



Beerburrum to Nambour Rail Upgrade Project

Offset Area Management Plan

PREPARED FOR



Queensland Government
Department of Transport and Main Roads

DATE

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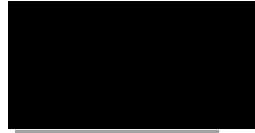
Beerburrum to Nambour Rail Upgrade Project

Offset Area Management Plan

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
B2N project	Beerburrum to Nambour Rail Upgrade project
DAWE	Department of Agriculture, Water and the Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DoE	Department of the Environment
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPBC PD	B2N EPBC Act Preliminary Documentation
ERM	Environmental Resources Management Australia Pty Ltd
FMP	Fire Management Plan
GPS	Global Positioning System
MNES	Matter of National Environmental Significance
MHQA	Modified Habitat Quality Assessment
NCL	North Coast Line
OAMP	Offset Area Management Plan
Offset Provider	Sunshine Coast Council
PAMP	Pest Animal Management Plan
PAV	Property Map of Assessable Vegetation
PMST	Protected Matters Search Tool
Approval Holder	Department of Transport and Main Roads
QR	Queensland Rail
RE	Regional Ecosystem
REDD	Regional Ecosystem Description Database
RWP	Regeneration Works Plan
SCC	Sunshine Coast Council
TEC	Threatened Ecological Communities
TMR	Department of Transport and Main Roads
VM Act	<i>Vegetation Management Act 1999</i>

GLOSSARY

Term	Definition
Action	A project, development, an undertaking, or other activity, or series of activities. Under the EPBC Act, an 'action' can also include a change to any of these things.
Approval Holder	The person to whom the EPBC Act project approval is granted and is responsible for compliance with conditions (if any) applied to a project.
Bi-annual	Occurring once every two (2) years.
BioCondition Benchmark	A description of a regional ecosystem vegetation community that represents the median or average characteristics of a mature and relatively undisturbed ecosystem of the same type. Benchmarks are specific to each regional ecosystem or vegetation community in Queensland.
Commencement of the Action	Means the first instance of any specified activity associated with the Action including clearing and construction. Excludes minor physical disturbances defined within the EPBC approval
Controlled Action	One of the possible decisions the Environment Minister can make about a referred action. A controlled action is one that the minister decides has, will have, or is likely to have, a significant impact on a protected matter.
EPBC Act	The Environment Protection and Biodiversity Conservation Act 1999 is Australia's national environmental law. It provides a legal framework to protect the environment, especially those aspects that are matters of national environmental significance.
Land-based Direct Offset	The most common type of offsets, which involve securing and improving the habitat of a protected matter. The offset site must support or be capable of supporting the protected matter.
Large Tree	Large trees are defined as living trees with a diameter at breast height (DBH) greater than the DBH threshold provided in the BioCondition benchmark document.
Offsets	Actions you take to compensate for residual or remaining significant impacts on a protected matter.
Offset Provider	The Offset Provider (Sunshine Coast Council) is responsible for offset delivery (including overseeing Management Actions and on-ground works such as site monitoring, management, and reporting), and management of vegetation/habitat quality assessments such as Modified Habitat Quality Assessments.
Suitably Qualified Ecologist	Suitably Qualified Ecologist means a person who has relevant professional qualifications and at least three 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
Weed/s	Means any weed species identified within the Weeds of National Significance (WoNS) and weed species listed under the <i>Biosecurity Act 2014</i> 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.

EXECUTIVE SUMMARY

The Beerburrum to Nambour Rail Upgrade (B2N) project involves upgrades of the rail line between Beerburrum and Nambour. The scope of the B2N project includes rail duplication between Beerburrum and Landsborough and other infrastructure improvements, such as station upgrades and additional passing loops between Landsborough and Nambour. The B2N project will address constraints on this section of the rail line by providing additional track capacity and reliability, creating travel time savings for passenger and freight services. The Department of Transport and Main Roads (TMR, (the Approval Holder)), in consultation with Queensland Rail (QR), is delivering the B2N project on behalf of the Australian and Queensland Governments.

Following the submission of an *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Referral to the Commonwealth Department of Agriculture, Water and the Environment (DAWE, and referred to as the Department of Climate Change, Energy, the Environment and Water (DCCEEW) since July 2022) on 30 September 2020, the B2N project was determined to be a 'Controlled Action' on 12 January 2021 (Reference: EPBC 2020-8803). The B2N EPBC Act Preliminary Documentation (EPBC PD) included an Offset Strategy, which established the offset approach and identified potential offset sites. The B2N project was approved in February 2022 with conditions for biodiversity offsets due to the project's impacts of up to 64.15 ha of potential habitat for the koala (*Phascolarctos cinereus*) and grey-headed flying-fox (*Pteropus poliocephalus*).

The offset and this Offset Area Management Plan (OAMP) has been developed in accordance with approval conditions and the EPBC Act Environmental Offsets Policy (Offsets Policy). The offset has also been developed with consideration of the approved conservation advice for these species, namely the National Recovery Plan for the grey-headed flying-fox (DAWE, 2021) and the National Recovery Plan for the koala (DAWE, 2022). The Offset is a direct, land-based offset, 189.97 ha in size and located within 15km of the B2N project at Obi Obi (Lots 176 MCH798,178 SCRMCH865 and 36 MCH1164). The offset location was included in the EPBC PD Offset Strategy and was assessed by DCCEEW as part of the broader EPBC Act Assessment Stage. The offset has been further developed as part of the OAMP and the size and scale of the Offset Area has been assessed using the EPBC Act Offset Assessment Guide.

The proposed Offset Area was selected as it supports suitable habitat in varying condition states, with potential for improvement through active interventions. It also offers strategic outcomes for both species, being part of a large terrestrial corridor and contiguous habitat. Through the offset, habitat will be formally protected and improved, supporting greater utilisation and accessibility to this important habitat corridor. The offset is within an existing council reserve owned by Sunshine Coast Council (SCC), zoned for environmental management and conservation under local laws; however, it is not currently being actively managed. Despite its zoning, this land is not formally protected under Commonwealth or State legislation. The offset provides active management, substantial additional funding, and measurable habitat improvements targeted for the koala and grey-headed flying-fox. The offset is additional as per the Offsets Policy as it provides additional conservation gains in this area that would not otherwise have been provided. It also provides formal, legal security of the area. The conservation gains anticipated to be achieved through the offset are improvements in existing habitat and reduction of threats.

This OAMP sets out management actions to be implemented in the Offset Area, establishes performance objectives as well as maintenance and monitoring requirements relevant to delivering the required offsets. Active interventions will be undertaken in the Offset Area to reduce the cover and extent of weeds, reduce pest animal occurrence, implement an appropriate fire regime, and control public access. These interventions will reduce threats and promote native vegetation regrowth, recruitment of eucalypts, increased canopy cover, and improve the overall habitat quality for both species. Habitat quality in the Offset Area will be improved by at least one point for each species, achieving a seven out of ten.

Monitoring actions have been designed to measure the effectiveness of the management actions in improving koala and grey-headed flying-fox habitat quality and to measure the progress towards completion criteria. The monitoring actions directly relate to determining whether the management actions are being achieved.

A risk analysis (qualitative) has been carried out for the proposed Offset Area. The risk assessment considers the risk of failure for the offset to reach its objectives and completion criteria. The risk assessment has been undertaken in accordance with EPBC Act Environmental Management Plan Guidelines.

The Offset Area will be secured through Voluntary Declaration, registered on the property title and the Offset Area will be mapped as a Category A area on the Property Map of Assessable Vegetation (PMAV).

1. INTRODUCTION

1.1 BACKGROUND

The Beerburrum to Nambour section of the North Coast Line (NCL) is an important part of the Australian Government's National Land Transport Network. It currently consists of a 39-kilometre single bi-directional rail line, with passing loops at stations. The NCL caters for a mix of passenger transport and essential freight movements that service central and northern Queensland. Services include high speed commuter/passenger tilt trains, long distance passenger services, containerised freight services, heavy haulage single commodity trains and cattle trains.

The ability of the NCL to effectively meet current and future freight and passenger transport demand is hindered by constraints in the section of track between Beerburrum and Nambour. These constraints include a single-track configuration, passing loops at stations only, poor horizontal and vertical alignments and numerous level crossings that reduce train speeds.

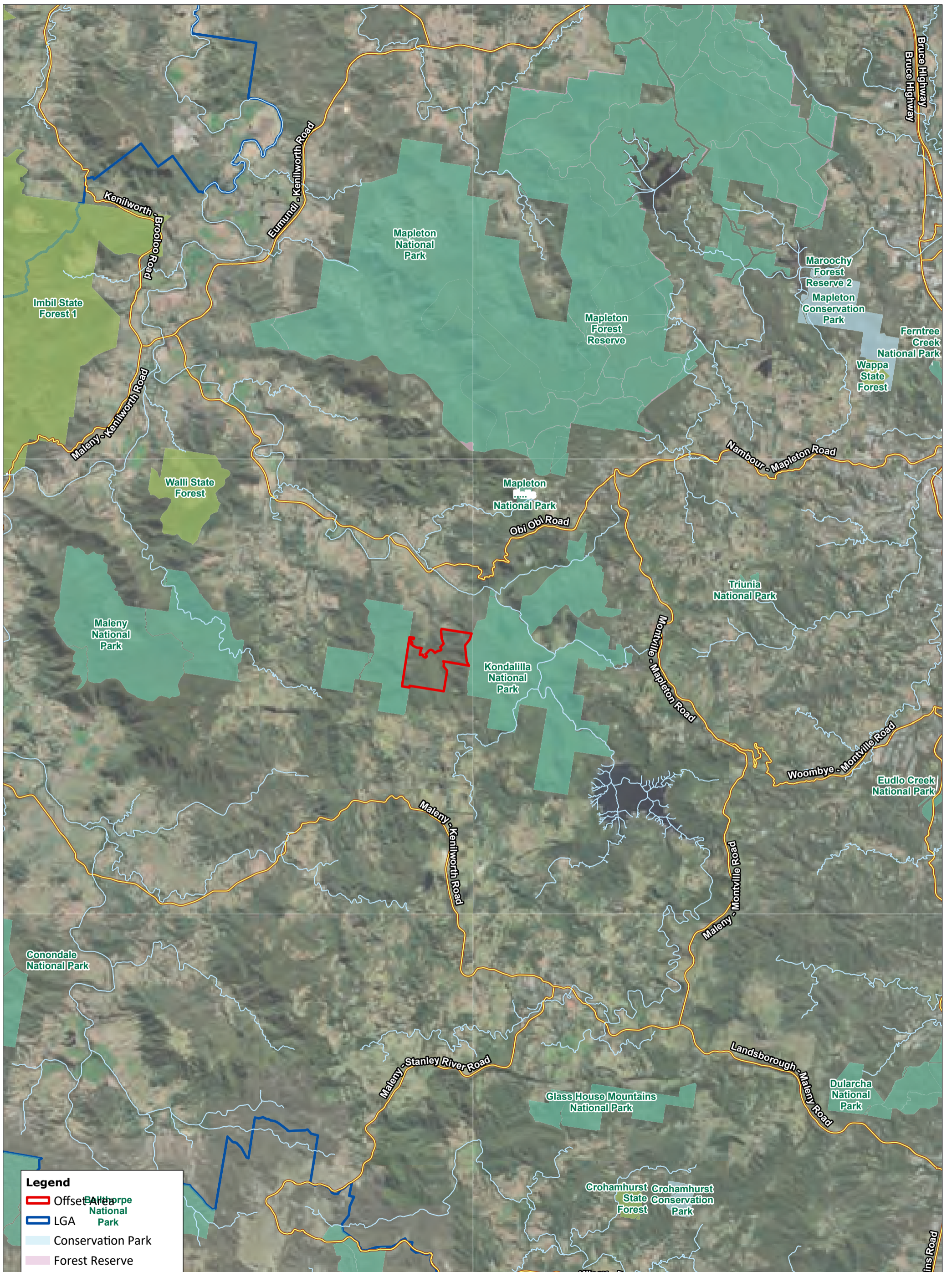
The Beerburrum to Nambour Rail Upgrade (B2N) project involves upgrades of the rail line between Beerburrum and Nambour. The scope of the B2N project includes rail duplication between Beerburrum and Landsborough and other infrastructure improvements, such as station upgrades and additional passing loops between Landsborough and Nambour. The Project Area will comprise areas of disturbance within the rail corridor and associated works outside the rail corridor required for access, laydown areas and related construction activities (Project Area). The B2N project will address capacity constraints on this section of the rail line by providing additional track capacity and reliability, creating travel time savings for passenger and freight services.

The Queensland Government has adopted a staged delivery approach for the B2N project, based on available funding. The stages of the B2N project, also referred to for the purposes of the EPBC Act approval as the components of the Action, include the Early Works, Stage 1 and Stage 2. Stage 2 is not currently funded and timing for delivery is unknown.

The Department of Transport and Main Roads (TMR, (the Approval Holder)), in consultation with Queensland Rail (QR), is delivering the B2N project on behalf of the Australian and Queensland Governments.

Following an EPBC Act Referral to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) on 30 September 2020 (Reference: EPBC 2020-8803) the B2N project was determined to be a 'Controlled Action' on 12 January 2021 due to the Project's impacts on the koala (*Phascolarctos cinereus*) and grey-headed flying-fox (*Pteropus poliocephalus*) assessed by submission of the Beerburrum to Nambour Rail Upgrade EPBC Act Preliminary Documentation (EPBC PD) (ERM, DTMR 2021).

The B2N project was approved under the EPBC Act on 25 February 2022 with requirements to offset the removal of habitat for both the koala and grey-headed flying-fox. The proposed Offset Area for the B2N project is shown in Figure 1-1 and Figure 1-2.



Legend


- ▭ Offset Area
- ▭ LGA
- ▭ Conservation Park
- ▭ Forest Reserve
- ▭ National Park
- ▭ State Forest
- Watercourse
- State Controlled Roads

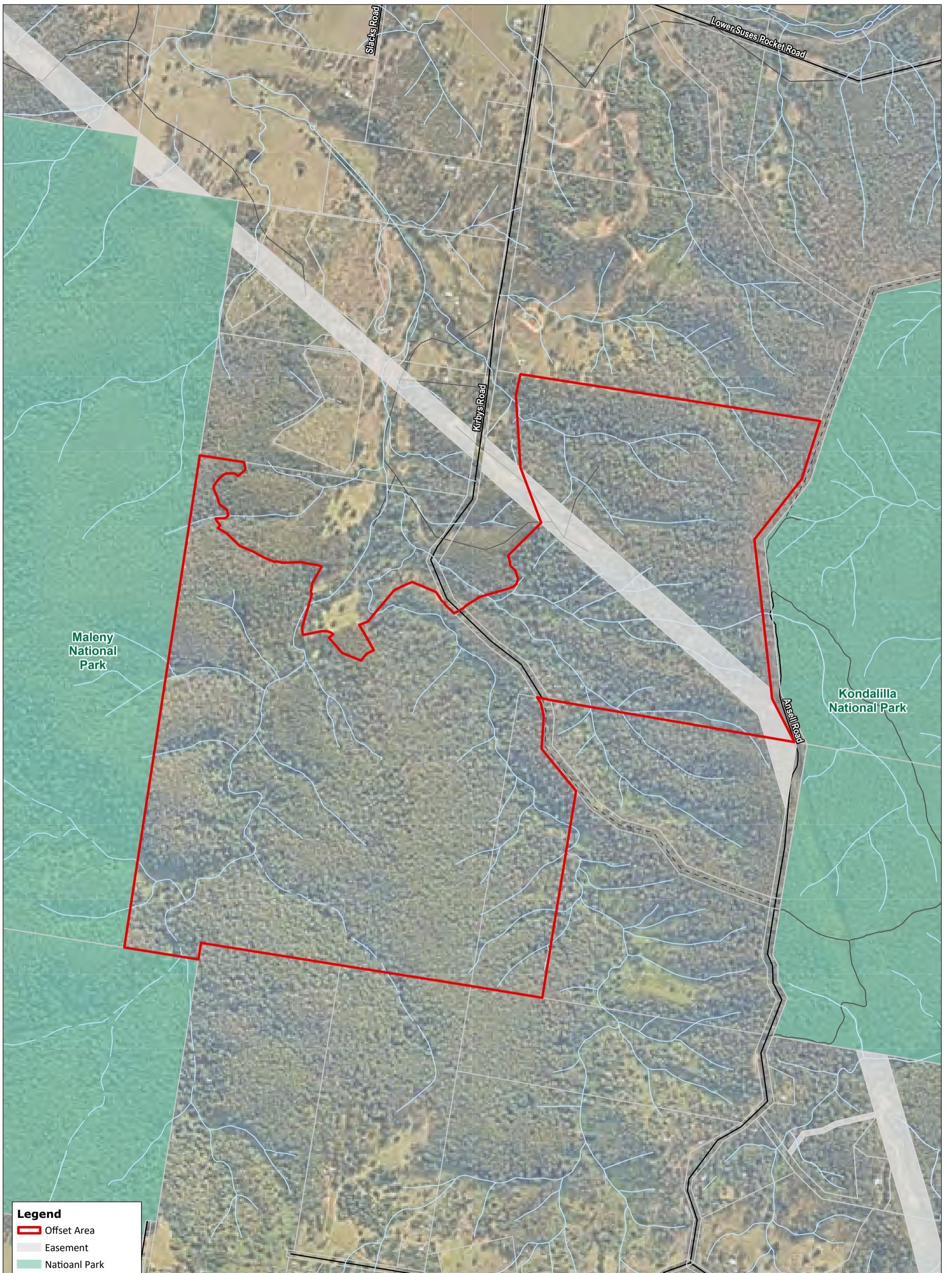
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GDA2020 MGA Zone 56
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Figure 1-1 Proposed Offset Area Locality

**Beerburrum to Nambour Rail Upgrade
Offset Area Management Plan**

Client: Qld Department of Transport and Main Roads





Legend

- ▭ Offset Area
- Easement
- National Park
- Freehold Land
- Watercourse
- Local Road
- Track (4WD)
- Unconstructed Road

Coordinate System:
GDA2020 MGA Zone 56
Date: 14/08/2024
Created By: VN
Drawing Size: A3

0 100 200 300m

▲
1:10,000

Figure 1-2 B2N Project Proposed Offset Area

Schultz Road

**Beerburum to Nambour Rail Upgrade
Proposed Offset Area**
Client: Qld Department of Transport and Main Roads

1.2 PURPOSE

This Offset Area Management Plan (OAMP) presents the proposed B2N project offset for the koala and grey-headed flying-fox, developed in accordance with the EPBC Act Environmental Offsets Policy (the Policy) and the Project-specific conditions of approval (EPBC 2020/8803).

The purpose of this OAMP is to:

- Summarise the B2N project impacts to the koala and grey-headed flying-fox;
- Identify and describe the Offset Area;
- Outline the regulatory framework guiding the development of the OAMP, and demonstrate compliance with requirements;
- Provide objectives of the offset and site-specific management actions to be implemented within the Offset Area, including specific timing and outcomes to be achieved;
- Establish the requirements for monitoring, reporting and corrective actions;
- Demonstrate complete acquittal of the calculated offset requirement; and
- Assess the risks associated with achieving the offset.

1.3 COMPLIANCE

The EPBC Act provides the legal framework to protect and manage nationally and internationally important flora and fauna species and ecological communities. The B2N project received EPBC Act approval on 25 February 2022 (EPBC 2020-8803). Approval conditions require the Approval Holder to offset significant residual impacts to habitat for the koala and grey-headed flying-fox, in accordance with the Offsets Policy (DSEWPC, 2012).

The Offsets Policy provides guidance on the development of suitable environmental offsets where a residual, significant impact to MNES remains. The principles of the EPBC Offsets Policy (Sections 6 and 7) and how the proposed Offset Area meets these principles, are outlined in Table 1.1. Additionally, compliance with conditions of EPBC Act Approval 2020-8803 is shown in Table 1.2.

This document has also been guided by the Environmental Management Plan Guidelines as required by approval conditions (DCCEEW, 2024).

TABLE 1.1 COMPLIANCE WITH OFFSET POLICY PRINCIPLES

EPBC Act Offset Principles (DSEWPC, 2012).	Project Offset Compliance
Must deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action	The offset includes a direct, land-based offset that will result in the protection and improvement of koala and grey-headed flying-fox habitat. The offset is like-for-like, comprising habitat values commensurate with the habitat impacted. Management actions will be undertaken to ensure the Offset Area's habitat quality is improved throughout the lifetime of the offset. The Offset Area will be managed exclusively for conservation purposes, will be protected and managed under this OAMP for the life of the approval.
Must be built around direct offsets but may include other compensatory measures	The proposed Offset Area for the koala and grey-headed flying-fox is a direct land-based offset. The offset secures a land-based offset that exceeds 100% of the offset obligation and will be managed in accordance with this OAMP.

