capturing individuals, surveying will include nocturnal spotlighting, acoustic listening for male bellowing and camera trapping.	At years 5, 10, 15 and 20	Surveys are designed to detect koala breeding within the offset area. Data collected will show evidence of breeding through back/pouch young, used pouches and male bellowing records.	Demonstrated use of the offset site for breeding purposes.

6.3.2 Vegetation management

In the context of broader offset management, management of vegetation would focus on enhancing the habitat values of the vegetated areas. The site is divided into three OMUs: remnant, regrowth and cleared (revegetated), based on structural features. The following broad vegetation management activities will be conducted across all OMU's:

- Facilitate natural regeneration by removal of weeds, management of fire regimes and reduction of grazing pressure;
- Retain live trees and shrubs (only to be cleared for property maintenance and thinning as necessary to remove weeds, protect property, establish and maintain boundary fencing, and to establish and maintain firebreaks and fire trails in accordance with an Offset Area Fire Management Plan);
- Retain stags and dead shrubs; and
- Retain fallen logs, leaf litter and other woody debris.

Revegetation will occur in cleared areas (OMU-03) through a combination of planting and direct seeding to create a self-sustaining vegetation community resembling the pre-clearance Regional Ecosystem/s present on the site. Species planted will be suitable for both koala food and habitat trees and GHFF food and habitat trees. Planting will include a range of species to avoid the creation of monocultures with the mix to at least include *Eucalyptus crebra*, *Eucalyptus melanophloia* and *Eucalyptus tereticornis* to ensure year round flowering resources are available for the GHFF. Revegetation will exclude areas of infrastructure, gazetted roads, and tracks which will be used beneficially to facilitate rehabilitation and management activities.

Maintenance of the planted areas will be conducted according to the following schedule:

- Erection of fencing (if required, some areas already bounded by fences) to exclude cattle from planted areas;
- Watering of planted trees immediately following planting, where required, to improve early stage survival in dry conditions;
- Application of broad-spectrum herbicide (glyphosate) around planted trees to reduce competition from grasses and broad-leaf weeds and improve survival and performance of planted trees;
- Undertaking survival assessments across all planted areas to identify areas of low survival;
- Infill area preparation and planting in identified areas of low survival to enhance successful vegetation establishment across the site;
- Annual firebreak and access track slashing prior to fire season to provide improved access for fire management and response activities.

Maintenance of direct seeded areas will be conducted according to the schedule:

- Direct seeding after ecological burn to increase the germination rate of the seeds;
- Application of broad-spectrum herbicide (glyphosate) for regrowth lantana after the ecological burn;
- Annual firebreak and access track slashing prior to fire season to provide improved access for fire management and response activities.

The extent and abundance of food tree species in OMU-01, OMU-02 and OMU-03 will be measured through the increase in both canopy and recruitment. This will be done through carrying out Habitat Quality Transects to assess against baseline data. Milestone surveys to measure the success of the revegetation will occur every 5 years.

Performance and completion criteria for vegetation management will be specified in the OMP but includes:

- Detailed rehabilitation plans for each OMU developed within 6 months of the commencement of the clearing at the impact site.
- Natural regeneration, seeding or planting to commence within 12 months of clearing at the impact site.
- Planted areas will have a 90% plant survival rate, with infill plantings occurring if required after 12 months of planting being carried out.
- Areas undergoing natural regeneration will display signs of native vegetation regrowth at rates expected for those species.
- Koala tree species richness and weed extent monitoring will occur annually for the first 5 years. Habitat Quality Transects will be completed every five years for the duration of the offset. The Habitat Quality Transect assessment methods for koala and GHFF detailed section 3 will be used to monitor habitat values.
- Habitat quality will at least be maintained at the current value for OMU 1 and 2. All OMUs will display signs of improvement within 5 years of the commencement of rehabilitation works.
- OMUs will reach the habitat quality scores identified in section 5.4 within 20 years.

6.3.3 Weed management

Weeds were observed to be generally low to moderate in abundance throughout the Offset Area, except for *Lantana camara* (Lantana), *Schinus terebinthifolius* (Broadleaved Pepper Tree) and *Celtis sinensis* (Chinese elm). All three species are of concern to achieving the offset objectives and weed control efforts should focus on the removal of these species during optimum growing conditions.

A detailed assessment was conducted in mid 2019 by the University of Queensland's Conservation Masters researchers, which noted the average abundance of *Lantana camara* at >50% of vegetation cover (UQ 2019). As discussed in section 6.1.2, lantana is an established threat to koala movement and koala habitat health and function. Lantana increases the risk of predation by feral carnivores by increasing the amount of time spent on the ground by individuals, it changes the structure of vegetation making it more susceptible to wildfire that damages koala habitat by creating hotter and more intense fires, and it prevents the recruitment of koala food and habitat trees through competition, shading and allelopathic properties (Berry et al 2011, Paull et al 2019, The honorable Leeanne Enoch 2019, Queensland Government 2019).

There are currently no regulated state requirements at the offset site for controlling *lantana camara*, broad leaved pepper tree or Chinese elm. These weeds are the main threat to the movement of koalas. Under the Queensland *Biosecurity Act 2014*, lantana, broad leaved pepper and Chinese elm are classified as a class 3 declared pest. Landholders are not required to control class 3 declared pest plants on their land. Weed management within the offset area will be additional to the current land management practices and align with the EPBC Environmental Offset Policy.

Lantana camara control will occur in the following order:

1. Cleared areas that are being revegetated and/or show significant regeneration.
2. Easy to access areas with low to medium infestations (start with areas with low infestation levels before moving to areas of medium infestation levels), to ensure that these areas are not getting worse in the future. Based on the landscape attributes, easy to access creek lines (which provide the best koala habitat based on the presence of *Eucalyptus tereticornis*) are to be treated first before treating other easy to access areas.
3. The remaining areas which will be harder to access. For the harder to access areas, creek lines with *Eucalyptus tereticornis* trees present will have precedence above the other remaining areas.

Infestations of *Schinus terebinthifolius* and *Celtis sinensis* are limited to creek lines of offset area. Recommended guidelines for the removal of both species include:

1. Areas of low to medium infestation fringing creek lines to ensure these areas are not getting worse in the future. Based on landscape attributes, start towards the head of the catchment and work downstream.
2. Remaining/highly infested areas treated second. Creek lines containing *Eucalyptus tereticornis* placed in higher priority.

At the commencement of site management weed extent will be mapped across the property. This will form the basis for the targeted areas for treatment. Monitoring will occur on an annual basis and the extent and abundance of weed cover in OMU-01, OMU-02 and OMU-03 will be measured through the improvement in non-native plant cover, measured through quadrats in Habitat Quality Transects assessments. Milestone surveys in the form of Habitat Quality Transects assessment will measure the success of the weed treatment every 5 years.

Performance and completion criteria for vegetation management will be specified in the OMP but will include:

- Baseline weed mapping completed for the offset site and a weed management strategy developed and implemented within 12 months of clearing commencing at the impact site.
- Weeds treated until coverage stabilises to less than 10% of baseline coverage and are maintained at that level.

6.3.4 Pest animal control

Wild dogs/dingoes, feral foxes and feral cats are restricted invasive animals under the *Biosecurity Act 2014* and do not require specific control measures. It states *"The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive animals under their control"*. The adaptive predator control measures, rigorous monitoring and coordinated landscape approach that will be implemented at the offset site go far beyond the minimal requirement of reducing the risks associated with invasive animals.

Monitoring data indicates that feral predators pose a significant threat to koalas in the offset area. Packs of wild dogs numbering up to nine individuals have been recorded in multiple locations on the site. Historically there has been no management of feral predators due to the preference by previous landholder not to manage them. Potential mortality by fox/dog has been recorded on the site in June 2017 at long 152.415808 and lat -27.863353. An adult male koala was discovered deceased in apparently healthy condition.