EPBC Act Offset Principles (DSEWPC, 2012).	Project Offset Compliance
Must be in proportion to the level of statutory protection that applies to the protected matter	The Offset Area calculation has been informed by the EPBC threat status for both impacted species, through the use of the EPBC Act Offsets Assessment Guide (OAG).
Must be of a size and scale proportionate to the residual impacts on the protected matter	The size and scale of the offset has been assessed using the EPBC Act OAG. This demonstrates that the 189.97 ha of habitat in the Offset Area will be sufficient to offset the removal of up to 64.15 ha of koala and grey-headed flying-fox habitat within the B2N Project Area. Using this tool, it was determined that this offset is 106.91% of the offset requirement for koala and 106.91% of the offset requirement for grey-headed flying-fox.
Must effectively account for and manage the risks of the offset not succeeding.	A detailed risk assessment has been provided in this OAMP, which details the relevant mitigation measures and residual risk rating. Key threats to the Offset Area will be actively managed in accordance with this OAMP. The risk of the offsets not succeeding has been factored into the EPBC Act Offset Assessment Guide calculator, with confidence in result of grey-headed flying-fox offset set at 75% and confidence in result for koala set at 75%. Adaptive management will be implemented as part of the OAMP and will ensure that changes and updates can be made to Management Actions, if circumstances in the Offset Area changes.
Must be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action, see Section 7.6)	<p>The proposed Offset Area is not formally protected through a State or Commonwealth mechanism. By including the Offset Area as a Category A (Offset Area) under the VM Act to provide additional legal protection. The proposed Offset Area and associated Management Plans are considered additional as:</p> <ul style="list-style-type: none"> • The 189.97 ha Offset Area provides additional, formal legal protection • The Council restoration areas, where active management is undertaken, are excluded from the Offset Area • While the Offset Area forms part of the council reserve, it is unmanaged and unable to be actively managed due to funding limitations • Current management is general in nature and not targeted to the koala or grey-headed flying-fox. The Offset Area will be actively managed to achieve set outcomes for the koala and grey-headed flying-fox <p>The Offset Area has not previously been used as part of a recovery plan or conservation outcome. Thus, the proposed Offset Area offers additional protection to what is already in place under planning regulations/schemes.</p>
Must be efficient, effective, timely, transparent, scientifically robust and reasonable	The offset will be governed by this OAMP, which includes a management, monitoring, and reporting program. The OAMP provides transparency around offset delivery and clear requirements around timing and required outcomes. The management actions have been informed by species-specific requirements and technical knowledge regarding key threats and effective control measures. Therefore, the offset is considered to be efficient, effective, timely, transparent, scientifically robust and reasonable.
Must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	The OAMP includes clear and detailed objectives (refer to Section 2.3), as well as the specific timelines that will be in place to ensure management of the Offset Area are followed and implemented. The responsibilities of the Approval Holder and landholder, as well as monitoring and auditing measures, are detailed in Section 2.5 and Section 7.

TABLE 1.2 EPBC ACT APPROVAL CONDITIONS RELEVANT TO THE OAMP

Item	EPBC Approval conditions 2020/8803	Plan Reference	Demonstration of how the Plan addresses conditions requirements and commitments
5	The Approval Holder must submit an Offset Area Management Plan (OAMP) for the Minister's approval that, to the satisfaction of the Minister, compensates for the significant residual impact of clearing 64.15 ha of koala habitat and grey-headed flying-fox foraging habitat within the development area. The OAMP must, to the satisfaction of the Minister, meet the requirements of the EPBC Offsets Policy and the Environmental Management Plan Guidelines, and must include:	Section 2 (Offset Overview)	<p>This OAMP is the relevant OAMP for EPBC Act Approval 2020/8803 submitted to the Minister for approval.</p> <ul style="list-style-type: none"> The offset has been developed in accordance with the EPBC Offsets Policy and the Environmental Management Plan Guidelines. Table 1.1 details the principles of the EPBC Offsets Policy (with a focus on S6 and S7 of the Policy) and how the proposed Offset Area will meet the Principles of the Policy. The Plan offsets the removal of up to 64.15 ha of vegetation that is potential habitat for the koala and grey-headed flying-fox.
5(a)	Environmental objectives, relevant EPBC Act protected matter/s and a reference to EPBC Act approval conditions to which the OAMP refers;	Section 2.1 (The Offset Area) Section 2.3 (Offset Area environmental objectives) Section 4.1 and 4.2 (Protected Matters) Section Table 1.2 EPBC Act Approval Conditions relevant to the OAMP	<ul style="list-style-type: none"> The overall objective of this OAMP is to improve the quality of koala and grey-headed flying-fox habitat to a seven out of ten within 20 years. The overarching objective and additional supporting objectives are provided in Section 2.3. The Offset Area proposed for the koala and grey-headed flying-fox (Protected Matters) is a direct, land-based offset containing native vegetation that will be managed to improve its condition to deliver the required offset. The Offset Area contains remnant and regrowth vegetation and is bordered by Maleny National Park and Kondalilla National Park (Figure 1-1). Each relevant EPBC Act Approval condition has been addressed in the development of the offset and this OAMP, alignment against each condition is provided in Table 1.2.
5(b)	A table of commitments to achieve the environmental objectives, and a reference to where the commitments are detailed in the OAMP;	Table 6.1 (Offset Area Management Actions and Commitments)	<ul style="list-style-type: none"> Table 6.1 provides a summary of the management actions to be undertaken through implementation of this OAMP, linked to the environmental objectives, and including timing and frequency of each action. This forms the table of commitments required under the conditions of approval.

Item	EPBC Approval conditions 2020/8803	Plan Reference	Demonstration of how the Plan addresses conditions requirements and commitments
5(c)	Reporting and review mechanisms, and documentation standards to demonstrate compliance with the OAMP;		<p>Reporting and review mechanisms are built into the OAMP and provided in Section 7.</p> <ul style="list-style-type: none"> An Annual Compliance Report will be submitted to DCEEW for each 12-month period following the date of commencement of the Action. This report will be consistent with the DCCEEW Annual Compliance Report Guidelines (2014) Modified Habitat Quality Assessment (MHQA) and Ecology Report: Suitably qualified field ecologists will be engaged to conduct ecological monitoring. Reports will be submitted to the Approval Holder every 5 years, and the Approval Holder will include a summary of findings as part of the relevant Annual Compliance Report.
5(d)	Details of the nature and timing of the mechanism to legally secure the Offset Area/s;	Section 2.4 (Legal Security)	<ul style="list-style-type: none"> Legal securement of the Offset Area for this Project will be obtained via a Voluntary Declaration per Section 19F of the VM Act. The Offset Area will be secured within twelve months of approval of this OAMP (Section 2.4).
5(e)	An assessment of risks to achieving environmental objectives and risk management strategies that will be applied, including contingency measures (adaptive management) and their timing; and	Section 6 and Section 8.2 (Management Actions and Objectives and Completion Criteria) Section 9 (Risk Analysis) and Table 9.1 Risk Analysis Table 7.1 Monitoring Programs, Performance Criteria and Corrective Actions Appendix E (Offset Area Fire Management Plan)	<p>Section 9 Risk Analysis (qualitative) has been carried out for the proposed Offset Area for the Project. This risk assessment assesses the risk of failure for the Project to reach its objectives and completion criteria.</p> <ul style="list-style-type: none"> The Risk Analysis (Table 9.1) has been undertaken in accordance with EPBC Environmental Management Plan Guidelines. Table 7.1 includes corrective actions and adaptive management options in the event an identified risk occurs.
5(f)	A monitoring program to be undertaken by a suitably qualified field ecologist, which must include: measurable performance indicators; trigger values for corrective actions;	Table 7.1 Monitoring Programs, Performance Criteria and Corrective Actions	<ul style="list-style-type: none"> Performance criteria/objectives are detailed in Table 7.1 and include those for Fire Management, Pest Animal Management, Habitat Management, Weed Management and Monitoring. Corrective actions are detailed in in Table 7.1 and will be implemented when interim performance targets or completion criteria are not being achieved following annual compliance monitoring / reporting and / or throughout monitoring / reporting in the first five years.

Item	EPBC Approval conditions 2020/8803	Plan Reference	Demonstration of how the Plan addresses conditions requirements and commitments
	<p>the timing and frequency of monitoring to detect trigger values and changes in the performance indicators; and proposed corrective actions if trigger values are reached.</p>		<ul style="list-style-type: none"> • For each type of monitoring, management and monitoring actions have been developed. The monitoring actions have been designed to measure the effectiveness of the management actions in maintaining koala and grey-headed flying-fox habitat quality and to measure the progress towards completion criteria. • Timing and frequency of monitoring varies depending on the Management Action: Ecological monitoring will be undertaken every 5 years, Fire, habitat (native vegetation), pest animal monitoring and weed monitoring will be undertaken annually. Actions are to be undertaken throughout the year but the monitoring / reporting will be undertaken annually.

2. OFFSET OVERVIEW

2.1 OFFSET AREA

The Offset Area for the koala and grey-headed flying-fox is a direct, land-based offset containing habitat that will to be protected and actively managed to improve its condition for the koala and grey-headed flying-fox.

The final EPBC PD response provided in December 2021 to support project approval included an Offset Strategy and several potential offset properties. The properties identified provided more area than the actual offset requirements and further work has been undertaken to refine the final offset requirements and Offset Area. The proposed Offset Area (Figure 1-2) of 189.97 ha is situated across sections of three freehold lots (Lots 176 MCH798, 178 MCH865 and 36 MCH1164) and directly adjoins both the Maleny National Park and Kondalilla National Park (see Figure 1-1). This area was identified in the Offset Strategy and is able to provide a consolidated, strategic Offset Area. The registered landholder for the three freehold lots is the Sunshine Coast Council (SCC). Offset delivery will be undertaken by TMR in collaboration with SCC.

The proposed Offset Area is shown in Plate 1-1 below. Easements and trails have been excluded from the offset area calculations and are shown in Plate 1-1 as 'Offset Exclusion Areas'. While they do not form part of the offset area calculation, they will be managed in accordance with this OAMP, i.e. they do not contribute to the acquittal of the required offset area, but they will be managed appropriately to support offset outcomes. This includes the following:

- Powerline easement;
- Unformed road reserve;
- A number of existing vehicle fire access trails; and
- 4 dedicated walking trails, with an additional 3 proposed (providing additional access for ongoing management).

The above areas are excluded from the offset area calculations because they are cleared and/or they cannot be legally secured. However, the management of these areas in accordance with this OAMP will contribute to the offset outcomes.

2.2 ADDITIONALITY

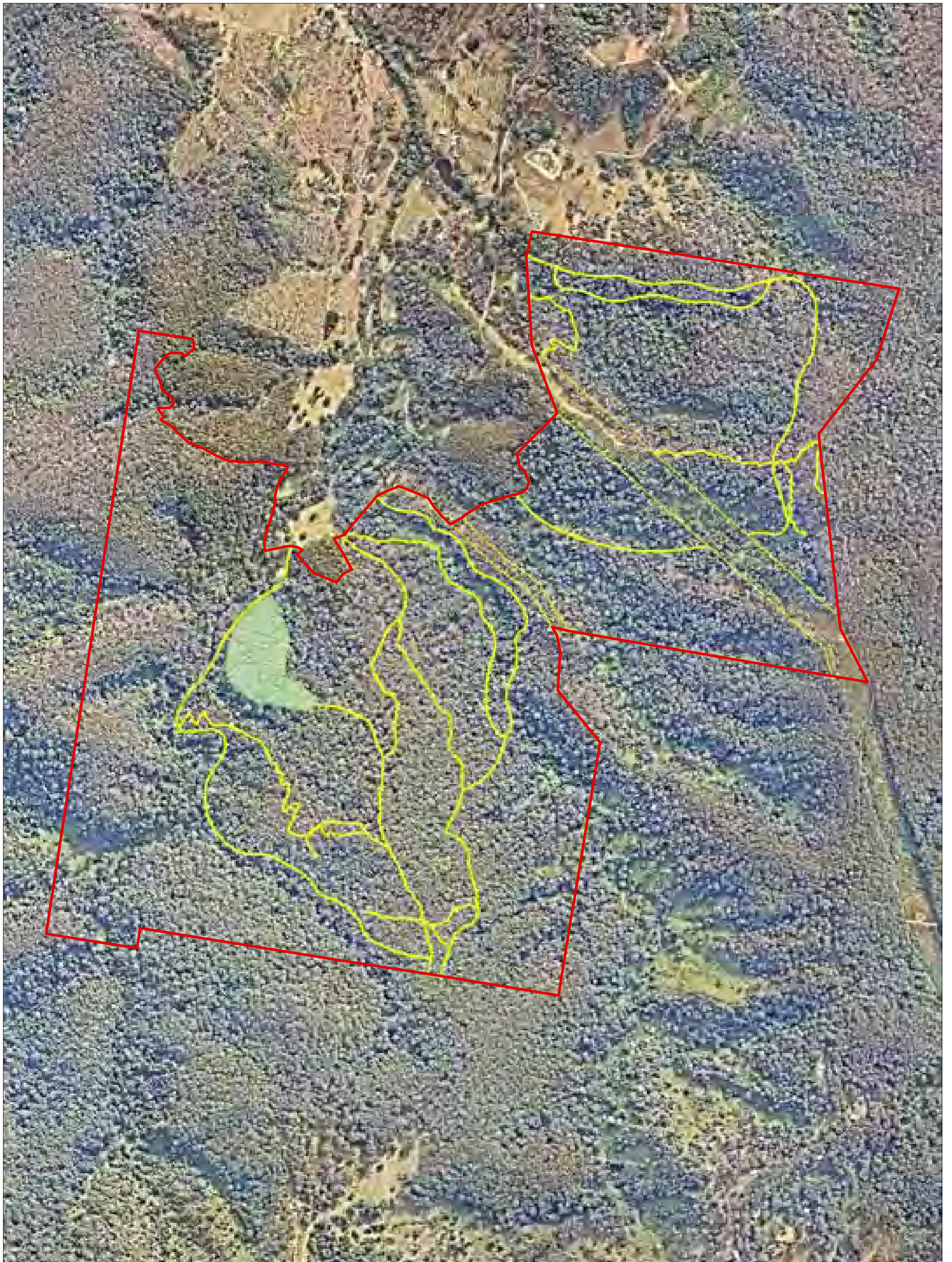
The offset is within an area of Council land that is not actively managed nor secured under State or Commonwealth mechanisms. Active management will be undertaken within the Offset Area targeted to the koala and grey-headed flying-fox and designed to achieve offset outcomes that benefit the species, beyond what would have been achieved without the offset.

Lot 176 MCH798 and 178 MCH865 were purchased by SCC in 2011 and Lot 36 MCH1164 in 2023 under Council's 'Environmental Land Levy Acquisition Program'. The three parcels of land are currently zoned under the SCC's Planning Scheme as (Land Use Designation Zone) 'Environmental Management and Conservation Zone'.

All restoration areas that are actively managed by SCC within the three land parcels have been excluded from the Offset Area. Since acquisition of the lots in 2011, SCC has implemented an establishment works program to remove old farm infrastructure including internal fencing, restore creek crossing access, upgrade access tracks and drainage, commission flora and fauna assessments and undertake a regeneration works plan. Council has also undertaken reactive treatment of exotic and declared weed species across the lots and isolated restoration works, however this has been limited due to budget constraints of \$40,000 per annum and largely restricted to approximately 30 ha within the reserve. Approximately 20 ha of Eucalypt forestry coops were contained within Lot 176 MCH798 and Lot 178 MCH865, which were planted by the previous owner in partnership with the Queensland Department of Primary Industries (DPI). The majority of the forestry coops are excluded from the proposed Offset Area. There is one coop contained within the proposed Offset Area, which will be managed and protected in accordance with this OAMP (see Plate 1-1).

The proposed Offset Area provides offset opportunities to improve habitat through increased funding from TMR and targeted species-specific management, beyond that which could be provided by SCC. Increased funding to allow for more effective management actions will enable the proposed Offset Area to meet the obligation under EPBC Approval 2020/8803. Without the financial contribution from TMR, restoration activities across the proposed 189.97 ha Offset Area would not be achievable.

The proposed management measures are not required under existing laws or planning regulations and have not been agreed to under any other schemes. As such, the offset is additional, as per Principle 6 of the Offsets Policy.



Legend

- Offset Area
- Forestry Coop (managed by OAMP)
- Offset Exclusion Areas

Data Source:
Nearmap Imagery June 2024

Coordinate System:
GDA2020 MGA Zone 56

Date: 22/08/2024
Created By: CB
Drawing Size: A3
0 50 100 150m




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Plate 1-1 Previous SCC management areas within the Offset Area

Beerburrum to Nambour Rail Upgrade
Offset Area Management Plan
Qld Department of Transport and



2.3 OFFSET AREA ENVIRONMENTAL OBJECTIVES

In addition to achieving regulatory requirements and operating in accordance with the Offset Policy, the overarching Environmental Objective of the offset is to increase the quality of koala and grey-headed flying-fox habitat, from a 6 to a 7 out of 10 within 20 years. Additional objectives to support the development of suitable management actions and are summarised below. Each individual objective is identified in full in Section 6, Table 6.1, along with the associated management action, timing, and frequency.

- Increase the quality of koala and grey-headed flying-fox habitat, from a 6 to a 7 out of 10 within 20 years:
 - Actively restore habitat for the koala and grey-headed flying-fox
- Re-establish a baseline of weed extent and cover, pest occurrence, fuel loads, and erosion
 - Reduce the extent and cover of weeds, the occurrence of pests, fuel loads, and remediate erosion
 - Prevent additional weed incursions from Offset Area activities and public access
 - Maintain firebreaks and implement controlled burns in accordance with species-specific requirements
 - Limit public access to walk-in access only and restrict access points to control unauthorised entry
 - Inform the public of Offset Area requirements and support enforcement for non-compliance

2.4 LEGAL SECURITY

Within 12 months of approval of this OAMP, legal security will be obtained via a Voluntary Declaration per Section 19F of the VM Act. The Voluntary Declaration will be registered on the property title and the Offset Area will be mapped as a Category A area on the Property Map of Assessable Vegetation (PMAV). A Category A area on a PMAV is described as an "Area subject to compliance notices, offsets and voluntary declarations."

Within 20 business days of legally securing the offset site/s, TMR will advise DCCEEW in writing and provide legal security documentation.

Note that due to the existing powerline easement and unformed road reserve, these areas are unable to be legally secured under the Voluntary Declaration. Although these areas are unable to be legally secured, they will be managed in accordance with this OAMP.

The area legally secured will include the forestry coop, which will be formally protected and will not be harvested.

The intent of the Offset Area is to be actively managed and secured for conservation purposes, being protected for the life of the approval. Should there be any consideration toward terminating the voluntary offset as outlined in this OAMP, the Commonwealth Minister representing DCCEEW or future relevant department with overarching regulatory responsibility for Commonwealth offsets must be consulted prior to any changes relating to offsets described in this OAMP.

2.5 ROLES AND RESPONSIBILITIES

The key OAMP stakeholders are identified by their roles below.

Department of Transport and Main Roads – Approval Holder

- Accountable for legally securing the Offset Area, OAMP compliance, and compliance oversight of Offset Provider
- OAMP reviews and updates
- Annual Compliance Report to be submitted to DCCEEW

Sunshine Coast Council – Offset Provider

- Natural Areas Offset Officer - Offset delivery, overseeing on-ground works e.g., site monitoring, management, and reporting.
- Senior Field Botanist - Vegetation/habitat quality assessment and MHQA.

Contractor - Operational works

- Weed management activities, weed treatment, revegetation, assisted regeneration, fire management activities, pest animal management, monitoring and ecological surveys as directed by the Offset Provider.

The Approval Holder will enter into an arrangement with the Offset Provider to undertake the management actions as outlined within this OAMP.

It will be the Offset Provider's responsibility to engage suitably qualified persons to undertake the MHQA assessments, ecological studies, koala and grey-headed flying-fox surveys, prepare reports and undertake inspections, as required. These suitably qualified persons will be reviewed and approved by the Approval Holder.

3. SPECIES PROFILES

A summary of habitat requirements and threats for the koala and grey-headed flying-fox are captured below with the intent of providing context and relevance to respective Offset Areas.

3.1 KOALA

The koala has one of the broadest distributions of threatened arboreal mammal species under the EPBC Act with a range extending from north-eastern Queensland to the south-east corner of South Australia. The biological species distribution is widespread in coastal and inland areas that extends over approximately one million square kilometers (Martin *et al.*, 1999). The occurrence throughout this range is dependent on environmental values.

Under the *Conservation Advice for Phascolarctos cinereus (koala) combined populations of Queensland, New South Wales and the Australian Capital Territory (DAWE, 2022)* habitat for the koala is described as including:

both coastal and inland areas that are typically characterised by Eucalyptus forests and woodlands. Biophysical habitat attributes for the koala include places that contain the resources necessary for individual foraging, survival (including predator avoidance), growth, reproduction and movement.

Furthermore, habitat critical to the survival of the species has also been defined. These are habitats that the species relies on to avoid or halt decline and promote the recovery of the species. Under the EPBC Act, the following factors and other relevant factors are considered when identifying habitat that is critical to the survival of the species:

- a) *Whether the habitat is used during periods of stress (examples: flood, drought or fire);*
- b) *Whether the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes);*
- c) *The extent to which the habitat is used by important populations;*
- d) *Whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development;*
- e) *Whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements;*
- f) *Whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation; and*
- g) *Any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community.*

Koala food trees are typically considered to be those of the following genus: *Angophora*, *Corymbia*, *Eucalyptus*, *Blakella*, *Lophostemon* and *Melaleuca*.

The floristic description for RE 12.12.15, the vegetation community described as a suitable offset for koala, is defined as mixed open forest including combinations of *Eucalyptus propinqua*, *E. siderophloia*, *Corymbia intermedia*, *E. microcorys*, and *Lophostemon confertus*. Other canopy species include *E. acmenoides*, *E. moluccana*, *Angophora subvelutina* and occasional vine forest species. Patches of *Eucalyptus pilularis* sometimes present (REDD 2024).

All canopy species included in the above floristic description of the offset, with the exception of *Lophostemon confertus* and *Angophora subvelutina*, are described as locally important koala trees for the South-East Queensland region (Youngetob et. al. 2021).

Summary of threats

Climate change is identified as a key driver for increasing the threat to koala. Greater frequency of drought, higher than average temperatures, prevalence of weather which favours conditions for bushfire, and a reduced area of occupancy are all being enhanced by climate change. However, there are also biological and other anthropogenic threats, outside of climate change, to the koala. These include, but are not limited to:

- koala retrovirus and chlamydia;
- habitat loss from land clearing associated with anthropocentric developments (e.g. housing, industrial and mining); and
- direct mortality (e.g. vehicle strike and dog attack).

3.2 GREY-HEADED FLYING-FOX

The grey-headed flying-fox is migratory and nomadic in response to availability of food resources. The species is primarily a nectivore with migration occurring in response to seasonal flowering events. Favoured foraging resources include fruit and blossoms of rainforest species (e.g. *Ficus spp.*) and blossoms of flowering myrtaceous species including genus *Eucalyptus*, *Corymbia*, *Angophora*, *Melaleuca* and proteaceous genus *Banksia*. This species is also known to forage on a variety of exotic and introduced garden cultivars.

Grey-headed flying-fox roost in large colonies also known as "camps". These are generally within a specific location either permanently or seasonally in response to food resource availability. Several examples of camps have been known to be utilised regularly in excess of 100 years.

Vegetation communities observed within the offset site contain suitable foraging habitat for grey-headed flying-fox. RE 12.12.15 contains foraging habitat in the form of Myrtaceous species as described above in Section 3.1. Furthermore, RE 12.12.1, also present within the study area contains fruiting and flowering rainforest species suitable for grey-headed flying-fox. RE 12.12.1 is described as notophyll and notophyll/microphyll vine forest, sometimes with *Archontophoenix cunninghamiana* and/or *Lophostemon confertus* closed forest. The plant families *Lauraceae*, *Myrtaceae* and *Elaeocarpaceae* are diagnostic of the type and *Pleioluma queenslandica* is common in the northern half of the bioregion. *Araucaria cunninghamii* is often present on margins.

Summary of threats

The primary threat identified for grey-headed flying-fox is loss and degradation of foraging and roosting habitat resulting from land clearing for anthropocentric development (e.g. roads, housing, industrial). Conflict with people, including disturbance in camps and mortality from actions to manage commercial fruit crops, is considered to be a moderate threat, but is increasing in urban areas (DAWE, 2021).

4. PROJECT IMPACTS

Data obtained from the EPBC Act PD (ERM, DTMR 2021) states that the total B2N project disturbance footprint equates to 256.9 ha and will lead to the clearing of the following areas of habitat for MNES:

- 64.15 ha of habitat for the koala; and
- 64.15 ha of foraging habitat for the grey-headed flying-fox.

It is considered that habitat for the grey-headed flying-fox and the koala are generally analogous (DAWE 2020, RFI, received 29 October 2020). Therefore, the 64.15 ha mapped koala habitat is also considered as a foraging resource for the grey-headed flying-fox and is wholly contained within the area of impact assessed for the koala.

The B2N Project Area is part of Queensland's major north-south rail corridor from Brisbane to the Sunshine Coast. Current land uses serve urban and residential purposes interspersed with agricultural lands, state forest and national parks. Located within the coastal lowlands of South-East Queensland, the region features coastal plains leading into the Dividing Range. The existing rail corridor is relatively linear and tracks along the boundary of coastal plain and range with minor deviations from linearity.

The majority of the B2N project alignment can be classed as 'urban area', e.g., the existing rail corridor, roads, urban development including residences and hardstand. From Beerburrum to Landsborough, there are minimal changes in elevation ranging from 20-40m AHD. The peaks of the Glasshouse Mountains occur to the west of the Project Area. The continuing section from Landsborough to Nambour crosses the foothills of the Dividing Range with elevation smoothly fluctuating in the range of 10-100m AHD. Two geological formations are situated beneath the Project Area being Landsborough Sandstone and Woogaroo Subgroup Sandstone.

The soils between Beerburrum and Landsborough are classified as Mf12 (Atlas of Australian Soils, (Atlas) [SMEC, 2019]), indicating a low hilly landscape. The Landsborough to Eudlo section was identified as Wf1 (Atlas, [SMEC, 2019]) suggesting low hilly to hilly terrain, with the ongoing Eudlo to Nambour section a similar Wf2 (Atlas, [SMEC, 2019]) classification (hilly to low hilly). Nambour station is located on Mm9 (Atlas, [SMEC, 2019]) soil which is considered steep hilly scarp.

Extensive clearing for state forests, agriculture and urban development have occurred within and adjacent to, the Project Area. Structurally, the Project Area is dominated by regrowth vegetation adjacent to the existing rail alignment, with mixed juvenile eucalypt and melaleuca species. Habitat structure is dependent on intensity of disturbance ranging from minimal to highly disturbed.

Remnant vegetation is largely restricted along waterways and drainage lines. Most of the native vegetation is associated with the Glass House Mountains and the foothills surrounding the mountains. Nine regional ecosystems intersect the Project Area in small patches with two listed as 'Endangered' (REs 12.3.1 and 12.5.3), four listed as 'Of Concern' (REs 12.3.2, 12.3.4, 12.3.11 and 12.3.6) and three as 'Least Concern' (REs 12.3.5, 12.3.13 and 12.9-10.14) under the *Queensland Vegetation Management Act 1999* (QLD VMA).

The potential MNES that may be impacted by the B2N project were determined through a desktop assessment and three ecological field survey programs conducted by SMEC in 2019, ARUP in 2019 and ERM in 2021. These assessments assisted in identifying presence, providing accurate ground conditions and subsequent impact assessments. The sections below provide a description of each of the threatened species for which residual impact was identified as likely to occur, their habitat preferences and the determination of habitat quality valuations within the Project Area. For a detailed description of survey methodology, vegetation community ground truthing, habitat condition assessments, and koala and grey-headed flying-fox habitat mapping, refer to the EPBC PD (ERM & DTMR, 2021).

4.1 KOALA

When the B2N project was deemed a controlled action on 12 January 2021, the koala was listed as 'Vulnerable' under the EPBC Act and under the *Nature Conservation Act 1992* (the NC Act). On 12 February 2022, the koala was up-listed to 'Endangered' under the EPBC Act. The koala was also up-listed to 'Endangered' under the NC Act in April 2022. Division 3A, section 158A of the EPBC Act states approval process decisions are not affected by listing events that happen after section 75 decision is made hence, the B2N project offsets were assessed for the 'Vulnerable' koala. Despite this, the most recent conservation advice for the koala related to its 'Endangered' listing has been referenced in the preparation of this OAMP.

4.1.1 IMPACTED HABITAT

The 2020 and 2021 field investigations did not record any sightings of koalas. One potential koala faecal pellet was observed near Landsborough Station Car Park and scratches were observed at Mellum Creek, Landsborough (ARUP, 2020). No other records of koalas were observed during the ERM surveys (2021) or by other previous targeted surveys (USC, 2020; USC 2021).

The habitat assessments undertaken during the desktop survey and field investigations identified that regrowth dominated by eucalypt and melaleuca species were present within the Project Area including residential areas, road reserves and cleared paddocks. Food trees of forest red gum (*E. tereticornis*), grey gum (*E. propinqua*), tallowwood (*E. microcorys*), swamp box (*Lophostemon suaveolens*), broad-leaved paperbark (*Melaleuca quinquenervia*), pink bloodwood (*Corymbia intermedia*), red mahogany (*E. resinifera*), blackbutt (*E. pilularis*), brown bloodwood (*C. trachyphloia*), rusty gum (*Angophora leiocarpa*) and grey ironbark (*E. siderophloia*) were recorded within the Project Area. Habitat maps are provided in Appendix D.3 and D.4 of the EPBC PD (ERM and DTMR, 2021).

The Project Area is located within the coastal range in South-East Queensland (SEQ). Koala habitat has been identified within the Project Area and is characterised by remnant and regrowth mixed eucalypt and melaleuca species within the road reserves and adjacent vegetation, consistent with the requirements of the *National Recovery Plan for the Koala* (DAWE, 2022).

4.1.2 SIGNIFICANT IMPACT

As the proposed disturbance to habitat, critical to the survival of the koala, as defined by the referral guidelines for the koala is assessed at 64.15 ha, the proposed development is likely to have an adverse effect on habitat critical to the survival of the koala.

Despite this, the avoidance measures included in the design, the already highly disturbed nature of the Project Area and limited evidence of koala presence, the proposed development is unlikely to interfere with the recovery of the koala, as concluded in the EPBC PD (ERM and DTMR, 2021).

4.2 GREY-HEADED FLYING-FOX

The grey-headed flying-fox is listed as 'Vulnerable' under the EPBC Act and has been concluded as 'known to occur' within the Project Area. The Project Area is situated in a small section of the distribution of the grey-headed flying-fox, which extends throughout eastern Australia.

The grey-headed flying-fox is considered to exist as one national population split into separate colonies due to the constant genetic exchange and movement between camps throughout the species' entire geographic range (DoE, 2021).

4.2.1 IMPACTED HABITAT

Colonies of grey-headed flying-fox rest, socialise, breed and give birth at roosting sites also known as camps. No known camps will be removed as part of the Project works.

Many myrtaceous tree species, that make up the diet of the grey-headed flying-fox, flower at different times of the year. Important winter and spring vegetation communities are those that contain *Eucalyptus tereticornis*, *E. albens*, *E. crebra*, *E. fibrosa*, *E. melliodora*, *E. paniculata*, *E. pilularis*, *E. robusta*, *E. seeana*, *E. sideroxylon*, *E. siderophloia*, *Banksia integrifolia*, *Castanospermum australe*, *Corymbia citriodora*, *C. eximia*, *C. maculata*, *Grevillea robusta*, *Melaleuca quinquenervia* or *Syncarpia glomulifera* (Eby and Law 2008; Eby 2016; Eby et al., 2019).

The Project Area contains many of these myrtaceous species and rainforest species with fleshy fruits. Where the existence of these important winter and spring flowering vegetation communities is verified in the field, they are considered habitat critical to the survival of the grey-headed flying-fox (DAWE, 2021). The total amount of grey-headed flying-fox habitat within the indicative disturbance footprint was mapped as 64.15 ha (Early Works: 2.57 ha, Stage 1: 56.26 ha and Stage 2: 5.32 ha).

4.2.2 SIGNIFICANT IMPACT

Conservative mapping and calculations of potential grey-headed flying-fox foraging resources within a 50 km radius of the Project Area determined that 344,510 ha of foraging resources are available. The impacts to 64.15 ha of resources within the Project Area equates to 0.018% of available habitat in the area. While the habitat loss is considered minimal at a regional scale, the grey-headed flying-fox foraging habitat to be cleared is considered habitat critical to the survival of the species, therefore a significant impact to the species has been conservatively concluded.

5. OFFSET SUITABILITY AND CONDITION

The Offset Area supports suitable habitat for the koala and grey-headed flying-fox, connected to a terrestrial corridor adjoining Maleny National Park and Kondalilla National Park. During the preparation of the EPBC PD (ERM, TMR, 2021), the proposed Offset Area was selected as it contains both remnant and regrowth habitat and can be improved through removal existing pressures and active, targeted management actions to enhance habitat values.

The Offset Area contains eucalypt dominated vegetation, providing foraging resources for the grey-headed flying-fox and koala (Youngentob, K.N, et al, 2021; DAWE, 2021). Both species are known to utilise the Offset Area. Evidence of koala and grey-headed flying-fox is depicted in Figure 5-1. The Offset Area contains remnant (90.6 ha) and regrowth eucalypt woodlands (70.9 ha), and gullies that contain notophyll vine forest vegetation communities (20.7 ha). Vegetation mapping is depicted in Appendix B. Additional ground-truthed Regional Ecosystem (RE) mapping has been undertaken and is illustrated in Figure 5-2. In its current state, the Offset Area is under threat from weed incursion and the onset of bell miner dieback.

Evidence of weed infestations and bell miner dieback are depicted in Appendix A. Non-native plant cover assessed at five transect plots (as per the Biocondition Assessment Methodology) during field surveys scored 30%, 40%, 5%, 30% and 20% cover. These percentages of non-native plant cover are anticipated to increase without implementation of the management actions outlined in Section 6.2. Further increases in non-native plant cover are anticipated to degrade the overall quality of habitat for koala and grey-headed flying-fox in the Offset Area. The Offset Area occurs on texture contrast soils. Soil group maps are provided Appendix C.

5.1 KOALA HABITAT AND PRESENCE

The Offset Area contains known koala food tree species including *Eucalyptus microcorys*, *Eucalyptus tereticornis*, *Eucalyptus acmenoides*, *Eucalyptus resinifera*, *Eucalyptus siderophloia*, *Eucalyptus grandis*, *Eucalyptus propinqua* and *Corymbia intermedia*.

The Offset Area is mapped containing remnant vegetation RE 12.12.15 (*Corymbia intermedia* +/- *Eucalyptus propinqua*, *E. siderophloia*, *E. microcorys*, *Lophostemon confertus* open forest on Mesozoic to Proterozoic igneous rocks) and RE 12.12.1 (Simple notophyll vine forest usually with abundant *Archontophoenix cunninghamiana* (gully vine forest) on Mesozoic to Proterozoic igneous rocks). These RE types contain suitable foraging, breeding and shelter habitat for the koala.

Habitat quality field surveys completed in 2021 and 2022 confirmed evidence of koala presence at the Offset Area, through location of scats and scratch marks in areas of remnant vegetation. Evidence of koala presence is depicted in Figure 5-1.

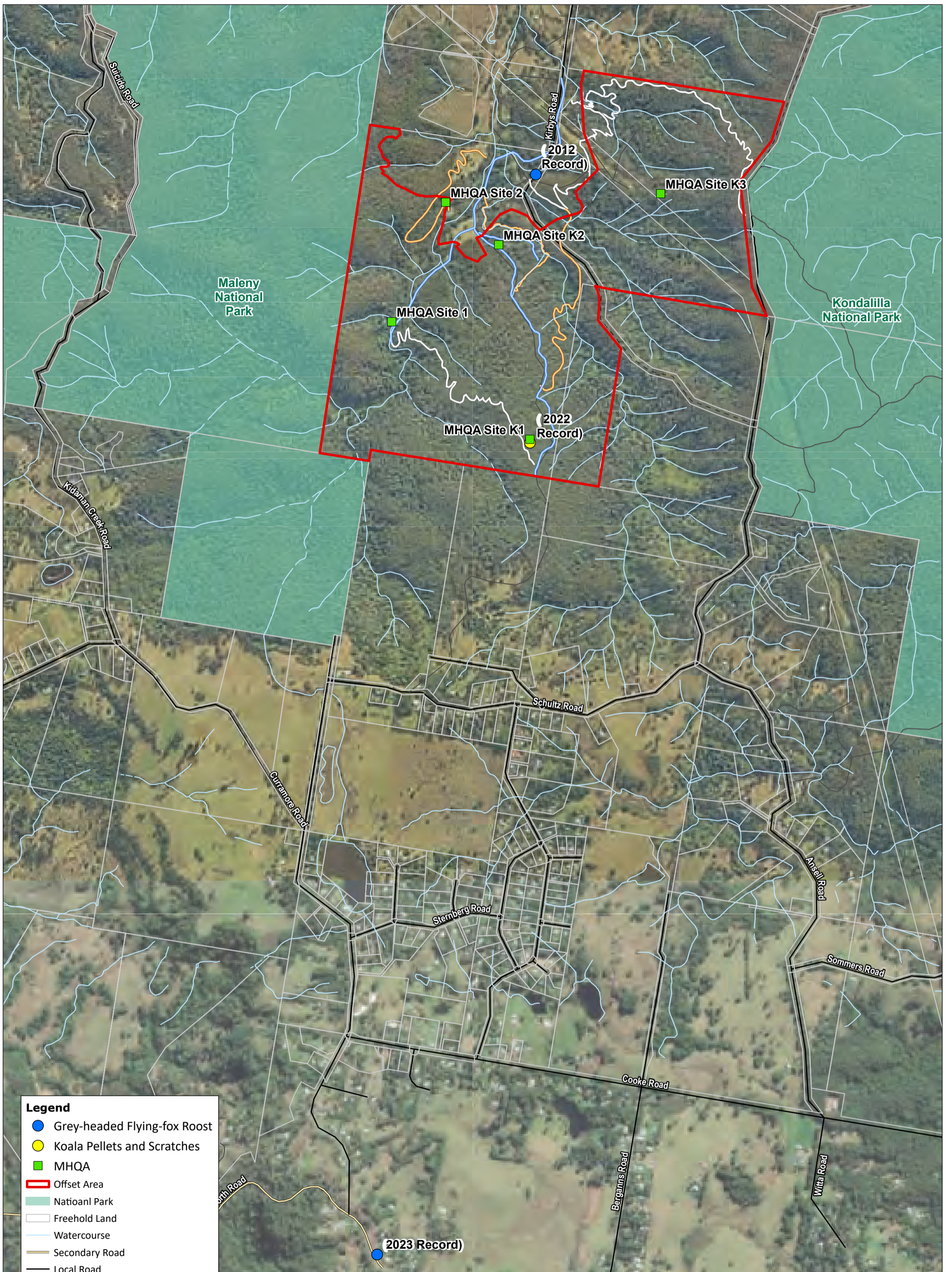
5.2 GREY-HEADED FLYING-FOX HABITAT AND PRESENCE

The Offset Area is mapped containing remnant vegetation RE 12.12.15 (*Corymbia intermedia* +/- *Eucalyptus propinqua*, *E. siderophloia*, *E. microcorys*, *Lophostemon confertus* open forest on Mesozoic to Proterozoic igneous rocks) and RE 12.12.1 (Simple notophyll vine forest usually with abundant *Archontophoenix cunninghamiana* (gully vine forest) on Mesozoic to Proterozoic igneous rocks). Both RE types contain suitable foraging and shelter habitat for grey-headed flying-fox.

The grey-headed flying-fox population, distribution and abundance changes seasonally as the species migrate across the east coast in response to flowering eucalypts and related species. Irregular patterns of camp occupancy are apparent for the species in the B2N project locality based on the DCCEEW Interactive Flying-Fox Web Viewer (DCCEEW interactive map) monitoring data and SCCs interactive BatMap (SCC BatMap) monitoring data.

A grey-headed flying-fox roost was recorded at the Offset Area in 2012 (O2Ecology, 2012) (see Figure 5-1). Field surveys completed in 2021 and 2022, across the Offset Area, have identified grey-headed flying-fox habitat. In addition to this roosting record, within a 3.5 km radius of the Offset Area, recent species records were identified south of the Offset Area in the vicinity of Maleny Kenilworth Road (ALA, 2023).

Twenty-nine roost sites are known to occur within a 40 km radius of the B2N Project Area. Known flying-fox camps from the *Interactive Flying-fox Web Viewer* online database (DCCEEW, 2024) in relation to the B2N Offset Area and Project Area are shown in Figure 5-3, with dates indicating the year surveys conducted at the roost sites last observed grey-headed flying-fox. Roost sites in relation to the Project Area are also presented in the Beerburrum to Nambour Rail Upgrade EPBC Act Preliminary Documentation (EPBC PD) (ERM, DTMR 2021). ARUP also identified one roost south of Coochin Creek, Glass House Mountains (5.4km north of the Project Area) and incidental records of foraging activity at night during their 2020 survey period (ARUP, 2021). Grey-headed flying-foxes forage over extensive areas and have been known to fly as far as 40 km to feed, before returning to their roost the same night (Eby, 1991). Given that the Offset Area is located within 15km of the B2N project and there are recent records of the species within 3.5km of the Offset Area, it is considered that suitable blossoms and fruit in canopy vegetation are foraging resources for the species. The mapped grey-headed flying-fox habitat (vegetation communities) in the Offset Area (Appendix B) are considered a foraging resource for the colonies utilising the abovementioned roost sites.



Legend

- Grey-headed Flying-fox Roost
- Koala Pellets and Scratches
- MHQA
- Offset Area
- National Park
- Freehold Land
- Watercourse
- Secondary Road
- Local Road
- Track (4WD)
- - - Unconstructed Road
- Existing walking trail
- Proposed walking trail
- Existing walking/vehicle trail

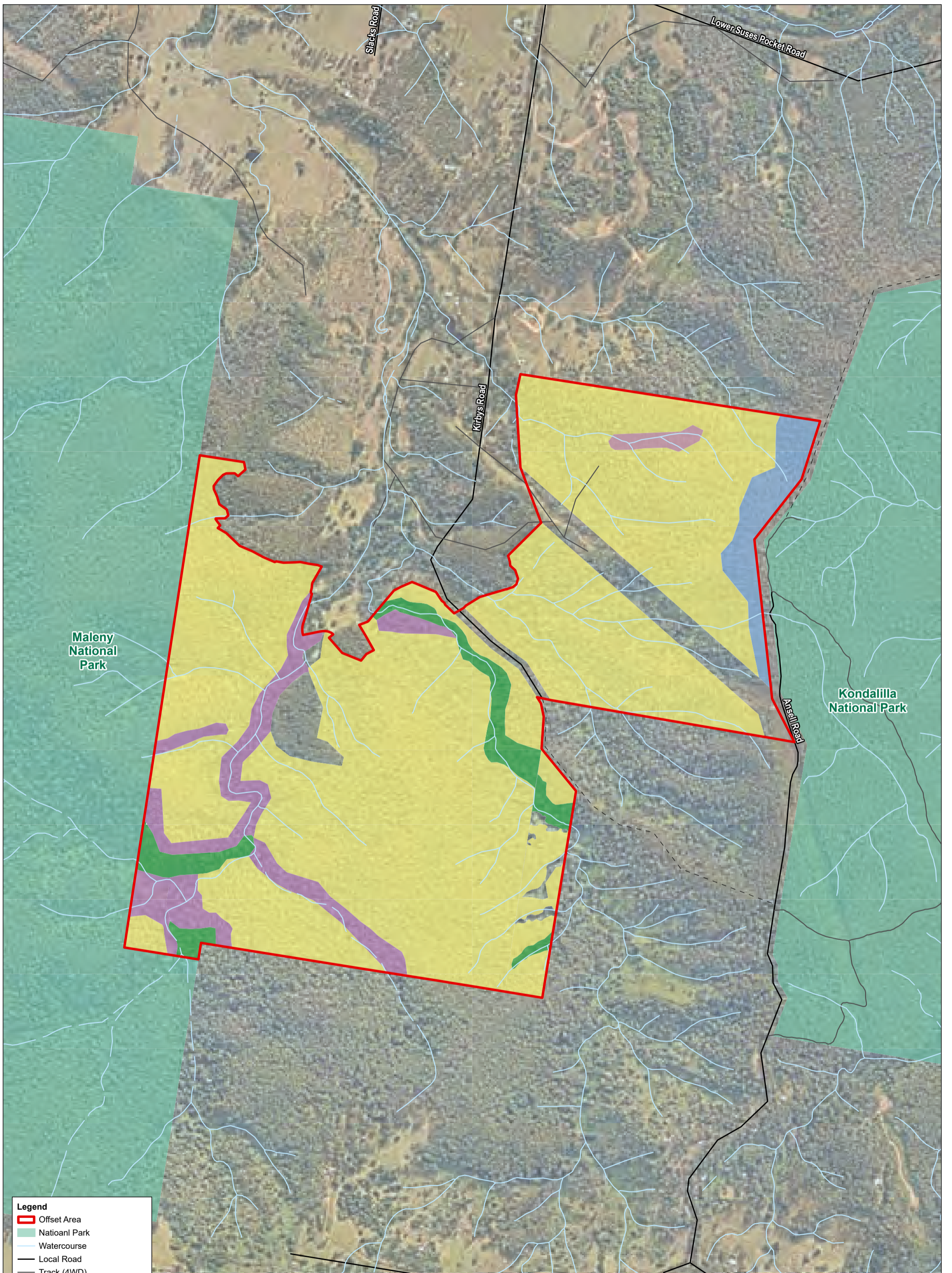
Coordinate System:
GDA2020 MGA Zone 56
Date: 22/08/2024
Created By: VN
Drawing Size: A3
0 100 200 300m