As part of the management program baseline monitoring will be undertaken on the property and a relative abundance index calculated for wild dogs and foxes. Where post control surveys indicate that there has been a recurrence of wild dogs and/or foxes on the site, control measures will be actioned using methods (e.g. controlled shooting and/or trapping) as determined by a pest control professional in consideration of these monitoring results.

Monitoring will be conducted bi-annually using wildlife motion cameras. Cameras will be positioned along tracks at a height of 50 cm and south-facing, to maximise capture. Cameras will be in place for 40 nights for each survey. Opportunistic scat surveys will be conducted, and the scats analysed to determine the diet of predators.

Management and monitoring programs will be ongoing resulting in a decrease in relative feral predator abundance index from the baseline and no recorded injury or death from feral animal attacks within the offset area.

To ensure the sustainability of the threatened species populations, it is critical to ensure management outcomes are maximised. Management of feral animals will be coordinated at a landscape level beyond the bounds of the land owned by QTFN.

QTFN is a founding member of the Little Liverpool Range Initiative (LLRI), established in July 2016 to encourage sustainable management of the Range's conservation values through a coordinated network of land managers. The range covers an area 20,000 hectares and encompasses a variety of private landholders, local government and organisation stakeholders. The LLRI's partners include Ipswich City Council, Scenic Rim Regional Council, Lockyer Valley Regional Council, Somerset Regional Council, The Turner Family Foundation, Queensland Trust for Nature and Healthy Land and Water. While the LLRI collaborates on a number of land management activities there is no coordinated pest management strategy currently in place. Control of non-native carnivore pest species such as wild dogs and foxes is generally reactionary and only occurs when native animal or livestock injury or mortality has occurred. Under the offset management plan, QTFN will fund and work with the LLRI to develop a range wide management program that coordinates management actions across multiple landholders, councils and

stakeholders. This will result in a wider pest management strategy that will result in pest management efforts being more effective.

The LLRI employs a coordinating officer, a position jointly funded by Ipswich City Council, QTFN and The Turner Family Foundation, which sits within Ipswich City Council. The officer position is funded for the next 3 years, and the role is to ensure the outcomes of the initiative are met, including coordinating land management activities, pest and weed management and helping to support locally rare and threatened species. QTFN will work closely with the coordinating officer to ensure management actions, including trapping and shooting, will be timed to coincide with neighbouring management actions to maximise outcome in feral predator control. The Initiative has the support of four councils, and will ensure positive environmental outcomes across a broader landscape than the offset area. Further details on the LLRI can be found on their website (https://www.llri.com.au).

6.3.5 Fire management

Fire management of the offset area is critical in achieving the intended outcomes and conservation gains over the 20 year management period. Managing the vegetation to promote natural regeneration and reduce the impacts of uncontrolled wildfire within the offset area will ensure management objectives are achieved.

QTFN's proactive fire management to date has assisted in averting devastating wildfire impacts on the property. The 2019/2020 summer of wildfires saw a wildfire pull up just short of the property boundary when it reached an area of previously burnt fuel. Ensuring that the offset area has a strong fire management strategy and that the impacts of lantana camara in increasing intensity of fires are managed is key to ensuring the health of koala and GHFF habitat. With over 80% of koala habitat impacted nationally by the 2019/2020 fire season (Australia Koala Foundation 2020), the importance of fire management in reducing key threatening for the species is high.

Three strategies are related to fire management at the offset site:

- Conduct ecological burns;
- Undertake hazard reduction action through burning and grazing to reduce biomass; and
- Fire exclusion.

The Sections below briefly summarise each of the above strategies. The offset will be regularly assessed for fire fuel loads.

Ecological Burning

Fire management will be carried out in accordance with guidelines recommended by the Queensland Government in relation to ecological burning for the Regional Ecosystem present at the site.

Ecological burns are to be undertaken during optimum burning conditions to achieve mosaic landscape burning. The appropriate permits will need to be applied for before starting a burn. It is recommended to burn the areas in a mosaic pattern wherever possible. Before undertaking a burn, the site will need to be prepared, which can involve, but is not limited to the following (not in order of priority):

- Install and/or upgrade fire breaks (using a grader and/or dozer depending on the terrain);
- Clear the firebreaks of any significant debris (using rake hoes, blowers etc);
- Clear any trees in proximity to fire breaks that have the potential to fall onto the fire breaks during a fire thereby potentially blocking safe access

- Rake around any significant habitat trees that have dead wood at the base where fire can travel up the trunk;
- Rake around dead stags that can provide habitat for fauna;

Ecological burning will form a key part in assisting natural regeneration. Management and burn strategy for each of the OMUs are as follows:

- OMU-01/02: Ecological burn with follow up weed treatment. Timing: First burn to occur in year 2-3 depending on weather conditions, with future burns occurring according to the recommended fire regime.
- OMU-03: Fire exclusion in planted areas around sensitive REs. Cool burn followed by direct seeding to promote regeneration. Follow-up weed treatment as required. Timing: Year 1-2 depending on weather conditions, with future burns occurring according to the recommended fire regime once trees are fully established.

A fuel hazard assessment (Overall fuel hazard assessment guide methodology) will be conducted on a twice-yearly basis by suitably qualified environmental personnel. Post fire monitoring will occur within 3 months of a burn being undertaken. Follow-up monitoring will occur within 12 months of the original burn.

Hazard Reduction Actions

Hazard management is required to reduce the overall biomass within the offset area to prevent large, uncontrolled and destructive wildfires, and crown fires which have detrimental impacts on koalas and koala and grey-headed flying-fox habitat. To date, QTFN's proactive fire management has assisted in averting devastating wildfire impacting on the property. The 2019/2020 summer of wildfires saw a wildfire pull up just short of the property boundary when it reached an area of previously burnt fuel. Ensuring that hazard reduction actions occur is a top priority in managing the offset area for koala and GHFF habitat. Instead of conducting a full ecological burn through a larger area of the offset, hazard reduction action can be undertaken to reduce the locally abundant fire fuel loads and in turn reducing the risk of a high intensity wildfire spreading throughout the offset. Hazard reduction actions will be conducted through a combination of ecological burns and grazing. A hazard reduction action will be used to reduce the risk of any fire getting into these zones (i.e. revegetation zones).

Triggers for when hazard reduction actions are required will be determined using the Overall Fuel Hazard Assessment Guide (DSE, 2010). Fuel hazard assessments will be undertaken on a twice-yearly basis by a qualified environmental manager, with hazard reduction actions occurring if the Overall Fuel Hazard is determined to be High, Very High, or Extreme. Hazard reductions actions will be implemented using the decision-making flowchart included as **Figure 5**.

Grazing will only occur within the offset area as a hazard reduction tool when an action is required. Actions around grazing are outlined in **Appendix K**. Grazing may be used as a tool until it has been assessed that fuel loads have been reduced to Low or Moderate according to the Overall Fuel Hazard Assessment. Monitoring and reporting of grazing impact will be rigorously documented and include the use of monthly forage and pasture reports. The use of grazing as a hazard reduction action will not occur in OMU-3 until koala and GHFF food and habitat trees are established as determined by a suitably qualified environmental manager.

The minimal grazing proposed under the OMP is to occur solely for the purposes of fuel load reduction and will go beyond minimizes soil loss. Grazing for short periods once or twice a year will not impact on the habitat improvements proposed.