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Figure 5-1 Evidence of Koala and Grey-Headed Flying-Fox at the Offset Area and MHQA Data Collection Locations

**Beerburrum to Nambour Rail Upgrade
Proposed Offset Area**
Client: Qld Department of Transport and Main Roads





Legend

- Offset Area
- National Park
- Watercourse
- Local Road
- Track (4WD)
- Unconstructed Road
- RE
- 12.12.15
- 12.12.16
- RE 12.12.15a-RE 12.12.15b
- RE 12.12.14

Coordinate System:
GDA2020 MGA Zone 56
Date: 22/08/2024
Created By: VN
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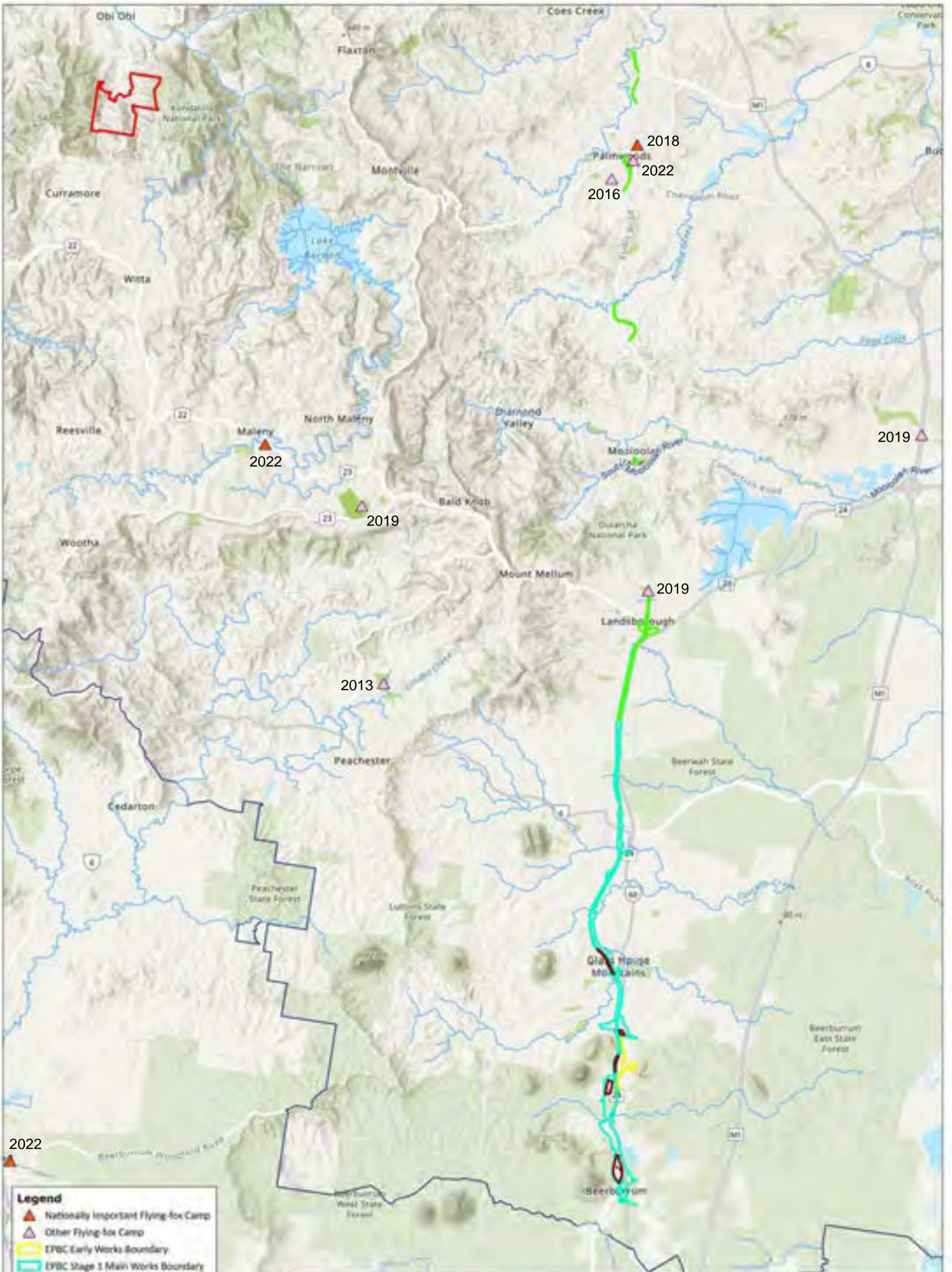
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Figure 5-2 Ground Truthed Regional Ecosystems within the Offset Area

**Beerburum to Nambour Rail Upgrade
Proposed Offset Area**

Client: Qld Department of Transport and Main Roads





Legend

- ▲ Nationally Important Flying-fox Camp
- ▲ Other Flying-fox Camp
- EPBC Early Works Boundary
- EPBC Stage 1 Main Works Boundary
- EPBC Stage 2 Boundary
- No GO Area
- Offset Area
- LGA Boundary
- Watercourse

Coordinate System:
GDA2020 MGA Zone 56

Date: 02/10/2024

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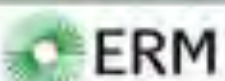
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F5-3 Known Flying-fox Camps in the Region

Beerburrum to Nambour Rail Upgrade
Proposed Offset Area

Client: Qld Department of Transport and Main Roads



5.3 HABITAT QUALITY METHODOLOGY

Modified Habitat Quality Assessment (MHQA) methodology was chosen as the preferred and most thorough method of assessing and comparing impact and Offset Areas. The MHQA is underpinned by tested methodology developed in Queensland for assessing habitat quality, The Guide for Determining Terrestrial Habitat Quality. However, MHQA builds on this assessment method by including an additional assessment item, species stocking rate, in order to satisfy the requirements of EPBC Act Offset Policy Principles.

This methodology is appropriate for both koala and grey-headed flying-fox as the scoring and assessment methodology quantifies available habitat features, for example number of large trees within an assessment unit, quality and availability of food and foraging habitat and sheltering habitat. These habitat features, whilst generally unique to specific MNES, are generally analogous in the circumstance of koala and grey-headed flying-fox.

Survey techniques incorporated into the MHQA surveys for this OAMP utilised methodology from "A review of koala habitat assessment criteria and methods" (Australian National University 2021) for koala and "The Survey guidelines for Australia's threatened bats" (DEWHA 2010) for grey-headed flying-fox. Methodology chosen and incorporated as part of the MHQA for presence or utilisation of the offset site by koala was faecal pellet searches, in particular spot assessment method.

Desktop review determined the presence of a known grey-headed flying-fox roost within the Offset Area. Furthermore, primary native food plant species for flying-fox species are well known and the presence of these plant species at a site should be used to assess the potential importance of the site to flying-foxes (DEWHA 2010). MHQA included flora assessment to identify suitable foraging plant species and foraging vegetation for grey-headed flying-fox.

5.4 OFFSET AREA ASSESSMENTS

The quality of the Offset Area for koala and grey-headed flying-fox has been assessed following field investigations of the Offset Area, including collection of plot-based information in areas of remnant and regrowth habitat for koala and grey-headed flying-fox both within the impact and Offset Areas. The habitat quality assessment included 41 assessments in four field investigations from 2021-2022. The overall quality of the habitat in the impacted areas was assessed as a score of 4 for koala and 4 for grey-headed flying-fox. This was determined using the Modified Habitat Quality Assessment (MHQA) methodology v1.3-DRAFT (DAWE, 2021a).

The overall quality of the proposed Offset Area (regrowth and remnant) has a score of 6 for both koala and grey-headed flying-fox. MHQA Transect Sites are depicted in Figure 5-1. This is documented in the MHQA assessment, provided to DCCEEW (December 2021) and attached in Appendix D. When the Offset Area is assessed using the EPBC Act Offset Assessment Guide, it is demonstrated that the proposed Offset Area meets 100% of the required offset. The Offset Assessment Guide reaches a score of 106.96% using the Offset Area proposed in this OAMP.

The details on the parameters entered into the calculator tool are summarised in Table 5.3 and Table 5.4. Baseline offset data for koala and grey-headed flying-fox is provided in Appendix D.

5.4.1 KOALA HABITAT QUALITY SUMMARY

Habitat quality assessments were undertaken in the impact and Offset Area using the Modified Habitat Quality Assessment Tool (MHQA Tool). Koala habitat in the impact area received a score of 4.3 and the Offset Area received a weighted score of 6.08. The Offset Area is of better quality than the impact area and is in moderate to good condition. However, there remains potential for improvements through active management as part of offset activities. Offset area management aims to improve the habitat quality by at least 1 point. A summary of koala habitat quality scores is provided in Table 5.1 below. Detailed habitat quality scoring is provided in Appendix D.

TABLE 5.1 SUMMARY OF KOALA HABITAT QUALITY SCORES

HQ Component	AU1	AU2	AU3	Score
Site condition (out of 3)	1.97	1.86	2.01	
Site context (out of 3)	1.92	1.8	1.5	
Species stocking rate (out of 4)	2.2	3.14	1.7	
HQ score (out of 10)	6.085	6.8	5.21	
AU area	70.89	90.6	20.66	
Area of offset	189.97	189.97	189.97	
AU size weighting	0.39	0.48	0.11	
Final score	2.27	3.24	0.57	6.08

5.4.2 GREY-HEADED FLYING-FOX HABITAT QUALITY SUMMARY

Habitat quality assessments were undertaken in the impact and Offset Area using the MHQA Tool). Grey-headed flying-fox habitat in the impact area received a score of 4.6 and the Offset Area received a weighted score of 6.08. The Offset Area is of better quality than the impact area and is in moderate to good condition. However, there remains potential for improvements through active management as part of offset activities. Offset Area management aims to improve the habitat quality by at least 1 point. A summary of grey-headed flying-fox habitat quality scores is provided in Table 5.2 below. Detailed habitat quality scoring is provided in Appendix D.

TABLE 5.2 SUMMARY OF GREY-HEADED FLYING-FOX HABITAT QUALITY SCORES

HQ Component	AU1	AU2	AU3	Score
Site condition (out of 3)	1.97	1.86	2.01	
Site context (out of 3)	1.62	1.8	1.5	
Species stocking rate (out of 4)	2.2	3.14	1.7	
HQ score (out of 10)	5.785	6.8	5.21	
AU area	70.89	90.6	20.66	
Area of offset	189.97	189.97	189.97	
AU size weighting	0.39	0.48	0.11	
Final score	2.26	3.26	0.57	6.09

TABLE 5.3 OFFSET ASSESSMENT GUIDE INPUTS FOR KOALA

Factor	Input	Justification
Impact area	64.15	As per EPBC PD and EPBC Act Approval.
Impact quality	4	Using the Habitat Quality approach outlined in Section 5.3, the Impact Area is calculated to have a score of four out of 10.
Total quantum of impact	25.66	Calculated by OAG.
Start quality of Offset Area	6	Using the Habitat Quality approach outlined in Section 5.3, the Offset Area is calculated to have a score of six out of 10.
Future quality without offset	5	Without management, it is anticipated that the Offset Area will decrease in habitat quality over time due to bell miner (<i>Manorina melanophrys</i>) dieback and severe weed encroachment. High density of weed infestations, such as lantana (<i>Lantana camara</i>) observed within the Offset Area prevents movement of the koala despite adequate presence of koala food trees (NSW Department of Planning and Environment 2022). Lantana can become dominant in disturbed areas of native vegetation where it disrupts recruitment of native species. Due to the plant's combustible nature, it can contribute to hotter than average bushfires which in turn alter native vegetation communities (Queensland Department of Agriculture and Fisheries 2023). All of these processes are expected to continue reduce habitat quality over time.
Future quality with offset	7	<p>The management of the offset for the koala will include assisted regeneration through the provision of weed and vegetation management actions.</p> <p>For the koala, the overall future quality of the Offset Area (over the 20-year offset timeframe) is 7. As there is evidence of early-stage natural regeneration of eucalypt saplings within the Offset Area, it is predicted that within 20 years there will be non-juvenile koala habitat trees established within the Offset Area.</p> <p>Areas of eucalypt forest regrowth will continue to develop into mature eucalypt open forest as the Offset Area is protected from weed encroachment and re-clearing. This will allow the development of a connected canopy of eucalypt open forest, with increased foraging resources opportunities for the koala. Currently, the extent of dense <i>Lantana camara</i> is restricting movement between habitat trees and restricting recruitment of foraging resources. Additionally, <i>Lantana camara</i> encourages bell miner carrying capacity to the point of bell miner-associated die back. The removal of this exotic understory will reduce refugia for the bell miner and return functional carrying capacity to a point where they are not affecting the ecologically dominant layer.</p>

Factor	Input	Justification
Time over which loss is averted	20	The maximum of 20 -years has been used in the OAG. It is noted that the longer the time frame, the more value this provides in terms of achieving conservation outcomes (DSEWPC, 2012).
Time until ecological benefit	20-years	The proposed active management will likely result in an ecological benefit being realised in a 20 -year period. While some benefits will likely be realised in a shorter timeframe, 20 years has been used to reflect the longer time horizon to achieve all objectives of this OAMP. This time period would be sufficient to provide a greater cover of eucalypt regrowth suitable as movement and foraging habitat for koala.
Risk of loss (%) without offset	0.11%	As the site currently has no formal weed management, the risk of loss without an offset is estimated to be 0.11% for the SCC area in Queensland. This value is in accordance with the risk of loss 'average annual background rate of loss 2005–2014' as provided in Maseyk, Evans & Maron (2017).
Risk of loss (%) with offset	0%	The proposed offset will be legally secured on the Title of the property via a Voluntary Declaration (VDec) under the VMA99 and the offset managed in accordance with this OAMP. The Voluntary Declaration is legally binding and will provide for a lower risk of loss. The risk of loss with the offset is considered to be 0% .
Confidence in Habitat Quality result (%)	75%	For the delivery of the offsets in the areas of remnant and regrowth vegetation, the confidence level in the one-unit gain in the offset quality is 75% , for koala at the Offset Area. This confidence level accounts for the likelihood of increased foraging habitat for koala.
Confidence in RoL result (%)	60	A conservative percentage has been used despite the very low RoL utilised in the calculator.
Offset Area	189.97	
Percentage of impact offset		Koala Offset Area TOTAL: 106.91%

TABLE 5.4 OFFSET ASSESSMENT GUIDE INPUTS FOR GREY-HEADED FLYING-FOX

Factor	Input	Justification
Impact area	64.15	As per Preliminary Documentation and EPBC Act Approval.
Impact quality	4	Using the Habitat Quality approach outlined in Section 5.3, the Impact Area is calculated to have a score of four out of 10
Total quantum of impact	25.66	Calculated by OAG.
Start quality of Offset Area	6	Using the Habitat Quality approach outlined in Section 5.3, the Offset Area is calculated to have a score of six out of 10.
Future quality without offset	5	Without management, it is anticipated that the Offset Area will decrease in habitat quality over time due to bell miner (<i>Manorina melanophrys</i>) dieback and severe weed encroachment and bell miner (<i>Manorina melanophrys</i>) dieback. Loss of roosting and foraging sites is a threat to grey-headed flying-fox. A listed action to reduce this threat is to rehabilitate flying-fox roost sites through management of weed species and planting of roost trees (NSW Department of Planning and Environment 2024). Lantana is highly invasive in nature and forms dense thickets which smother and destroy native vegetation. It can become dominant in disturbed areas of native vegetation where it disrupts recruitment of native species and decreases biodiversity. This woody shrub has combustible canes which can contribute to hotter than average bushfires and in turn alter native vegetation communities (Queensland Department of Agriculture and Fisheries 2023). All of these processes are expected to continue to reduce habitat quality over time.
Future quality with offset	7	For the grey-headed flying-fox the future quality of the Offset Area is estimated to be a 7 , reflecting the assisted regeneration of myrtaceous species and rainforest species with fleshy fruits that are foraging resources considered habitat critical to the survival of the species after 20 years in the Offset Area. Areas of eucalypt forest regrowth will develop into mature eucalypt open forest as the Offset Area is protected from weed encroachment and re-clearing. This will allow the development of a connected canopy of eucalypt open forest, with increased foraging resources and roosting opportunities for the grey-headed flying-fox. Currently, the extent of dense <i>Lantana camara</i> is restricting movement between some roosting sites restricting recruitment of foraging resources. Additionally, <i>Lantana camara</i> encourages bell miner carrying capacity to the point of bell miner associated die back. The removal of this exotic understory will reduce refugia for bell miner and return functional carrying capacity to a point where they are not affecting the ecologically dominate layer.
Time over which loss if averted	20	The maximum of 20 -years has been used in the OAG. It is noted that the longer the time frame, the more value this provides in terms of achieving conservation outcomes (DSEWPC, 2012).
Time until ecological benefit	20-years	The proposed active management will likely result in an ecological benefit being realised in a 20 -year period. While some benefits will likely be realised in a shorter timeframe, 20 years has been used to reflect the longer time horizon to

Factor	Input	Justification
		achieve all objectives of this OAMP. This time period is sufficient to provide a greater cover of eucalypt regrowth for foraging and roosting habitat.
Risk of loss (%) without offset	0.11%	As the site currently has no formal management, the risk of loss without an offset is estimated to be 0.11% for the SCC area in Queensland. This value is in accordance with the risk of loss 'average annual background rate of loss 2005–2014' (Maseyk, Evans & Maron (2017)).
Risk of loss (%) with offset	0%	The proposed offset will be legally secured on the Title of the property via a VDec under the VMA99 and actively managed in accordance with this OAMP. The VDec is legally binding and will provide for a lower risk of loss. The risk of loss with the offset is considered to be 0% .
Confidence in habitat quality result (%)	75%	For the delivery of the offsets in the areas of remnant and regrowth vegetation, the confidence level in the one unit gain in the offset quality is 75% , for the grey-headed flying-fox at the Offset Area. This confidence level accounts for the likelihood of increased foraging and roosting habitat.
Confidence in RoL result (%)	60%	A conservative percentage has been used despite the very low RoL utilised in the calculator.
Offset Area	189.97	
Percentage of impact offset		Grey-headed flying-fox Offset Area TOTAL: 106.91%

6. OFFSET AREA MANAGEMENT

Offset Area Management Actions have been developed to achieve the predicted gains in habitat quality to deliver the required offset for koala and grey-headed flying-fox. The aim of the management actions are to increase the MHQA metrics most associated with improving habitat quality for koala and grey-headed flying-fox, including number of large trees (eucalypts), native non-eucalypt trees and tree canopy cover. Large trees are particularly relevant for grey-headed flying-fox as they are more readily used for roosting and foraging.

Management actions have been divided into seven broad categories; habitat, regeneration (weeds and revegetation), pest animals, fire, public access management, erosion, and general management. Specific actions are detailed within existing management plans for:

- Fire (Fire Management Plan (FMP), see Appendix E). Fire Management Units (FMU) have been delineated by existing fire breaks, fire trails, lot boundaries, internal tracks and property boundaries. The Offset Area will be managed in accordance with the principles of the FMP, with actions specific to each FMU.
- Pest Animals (Pest Animal Management Plan (PAMP), see Appendix F). The PAMP includes guidance and detail on management and monitoring methods, specific to each identified targeted pest animal species, that align with relevant threat abatement plans and guidelines. The PAMP aims to ensure pest animals do not impact MNES within the Offset Area.
- Weeds and revegetation (Offset Area Regeneration Works Plan (RWP) see Appendix G). The RWP provides details of Management Zones and technical weed management and revegetation specifications applicable to each Zone within the Offset Area.

Habitat management for the benefit of koala and grey-headed flying-fox is the key focus of this OAMP, therefore objectives described in Section 2.3 will be achieved by implementing management actions in all broad categories. Table 6.1 below summarises all Management Actions and Commitments as per Condition 5(b) of the Approval.

6.1 HABITAT MANAGEMENT

Habitat for koala and grey-headed flying-fox within the Offset Area will be enhanced through implementation of actions within the Offset Area RWP. Actions will focus on vegetation recovery, which will facilitate the successful promotion of native regrowth and recruitment of eucalypts. The two approaches below are identified as a priority to act against habitat loss, disturbance and modification for the koala, as specified in the Approved Conservation Advice for koala (DSEWPC 2012).

- Regeneration of existing remnant and regrowth vegetation; and
- Creation of habitat via infill plantings to assist with canopy closure (Note: Increased canopy cover is an indicator of the development of an intact eucalypt forest, providing improved habitat conditions for both koala and grey-headed flying-fox).

The Offset Area RWP will also include provision for fire restoration techniques such as cool-burns that align with principles of the FMP.

6.2 REGENERATION

Regeneration will include active weed management and revegetation planting (refer to the RWP, Appendix G). Maintaining and eradicating legacy infestations and preventing new weed incursions will improve the condition of koala and grey-headed flying-fox foraging habitat within the Offset Area. Kirby's Road Environment Reserve has a history of grazing pressure from historical dairy production and infrequent encroachment from neighbouring livestock. Due to this, a variety of weeds have established in the Offset Area, and they currently degrade habitat quality for koala and the grey-headed flying-fox.

The threat of weeds will be managed through implementation of the Offset Area RWP (see Appendix G). The Offset Area RWP details weed management actions to ensure weeds are controlled by bush regeneration practitioners, to achieve habitat quality outcomes. The RWP provides detail of management zones and technical weed management specifications for each management zone within the Offset Area. Weed control actions will be undertaken progressively throughout the Offset Area and in accordance with the Offset Area RWP. To mitigate the potential of weeds being spread within the Offset Area from allowing public access, mitigation measures will be implemented, including restricted access and entry procedures, as outlined in Table 6.1.

The Offset Area RWP includes specific guidance and detail on weed control, including best practice bush regeneration techniques, mechanical removal, herbicide use, and weed hygiene.

6.3 PEST MANAGEMENT

Pest animals degrade the quality and suitability of habitat for native fauna and flora. In high densities pest animals can lead to declines in tree health, disrupted recruitment, the spread of weeds, and reductions in soil and water quality. For the koala and the grey-headed flying-fox, degradation of habitat is considered a key ecological threatening process and has the potential to further disrupt population movements and the availability of critical foraging resources (DAWE, 2022; DAWE, 2021). Pest animals also have the potential to cause direct impacts to MNES species, particularly the koala, and are known to cause injury and mortality (DAWE, 2022). Within Queensland, all pest animals (defined as restricted invasive animals) carry management requirements prescribed by the Qld Biosecurity Act 2014.

The threat of pest animals will be managed through the implementation of the Offset Area PAMP (Appendix F). The purpose is to identify existing and potential biosecurity risks associated with pest vertebrate animals, and to determine and recommend measures to restrict the entry, establishment or spread of, and manage, reduce, any pest animal species. The PAMP will focus on pests in areas that pose a significant biosecurity risk to koala or grey-headed flying-fox or their habitat. A monitoring program will be established that will record and understand pest animal presence and movements within the Offset Area, then undertake management actions, which have been sourced from relevant threat abatement plans for each species (i.e. baiting programs or trapping).

Monitoring of pest animal presence within the Offset Area will be ongoing, any observed evidence of any pest species will be reported and serve as a trigger for adaptive management and corrective actions. Pest animal control will include baiting and/or trapping and will be undertaken by a suitably qualified expert. The Offset Area is in the sunshine coast hinterland, which is heavily populated with smaller property size, as such, shooting is not proposed as a pest control measure.

The Offset Area PAMP includes specific guidance and detail on management and monitoring methods, that align with relevant threat abatement plans and guidelines to ensure pest animals do not impact the Offset Area.

6.4 FIRE MANAGEMENT

A Fire Management Plan (FMP, see Appendix E) has been prepared to address community safety and the maintenance of ecological values within the Offset Area and address requirements for this OAMP for impacts to koala and grey-headed flying-fox.

To ensure that vegetation within the Offset Area is of suitable habitat value to both species, appropriate fire management is needed including prevention / protection from unplanned fires and planned burns for ecological restoration (where appropriate). Fire management will be undertaken in accordance with the Queensland Government Planned Burn Guidelines (Melzer and Hines 2022), which incorporates Regional Ecosystem specific guidance provided in the Regional Ecosystems Description Database.

To ensure impacts from fire are mitigated, a site assessment has been completed which focused on attributes relevant to fire management including vegetation surveys, slope assessment, fuels loads, aspect and dominant species associations. These assessments culminated in the production of Fire Management Zones. These zones contain specific attributes and prescribed management in order to achieve management objectives. Fire Management Units have been delineated by existing fire breaks, fire trails, lot boundaries, internal tracks and property boundaries. The Offset Area will be managed in accordance with the principles of the FMP. This includes removal of high fuel loads, maintenance of firebreaks and fire trails, and the management of weed species to reduce the impacts from an unplanned fire.

Potential risks posed by fire to the Offset Area have additionally been considered in the FMP. Potential risks have been assessed against a risk matrix supplied by DCCEE and provides trigger thresholds and corrective actions to mitigate the potential impacts of these risks.

Sunshine Coast Council (SCC) are considered to be a land occupier under the Qld Fire and Emergency Services Act 1990 (s67). On becoming aware of a fire burning on land it occupies, Section 67 of the Act requires SCC to take all reasonable steps to extinguish or control the fire and report the fire and its location to a fire officer as soon as possible. The FMP addresses the requirements under this Act.

6.5 PUBLIC ACCESS MANAGEMENT

The proposed offset site contains four dedicated walking trails, as well as an additional three proposed walking trails (see Figure 6-1). While these walking trails fall within the broader Offset Area, they do not form part of the Offset Area calculations for each MNES, i.e. the trails do not count toward conservation gains. Walking trails will be constructed and maintained in accordance with Australian Standard AS 2156.2-2001. Walking trails have been designed by specialist consultants and have been constructed in general accordance with design drawings provided in Appendix H. Photographs of the constructed walking trails within the Offset Area have also been provided in Appendix H.

During the delivery of the B2N project's offset, public access to these walking trails will be maintained and restricted to the trails presented in Figure 6-1. Those walking trails which enter the Offset Area will be managed under this OAMP.

There are some benefits associated with provision of public access to the area. Public access allows the community to access nature and culture and encourages the connection and care for natural areas. The recovery plans for both species include actions to raise awareness and education within the public and across stakeholders.

However, public access needs to be appropriately managed as it has potential to facilitate spreading of weeds, potential impacts from domestic fauna, rubbish dumping, illegal harvesting of timber, unplanned fires, construction and trail maintenance, and potential fragmentation of habitat. Mitigation measures have been developed that directly alleviate potential impacts from public access into the Offset Area, in which will ensure habitat connectivity within the Offset Area is maintained, allowing koalas and grey-headed flying-foxes to transverse the Offset Area seamlessly, and provide a documented and measurable response strategy for potential risks.

A review of the construction, maintenance and ongoing use of the proposed walking trails by ERM's Principal ecologist concluded that the existing and proposed trails will not fragment natural habitats within the Offset Area or disturb the movement or habitat connectivity of koalas or grey-headed flying-foxes. These conclusions were based upon the following:

- The small scale and localised nature of the walking trail construction and maintenance;
- The limited use expected of the walking trails, which has been successfully implemented in all National Parks within Australia, including Maleny National Park and Kondalilla National Park;
- Grey-headed flying-foxes, being highly mobile, will face no barriers to accessing foraging resources in the Offset Area due to the presence of walking trails; and
- Koalas persist throughout South-East Queensland and have adapted to navigating urban areas, including reserves within the urban matrix and so there is little evidence to suggest that limited use of walking trails will affect the species as they are largely arboreal, and tend to move at night when the walking trails are less likely to be used.

Koalas and koala populations can persist in highly fragmented landscapes such as peri-urban areas and scattered paddock trees in agricultural land where koalas regularly move across the ground for tens or even hundreds of meters (Youngentob et al., 2021). Koalas will navigate the Offset Area with ease, encountering minimal barriers from walking trails. Moreover, considering the Offset Area's adjacency to national parks to the east and west, it will serve as a crucial corridor for koala dispersal and maintenance of diversity.

The incorporation of construction materials (concrete steps, rock, gravel) within select areas on the walking trails would not create a barrier for koala movement and any increased weed risk could be appropriately managed under RWP and OAMP. Therefore, management actions are not proposed for habitat fragmentation.

6.6 EROSION

The proposed Offset Area is located within the Blackall Range, with sections of steep terrain and typically high rainfall. These natural factors along with the previous land uses including forestry coops and dairy grazing may increase the likelihood of erosion to occur. Whilst erosion is not a listed threat for koala or grey-headed flying-fox, the effects of erosion can directly impact on the quality of habitat, a known threat, by reducing the vegetation structure and composition, encouraging weed infestations and increasing sedimentation in waterways which has the potential to reduce the conservation value of the Offset Area.

The risks associated with erosion will be actively managed by identifying areas of current erosion (if present) and areas susceptible to erosion, which can be remediated or monitored accordingly. All ground disturbance works associated with the construction or maintenance of trails or weed management will operate under erosion and sediment control practices. Areas of erosion will be remediated to assist with natural regeneration of the Offset Area.

6.7 GENERAL OFFSET AREA MANAGEMENT

The quality of habitat within the Offset Area can be at risk of degradation without proper signage, maintenance of the infrastructure (i.e., signage, gates and fencing) and enforcement of local laws. Therefore, management actions have been proposed to erect and maintain signage, maintain gates and fencing, and report non-conformance with local laws to the Council to enforce, deter and prevent further degradation. Locations of gates and fencing to be maintained under the OAMP are shown in Figure 6-1. These actions are intended to protect the quality of the Offset Area from potential decline that may be caused directly by human interference, or indirectly through degradation of infrastructure.

TABLE 6.1 OFFSET AREA MANAGEMENT ACTIONS AND COMMITMENTS

Management Objectives	Management Actions	Frequency	Timing	Activity Provider
Habitat Management (to be carried out in line with this OAMP and appended management plans)				
Actively restore habitat for koala and grey-headed flying-fox	<p>Undertake regeneration of existing remnant and regrowth vegetation via infill plantings to assist with canopy closure.</p> <p>Actions will involve:</p> <ul style="list-style-type: none"> • Management of weed species (see Weed Management below); • Habitat infill and direct plantings of relevant community species (mostly canopy species but some mid-storey and understory planting); and • Additional infill planting as required to replace unsuccessful plantings. <p>Habitat infill and direct planting is specific to each Management Zone, as outlined in the RWP.</p>	As necessary	Timing of infill plantings will be specific to planted species requirements.	TMR or delegated suitably qualified and experienced bush regeneration contractor.
Regeneration (to be carried out in line with the Regeneration Works Plan (RWP) presented in Appendix G)				
Actively revegetate habitat	<p>Commence planting of revegetation areas, in accordance with the RWP.</p> <p>The ongoing maintenance and any infill or supplementary plantings are outlined in the RWP. Each management zone must be managed in accordance with the actions outlined in Table 5-1 of the RWP.</p>	NA	Within 12 months of OAMP approval	Suitably qualified revegetation contractor
Re-establish a baseline of weed extent and cover	Revised, baseline weed mapping to be undertaken for WoNS and locally significant weeds relevant to the threatened species within the Offset Area, and site-specific treatment techniques developed per site location and extent of weed coverage.	Once	Within six months of OAMP approval.	TMR or delegated suitably qualified and experienced bush regeneration contractor.
Reduce the extent and occurrence of weeds	Weed treatment on all identified WoNS and locally significant weeds will be undertaken. Treatment will be risk-based and managed to avoid any detrimental impacts on non-target species or having	<p>At least Annually.</p> <p>Frequency will be specific to weed species technical requirements.</p>	Specific to weed species technical requirements.	TMR or delegated suitably qualified and experienced bush regeneration contractor.

Management Objectives	Management Actions	Frequency	Timing	Activity Provider
	<p>unintentional consequences. Weed management activities include:</p> <ul style="list-style-type: none"> • Hand pulling juvenile woody weeds; • Cut and treat or drill and fill for larger woody weeds; • Spot and foliar spraying for exotic vines and grasses. <p>Weed management and maintenance will be specific to each Management Zone, as outlined in the RWP.</p>			
Actively manage any weed incursion caused by public access	Walking trails used by the public will serve as the main access routes for ecological restoration practitioners conducting weed control in the Offset Area. Consequently, these trails and the adjacent vegetation will have high visibility and be the easiest areas to consistently treat and monitor for weed incursions. The baseline assessment and active weed management will include all trails within the Offset Area.	Ongoing	Ongoing	TMR or delegated suitably qualified and experienced bush regeneration contractor.
Prevent additional weed incursions	All machinery and vehicles required to access the Offset Area for construction or maintenance will be required to be cleaned down prior to entering the Offset Area, to remove vegetation and soil limiting the risk of weeds being transferred to the site.	Ongoing	Ongoing	TMR or delegated environmental managers and/or supervisors
	All construction materials required to facilitate construction of the walking trails will be sourced from licenced facilities and will be certified weed free. Material transportation will be restricted to nominated vehicle access roads within the Offset Area, limiting the risk to additional weed spread within the Offset Area	Ongoing	During construction of walking trails.	TMR or delegated environmental managers and/or supervisors Trail construction contractor.
	Installation of a footwear wash station will be installed at the entrance of the reserve. All visitors entering the reserve will be required to clean their footwear before and after embarking on a walk/hike.	At all times	Ongoing Footwear wash station installed within 12	TMR or delegated suitably qualified professional. All visitors

Management Objectives	Management Actions	Frequency	Timing	Activity Provider
			months of OAMP approval.	
Manage weeds in accordance with the RWP	Implement the RWP.	Ongoing	For the duration of the offset.	TMR or delegated environmental managers and/or supervisors, with support from SCC.
Pest Animal Management (to be carried out in line with the Pest Animal Management Plan (PAMP) presented in Appendix F)				
Re-establish a baseline of pest animal occurrence	Undertake surveys to re-establish pest animal occurrence and detailed mapping of targeted pest animals within the Offset Area, prior to active management. Surveys will determine presence and densities of identified targeted pest animals, which are: <ul style="list-style-type: none"> • Feral dogs (domestic or wild) • Feral cats • Foxes • Feral pigs • Feral deer 	Once	Within six months of OAMP approval.	Suitably qualified expert
Reduce the occurrence of pest animals	Undertake pest animal control, in accordance with the PAMP. The control program will include baiting and/or trapping of pest animals and will be undertaken in accordance with the species-specific guidance and undertaken by suitably qualified experts. All pest animal control must be undertaken in a humane manner. Shooting will not be undertaken due to the regional context of the Offset Area.	As required	Any time of year. As per specific guidance for relevant pest animals.	Suitably qualified expert
Implement post-fire pest animal monitoring and management	Where an unplanned or uncontrolled fire affects the Offset Area, an assessment will be undertaken to determine the extent and severity of impact to habitat quality (see FMP, Section 4.5). This assessment will determine if the impact of the	After any unplanned fire event determined likely to result in changes in pest animal species presence within the Offset Area.	Review to be conducted within one month of fire event.	Suitably qualified expert

Management Objectives	Management Actions	Frequency	Timing	Activity Provider
	<p>unplanned fire is likely to result in changes in the number of pest animals present.</p> <p>A review of the management actions outlined in the PAMP will be carried out to ensure targeted pest animal species are adequately monitored. Where targeted pest animal densities are found to increase after a fire event, immediate application of corrective actions will be carried out. For example, where an increase in the number of feral cats or foxes are observed post-fire event, additional control programs (baiting, trapping) will be immediately implemented to reduce risk to MNES.</p>			
<p>Fire Management (to be carried out in line with the Fire Management Plan (FMP) presented in Appendix E)</p>				
<p>Re-establish a fuel load baseline</p>	<p>Surveys will be undertaken by suitably qualified professionals to re-establish a baseline of fuel loads within the Offset Area prior to active management, which can be monitored against for implementation of corrective actions.</p>	<p>Once</p>	<p>Within three months of OAMP approval.</p>	<p>Suitably qualified fire ecologist.</p>
<p>Reduce fuel loads within the Offset Area</p>	<p>Management activities to reduce fuel loads will be undertaken within the Offset Area. Activities will be determined on a case-by-case basis for each Management Unit at the time of assessment as to which fuel reduction strategy or combination is most suitable (as detailed in the FMP). Fuel reduction activities will include:</p> <ul style="list-style-type: none"> • Raking or manual removal of fine fuels. Removal of ground fuels such as fallen leaves, twigs and bark in areas where canopy scorching may occur is recommended; • Reduction of grasses and forbs by mowing, slashing or brush cutting; and • Removal of weedy shrubs, understory and exotic grasses with high fuel loads by manual removal or brush cutting. <p>Fuel load reduction is not proposed in vine forest (RE 12.12.16) or rainforest Management Units.</p>	<p>As required based on annual fuel load assessment / monitoring.</p>	<p>When fuel load exceeds 25 t/ha within Management Zones of forest vegetation communities (in accordance with vegetation classification and fuel load in AS3959-2018 Committee FP-020, 2018).</p>	<p>Suitably qualified contractor.</p>

Management Objectives	Management Actions	Frequency	Timing	Activity Provider
Actively reduce fuel load after maintenance works	Following slashing, mowing or brush cutting of weeds, debris resulting from the process will be placed in contact with the ground to reduce elevated fine fuels which would otherwise contribute to fire spread.	Ongoing	Ongoing	Suitably qualified contractor.
Maintain existing firebreaks to minimise risk of fire damage	Maintain existing fire breaks and fire trails within the Offset Area to minimise the risk of fire damage to the offset. This will be achieved via: <ul style="list-style-type: none"> Vegetation management (mowing, slashing, brush cutting); Grading and erosion control. Where it is determined that fuel loads within fire breaks are too high, either through monitoring or as advised by SCC, this will be rectified (in line with fuel reduction activities detailed above) within three months.	As required based on quarterly inspection of fire breaks.	Where firebreak maintenance is identified, repairs will be undertaken within 3 months of being identified.	Suitably qualified contractor.
Implement controlled burns to reduce fuel load	Undertake controlled burns in accordance with the FMP and the Planned Burn Guidelines (Melzer and Hines 2022). Planning for management of controlled burns is key to ensuring the success of the MNES offset. Controlled burning will : <ul style="list-style-type: none"> Manage burn intensity (e.g., spot lighting patterns rather than strip lighting, cooler burns in colder months); Reducing canopy scorch (e.g., reducing fuel load surrounding canopy trees, carefully considering topography of an area to be burned); Fuel reduction activities (as outlined above); and Mosaic burning will be undertaken in accordance with the guidelines (Melzer and Hines 2022). Be designed by a suitably qualified fire ecologist to prevent mortality of MNES, including koala which is slow-moving 	As required based on annual fuel load assessment/monitoring.	Controlled burning regimes to align with the objectives for each Fire Management Unit (as detailed in the FMP). Fuel load reduction must take place before any controlled burns are implemented.	Suitably qualified fire ecologist.
Manage fire risk in accordance with the FMP	Implement the FMP.	Ongoing	At all times	TMR and suitably qualified fire ecologist.

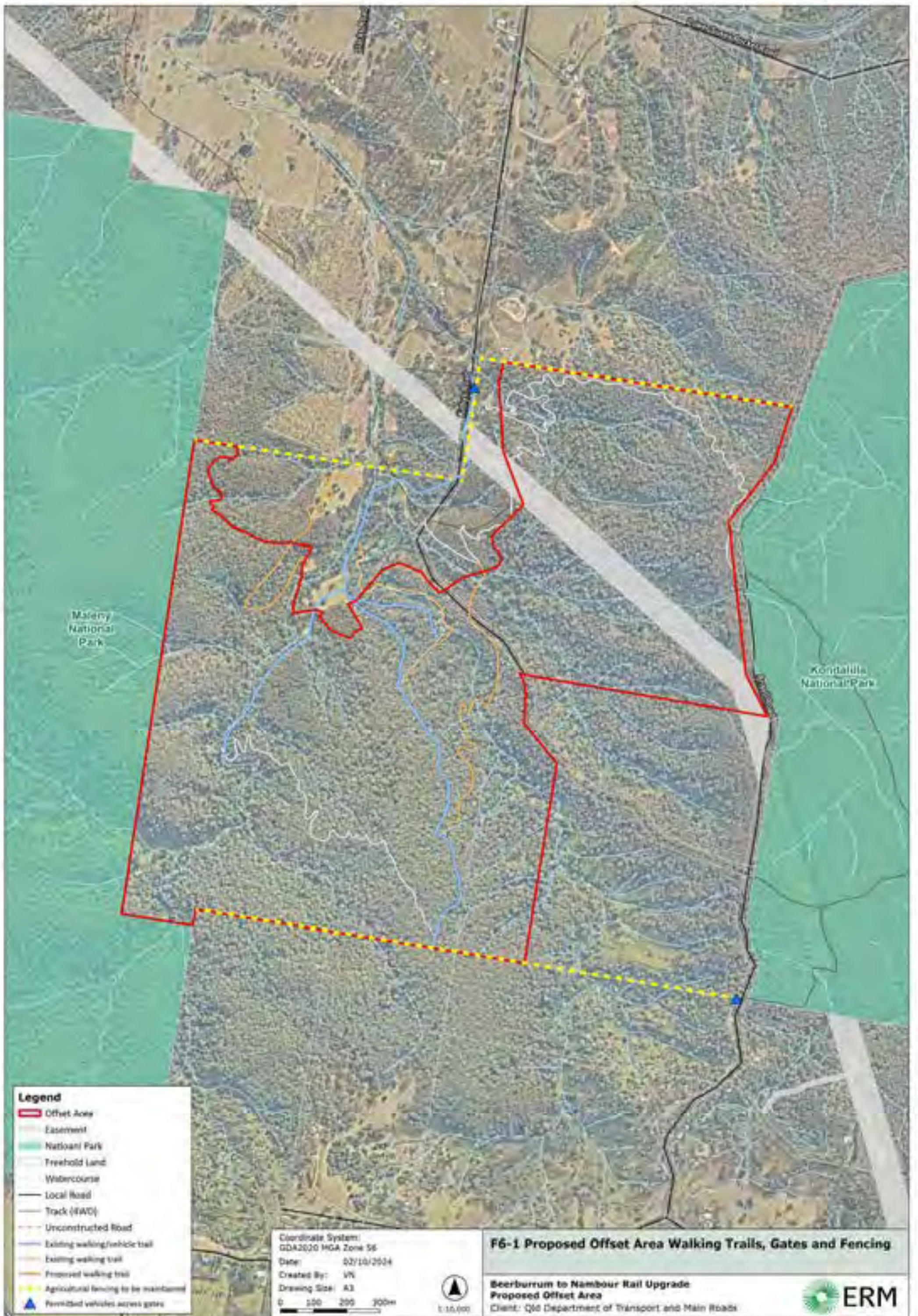
Management Objectives	Management Actions	Frequency	Timing	Activity Provider
Public Access Management				
Limit public access to walk-in access only	Bicycles, horses, and unauthorised vehicles will all be prohibited within the Offset Area to reduce risk of weed incursion. The Offset Area will be limited to walk-in access only.	Ongoing	At all times	All visitors
Restrict access points to control unauthorised entry	Restrict public access to the reserve and Offset Area to one access point at the end of Kirby's Road to allow control over entry.	Ongoing	At all times	All visitors
Prohibit the entry of domestic animals to reduce threats to MNES	All domestic animals will be prohibited from entry to the Offset Area, (currently there are no restrictions on domestic animal access within the reserve).	Ongoing	At all times	All visitors
Monitoring compliance of prohibited domestic animals	Compliance with prohibiting domestic animals within the reserve and Offset Area will occur through visual monitoring by ecological restoration practitioners conducting operational works within the Offset Area and camera monitoring proposed under the PAMP.	Ongoing	At all times	All visitors
Prohibit the lighting of fires by unauthorised persons to reduce chance of uncontrolled fires	Only fires implemented and managed by authorised personnel, in accordance with controlled burning activities outlined in the FMP, will be permitted within the Offset Area.	Ongoing	At all times	All visitors
Report and management of unplanned fires	Immediate reporting of any unplanned fires observed by ecological restoration practitioners to the Offset Area manager, which will serve as a trigger for an assessment to determine the extent and severity of impact within the Offset Area as outlined in the FMP. This may include referral of the incident to SCC for investigation and enforcement under local laws. Ongoing occurrence of unplanned fires will serve as a trigger for additional corrective actions. Surveillance and additional signage (such as:	Ongoing	At all times	All visitors

Management Objectives	Management Actions	Frequency	Timing	Activity Provider
	Surveillance cameras in use) will be installed to monitor any identified high-risk sections of the Offset Area.			
Remove rubbish from Offset Area	Any miscellaneous rubbish observed during operational works would be collected and appropriately disposed of by the ecological restoration practitioners conducting management operations. Ongoing occurrence of rubbish will be reported to the Offset Area manager, which will serve as a trigger for corrective actions. Where ongoing miscellaneous rubbish is observed, additional mitigation measures would be considered, including but not limited to installing a rubbish collection system within the Offset Area.	Ongoing	At all times	All visitors
Support enforcement of penalties for illegal dumping	Observations of illegal rubbish dumping will be reported to the Offset Area manager, which will serve as a trigger for corrective actions including cooperation with Council to impose fines on individuals caught.	Ongoing	At all times	All visitors
Prohibit harvesting of timber	No harvesting of timber (including from Council's forestry coops) will be permitted within the Offset Area. Forestry coops contained within the Offset Area will be managed in accordance with this OAMP for the benefit of the protected matters.	Ongoing	At all times (in accordance with Section 2.4)	All visitors
Visual monitoring of compliance with prohibited timber harvesting	Ongoing occurrence of timber harvesting will be reported to the Offset Area manager, which will serve as a trigger for corrective actions. Surveillance and additional signage (such as: Surveillance cameras in use) will be installed to monitor any identified high-risk sections of the Offset Area.	Ongoing	At all times	All visitors
Minimise disturbance associated with the construction and use of new walking trails	All current and proposed walking trails have been designed by specialist consultant, which considered locations and construction methodologies to align with existing vegetation and topography. Where	Once	Prior to construction of trails.	TMR or delegated suitably qualified professional.