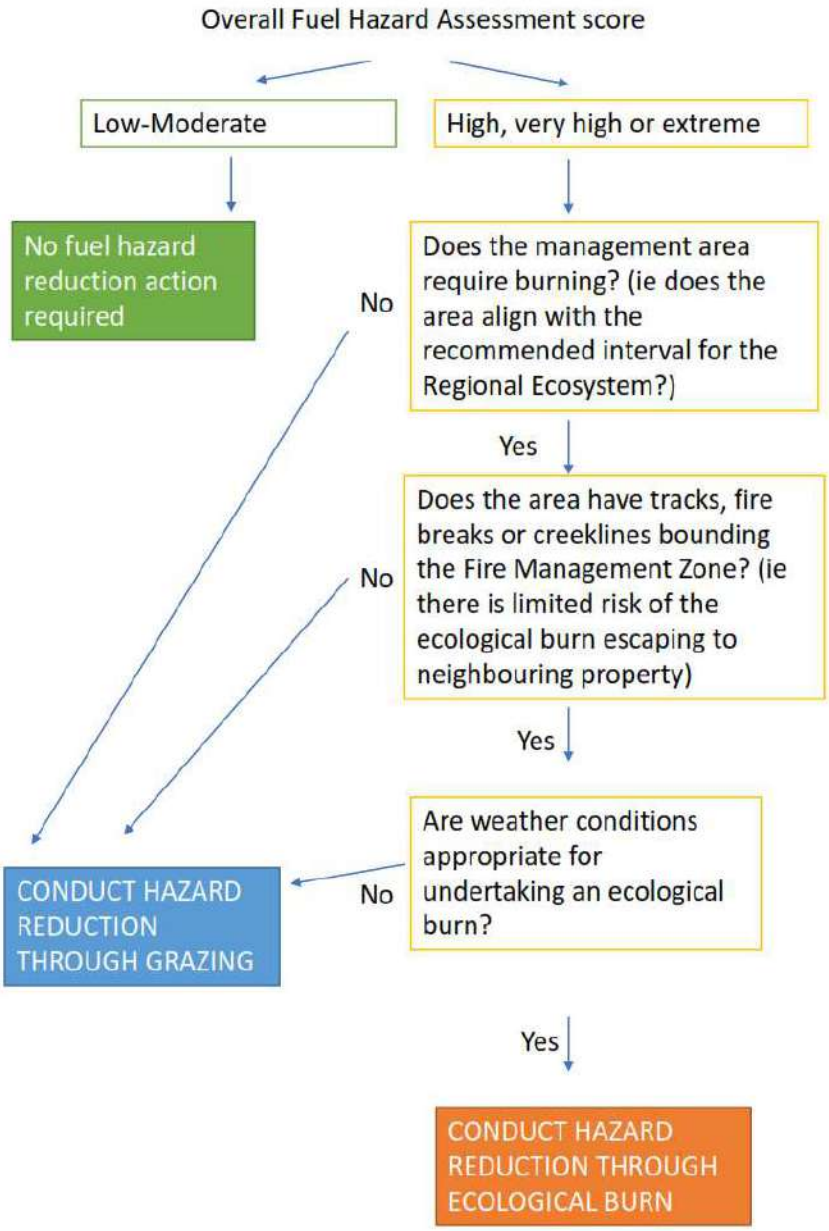

Figure 5: Hazard Reduction Decision Making Flow Chart

Multiple papers support the use of grazing in supporting good natural regeneration where grazing is used intermittently and lightly. A review of the available literature identified the following

- Competition from exotic pastures and shrubs lantana, broad leaved pepper, etc) markedly reduces regeneration of large tree species (Semple and Koen 2003). Increasing the cover of exotic annual plants is associated with declining probabilities of Eucalypt recruitment (Dorrough and Moxham 2005).
- Grazing activities can disrupt and control exotic weeds and if carried out at appropriate times can disrupt the seeding of exotic weeds and favour the regeneration of native plants (Biodiversity Conservation Trust)
- Eucalypt regeneration is unlikely in areas that are frequently and heavily grazed. However, there are multiple papers that support good natural regeneration with intermittent or light grazing (Dorrough and Moxham 2005), natural regeneration after rainfall with lightly stocked paddocks (Lunt 2005) and under a range of strategic grazing systems involving extended periods of rest (Spooner et al 2000). Eucalypt seedlings are able to re-sprout and persist if damaged by grazing if followed by periods of rest (Semple and Koen 2001).
- Trends show reduced ability to regenerate in areas of lower slopes with high fertility that have been heavily historically grazed. Increased surface soil hardness, lack of micro-relief and decreased water infiltration rates from compaction and an increase in woody pasture weeds limit eucalypt establishment.

Given the high level of weeds within the offset area and the difficulties of managing fuel loads due to the topography and access to areas within the offset area, light grazing for short windows is an appropriate tool for reducing the fuel loads and managing the risk of catastrophic wildfire where ecological burns are not appropriate. Grazing will be excluded from the lower slopes with high fertility (Category X areas), and these areas will be revegetated with native seedlings.

All management actions proposed are additional to current practices within the offset areas and align with the EPBC Environmental Offset Policy. Details on hazard reduction regimes that will ensure the achievement of the management objectives within the offset area are described in the **Appendix K** - Livestock Grazing and Managing Offsets. Pre and post fire load management surveys will also be carried out to identify whether any reduction in the recruitment of woody perennial species has occurred (refer to section 6.3.7). If this does occur fuel load reduction techniques will be reviewed and modified to ensure no reduction in recruitment.

Fire Exclusion

Fire is to be excluded from a few areas across the property as per list below:

- Revegetated areas. Areas where revegetation is being undertaken contain trees that are not sufficiently well grown to withstand an ecological burn/wildfire. It is recommended to protect these revegetation areas from fire through various operational actions:
  - Regularly monitor fire fuel load;
  - Install and maintain fire breaks in and around the revegetation zones;
  - Slash tracks regularly to keep grass load (and therefore fuel load) load along tracks;
  - Conduct a hazard reduction burn in surrounding area.
- Asset Protection Zones (APZ) such as sheds/farm buildings, infrastructure such as boars and watering points and dwellings.

6.3.6 Adaptive Management

Given the extended management timeline, it is not possible or intended that this OMP will provide a detailed prescription of management actions. This OMP has been based on the current state of knowledge of species ecology and best practice habitat management approaches for koala and GHFF habitat.

It is anticipated that new techniques will become available over the course of the management period to monitor vegetation composition, koala absence/presence and abundance, weed presence etc. To account for this an adaptive management approach has been adopted to ensure future research and practise development can be integrated into management and monitoring actions. This will ensure best practice techniques can be adopted contemporaneously in a way that ensures delivery and measurement of stated offset outcomes.

Adaptive management refers to a way of managing natural resources where management actions are regularly reviewed and, if necessary, modified based on monitored changes in environmental condition and/or changes in base knowledge which underpins the original management approach.

Figure 6: Adaptive Management process (CSIRO)

6.3.7 Koala and GHFF Key Management Actions and Outcomes

Key proposed actions and outcomes that will enhance habitat values for the Koala and GHFF are outlined in **Table 13**. If outcomes are not achieved within the timeframes identified the proponent and QTFN must provide a strategy to AWE to identify additional actions to achieve the required outcomes.