Management Objectives	Management Actions	Frequency	Timing	Activity Provider
	required to facilitate track construction, select vegetation removal will be limited to groundcovers and regrowth, prohibiting removal of vegetation providing koala and grey-headed flying-fox habitat. Any vegetation removal will be subject to flora and fauna studies to avoid any potential impact.			
	Construction of Trail 3 and 4 will be limited to hand tools only due to the terrain and insitu vegetation cover. Due to limited vegetation cover and proposed difficulty rating, sections of Trail 5 will include machine grading to provide a suitable trail surface.	During construction	During construction	TMR or delegated suitably qualified professional.
Managing weed as a result of construction or maintenance	Any weed growth which results from soil disturbance during construction or maintenance of these trails will be managed in accordance with the RWP.	Ongoing	Ongoing	TMR or delegated suitably qualified professional.
Prevent the establishment of and remediate unauthorised access tracks (if present)	Where unauthorised access tracks are identified which deviate from the approved path by TMR's ecological restoration practitioners, these sections will be flagged off to prevent further use and appropriate awareness signage installed as under this OAMP.	Ongoing	Ongoing	TMR or delegated suitably qualified professional.
Erosion				
Establish an erosion baseline	Undertake a baseline survey and mapping of existing areas of erosion and erosion risk areas (where present) within the Offset Area.	Once	Within six months of OAMP approval.	TMR or delegated suitably qualified and experienced bush regeneration contractor.
Remediate and manage erosion within the Offset Area	Identified erosion hazards will be remediated as soon as possible when weather permits following the completion of the wet season. Remedial works must not exacerbate or create additional soil erosion risks. Existing tracks may require rehabilitation or upgrading where soil erosion has occurred. Where required, access track rehabilitation or maintenance shall only occur outside of high rainfall periods.	As required, at least annually	As determined by activity provider.	TMR or delegated suitably qualified professional.

Management Objectives	Management Actions	Frequency	Timing	Activity Provider
	Access track maintenance will be undertaken as necessary in response to seasonal rainfall events causing damage.			
Limit potential for erosion during trail construction	Limit machinery used during construction of trails to avoid additional ground disturbance and erosion risk. Any erosion that occurs as a result of construction activities must be remediated as soon as possible.	Ongoing	During access construction	TMR or delegated suitably qualified professional. Access track contractor.
Remediate erosion associated with walking trails	The walking trails will be used by TMR’s ecological restoration practitioners and where track erosion is evident and causing increased sediment load within the Offset Area, restoration works will occur under the scope of this OAMP. Regular maintenance, such as repairing damaged sections and managing water drainage, is expected to mitigate the risk of erosion caused by public access to walking trails.	As required	Ongoing	TMR or delegated suitably qualified professional.
General management				
Prohibit Clearing in the Offset Area	Clearing of native vegetation (other than for firebreak maintenance) is prohibited, this includes the forestry coop which forms part of the offset and cannot be harvested	ongoing	At all times (In accordance with Section 2.4)	All personnel
Inform the public of the Offset Area and reduce non-compliance with OAMP requirements	Installation and maintenance of new signs at the entrance to the Offset Area outlining the rules and regulation for the Offset Area, including: <ul style="list-style-type: none"> • Weed hygiene practices (i.e., foot wash station) • Fires are prohibited • Domestic animals are prohibited • Harvesting of timber is prohibited • Dumping of rubbish/waste is prohibited • the importance of protecting natural habitats • Surveillance cameras in use (if installed as a corrective action) • Information detailing penalties for non-compliances. 	Installed once and maintained as necessary.	Signage to be installed within three months of OAMP approval.	TMR or delegated suitably qualified professional.

Management Objectives	Management Actions	Frequency	Timing	Activity Provider
Maintain gates at the entrance to the Offset Area to limit prohibited activities	Gates at the entrance of Offset Area will be maintained to: <ul style="list-style-type: none"> Prevent the entry of horses and other large domestic animals Restrict the volume of potential illegal dumping Remove vehicle access and limiting any potential harvesting of timber. 	As necessary	Throughout the duration of the offset, maintenance to occur within three months of being identified.	TMR or delegated suitably qualified professional.
Control vehicle access	Vehicle access is limited to council and authorised contractors undertaking offset area management in accordance with this plan. A limit of 40km per hour will be imposed.	Ongoing	At all times	All visitors
Report non-compliances and support enforcement action	Non-compliance within the Offset Areas will be reported to the Offset Area Manager and Council to be enforced under local law and encourage compliance with Offset Area rules and regulations and serve as a deterrent. These include fines for: <ul style="list-style-type: none"> Individuals who bring prohibited domestic animals Illegal dumping Prohibited harvesting of timber. 	Incidents reported within 30 days of event and reported annually.	Throughout the duration of the offset.	All visitors to the Offset Area.



Maleny National Park

Kondalilla National Park

- Legend**
- Offset Area
 - Easement
 - National Park
 - Freehold Land
 - Watercourse
 - Local Road
 - Track (RWC)
 - Unconstructed Road
 - Existing walking/vehicle trail
 - Existing walking trail
 - Proposed walking trail
 - Agricultural fencing to be maintained
 - ▲ Permitted vehicle access gates

Coordinate System:
GDA2020 MGA Zone 56
Date: 02/10/2024
Created By: VN
Drawing Size: A3
0 100 200 300m
1:10,000

F6-1 Proposed Offset Area Walking Trails, Gates and Fencing

Beerburrum to Nambour Rail Upgrade
Proposed Offset Area
Client: Qld Department of Transport and Main Roads



7. MONITORING AND REPORTING

7.1 MONITORING PROGRAM

The following monitoring program (Table 7.1) describes the monitoring actions that will occur within the Offset Area. The OAMP will continue monitoring actions for the life of the approval to ensure corrective actions are undertaken and the Offset Area continues to meet criteria set by the approval. Monitoring has been developed to assess success of the management actions, to improve the overall habitat condition for koala and grey-headed flying-fox in the Offset Area. Monitoring data will be submitted electronically to DCCEE in accordance with the *Guidelines for biological survey and mapped data* (DoE, 2018).

The monitoring actions described in Table 7.1 will be managed by the Offset Provider and will be completed by a suitably qualified expert, as required by the conditions of approval. . The placement of permanent MHQA transects and photo monitoring locations will correspond to the same locations used for the calculation of the start habitat quality scores used in the assessment of the Offset Area suitability.

Thirteen field-based ecological condition indicators used in the MHQA will be monitored to track the effectiveness and success of the OAMP:

- Recruitment of woody perennial species – includes koala canopy feed and shelter tree species.
- Native plant species richness (trees, shrubs and grasses) – as an indicator of ecological succession and regeneration progress after mitigating ecosystem threats.
- Tree canopy height – indicates progress towards ecological maturity and increases in koala and grey-headed flying-fox habitat availability.
- Tree canopy cover – indicates progress towards ecological maturity and increases in koala and grey-headed flying-fox habitat availability.
- Shrub canopy cover – indicates progress towards ecological maturity and increases in koala and grey-headed flying-fox habitat availability.
- Native perennial grass cover – which suppresses weeds and thereby encourages recruitment of juvenile eucalypt foraging and roosting trees.
- Organic litter cover – important for surface soil moisture retention, cycling of nutrients and providing interstitial spaces to enhance tree seed germination and growth and recruitment of canopy species including actively-growing species that support koala and grey-headed flying-fox foraging and roosting.
- Large trees per hectare – as a measure of important as foraging and roosting trees for koalas and grey-headed flying-fox and the production of seeds for recruitment.
- Coarse woody debris per hectare – an increase relative to the benchmark could indicate a decline in canopy tree health / increase in senescence.
- Non-native plant cover – which can compete with native plants for light, moisture and nutrients, especially recruiting koala food and shelter tree canopy species. Invasive plants can increase fuel load and change fire regimes and susceptibility to unplanned fires. The invasive plant cover within the Offset Area currently provides overabundant sheltering resources for the bell miner.

- Quality and availability of food and foraging – e.g. number, size and health of foraging trees.
- Quality and availability of shelter – e.g. density and health of roosting trees.
- Threats to species – e.g. wild dog activity and vehicle strike.

These attributes will put through the MHQA to assess the progress of the Offset Area towards the completion criteria. The location of the monitoring transects are shown in Figure 5-1 and correspond with the same location where MHQA transects were positioned to measure the start habitat quality score of the Offset Area.

The Offset Area RWP will also include provision for fire restoration techniques such as cool-burns that align with principles of the FMP.

TABLE 7.1 MONITORING PROGRAMS, PERFORMANCE CRITERIA AND CORRECTIVE ACTIONS

Monitoring (incl. timing, frequency, etc.)	Performance Criteria	Trigger for Adapting Management and Corrective Action(s)	Corrective Actions
Habitat Monitoring (to be carried out in line with this OAMP and appended management plans)			
<p>Monitoring of habitat within the Offset Area will be undertaken in accordance with the OAMP and RWP at a frequency and extent that allows reliable success measurement of the OAMP management objectives, including;</p> <ul style="list-style-type: none"> • Annual Offset Area habitat monitoring including field surveys, mapping, data spreadsheets and images by a suitably qualified ecologist and suitably qualified vegetation management specialist engaged by the Approval Holder. • Photo-point monitoring is to be undertaken annually at the same time of the year. Photo monitoring will be conducted within the centre point of the 100 x 50 m MHQA plot. The photos provide the baseline imagery to compare future photo-point monitoring. A record of the photos with the following attributes (details) will be maintained as per the following: <ul style="list-style-type: none"> ◦ GPS co-ordinates of the photo-point. ◦ Number identification of each photo and date and time when taken. ◦ Direction in which the photo was taken (north, south, east and west). 	<ul style="list-style-type: none"> • >65% of benchmark RE criteria for regrowth areas in year 10 for number of large trees and tree canopy cover; • >75% of benchmark RE criteria for regrowth areas in year 20 for number of large trees and tree canopy cover; • >80% of benchmark RE criteria for current remnant RE areas in year 10; • >90% of benchmark RE criteria for current remnant RE areas in year 20; and • An improvement on benchmark RE criteria is seen with each yearly monitoring event, based on data from MHQA assessments. 	<ul style="list-style-type: none"> • MHQA assessments and monitoring indicate that habitat quality scores for interim performance targets will not be achieved for one or more offset values by: <ul style="list-style-type: none"> ◦ Year 5 ◦ Year 10 ◦ Year 15 ◦ Year 20 • Habitat quality scores from MHQA assessments and monitoring do not indicate improvements on habitat quality scores after annual monitoring events. 	<p>Step 1: Investigate cause of trigger: Within one month after detection of the trigger, complete an investigation into the reasons why the interim performance targets were not achieved within the specified timeframes. Within two months after detection of the trigger, complete a re-evaluation of the suitability of the relevant management actions in the OAMP. The re-evaluation must identify appropriate corrective actions (i.e. removal of excess invasive species, availability of habitat, and/or decrease presence of pest animal species) and/or increased preventative measures to be undertaken.</p> <p>Step 2: Implement corrective action/s within three months of detection of trigger, including, as appropriate: Approval Holder to review the OAMP with assistance from the Offset Provider, relevant senior land manager and/or a senior ecologist, if required, to provide input on the effectiveness of the management actions.</p>

Monitoring (incl. timing, frequency, etc.)	Performance Criteria	Trigger for Adapting Management and Corrective Action(s)	Corrective Actions
<ul style="list-style-type: none"> After each monitoring event, a GPS waypoint of the location of the habitat and a polyline extent will be recorded. The following elements will be noted on a field datasheet. At 5-year intervals, a MHQA will assess predetermined BioCondition plots of koala and grey-headed flying-fox specific habitat attributes, with a report generated showcases the monitoring data and given to the Approval Holder At 5-year intervals, targeted surveys for koala and grey-headed flying-fox will be undertaken in accordance with relevant survey guidelines for each species (Survey guidelines for Australia’s threatened bats (DSEWPC 2010) and Action 1g National Recovery Plan for the koala (DAWE, 2022). These surveys will seek to inform presence of grey-headed flying-fox and koala within the Offset Area and provide specific locations of sightings. <p>At 5-year intervals the Annual Compliance Report produced by the Approval Holder and submitted to DCCEEW will include results of the MHQA and targeted surveys.</p>			<p>Approval Holder and Offset Provider to review the OAMP and appended plans and revise as required. Where interim performance targets, relating to habitat quality are not likely to be met in the required timeframe, the Approval Holder will notify DCCEEW within one month from the time of reporting this situation and implement additional management actions. Where final habitat quality scores are not likely to be met by year 20 the Approval Holder will notify DCCEEW within one week from the time of reporting this situation. The Approval Holder will obtain advice from the Offset Provider, a senior ecologist and senior land manager with the aim of identifying appropriate additional management interventions, such as intensifying management actions or including planting to enhance habitat.</p> <p>Step 3: Trigger for Corrective Action is resolved and reported within annual compliance monitoring.</p>

Regeneration Monitoring (to be carried out in line with the Regeneration Works Plan (RWP) presented in Appendix G)

Monitoring (incl. timing, frequency, etc.)	Performance Criteria	Trigger for Adapting Management and Corrective Action(s)	Corrective Actions
<p>Annual monitoring of WoNS and locally significant weeds will include:</p> <ul style="list-style-type: none"> • GPS coordinated mapping to determine the presence and location of weed presence or infestation and planting effort within the Offset Area; • A recorded datasheet, either hard-copy, tablet form, or as spatial data on ARC GIS field maps, to identify the year, date, time observed weed species, photo location, direction, and any other notes about the weed coverage. Datasheets will also record information about regenerative planting effort; • A copy of the previous year’s data and baseline mapping will be consulted before and after the assessments to determine any notable changes and establish the starting condition of the environment; and • Create or collate data with previous years as spatial data on field maps; listing Call GPS points and a weed survey map for ongoing monitoring purposes and annual compliance reporting. • Monitoring results will be included in the Councils annual report submitted to the DTMR. These results will likely be in the form of a series of photographic monitoring points at key areas of 	<ul style="list-style-type: none"> • Revised baseline weed and revegetation mapping within the Offset Area completed within 6 months of OAMP approval; • Initial treatment of all WoNS and planting in revegetation areas identified in the baseline mapping commenced within 12 months of OAMP approval; • 80% planting survival rate of planted seedlings and target stem densities achieved in identified Management Zones within the first 5 years of offset commencement; • Weed extent reduces to <5% (current maximum baseline weed extent is 40%) cover at all monitoring locations within 10 years of offset commencement; and • BOA Condition reaches ‘Excellent’ during the 20th year from offset commencement. 	<ul style="list-style-type: none"> • When seedlings in a particular area and/or general survival rate of seedlings does not exceed 80% within the first 5 years of offset commencement. If seedlings are not surviving within an area or in general, a review must take place and consultation with experts to understand issues arising with seedling success rate. • When becoming aware of new weed species (other than a new WoNS) being present in greater than 5% of the Offset Area. • Habitat quality scores from MHQA assessments and monitoring do not indicate improvements on habitat quality scores after yearly monitoring events. • One new WoNS species is identified in the Offset Area (regardless of extent), that was not previously present. • Weed extent increases from the current baseline level (40%). • Weed extent increases over two monitoring periods, when compared to the previous monitoring period (this identifies continual increases over subsequent monitoring as it is noted 	<p>Step 1: Investigate the cause of the trigger. Determine whether any factors (public access, weather event, fire or biosecurity incident) has contributed to the incursion of a weed species.</p> <p>Step 2: Implement corrective actions. Implement additional weed control actions (i.e. actively manage invasive weeds via physical, chemical, or biological methods as discussed in the RWP) weed within two months of detection. Implement new hygiene controls (i.e. ensuring all personnel / vehicles and equipment visiting the Offset Area have no weed contaminants present, limit dispersal mechanisms from anthropogenic causes, and ensure the Offset Area has physical barriers to limit weed dispersal). Review the Offset Area RWP and revise if necessary.</p> <p>Step 3: Trigger for Corrective Action is resolved and reported within annual compliance monitoring.</p>

Monitoring (incl. timing, frequency, etc.)	Performance Criteria	Trigger for Adapting Management and Corrective Action(s)	Corrective Actions
<p>infestation or one photograph for each management unit.</p> <p>The Annual Compliance Report compiled by the Approval Holder and submitted to DCCEWW will summarise any monitoring and management actions undertaken regarding weeds where relevant to demonstrate compliance with the OAMP.</p> <p><i>Note:</i> Monitoring frequency will be reduced from annual to bi-annual once the OAMP completion criteria have been successfully achieved (see Section 8.2).</p>		<p>weed extent may fluctuate year to year).</p>	

Pest Animal Monitoring (to be carried out in line with the Pest Animal Management Plan (PAMP) presented in Appendix F)

<ul style="list-style-type: none"> Initial detailed pest assessment within six months of OAMP approval to re-establish a baseline dataset and detailed mapping of targeted pest animals within the Offset Area; Ongoing targeted pest animal monitoring will take place quarterly within the Offset Area. Incidental observations of pest animal activity will also be reported by employees and contractors working in the Offset Area as well as members of the public through provided hotlines. 	<ul style="list-style-type: none"> No targeted pest animal population will exceed baseline survey results throughout the Offset Area AND overall population trends of all targeted pest animal species will show decreasing trends over the life of the Offset delivery program; Threat scores within MNES habitat quality do not increase over the life of the Offset delivery program Pest activity records of all targeted pest animal species show decreasing trends over the life of the Offset delivery program; 	<p>Triggers for corrective actions specific to each targeted pest animal species are discussed in Section 5 of the PAMP. They include:</p> <ul style="list-style-type: none"> One (1) or more incidental observations or public reports at any time including instances of injury or mortality to MNES attributed to pest animals. Confirmed presence of any pest animal by a suitably qualified professional Density becomes equal to or higher than baseline density. In the case where baseline data is not available, a 	<p>Adaptive management and corrective actions specific to each targeted pest animal species are discussed in Section 5 of the PAMP.</p> <p>Step 1: Investigate the cause of the trigger.</p> <p>Additional assessment (e.g., targeted survey) within one (1) month of trigger to confirm presence of pest animal, if confirmed immediate corrective actions will be put in place (e.g. targeted control and / or increased monitoring). These findings will be incorporated into next pest assessment.</p>
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Monitoring (incl. timing, frequency, etc.)	Performance Criteria	Trigger for Adapting Management and Corrective Action(s)	Corrective Actions
<p>The Annual Compliance Report compiled by the Approval Holder and submitted to DCCEWW will provide an update on activities and monitoring of pest animals within the Offset Area.</p>	<ul style="list-style-type: none"> Any injury or mortality of koala and grey-headed flying-fox attributed to targeted pest animals will not have a significant impact on species population health or viability (to be determined using results from the 5-yearly targeted surveys outlined in the OAMP); No reduction in quality of habitat for koala and grey-headed flying-fox, and subsequent detracting from MHQA score objectives described in the OAMP, directly linked to the targeted pest animals will occur; and Recruitment of critical habitat trees for koala and grey-headed flying-fox will not be directly impacted by the targeted pest animals. 	<p>maximum acceptable absolute density of three (3) animals observed within the Offset Area will serve as a trigger for additional corrective actions.</p>	<p>Step 2: Implement corrective actions. On confirming presence of any pest animal during triggered additional assessment or quarterly monitoring, implement appropriate corrective action (baiting, trapping) in Offset Area within one (1) month of assessment completion. If density becomes equal to or higher than baseline density, undertake and complete all additional corrective actions necessary to reduce pest animal density to baseline numbers or fewer. Review management actions to ensure control measures are sufficient.</p> <p>Step 3: Trigger for Corrective Action is resolved and reported within annual compliance monitoring.</p>

Fire Monitoring (to be carried out in line with the Fire Management Plan (FMP) presented in Appendix E)

<p>Monitoring will be undertaken in accordance with the FMP at a frequency and extent that allows reliable success measurement of the OAMP management objectives, including;</p> <ul style="list-style-type: none"> An initial fuel load assessment to occur within 3 months of OAMP approval, and thereafter be conducted annually; Quarterly inspection of fire breaks; Annual monitoring for signs of fire and fire damage (starting within 	<ul style="list-style-type: none"> No unplanned fires occurring within the Offset Area throughout the duration of the offset. No reduction in quality of habitat for koala and grey-headed flying-fox, and subsequent detracting from MHQA score objectives described in the OAMP, directly linked to fire. No mortality of MNES Recruitment of critical habitat trees for koala and grey-headed 	<ul style="list-style-type: none"> After an annual reporting event, fuel loads are reported to be at high levels, therefore need corrective actions as per FMP (Appendix E) (i.e. removal of excess fuel load within Offset Area, via controlled burn for example). If deliberate or unplanned fires occur within the Offset Area. 	<p>Step 1: Investigate the cause of the trigger. Within a month of detection of the trigger an investigation shall be completed to determine the source of the fire.</p> <p>Step 2: Implementation of corrective actions. Once notified or made aware of the trigger, the Offset Provider must notify the Approval Holder immediately.</p>
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Monitoring (incl. timing, frequency, etc.)	Performance Criteria	Trigger for Adapting Management and Corrective Action(s)	Corrective Actions
<p>six months from date of OAMP implementation);</p> <ul style="list-style-type: none"> Any opportunistic records of evidence of unplanned fires within the Offset Area (by on-site workers or members of the public) will be reported to the Offset Area Manager. <p>The Annual Compliance Report compiled by the Approval Holder and submitted to DCCEWW will summarise any monitoring and management actions undertaken regarding fire where relevant to demonstrate compliance with the OAMP, and will summarise condition of access tracks, fire breaks and fuel loads.</p>	<p>flying-fox will not be directly impacted by fire.</p> <ul style="list-style-type: none"> All fire management activities undertaken throughout the duration of the offset align with the management prescriptions described in the FMP. 	<ul style="list-style-type: none"> The destruction of or significant damage to habitat within part or all of the Offset Area and fire breaks. If a fire were to significantly impact >30% of the Offset Area (i.e. burn a majority of the habitat / regrowth) a new baseline MHQA survey must be completed within a 12-month period post fire. Mortality of MNES caused by a controlled burn. 	<p>After an unplanned fire has occurred in the Offset Area, within two months the Offset Provider will: Inspect, repair and re-establish all firebreaks as necessary without reducing the vegetation of the Offset Area. Reassess and correct, as required, fuel load reduction practices. Where there is a large amount of damage to the Offset Area, within twelve months of the fire event, the Approval Holder must arrange for a MHQA assessment that determines habitat quality loss and, immediately upon completion of the MHQA assessment, report the loss and how it will be addressed to meet the completion criteria, to DCCEEW.</p> <p>Step 3: Trigger for Corrective Action is resolved and reported within annual compliance monitoring.</p>

Public Access (to be carried out in line with this OAMP and appended management plans)

<ul style="list-style-type: none"> Any observations (by contractors or members of the public) of unauthorised fires, domestic animals, new weed incursions, rubbish and illegal timber harvesting will be reported to the Offset Area manager immediately. Annual monitoring for habitat, fire, weed and pest animals within 	<ul style="list-style-type: none"> No unauthorised fires lit within the Offset Area throughout the duration of the offset. No domestic animals observed via visual monitoring during works in the Offset Area or during annual pest assessments. No injury or mortality of koala or grey-headed flying-fox, or reduction in habitat quality, 	<ul style="list-style-type: none"> Any damage to infrastructure (i.e. gates, fences, signs) is identified. Any evidence of unauthorised fires within the Offset Area. Injury to or mortality of koala or grey-headed flying-fox, or habitat damage, is identified in the Offset Area 	<p>Step 1: Investigate the cause of the trigger. Determine whether any factors (broken gates or fences, damaged signs, alternative access points) have contributed to the impact to the Offset Area.</p> <p>Step 2: Implement corrective actions. Implement corrective or</p>
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Monitoring (incl. timing, frequency, etc.)	Performance Criteria	Trigger for Adapting Management and Corrective Action(s)	Corrective Actions
<p>the Offset Area will identify any potential impacts attributed to public access.</p> <p>The Annual Compliance Report compiled by the Approval Holder and submitted to DCCEWW will summarise any monitoring and management actions undertaken regarding public access where relevant to demonstrate compliance with the OAMP.</p>	<p>attributed to domestic animals brought in by members of the public.</p> <ul style="list-style-type: none"> No damage to habitat or new weed incursions attributed to public access in the Offset Area. No reports or observations of illegal rubbish dumping or timber harvesting within the Offset Area. No disturbance to habitat, new weed incursions or erosion damage attributed to construction and use of new walking trails. 	<p>and attributed to domestic animals brought in by members of the public.</p> <ul style="list-style-type: none"> A new weed species, or area impacted by weeds, is identified in the Offset Area that was not previously present and is attributed to public access. Any reports or observations of illegal rubbish dumping or timber harvesting within the Offset Area. Any disturbance to habitat, new weed incursions or erosion damage is identified and attributed to construction and use of new walking trails. 	<p>additional control actions (i.e. repair damaged infrastructure, install additional signage or surveillance measures, engage SCC to enforce penalties) within an appropriate timeframe after identification (i.e. repairs to signs and gates should commence within one month of identification, however additional surveillance systems may require longer to arrange and install). Repair damage to habitat if necessary (through RWP), review the OAMP and revise if necessary.</p> <p>Step 3: Trigger for Corrective Action is resolved and reported within annual compliance monitoring.</p>

Erosion (to be carried out in line with this OAMP)

<ul style="list-style-type: none"> A baseline survey and mapping of existing areas of erosion and erosion risk areas will be undertaken within six months of OAMP approval. Annual monitoring for habitat, fire, weeds and quarterly monitoring for pest animals within the Offset Area will identify any areas impacted by erosion. Remediation and management of erosion within the Offset Area will be undertaken as required, at least annually. 	<ul style="list-style-type: none"> No erosion damage attributed to construction and use of new walking trails, or other use of equipment and machinery within the Offset Area during offset delivery. No reduction in quality of habitat for koala and grey-headed flying-fox, and subsequent detraction from MHQA score objectives described in the OAMP, directly linked to erosion. 	<ul style="list-style-type: none"> Any erosion damage is identified during construction, maintenance or use of walking trails, or other use of equipment and machinery within the Offset Area during offset delivery. Any erosion damage is identified during monitoring events. Any reduction in quality of habitat for koala and grey-headed flying-fox, and likely subsequent detraction from 	<p>Step 1: Investigate the cause of the trigger. Determine whether any factors (damaged walking trails, improper use of machinery by contractors, alternative public access points) have contributed to the impact to the Offset Area.</p> <p>Step 2: Implement corrective actions. Implement additional control actions (i.e. rehabilitation or upgrading of trails, address possible non-compliance with the OAMP or</p>
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Monitoring (incl. timing, frequency, etc.)	Performance Criteria	Trigger for Adapting Management and Corrective Action(s)	Corrective Actions
<p>The Annual Compliance Report compiled by the Approval Holder and submitted to DCCEWW will summarise any monitoring and management actions undertaken regarding erosion where relevant to demonstrate compliance with the OAMP.</p>		<p>MHQA score objectives described in the OAMP, is identified and linked to erosion impacts.</p>	<p>appended plans) within an appropriate timeframe after identification. Erosion hazards will be remediated as soon as possible when weather permits following the completion of the wet season. Review the OAMP and appended plans and revise if necessary.</p> <p>Step 3: Trigger for Corrective Action is resolved and reported within annual compliance monitoring.</p>

7.2 REPORTING

7.2.1 ANNUAL COMPLIANCE REPORT

In accordance with the projects EPBC Approval, the Approval Holder will prepare an Annual Compliance Report against each EPBC Approval condition, including this OAMP and submit to DCCEEW 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 annual compliance report will be consistent with the DCCEEW *Annual Compliance Report Guidelines (2014)*.

The Annual Compliance Report will document any reported incidents of undesirable impacts on koalas and grey-headed flying-fox within the Offset Area, any occurrences of unauthorised fire, monitoring and management actions including tracking of progress towards the required interim performance targets and completion criteria during the previous 12 months. The report will also summarise any monitoring and management actions undertaken regarding fire, vegetation, pest animals and weeds where relevant to demonstrate compliance with the OAMP.

The Annual Compliance Report will also document any non-compliance with the OAMP and will allow for discussion on how management actions have resulted in, or are leading to, the completion criteria.

7.2.2 ANNUAL OFFSET REPORT

An Annual Offset Report will be developed by the Offset Provider and submitted to the Approval Holder to facilitate completion of the Annual Compliance Report.

The Annual Offset Report will be coordinated and reviewed by a suitably qualified ecologist and suitably qualified vegetation management specialist, with technical review and quality assurance processes followed so that robust reporting on the offset progress is documented. The report will be prepared to follow appropriate documentation standards for the communication of monitoring data, with the following applied:

- EPBC Act approval number and project name;
- Revision history and signature page of all reviewers;
- Scale in figures and maps– an appropriate standard metric scale should be chosen to best represent the information required for the location of monitoring plots and any spatial information;
- Datum – plans and cross sections should refer to Australian Height Datum; and
- All relevant figures and maps will include a title Block – plans should have a title block in the lower right-hand corner of the sheet with the following information:
 - EPBC number and project name;
 - Title and number of the plan;
 - Author;
 - Scale;
 - Date; and
 - Source and date of data.

7.2.3 MHQA AND ECOLOGY REPORT

Suitably qualified field ecologists will be engaged to conduct ecological monitoring (including targeted surveys, MHQA and BioCondition assessments). Reports will be submitted to the Approval Holder every 5 years, and the Approval Holder will include a summary of findings as part of the relevant Annual Compliance Report. Reporting will follow frequency as detailed in Table 7.2.

TABLE 7.2 REPORTING FREQUENCY

Report Type	Timing for delivery
Annual Compliance Report	Annually 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.
Annual Offset Report	Annually for each 12-month period from the commencement of the OAMP implementation.
OAMP MHQA and Ecology Report	Every 5 years via every 5 th Annual Offset Report. Report will be submitted to the Approval Holder every 5 years, and the Approval Holder will include a summary of findings as part of the relevant Annual Compliance Report.

7.2.4 INCIDENT OR NON-COMPLIANCE MANAGEMENT

Reporting of non-compliances will be undertaken in accordance with Conditions 15 and 16 of the EPBC Act Project Approval. Incidents (as defined in the EPBC Act approval) or non-conformances identified on site will be reported to the Approval Holder by the Offset Provider. The level of severity will dictate the necessary actions and responses through the Approval Holder's formal incident management system.

TMR will notify the Department in writing of any: incident; non-compliance with the conditions; or non-compliance with the commitments made in plans. The notification will be given as soon as practicable, and no later than 2 business days after becoming aware of the incident or non-compliance. The notification will specify:

- a) any condition which is or may be in breach;
 1. a short description of the incident and/or non-compliance; and
 - b) 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.

TMR will provide to the Department the details of any incident or non-compliance with the conditions or commitments made in plans 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
2. the method and timing of any remedial action that will be undertaken by the Approval Holder.

Responses to incidents or non-compliance adversely impacting habitat quality within the Offset Area, or koalas and grey-headed flying-fox directly, will be coordinated by the Approval Holder, to ensure remediation or enhanced management actions are implemented to address the incident or non-compliance as soon as reasonably possible.

8. PERFORMANCE OBJECTIVES & COMPLETION CRITERIA

8.1 PERFORMANCE OBJECTIVES

The overall objective of managing the offset is to improve the quality of habitat so that it reaches a higher MHQA habitat quality score than has been measured for the existing baseline condition within a 20-year period and continues for the life of the approval.

A demonstrated increase in measurable habitat criteria (see Table 7.1), as defined in the MHQA, will be provided against the baseline condition assessment (see Section 5.4).

Monitoring results will be analysed against the interim performance targets to determine whether performance objectives are met prior to the completion criteria being achieved. Monitoring against the targets and the criteria will provide an indication of the success of the management and monitoring actions being implemented to improve the quality of koala and grey-headed flying-fox habitat. They will also serve to trigger implementation of corrective actions where targets and criteria are not being met.

Performance criteria for each management action are provided in Table 7.1.

8.2 COMPLETION CRITERIA

- To facilitate regrowth to transition into remnant vegetation, the following parameters will be assessed using the MHQA against RE benchmark conditions:
 - Native plant species richness - trees
 - Native plant species richness - shrubs
 - Native plant species richness - grasses
 - Native plant species richness - forbs
 - Tree canopy height (average of emergent, canopy, sub-canopy)
 - Tree canopy cover (average of emergent, canopy, sub-canopy)
 - Number of large eucalypt trees
 - Shrub canopy cover
 - Native grass cover
- Completion criteria specific to meeting required habitat improvements for koala and grey-headed flying-fox will include meeting 75% of the benchmark value for:
 - Large eucalypt and non-eucalypt trees, as an indicator of potential foraging and roosting resources; and
 - Tree canopy cover, as an indicator of mature open eucalypt forest.

With an overall objective of reaching an increase of 1 unit in MHQA Scoring, the proposed weed management and fire management is aimed at improving habitat condition in lower canopy and recruitment of canopy species. Additionally, tree growth throughout the Offset Area will contribute to the overall objective of improving foraging and sheltering resources for koala and grey-headed flying-fox. Indicative criteria have been outlined for 'large trees' and 'canopy cover' metrics.

Interim performance targets and the completion criteria are provided in Table 8.1 below.

TABLE 8.1 INTERIM PERFORMANCE TARGETS AND COMPLETION CRITERIA

Protected matter	Offset Area remnant and regrowth eucalypt open forest	Offset Area remnant and regrowth notophyll vine forest
Offset Area details		
Impact area (IM)	Up to 64.15 ha with a MHQA score of 4	
Transect Site Reference (see Figure 3)	Site 2 & K2 (regrowth) Site K1 & K3 (remnant)	Site 1 (remnant)
Offset Area (ha)	148	19
MHQA overall scoring		
MHQA start quality	6	5
MHQA score Year 5	6.2 – 6.3	5.2 – 5.3
MHQA score Year 10	6.4 – 6.5	5.4 – 5.5
MHQA score Year 15	6.6 – 6.7	5.6 – 5.7
MHQA score Year 20	6.8 – 7.0	5.8 – 6.0
Indicative large trees criteria		
Benchmark RE	12.12.15 (57 trees/ha)	12.12.16 (38 trees/ha)
Start condition	40% of benchmark (23 trees)	45% of benchmark (17 trees)
Year 5	50% of benchmark (28 trees)	50% of benchmark (19 trees)
Year 10	60% of benchmark (34 trees)	60% of benchmark (23 trees)
Year 15	70% of benchmark (40 trees)	70% of benchmark (26 trees)
Year 20	75% of benchmark (43 trees)	75 % of benchmark (28 trees)

Protected matter	Offset Area remnant and regrowth eucalypt open forest	Offset Area remnant and regrowth notophyll vine forest
Indicative tree canopy cover criteria		
Benchmark RE	12.12.15 (68.5% cover)	12.12.16 (45% cover)
Start condition	67% of benchmark (46% cover)	73% of benchmark (33% cover)
Year 5	70% of benchmark (48% cover)	75% of benchmark (34% cover)
Year 10	70% of benchmark (48% cover)	75% of benchmark (34% cover)
Year 15	75% of benchmark (51% cover)	80% of benchmark (36% cover)
Year 20	75% of benchmark (51% cover)	80% of benchmark (36% cover)

9. RISK ANALYSIS

A risk analysis (qualitative) has been carried out for the proposed Offset Area and is presented in Table 9.1. This risk analysis assesses the risk of failure for the offset to reach its performance criteria specific to each category (as outlined in Table 7.1) and overall completion criteria (as outlined in Section 8.2). The risk analysis has been undertaken in accordance with EPBC Environmental Management Plan Guidelines and has characterised the risks as low, medium, high or severe. This is a result of assessing the likelihood of and consequence of each of the outcomes that present a risk to the Offset Area. The risks assessed have additionally been provided with preventative measures, which relate to corrective offset management actions as described in Table 7.1, to ensure the risk described can be mitigated effectively.

The framework utilised for the risk analysis, including descriptions for the likelihood and consequence criteria and risk rating matrix, is provided below.

RISK LIKELIHOOD

Likelihood	Description
Highly Likely	It is expected to occur in most circumstances.
Likely	Will probably occur during the life of the Project
Possible	Might occur during the life of the Project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

RISK CONSEQUENCE

Minor	Moderate	High	Major	Critical
Results in short term delays to achieving OAMP objectives, implementing low cost, well characterised corrective actions.	Results in short term delays to achieving OAMP objectives, implementing well characterised, high cost/effort corrective actions.	Results in medium-long term delays to achieving OAMP objectives, implementing uncertain, high cost/effort corrective actions.	The OAMP objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies.	The OAMP objectives are unable to be achieved, with no evidenced mitigation strategies.

RISK MATRIX

Likelihood	Consequence				
	Minor	Moderate	High	Major	Critical
Highly Likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

TABLE 9.1 RISK ANALYSIS

Risk Event	Likelihood	Consequence	Risk Level	Event Trigger	Contingency measures	Residual Risk Level	Related Monitoring Activity
Habitat quality for koala and grey-headed flying-fox does not improve or is reduced compared to baseline conditions.	Possible	Moderate	Medium	<p>MHQA assessments and monitoring indicate that habitat quality scores for interim performance targets will not be achieved for one or more offset values by:</p> <ul style="list-style-type: none"> Year 5 Year 10 Year 15 Year 20 <p>Habitat quality scores from MHQA assessments and monitoring do not indicate improvements on habitat quality scores after annual monitoring events.</p>	<p>Within one month after detection of the trigger, complete an investigation into the reasons why the interim performance targets were not achieved within the specified timeframes.</p> <p>Within two months after detection of the trigger, complete a re-evaluation of the suitability of the relevant management actions in the OAMP. The re-evaluation must identify appropriate corrective actions (i.e. removal of excess invasive species, availability of habitat, and/or decrease presence of pest animal species) and/or increased preventative measures to be undertaken.</p> <p>Approval Holder and Offset Provider to review the OAMP and appended plans and revise as required.</p> <p>Where interim performance targets, relating to habitat quality are not likely to be met in the required timeframe, the Approval Holder will notify DCCEE within one month from the time of reporting this situation and implement additional management actions.</p>	Low	Annual habitat monitoring and BioCondition Assessment 5 yearly MHQA assessment

<p>Weeds degrade habitat quality within the Offset Area and inhibit the regrowth and recruitment of canopy trees.</p>	<p>Likely</p>	<p>Moderate</p>	<p>Medium</p>	<p>Increases in the presence of invasive flora species (weed infestations) are observed. Vegetation condition and habitat quality within the Offset Area decline from the presence of weed species. Habitat quality score does not increase after 5 years as a result.</p>	<p>If it is found that the performance criteria are not met within the timeframe, the following corrective actions will be adopted:</p> <ul style="list-style-type: none"> • Where the BOA Condition score reduces from the previous assessment, management actions to restore and improve habitat will be increased in frequency and at a higher rate of control until the completion criteria is achieved. • If Increases in the presence of WoNS or locally significant weeds are identified, the scope and frequency of the management actions will be increased until the completion criteria have been achieved. • Where vegetation restoration has a success rate of below 60% (measured against MHQA and monitoring events habitat quality scores), active regeneration (habitat infill and direct plantings of relevant community species) measures will be repeated until the completion criteria for the OAMP and benchmark vegetation levels for the respective RE are achieved. • In the instance of unplanned fires or flooding during the monitoring interval, any negative impacts to the habitat quality score and BOA Condition will be regarded. Areas effected will be compared to monitoring site that remain unaffected and were previously at the same, or nearest to, the quality of the affected site. Any resulting 	<p>Low</p>	<p>Annual weed monitoring 5 yearly MHQA assessment</p>
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Risk Event	Likelihood	Consequence	Risk Level	Event Trigger	Contingency measures	Residual Risk Level	Related Monitoring Activity
					disturbance as a consequence of these instances, for instance weed infestation, will be managed to ensure the completion criteria for that value is attained.		
Unplanned fire degrades habitat quality within the Offset Area or results in direct mortality of MNES species.	Possible	High	Medium	Unplanned fire results in the destruction of or significant damage to habitat within part or all of the Offset Area and fire breaks.	<p>Fuel reduction, fire break maintenance and controlled burning activities will reduce the potential impact of an unplanned fire within the Offset Area.</p> <p>If a fire was still to occur during the life of the offset, actions to restore habitat following an unplanned fire event include:</p> <ul style="list-style-type: none"> • Inspection of the affected area within 2 months; • MHQA undertaken within 3 months of an unplanned fire event at monitoring locations and or affected areas; • Corrective management measures developed for all affected areas (areas where MHQA scoring has decreased in value from previous monitoring event) within 5 months of unplanned fire event; and • Corrective management actions, specific to condition of habitat and vegetation within affected areas (e.g. habitat restoration, revegetation, weed suppression and removal) commenced within 8 months. 	Medium	Annual fire monitoring Quarterly fire break inspections

Risk Event	Likelihood	Consequence	Risk Level	Event Trigger	Contingency measures	Residual Risk Level	Related Monitoring Activity
Pest animals degrade habitat quality within the Offset Area or result in direct mortality of MNES species.	Possible	Moderate	Medium	Quarterly monitoring identifies increases in the presence of pest animal species compared to baseline assessment.	If density becomes equal to or higher than baseline density, undertake and complete all additional corrective actions necessary to reduce pest animal density to baseline numbers or fewer. Review PAMP and management actions to ensure control measures are sufficient.	Low	Quarterly pest animal monitoring 5 yearly MHQA assessment
Impacts from public access degrade habitat within Offset Area (e.g., vegetation damage from walking off designated trails).	Likely	Moderate	Medium	Decline in vegetation condition and/or habitat quality within the Offset Area is identified and attributed to public access (e.g., flora being trampled or native fauna being injured by domestic animals).	Investigate cause of impact to flora, fauna or habitat and confirm link to public access. Employ further signage, surveillance (e.g., CCTV cameras) or additional penalties for non-compliance (in conjunction with SCC). Undertake corrective management actions, specific to condition of affected habitat and vegetation (e.g., revegetation). Review Public Access facilitation and management actions within this OAMP.	Low	Annual habitat monitoring 5 yearly MHQA assessment
Administrative Risk (OAMP not succeeding),	Unlikely	High	Medium	Habitat quality scores from MHQA assessments and monitoring indicate final habitat quality scores are not likely to be met by year 20.	Adaptive management has been implemented into all management actions presented in this OAMP and appended plans. This will enable changes and updates to be made to management actions, if circumstances in the Offset Area changes, to ensure the performance criteria and overall completion criteria continue to be met for the duration of the offset.	Low	Annual monitoring and reporting 5 yearly MHQA assessment.