Table 13: Koala and GHFF Key Management Actions and Outcomes

Year	Outcome	Key Actions
Securing the Offset Site		
Year 1	Protection of the offset site to ensure existing habitat values are retained risk of further loss of habitat values is avoided.	Legally secure the offset area under section 19F of the *Vegetation Management Act 1999*.
Year 20	Protection of the offset site to ensure existing and created habitat values are retained risk of further loss of habitat values is avoided.	Have the offset site declared a Nature Refuge under the *Vegetation Management Act 1999*.
Non-native carnivore Pest Management		
Year 1	Identify a baseline level of non-native carnivore pests within the region covered by the LLRI. Criteria will be set for reducing the number non-native carnivore pests in comparison to the baseline. Numbers must be reduced to a level that results in no recorded injury or death	Complete detailed baseline seasonal non-native carnivore pest management surveys. Develop a Little Liverpool Range Pest Management Strategy that coordinates management actions across the multiple landholders, councils and stakeholders encompassed by the Little Liverpool Range Initiative. This will result in a broadscale approach to non-native carnivore pest management. Commence implementation of Pest Management Strategy
Years 2-5	Analysis of predator scats shows no predation on koalas or GHFF.	Implement Pest Management Strategy Undertake bi-annual seasonal vertebrate pest surveys. Undertake property wide non-native carnivore scat collection and analysis for contents
Year 5	Demonstrate a significant decrease in numbers of non-native carnivores at the offset site with a 95% confidence level. Analysis of predator scats shows no predation on koala or GHFF. No recorded injury or death of a koala or GHFF from feral animal attacks within the offset area. Where one occurs the pest animal responsible is identified and destroyed.	Implement Pest Management Strategy. Where koala or GHFF mortality occurs, the strategy will be updated to improve measures. This may include increasing intensity and/or frequency of baiting and shooting measures in specific areas.

Year	Outcome	Key Actions
Years 5-20	Maintain an overall decrease in numbers of non-native carnivores at the offset site, relative to the baseline. Analysis of predator scats shows no predation on koala or GHFF. No recorded injury or death of a koala or GHFF from feral animal attacks within the offset area. Where one occurs the pest animal responsible is identified and destroyed.	Implement Pest Management Strategy Undertake bi-annual seasonal vertebrate pest surveys Undertake property wide non-native carnivore scat collection and analysis for contents Where koala or GHFF mortality occurs, the strategy will be updated to improve measures. This may include increasing intensity and/or frequency of baiting and shooting measures in specific areas.
Weeds of National Significance		
Year 1	Development of a detailed site-specific management plan for removal of weeds impacting koala movement and habitat tree recruitment at the offset site.	Complete detailed baseline weed extent surveys at offset site for *Lantana camara* and *Schinus terebinthifolius*.
Year 5	Demonstrate overall cover of weeds at <25% of the baseline levels across offset site.	Replicate Detailed Weed Extent Re-Survey through the Offset Area – Include plans and calculations in the Year 5 demonstrating less than 25% of the year 1 baseline survey results.
Year 10, 15, 20	Demonstrate and maintain overall cover of weeds at <5% of the baseline levels across offset site. Weeds are not impacting on the movement of koalas across the site and not negatively impacting on recruitment of koala food and shelter trees.	Replicate Detailed Weed Extent Re-Survey through the Offset Area – Include plans and calculations in the Year 10 demonstrating less than 5% of the year 1 baseline survey results.
Bushfire Management		
Year 1	Develop an Offset Area Bushfire Management Plan in accordance with relevant Queensland guidelines and have it endorsed by an experienced bushfire practitioner.	Complete baseline survey(s) of bushfire fuel loads within OMU 1 & OMU 2 in accordance with the Overall Fuel Hazard Assessment Guide.
Year 2-20	No uncontrolled bushfires or reduction in habitat value as a result of fuel reduction actions.	Implement Offset Area Bushfire Management Plan including ongoing assessment of fuel loads. If the assessment identifies a high, very high or extreme fuel load, actions will be put in place to reduce fuel loads. The specific action is dependent on-site characteristics and will follow the flow chart in Figure 5.
	No reduction in recruitment of woody perennial species score when compared to the terrestrial habitat assessment benchmarks.	Complete surveys pre and post fuel load reduction of recruitment of woody perennial

Year	Outcome	Key Actions
		species using the methodology in the modified habitat quality assessment.
	Overall Fuel Hazard Assessment reduced to Low or Moderate. Risk of catastrophic wildfire reduced. No koala mortalities occur as a result of overall fuel hazard reduction action.	Overall Fuel Hazard Assessment conducted pre and post fuel hazard reduction action, and level of risk of catastrophic wildfire documented. If post actions survey reveals Overall Fuel Hazard Assessment is still high, very high or extreme, another action will be undertaken following the flowchart in Figure 5.
Management of OMU 1		
Year 1	Development of a detailed site-specific rehabilitation management plan to guide on ground vegetation management, rehabilitation and monitoring.	Identify and map specific rehabilitation requirements including planting areas and densities for native shrubs and grasses. Establish habitat monitoring transects including completing additional baseline transects where required for ongoing monitoring. Establish locations and methods for carry out annual koala monitoring including SAT surveys and intensive population surveys.
Year 10	Increase koala habitat score from baseline 7 to an 8 including the following increases against the benchmark scores: - Increase Canopy height to >90% in all AUs (score of 5) - Increase native shrub species richness to >49% in all AUs (score of 2.5) - Increase native perennial grass cover to >90% in all AUs (score of 5) - Increase large trees to between 50%-100% (score of 10) in all AUs - Reduce non-native plant cover (weeds) to <5% in all AUs - Reduce weed cover, non-native carnivore pest species and bushfire threat as required under the specific management plans so that threats and barriers to dispersal for koala are considered low Increase GHFF habitat score from baseline 7 to an 8 including the following increases against the benchmark scores: - Reduce non-native plant coverage to <5% (score of 20) - Reduce weed cover, non-native carnivore pest species and bushfire	Implement rehabilitation plans including vertebrate pest and weed management requirements. Carry out infill planting as identified by detailed rehabilitation plans. Carry out annual koala monitoring including SAT surveys and intensive population surveys.

Year	Outcome	Key Actions
	threat as required under the specific management plans so that threats and barriers to dispersal for koala are considered low	
Year 20	Increase koala habitat score from baseline 7 to a 9 by maintaining increases achieved in year 10 and increasing the following against the benchmark scores: - Increase recruitment of woody perennial species to >75% in all AUs (score of 5) - Increase native forb cover species richness to >90% in all AUs (score of 5) - Increase large trees to >100% in all AUs (score of 15) - Reduce non-native plant cover (weeds) to <5% in all AUs - Increase koala density to an average of at least 22.5% (moderate) based on the Koala Activity Level Classification (Phillips and Callaghan 2011). Increase GHFF habitat score from baseline 7 to a 9 by maintaining increases achieved in year 10 and increasing the following against the benchmark scores: - Increase stem density of large GHFF habitat trees to >301 stems per hectare	Implement rehabilitation plans including vertebrate pest and weed management requirements. Carry out infill planting as identified by detailed rehabilitation plans. Carry out annual koala monitoring including SAT surveys and intensive population surveys.
Management of OMU 2		
Year 1	Development of a detailed site-specific rehabilitation management plan to guide on ground vegetation management, rehabilitation and monitoring.	Identify and map specific rehabilitation requirements including planting areas and densities for native shrubs and grasses Establish photo monitoring points and protocols. Establish habitat monitoring transects including completing additional baseline transects where required for ongoing monitoring. Establish locations and methods for carry out annual koala monitoring including SAT surveys and intensive population surveys.
Year 10	Increase koala habitat score from baseline 7 to an 8 including the following increases against the benchmark scores: - Increase recruitment of woody perennial species to >75% in all AUs (score of 5)	Implement rehabilitation plans including vertebrate pest and weed management requirements. Carry out infill planting as identified by detailed rehabilitation plans.

Year	Outcome	Key Actions
	- Increase Canopy height to >90% in all AUs (score of 5) - Increase native shrub species richness to >49% in all AUs (score of 2.5) - Increase native perennial grass cover to >90% in all AUs (score of 5) - Increase large trees to between 50%-100% (score of 10) in all AUs - Reduce non-native plant cover (weeds) to <5% in all AUs - Reduce weed cover, non-native carnivore pest species and bushfire threat as required under the specific management plans so that threats and barriers to dispersal for koala are considered low Increase GHFF habitat score from baseline 7 to an 8 including the following increases against the benchmark scores: - Reduce non-native plant coverage to <5% (score of 20) - Reduce weed cover, non-native carnivore pest species and bushfire threat as required under the specific management plans so that threats and barriers to dispersal for koala are considered low	Carry out annual koala monitoring including SAT surveys and intensive population surveys.
Year 20	Increase koala habitat score from baseline 7 to a 9 by maintaining increases achieved in year 10 and increasing the following against the benchmark scores: - Increase native shrub, forb and perennial grass cover species richness to >90% in all AUs (score of 5) - Increase large trees to >100% in all AUs (score of 15) - Increase koala density to an average of at least 22.5% (moderate) based on the Koala Activity Level Classification (Phillips and Callaghan 2011). Increase GHFF habitat score from baseline 7 to a 9 by maintaining increases achieved in year 10 and increasing the following against the benchmark scores: - Lodge and have approved a Property Map of Vegetation to change	Implement rehabilitation plans including vertebrate pest and weed management requirements. Carry out infill planting as identified by detailed rehabilitation plans. Carry out annual koala monitoring including SAT surveys and intensive population surveys.

Year	Outcome	Key Actions
	vegetation status from regrowth to remnant - Increase stem density of large GHFF habitat trees to: - 251–300 stems per hectare in AU01 - 201–250 stems per hectare in AU04 - 151–300 stems per hectare in AU06 - 301+ stems per hectare in AU07 - 201–250 stems per hectare in AU08	
Revegetation (habitat creation) Activities (OMU 3)		
Year 1	Develop detailed rehabilitation plan for all OMU 3 areas	Finalise locations, sequence and timing for revegetation program Cultivate and prepare revegetation areas in preparation for year 2 planting Establish photo monitoring and habitat transect points and protocols for revegetation area
Year 2	Koala and GHFF habitat trees to be planted as tube stock or through direct seeding application at a density of 1 tree per 20m^2 for the entire OMU 3 area. Species diversity according to Pre-clear mapped Regional Ecosystem. Plantings occur as weather conditions permit (do not plant in drought). Planting should include more than 6 GHFF foraging species.	Complete revegetation according to revegetation plan.
Years 3-5	Koala and GHFF habitat trees to achieve survival rate of >80%.	Monitor and maintain all revegetation areas. Livestock are excluded from replanting areas. Replanting and/or in-fill planting to be carried out as required Implement additional weed control, fertiliser, amelioration or other management actions necessary to stimulate tree growth
Year 5	Koala and GHFF habitat trees to be established and self-sustaining. Increase koala habitat score from baseline 2 to a 5 including the following increases against the benchmark scores: - Increase recruitment of woody perennial species to >20% to 75% in all AUs (score of 3)	Implement rehabilitation plans including vertebrate pest and weed management requirements. Carry out infill planting as identified by detailed rehabilitation plans. Carry out annual koala monitoring including SAT surveys and intensive population surveys.

Year	Outcome	Key Actions
	- Increase native tree, shrub and forb species richness to >25% to 90% in all AUs (score of 2.5) Increase GHFF habitat score from baseline 1 to a 4 including the following increases against the benchmark scores: - Reduce non-native plant coverage to <5% (score of 20) - Establishment of more than 6 species of GHFF foraging species - At least 4 of these species should be considered significant foraging species (>0.65 wt p*r) - Achieve a flowering score of 0.51-0.75	
Years 5-10		Monitor and maintain all revegetation areas. Livestock are excluded from replanting areas. Replanting and/or in-fill planting to be carried out as required Implement additional weed control, fertiliser, amelioration or other management actions necessary to stimulate tree growth
Year 10	Koala and GHFF habitat trees to be established and self-sustaining. Increase koala habitat score from baseline 2 to a 6 including the following increases against the benchmark scores: - Increase recruitment of woody perennial species to >20% to 75% in all AUs (score of 3) - Increase native tree, shrub and forb species richness to >25% to 90% in all AUs (score of 2.5) - Increase shrub canopy cover to 10-50% (score of 3) - Increase native perennial grass cover to 50-90% (score of 3) - Increase organic litter to 10-50% (score of 3) - Increase non-native plant cover to 5% to 25% (score of 5) - Reduce weed cover, non-native carnivore pest species and bushfire threat as required under the specific	Implement rehabilitation plans including vertebrate pest and weed management requirements. Carry out infill planting as identified by detailed rehabilitation plans. Carry out annual koala monitoring including SAT surveys and intensive population surveys.

Year	Outcome	Key Actions
	management plans so that threats and barriers to dispersal for koala are considered moderate - Increase koala density to an average density of 1% - 22.5% (low) based on the Koala Activity Level Classification (Phillips and Callaghan 2011).	
Year 10-20		Monitor and maintain all revegetation areas. Livestock are excluded from replanting areas. Replanting and/or in-fill planting to be carried out as required Implement additional weed control, fertiliser, amelioration or other management actions necessary to stimulate tree growth
Year 20	Koala and GHFF habitat trees to be established and self-sustaining. Increase koala habitat score from baseline 2 to a 7 including the following increases against the benchmark scores: - Increase recruitment of woody perennial species to >75% in all AUs (score of 5) - Increase native tree, shrub and forb species richness to > 90% in all AUs (score of 5) - Increase tree canopy cover to 25%-75% (score of 3) - Increase shrub canopy cover to >50% but <200% (score of 5) - Increase organic litter to >50% but <200% (score of 5) - Increase coarse woody debris to >50% but <200% (score of 5) - Increase non-native plant cover to <5% (score of 10) - Increasing the threats to species to moderate (score 7) - Increase large trees to 0%-50% (score of 5) - Increasing species mobility capacity to 7 (moderately restricted) - Increase koala density to an average density of at least 22.5% (moderate) based on the Koala Activity Level	Implement rehabilitation plans including vertebrate pest and weed management requirements. Carry out infill planting as identified by detailed rehabilitation plans. Carry out annual koala monitoring including SAT surveys and intensive population surveys.

Year	Outcome	Key Actions
	Classification (Phillips and Callaghan 2011). - Increase quality and availability of food and foraging and shelter habitat score to 5 (moderate provided) - Reduce weed cover, non-native carnivore pest species and bushfire threat as required under the specific management plans so that threats and barriers to dispersal for koala are considered low - Increase koala density to an average density of 1% - 22.5% (low) based on the Koala Activity Level Classification (Phillips and Callaghan 2011). Increase GHFF habitat score from baseline 1 to a 7 by maintaining increases achieved in year 10 and increasing the following against the benchmark scores: - Lodge and have approved a Property Map of Vegetation to change vegetation status from regrowth to remnant - Ensure at least one species of GHFF foraging tree flowers during times of biological shortages - Increase stem density of large GHFF habitat trees to 151-200 stems per hectare	

Appendix 3

Third Party Review of Rehabilitation Method and Costs

Saunders Havill Group

Attn: Sam Maynard

RE: Celestino Rehabilitation Costing Review

To whom it may concern,

My name is David Taylor and I am a Director of Interface Landscapes P/L. I have been involved in the Industry for over 30 years and during that time have been heavily involved with Landscape Construction, Rehabilitation and Revegetation Projects and Maintenance of those projects.

I have reviewed the relevant documentation and costings and believe that what has been provided is a fair reflection of what is required to achieve the desired outcomes.

Yours sincerely,

David Taylor

Director

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"The Point of Difference"

COMPANY PROFILE

INTERFACE LANDSCAPES

Our focus, commitment and continuous training has resulted in maintaining

that all projects are delivered to an exceptional standard.

OUR SCOPE

Interface Landscapes creates the environments where people want to be. From large scale, fully integrated residential developments like North Harbour, ECCO Ripley and Flagstone Estate, to boutique developments and council works; from major infrastructure like airports to specialist precincts like marinas, we have the experience and expertise required to deliver outstanding landscaping results.

Softscape Works - Creating award-winning, formal and informal environmental panoramas which deliver your landscape concepts to life.

Hardscape Works - Integrating the functionality of landscaping features within the environment from boardwalks, bridges and shelters to playgrounds, exercise equipment and shade sails.

Maintenance – Delivering excellence to your landscaping investment through providing "attention to detail" services designed to ensure each element of your project presents to the highest standards.

Rehabilitation/Revegetation - Reinstating local environments by capitalising on their existing assets and re-greening and stabilising areas debilitated by land uses.

Project Management – Personalised and meticulous planning is undertaken to ensure that your project is delivered on time and within budget, with zero health, safety or environmental incidents.

Our team of specialists have experience in every element of project delivery, regardless of the scale or complexity. This experience combined with a highly systemised organisation means we always deliver on our promise; to be "The Point of Difference".

INTERFACE LANDSCAPES

Other elements included a fitness area and amenities block.

barbeque areas that overlook the park and the rolling green lawns, and is

wall which stretched 130lm and designed and constructed a

construction process. We are proud to

facilities. For the adults, there are sheltered barbeque and picnic areas

Byron Park

INTERFACE LANDSCAPES

children to s
and walking the rope bridge – all whilst being protected from the sun under the large shade sail. Just a few steps away is the unique

LANDSCAPE QUEENSLAND CONSTRUCTION EXCELLENCE AWARDS 2018 WINNER ECOLOGICAL REHABILITATION CATEGORY

Within the master planned community at **North Harbour**, Interface was engaged to undertake revegetation works to significant areas which had been overrun by typha. These works included planting over 83,000 tubestock and emptying low lying basin areas to complete works.

Our focus on the Environment is evident in our stringent procedures which has seen Interface achieve our Environmental certification to AS-NZS 14001:2016. This passion for protecting the space around us is demonstrated through all projects we undertake, and this commitment has been recognised through our consistent achievement of industry awards.

INTERFACE LANDSCAPES

Currently the President of Landscape Queensland Industries Association, Dave has extensive

MEET THE TEAM - MANAGEMENT

Justin Carter
Project Support Manager

Justin has been a part of the Interface family for over ten years. His passion and love for landscape construction made his journey to a Project Support Manager within our business, a natural progression. Justin has extensive experience managing multi-million-dollar construction projects, and his attention to detail, project deadline compliance and dynamic personality makes him an asset to our team.

A career highlight of Justin's includes the delivery of $4 million dollar Flagstone Adventure Park. A part of the massive Flagstone Recreation Park - hailed as Queensland's largest playground, and a cutting-edge example of bringing communities together in one big, connected park. Justin was also the Project Support Manager for Eagle Tree Park at Foreshore, Coomera. A $1.6 million dollar park constructed for Stockland, Justin's coordination meant the state-of-the-art playground was delivered to the highest of standards.

Qualifications: Certificate IV in Civil Construction Supervision, Certificate III in Horticulture, Pinnacle Working at Heights Training, Odyssey Leading Teams Training, NSCA Hazard Identification and Management, COVID19 Infection Control Training, and a White Card in Construction.

Micah Hoogland
Project Support Manager

Micah is a recent addition to the Interface Landscapes team and brings a wealth of experience to the company. He has over 18 years of experience in the industry; 10 years in landscape construction and 8 years as a Landscape Architect specialising in construction delivery.

Micah takes a holistic approach to project management and his experience gives him the ability to manage project delivery from the ground up.

Some of of Micah's career highlights include delivering the entire works at Providence Estate since 2014 and delivery of the Flagstone Estate RRP3 project.

Qualifications: Certificate III in Horticulture. Micah is currently working towards completing his degree in Landscape Architecture at QUT.

and Spill Kit
Management (currently studying).

Stuart one of our most Senior Foreman. Stuart's personal attributes including his structured

Our team are equipped with dedicated plant and equipment to ensure the job gets done quickly, and our fleet of maintenance vehicles

LANDSCAPE QUEENSLAND CONSTRUCTION EXCELLENCE AWARDS 2018 WINNER MAINTENANCE CATEGORY

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Additionally, since early 2018, Interface Landscapes has connected with the

adopt best practice methodologies when undertaking any work to ensure that all projects are delivered to an exceptional standard.

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CORPORATE SOCIAL AND SUSTAINABILITY RESPONSIBILITY

Pallara Trees
ADVANCED TREE SPECIALISTS

INTERWATERING

qbcc queensland building and construction commission

Nursery & Garden Industry Queensland

UDIA Urban Development Institute of Australia QUEENSLAND

NSCA National Safety Council of Australia Ltd

Head Office MATES in Construction ACCREDITED SITE Interface Landscapes

muravah foundation

Landscape Queensland Industries Assoc.Inc. MASTER LANDSCAPE PROFESSIONAL MASTER

Landscape Queensland Industries Assoc.Inc. ACCREDITED CONTRACTOR

OUR COMMUNITY

- Children will attend school

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particularly o

Most Awarded Commercial Landscaping Company 2018

LANDSCAPE QUEENSLAND CONSTRUCTION EXCELLENCE AWARDS
2018 WINNER MAINTENANCE CATEGORY

LANDSCAPE QUEENSLAND CONSTRUCTION EXCELLENCE AWARDS
2018 WINNER BEST FEATURE COMMERCIAL

LANDSCAPE QUEENSLAND CONSTRUCTION EXCELLENCE AWARDS
2018 WINNER ECOLOGICAL REHABILITATION CATEGORY

LANDSCAPE QUEENSLAND CONSTRUCTION EXCELLENCE AWARDS
2018 HIGHLY COMMENDED

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REFEREE DETAILS

John Sprent Reserve Park Upgrade
Sarah Springer, Brisbane City Council
Ph: 07 3027 4557

Apex Park and Wentworth Drive Park
Michelle Gill , Redland City Council
Ph: 07 3829 8967

Logan Gardens Waterpark
Caroline King, Logan City Council
Ph: 3412 5570

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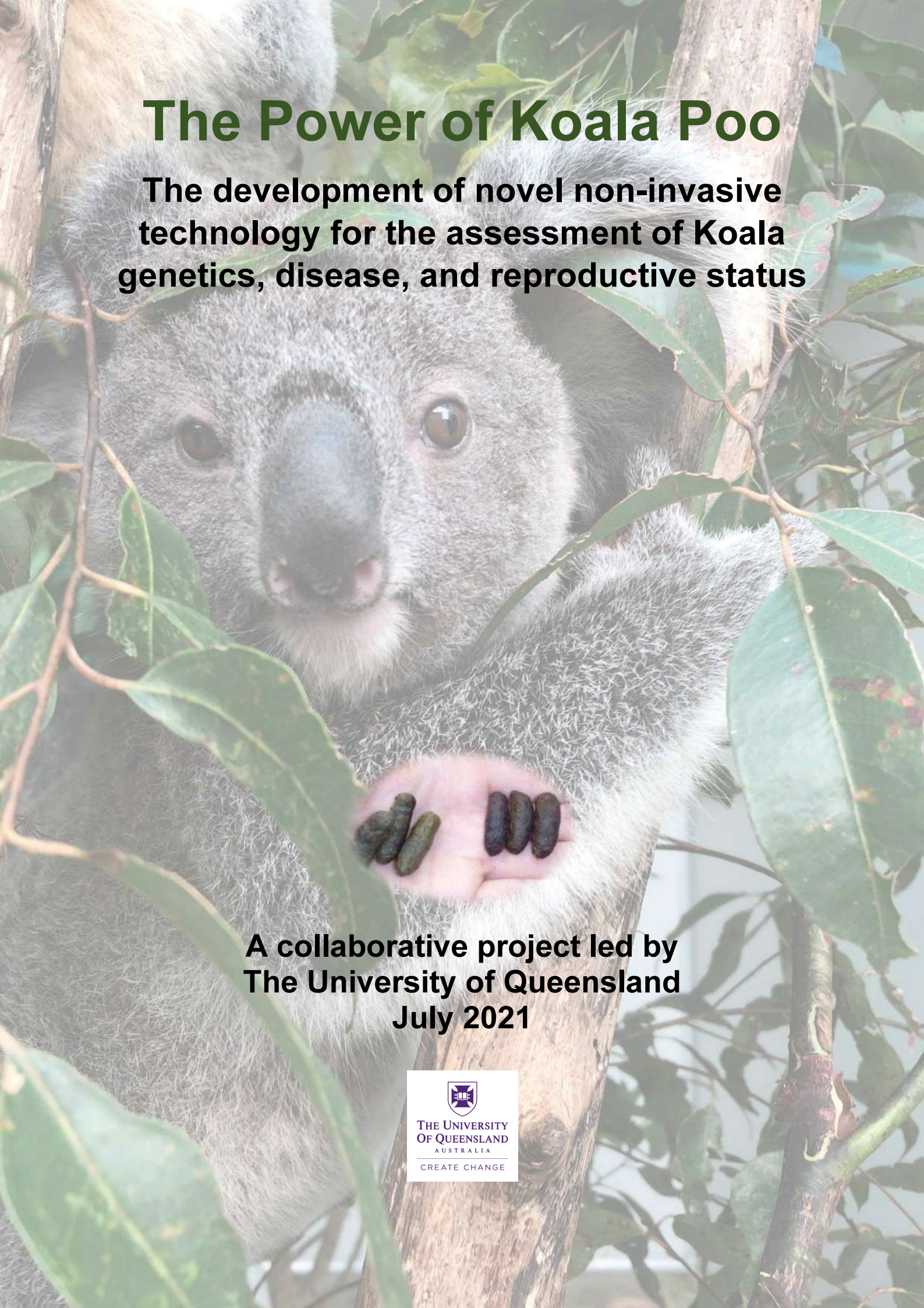
"The Point of Difference"

Appendix 4

UQ Research Project Outline

The Power of Koala Poo

The development of novel non-invasive technology for the assessment of Koala genetics, disease, and reproductive status



A collaborative project led by
The University of Queensland
July 2021

The University Of Queensland
AUSTRALIA
CREATE CHANGE

The Power of Koala Poo: The development of novel non-invasive technology for the assessment of Koala genetics, disease and reproductive status.

OVERALL OBJECTIVE: To develop new generation non-invasive technology to assess koala genetics and reproductive status in the Jimboomba Residential Development that can ultimately be applied to koala populations in Eastern Australia.

PROPOSAL: The power-poo concept is an exciting non-invasive technological advancement that will allow us to obtain a broad range of genetic and reproductive information from koala populations non-invasively.

From koala faecal pellets this project will aim to establish population level (1) high resolution genetic profiles, (2) sex ratio, (3) reproductive status (ovulation and gestation – progesterone, oestrogen, testosterone and prostaglandins), (4) stress markers (cortisol and corticosterone) and (5) *Chlamydia* presence and clinical load.

Most contemporary koala studies focus on population density and overall count which provides a snapshot of the species. The high incidence of disease affecting SE Queensland koala populations, environmental stressors including habitat loss, dog attack and vehicle strike means that the life span and breeding rates of koalas are greatly impacted in urban and peri-urban areas. The acquisition of robust baseline datasets and their ongoing monitoring is important to determine any compensatory measures that are adopted when considering developments that might impact local koala populations.

This proposal will link with the broader SEQ Koala Conservation Strategy and its future endeavours to secure and support Priority Areas. The methodologies developed and the datasets obtained during the power-poo project will serve as a working model that can be replicated across other regions, either through specific programs or as an additional layer of assessment for projects with the potential to have significant impacts on koalas and their habitat.

The following tasks will provide robust baseline datasets and ongoing monitoring datasets to benefit the koalas within Jimboomba and surrounds and is consistent with the SEQ Koala Conservation Strategy and DES advice from the SEQ Koala Oversight and Policy Team.

The proposal builds on and extends previously funded pilot work that has been endorsed by the Queensland Government through the Advanced Queensland Innovative Partnerships Program: Live Koala Genome Bank.

TASK 1: KOALAS ON A CHIP

The fundamental issues for koala conservation are population declines from various causes including habitat loss, disease and vehicle strike, and secondly genetic isolation i.e., low gene flow among koala populations due to habitat fragmentation. These issues can lead to immediate and long-term problems through inbreeding and loss of genetic diversity.

Understanding the genetic connectivity of koala populations is also fundamental to management and conservation of koala populations as it can guide strategies around habitat restoration and protection, reduction of threats, and potentially inform assisted movement of

koalas between regions. A coordinated approach to management was suggested for urban and peri-urban koala populations in SE Queensland by the Queensland Koala Expert Panel[1].

Analysis of the connectivity of koala populations across the region is currently hampered by the use of different genetic marker systems developed over time and with different technologies by various research groups. This has led to an inability to compare across studies, limits regional interpretation and hence limits coordination of management strategies.

A SNP-chip (SNP: single nucleotide polymorphism) consisting of thousands of genetic markers distributed across the genome will provide a coordinated approach to genetic diversity and fragmentation studies but also opens the way, in association with the recent publication of the koala genome, to more advanced studies in the future, such as to identify genetic variants associated with disease resistance, congenital issues or adaptive genes impacting fitness. Genetic markers will be added to define subtypes of *Chlamydia pecorum* and KoRV pathogens to advance disease monitoring.

Deliverables: We will deliver a standardised suite of **publicly accessible genetic markers** for koala populations for use now and into the future. We will map a suite of SNP genetic markers for koala populations, incorporating all SNP markers already genotyped in koalas that are published or shared by koala researchers across Australia. We will include genetic markers for the sub-types of two common pathogens – *Chlamydia pecorum* and Koala Retrovirus (KoRV) in the suite of markers, to enable concurrent gender identification, disease pathogen and koala genetic diversity screens. We will develop a Koala array for SNP markers (a *Koala SNP-chip*) to enable genotyping of koalas. **The Koala SNP-chip will be made available to all researchers and managers**. We will optimize its use with a range of sample types, but particularly DNA isolated from koala faecal samples. Following our analysis, we will be able to provide a thorough assessment of the genetic health of the Jimboomba population. Our analysis will also be able to establish the genetic diversity of the population, sex ratio and how genetically different the Jimboomba population is to that of other surrounding populations and those in SE Queensland.

TASK 2: NON-INVASIVE ASSESSMENT OF KOALA REPRODUCTION AND STRESS RESPONSE

As part of a recent state government funded program we have developed a reliable non-invasive faecal progestogen metabolite assay that allows us to monitor whether a female koala has recently been mated and ovulated (potentially pregnant). While this assay is currently being used for captive reproductive management, task 2 seeks to expand our range of reproductive hormones to cover oestrogen, testosterone and prostaglandin metabolites.

Oestrogen is an important hormone in detecting whether koalas are showing reproductive cycles to confirm potential fertility. Testosterone is the major reproductive hormone in male koalas and facilitates the study of male seasonality, fertility and male-male competition for breeding opportunities. Prostaglandin metabolites will be useful to attempt to develop a

[1] https://environment.des.qld.gov.au/ _data/assets/pdf_file/0031/88582/qld-koala-expert-panel-report-2017.pd

pregnancy test for koalas to allow for the evaluation of reproductive success. An integrated study of reproductive hormones will provide a measure of fecundity for the population to determine if reproductive rates are adequate to maintain the population or suppressed due to disease, drought, or other environmental stressors.

In addition, we have published on the measurement of faecal adrenal hormone metabolites in the koala (Johnston et al. 2013) and have recently completed further validation studies (Keeley, unpublished). The purpose of developing and refining robust faecal adrenal metabolites (cortisol and corticosterone) assays in the koala will be its applied use as a biomarker to evaluate the potential impact of environmental stressors, disease, drought and bushfires on koala population health.

Deliverables: We will validate, faecal hormone metabolite assays for koala oestrogens, prostaglandin, testosterone; in combination with our established assays of faecal progesterone, cortisol and corticosterone we will apply this assay suite to the Jimboomba koala population and other Gold Coast populations for comparison.

TASK 3: APPLICATION OF PROVEN AND NOVEL NON-INVASIVE TECHNOLOGIES TO ASSESS THE GENETICS, DISEASE AND REPRODUCTIVE HEALTH OF KOALAS LOCATED IN THE JIMBOOMBA DEVELOPMENT SITE AND SURROUNDING AREAS.

Task 3 is about implementing tasks 1 and 2 together into real world use. Although our technologies will have broad application to koala conservation throughout Australia more generally, task 3 will apply our non-invasive technology specifically to the monitoring of the Jimboomba and surrounding koala populations.

Deliverables: Using faecal samples collected over a 1.5 year period, we will produce an integrative analysis of the health of the Jimboomba population (fine scale genetics, demography, disease status (Chlamydia and KoRV status and load) and reproductive potential) and thereby establish the efficacy of the POWER POO concept to assess the structure and health of a resident koala population. This work could then become a potential model for the analysis of other koala populations subject to development applications.

Our program of research is consistent with the Queensland Government's SEQ Koala Conservation Strategy 2020-2025 and the recommendations of the Queensland Government Koala Expert Panel. It supports directly Action 4.5 which is to identify koala threats and develop mapping methodology. The project outcomes also have great benefit for koala conservation more broadly and offers the opportunity to standardize procedures for genetic and health management using next generation technology that is non-invasive to the koala.

PROJECT TIMELINE AND MILESTONES

General

- August 2021 – Commence project and appoint post-doctoral fellow Dr Lyndal Hulse (0.7 FTE)

- September 2021 – Submit DES scientific purposes permit (SPP) and UQ Animal Ethics Permits
- November 2021 – Obtain DES SSP and Animal Ethics Approval.
- December 2021 – Identify UQ honours students
- August 2022 – Annual report on progress
- August 2023 – Final report and submission of peer-reviewed papers; media release

Task 1: Deliver a standardised suite of genetic markers for koala populations

- February 2022 - Sample collection for task 1 complete; DNA extraction from 1000 tissue samples from SE QLD complete; DNA faecal extraction validations complete (UQ Honours student)
- May 2022 - Assemble and map koala SNP markers.
- Dec 2022 – Establish and validate koala SNP chip.
- March 2023 – Analysis and write up of task 1 in the form of scientific peer-reviewed papers; Present results at scientific conferences and DES.
- August 2023 – Advertise, promote and establish repository for SNP technology and make available to other researchers

Task 2: Validate, faecal hormone metabolite assays for oestrogens, prostaglandin and testosterone

- September 2021 – Identify faecal samples for endocrine analysis – note these samples have already been collected and are available.
- August 2022 - Faecal oestrogen, prostaglandin and testosterone assay validation complete (UQ PhD student).
- March 2023 – UQ PhD Thesis submitted; peer review of the technical procedures published.

Task 3: Apply the non-invasive technology specifically to the Jimboomba koala population

- September 2021 – Fortnightly faecal sample collection of the Jimboomba and surrounding koala populations to commence.
- December 2022 – Faecal sample collection of the Jimboomba and surrounding koala populations completed.
- June 2023 – Genotype faecal scat samples from Jimboomba population and surrounding populations, complete analysis of all faecal hormone assays and Chlamydia PCR (represents 15 months of faecal sample collection) from the Jimboomba population and surrounding populations.

RESEARCH TEAM

- Project coordinator - A/Prof Stephen Johnston (BSc, Hons, PhD, FSRB) https://researchers.uq.edu.au/researcher/221
- Koala genetics specialist - Professor Jenny Seddon (BVSc, MSc, PhD) https://researchers.uq.edu.au/researcher/1349
- Koala faecal endocrinology specialist – Dr Tamara Keeley (BSc, MSc, PhD) https://researchers.uq.edu.au/researcher/9623
- Post-doctoral Fellow - Dr Lyndal Hulse (BSc, MAnimSc, PhD) https://researchers.uq.edu.au/researcher/26526
- Koala field ecologist – Adj A/Prof Albano Mucci (Consultant)

MONITORING AND REPORTING

Threat mitigation and koala care is essential for ensuring the long-term viability of koalas in Southeast Queensland given the increased vulnerability of populations due to habitat loss and fragmentation. The Koala Expert Panel found that the distribution of threats across SEQ varied significantly.

Science based and reliable data will be provided to assist DES and other governments in supporting policy and management decisions. This project aligns initiatives of the SEQ Koala Conservation Strategy to encourage research that is directly linked to policy decisions and to incentivise multi-disciplinary partnerships between researchers and end users.

Therefore, a monitoring and evaluation framework from the findings of this proposal will be critical to providing relevant data and information to Queensland Government Dept Environment and Science, Local Council area - Logan City Council, Celestino Developments and the local community through media, social and stories generated via this important project. We intend to tailor this project so it fits with existing DES programs.

Appendix G

Warning Letter from DAWE

Australian Government
Department of Agriculture, Water and the Environment

Our reference: EPBC 2016/7724
Email: EPBCmonitoring@environment.gov.au

Andrew Jennings
Assistant Development Manager
Celestino Pty Limited
PO Box 438
PENDLE HILL NSW 2145

Dear Mr Jennings,

Warning Letter - Contravention of *Environment Protection and Biodiversity Conservation Act 1999* for EPBC 2016/7724

As you are aware, the Department of Agriculture, Water and the Environment (the department) has been conducting inquiries into a potential contravention of section 142 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); specifically, a potential breach of conditions attached to the EPBC 2016/7724 approval.

After reviewing a range of information including the information you provided, the department has formed the view that a contravention of condition 21.a. has been substantiated. Section 142 of the EPBC Act requires an approval holder to comply with conditions attached to an approval. Penalties may apply to approval holders who contravene conditions.

After careful consideration, the department has concluded that the issuing of an infringement notice is not an appropriate response in relation to this matter. However, the department has determined that Celestino Pty Limited will be issued a warning for contravening section 142 of the EPBC Act. This letter serves as the warning notice and finalises the compliance matter relating to condition 21.a. of the EPBC 2016/7724 approval.

Please note that this matter will be recorded and considered to be part of your environmental history and may be considered in any future dealings with the department in relation to the EPBC Act and environmental matters.

Please ensure that you continue to maintain accurate records of all activities associated with, or relevant to, the conditions of the approval. Such documents and records may be used in the future to verify compliance with the conditions of the EPBC 2016/7724 approval. Please note that EPBC Act places a duty on a person to provide accurate information. Please note that the provision of false or misleading information may constitute an offence under the Act.

Should you have any questions regarding this matter please contact Michaela Ballard (contact details above).

Yours sincerely

Thomas Long
Assistant Director
Environmental Audit Section
28 February 2022