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APPENDIX A EVIDENCE OF THREATS TO OFFSET AREA



ERM



CASTOR OIL PLANT (*RICINUS COMMUNIS*), WILD TOBACCO (*SOLANUM MAURITIANUM*) AND EXOTIC GRASSES AT THE OFFSET AREA.



ERM



DEFOLIATION ASSOCIATED WITH BELL MINER DIEBACK AT THE OFFSET AREA.



ERM

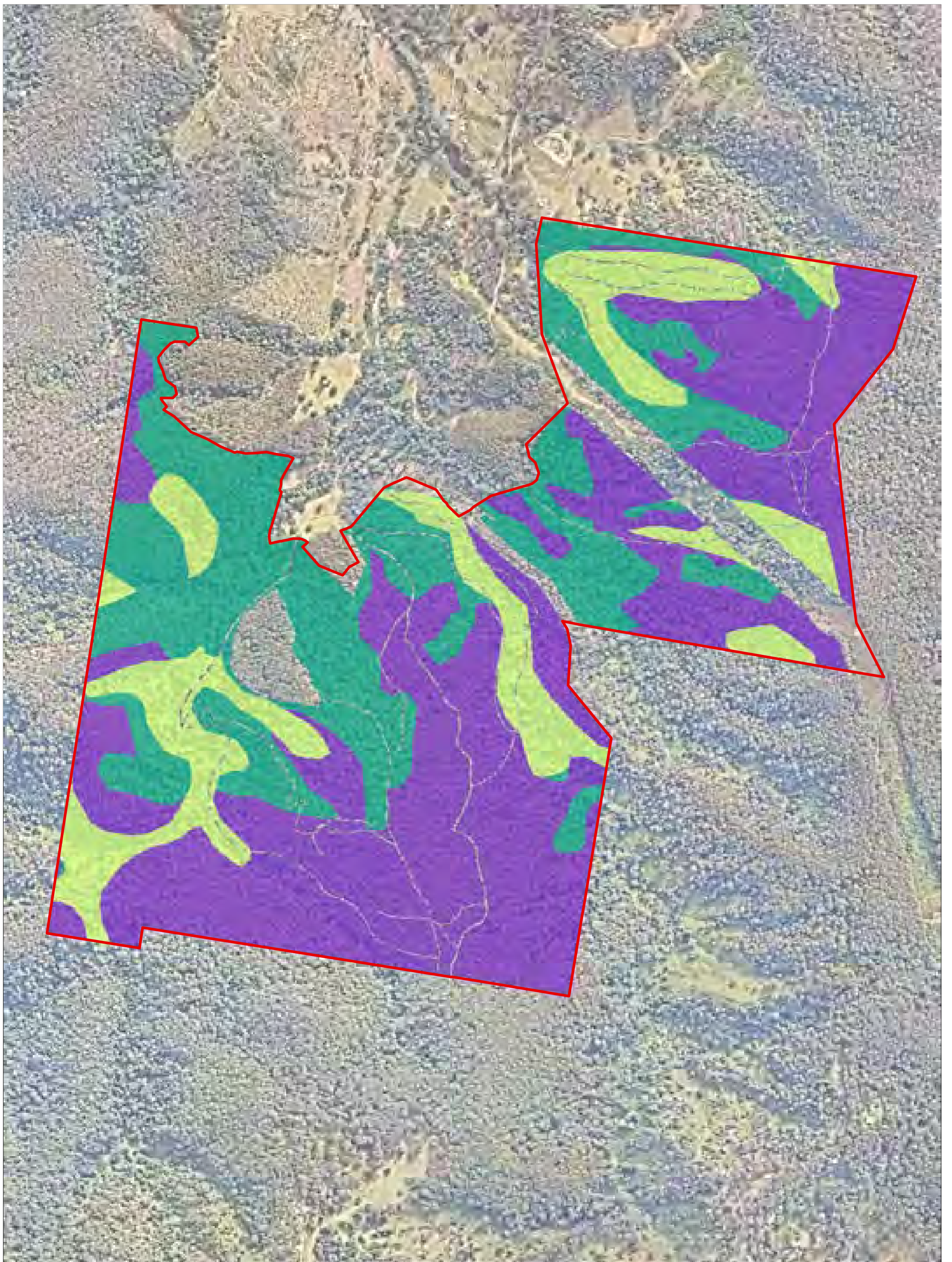


DENSE LANTANA (*LANTANA CAMARA*) UNDERSTOREY AT THE OFFSET AREA.



APPENDIX B

OFFSET AREA VEGETATION MAPPING



Legend

- ▭ B2N Project Offset Area
- ▭ Eucalyptus woodland (remnant)
- ▭ Eucalyptus woodland (non-remnant)
- ▭ Vine forest

Coordinate System:
GDA2020 MGA Zone 56

Date: 23/08/2024
Created By: CB
Drawing Size: A3

0 50 100 150m



1:8,000

B2N Offset Area Vegetation Mapping

Beerburrum to Nambour Rail Upgrade
Offset Area Management Plan
Qld Department of Transport and



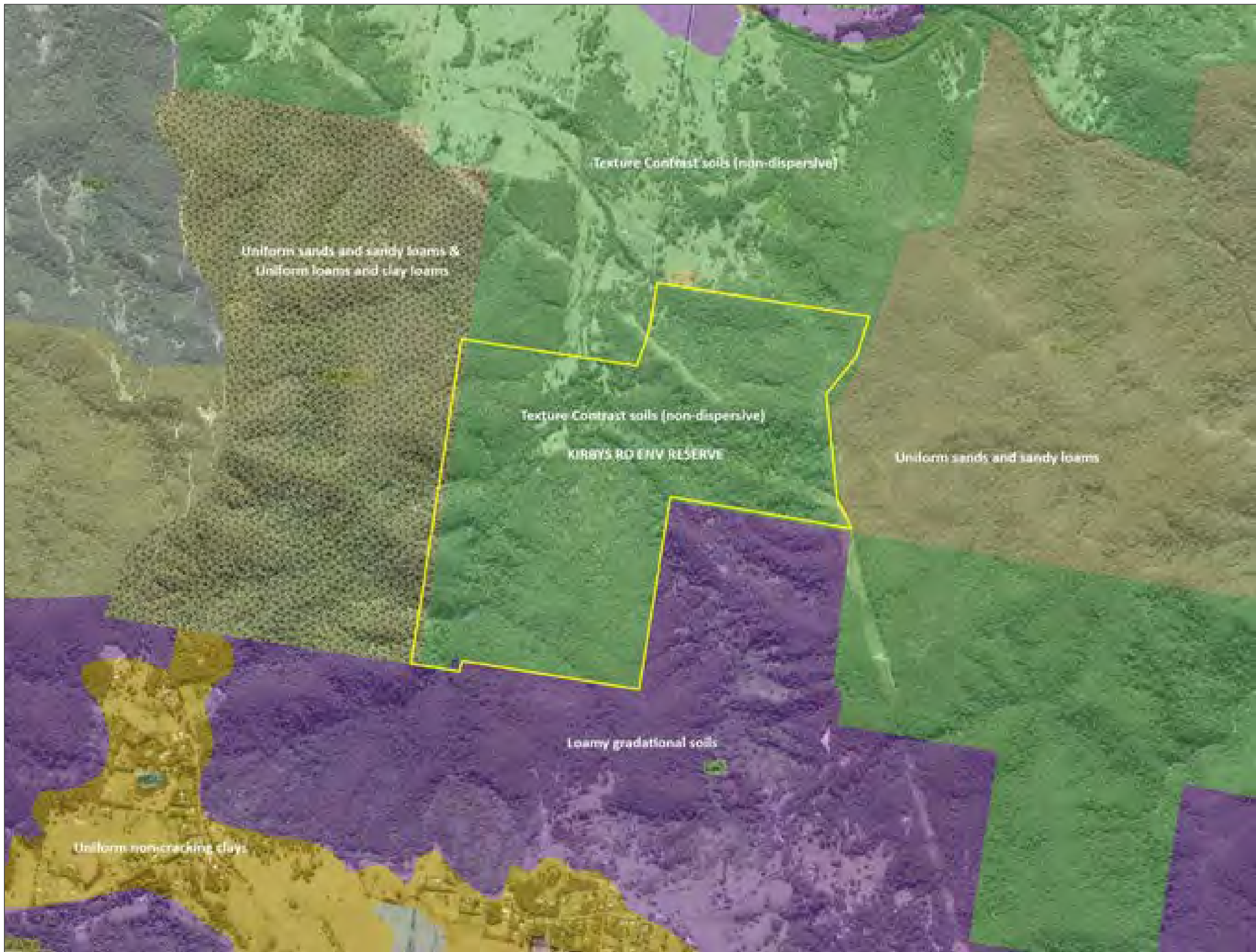
Data Source:
Nearmap Imagery June 2024

0589458s_B2N_OS_G005_R5.mxd



APPENDIX C

OFFSET SITES SOIL GROUP MAP





APPENDIX D

BASELINE OFFSET DATA

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

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Units	Information source	
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes		Area	64.15	Hectares	
			Quality	4	Scale 0-10	
			Total quantum of impact	25.66	Adjusted hectares	
<i>Threatened species</i>						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator																			
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality	Future area and quality without offset	Future area and quality with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source			
<i>Ecological Communities</i>																			
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (% without offset)	0.0	Risk of loss (% with offset)	0.0									
					Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0											
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	7									
<i>Threatened species habitat</i>																			
Area of habitat	Yes	25.66	Adjusted hectares	161	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	189.97	Risk of loss (% without offset)	0%	Risk of loss (% with offset)	0%	0.21	60%	0.13	0.12	27.43	106.91%	Yes
					Future area without offset (adjusted hectares)	189.8	Future area with offset (adjusted hectares)	190.0											
					Time until ecological benefit	20	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	7	2.00	75%	1.50	1.44			
<i>Threatened species</i>																			
Birth rate e.g. Change in nest success	No																		
Mortality rate e.g. Change in number of road kills per year	No																		
Number of individuals e.g. Individual plants/animals	No																		

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	25.66	27.43	106.91%	Yes	\$0.00	N/A	\$0.00
Area of community	0				\$0.00		\$0.00
					\$0.00	\$0.00	\$0.00

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

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
<i>Ecological communities</i>						
Area of community	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species habitat</i>						
Area of habitat	Yes		Area	64.15	Hectares	
			Quality	4	Scale 0-10	
			Total quantum of impact	25.66	Adjusted hectares	
<i>Threatened species</i>						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator																		
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality	Future area and quality without offset	Future area and quality with offset	Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source		
<i>Ecological Communities</i>																		
Area of community	No				Risk-related time horizon (max. 20 years)	Start area (hectares)	Risk of loss (% without offset)		Risk of loss (% with offset)									
					Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0										
					Time until ecological benefit	Start quality (scale of 0-10)	Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)									
<i>Threatened species habitat</i>																		
Area of habitat	Yes	25.66	Adjusted hectares	161	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	189.97	Risk of loss (% without offset)	0%	Risk of loss (% with offset)	0%						
					Future area without offset (adjusted hectares)	189.8	Future area with offset (adjusted hectares)	190.0	0.21	60%	0.13	0.12						
					Time until ecological benefit	20	Start quality (scale of 0-10)	6	Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	7	2.00	75%	1.50	1.44	27.43	106.91%
<i>Threatened species</i>																		
Birth rate e.g. Change in nest success	No																	
Mortality rate e.g. Change in number of road kills per year	No																	
Number of individuals e.g. Individual plants/animals	No																	

Summary							
Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost (\$)		
					Direct offset (\$)	Other compensatory measures (\$)	Total (\$)
Birth rate	0				\$0.00		\$0.00
Mortality rate	0				\$0.00		\$0.00
Number of individuals	0				\$0.00		\$0.00
Number of features	0				\$0.00		\$0.00
Condition of habitat	0				\$0.00		\$0.00
Area of habitat	25.66	27.43	106.91%	Yes	\$0.00	N/A	\$0.00
Area of community	0				\$0.00		\$0.00
					\$0.00	\$0.00	\$0.00

OFFSET - GHFF
Kirby's Rd

Site Reference	12.12.15									12.12.15								
	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Average Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Average Score				
Recruitment of woody perennial species in EDL	100	70	70	3	100	100	5	100	75	75	5	75	75	5				
Native plant species richness - trees	8	5	62.5	2.5	4	50	2.5	8	5	62.5	2.5	4	50	2.5				
Native plant species richness - shrubs	6	3	50	2.5	2	33	2.5	6	4	67	2.5	4	67	2.5				
Native plant species richness - grasses	5	2	40	2.5	2	40	2.5	5	3	60	2.5	3	60	2.5				
Native plant species richness - forbes	17	6	35	2.5	6	35	2.5	17	6	35	2.5	7	41	2.5				
Tree canopy height (average of emergent, canopy, sub-canopy)	17	13.5	79	5	15	88	5	17	12.5	74	5	12	70	3				
Tree canopy cover (average of emergent, canopy, sub-canopy)	68.5	46.5	68	5	40	58	5	68.5	45	66	5	32	47	2				
Shrub canopy cover	5	25	500	3	30	600	3	5	2	40	3	2	40	3				
Native grass cover	23	5	22	1	5	22	1	23	12	52	3	10	43	1				
Organic litter	65	70	108	3	50	77	5	65	60	92	5	35	54	5				
Large trees (euc plus non-euc)	57	34	60	10	11	19	5	57	29	51	10	19	33	5				
Coarse woody debris	613	315	51	5	405	66	5	613	302	49	2	265	43	2				
Non-native plant cover	0	30	30	3	40	40	3	0	5	5	5	30	30	3				
Quality and availability of food and foraging habitat	25	25	100	10	20	80	8	25	25	100	10	15	60	6				
Quality and availability of shelter	25	25	100	10	20	80	8	25	25	100	10	15	60	6				
Size of patch	10			5			5				5			5				
Connectedness	5			4			4				4			4				
Context	5			4			4				4			4				
Ecological Corridors																		
Role of site location to species overall population in the state	10			6			6				5			5				
Threats to the species	10			1			1				1			6				
Species mobility capacity	10			7			7				6			6				

Species Stocking Rate (SSR)					
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0	5	10	
		No	Yes - adjacent	Yes - on site	
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15
		Not habitat	Dispersal	Foraging	Breeding
Approximate density (per ha)	Score	0	10	20	30
		0%	X		
Role/importance of species population on site*	Score (Total from supplementary table below)	0	5	10	15
		0	5 - 15	20 - 35	40 - 45
Total SRR score (out of 70)		55			
SRR Score (out of 4)		3.142857143			

10
15
20
10

*SSR Supplementary Table			Score assigned
*Key source population for breeding	Score	0	10
		No	Yes/ Possibly
*Key source population for dispersal	Score	0	5
		No	Yes/ Possibly
*Necessary for maintaining genetic diversity	Score	0	15
		No	Yes/ Possibly
*Near the limit of the species range	Score	0	15
		No	Yes
Total SSR			30

Final habitat quality score (weighted)	AU1	AU2	AU3	Average/ Final
Site Condition score (out of 3)	1.97	1.86	2.01	
Site Context Score (out of 3)	1.62	1.8	1.5	
Species Stocking Rate Score (out of 4)	2.2	3.14	1.7	
Habitat Quality score (out of 10)	5.785	6.8	5.21	5.93
Assessment Unit area (ha)	70.89	90.6	20.66	
Total offset area (ha) for this MNES	189.97	189.97	189.97	
Size Weighting	0.39	0.48	0.11	
Weighted Habitat Quality Score	2.26	3.26	0.57	6.09

Site Context Attribute
Size of patch
Connectedness
Context
Ecological Corridors
Threats to the species
Quality and availability of habitat required for mobility

Size of Patch Scoring

Score	Description
0	< 5 hectares
2	5 - 25 hectares
5	26 - 100 hectares
7	101 - 200 hectares
10	> 200 hectares

Connectedness Scoring

Score	Description
0	The assessment unit: is not connected using any of the below descriptions.
2	The assessment unit: is connected with adjacent remnant vegetation along >10% to <50% of its perimeter OR is connected with adjacent remnant vegetation along <10% of its perimeter AND is connected with adjacent regrowth native vegetation > 25% of its perimeter.
4	The assessment unit: is connected with adjacent remnant vegetation along 50% to 75% of its perimeter
5	The assessment unit: is connected with adjacent remnant vegetation along >75% of its perimeter OR includes > 500 ha remnant vegetation

Ecological Corridors Scoring

Score	Description
0	Not within an ecological corridor.
3	Sharing a common boundary with an ecological corridor.
6	Within an ecological corridor.

Quality and availability of habitat required for mobility Scoring**

Score	Description
0	The assessment unit: is not connected using any surrounding GHFF foraging habitat.
4	The assessment unit: is connected with adjacent GHFF foraging habitat along >10% to <50% of its perimeter OR is connected with adjacent GHFF foraging habitat along <10% of its perimeter AND is connected with adjacent GHFF foraging habitat > 25% of its perimeter.
8	The assessment unit: is connected with adjacent GHFF foraging habitat along 50% to 75% of its perimeter
10	The assessment unit: is connected with adjacent GHFF foraging habitat along >75% of its perimeter OR includes > 500 ha GHFF foraging habitat

**Habitat required for mobility relates to the species' ability to move within the matter and, if relevant, to and from adjacent patches of habitat. Mobility capacity between adjacent patches of suitable habitat will only be relevant to species that naturally inhabit an area that is larger than the matter area

Context Scoring*

Score	Description
0	< 5 hectares
2	5 - 25 hectares
4	26 - 100 hectares
5	101 - 200 hectares

*The context attribute refers to the amount of native vegetation that is retained in the landscape proximal to the site being assessed. A 1 km radius buffer from the 50 m mark of the AU transect is used to delineate a circular spatial extent. The scoring relates to the proportion of native remnant vegetation and/or regrowth vegetation) is retained within the 1 km radius landscape.

Threats to Species Scoring[^]

Score	Description
1	High level of threats to species: 1 - 10 threat score.
5	Medium level of threats to species: 11 - 20 threat score.
10	Low level of threats to species: > 20 threat score.

Threat Matrix		Threats				
		Severity				
Scope		Very High	High	Medium	Low	Very Low
Very High	1	1	2	3	4	5
High	2	2	4	6	8	10
Medium	3	3	6	9	12	15
Low	4	4	8	12	16	20
Very Low	5	5	10	15	20	25

Threats to GHFF within Offset site[^]

Direct Threats	Scope	Severity	Score
Heat Stress	3	3	9
Bushfires	2	2	4
Final score:			4

[^]**NB:** Threats remain consistent in both scope and severity across all assessment units due to the nature of the threats.

Species Stocking Rate (SSR) Attribute	Score	Justification
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	10	A Grey-Headed Flying-Fox roost was recorded at the Offset Area in 2012 (O2Ecology, 2012) (See Appendix A). Field : completed in 2021 and 2022, across the Offset Area, have identified Grey-Headed Flying-Fox habitat (see Appendix nine roost sites are known to occur within a 40 km radius of the B2N Project Area. Roost sites in relation to the Proj presented in the Beerburrum to Nambour Rail Upgrade EPBC Act Preliminary Documentation (EPBC PD) (ERM, DTM ARUP also identified one roost south of Coochin Creek, Glass House Mountains (5.4km north of the Project Area) an records of foraging activity at night during their 2020 survey period (ARUP, 2021).
Species usage of the site (habitat type & evidenced usage)	15	As above, a Grey-Headed Flying-Fox roost was recorded at the Offset Area in 2012 (O2Ecology, 2012) (See Appendix A). Additionally, The Offset Area is ground-truthed mapped containing remnant vegetation RE 12.12.15 (Corymbia ir Eucalyptus propinqua, E. siderophloia, E. microcorys, Lophostemon confertus open forest on Mesozoic to Proterozoic rocks) and RE 12.12.1 (Simple notophyll vine forest usually with abundant Archontophoenix cunninghamiana (gully on Mesozoic to Proterozoic igneous rocks). Both RE types contain suitable foraging and shelter habitat for Grey-Hea Fox.
Approximate density (per ha)	20	Irregular patterns of camp occupancy are apparent for the species in the Offset Area locality based on the DCCEEW Flying-Fox Web Viewer (DCCEEW interactive map) monitoring data and Sunshine Coast Council's interactive BatMap BatMap) monitoring data. Twenty-nine roost sites are known to occur within a 40 km radius of the B2N Project Are in relation to the Project Area are presented in the Beerburrum to Nambour Rail Upgrade EPBC Act Preliminary Doc (EPBC PD) (ERM, DTMR 2021).
Role/importance of species population on site*	10	Total from SSR Supplementary Table below is 30. A total score of 20 - 35 from SSR Supplementary Table below resu of 10 for 'role/importance of species population on site'.

*SSR Supplementary Table	Score	Justification
*Key source population for breeding	10	The grey-headed flying-fox is considered to exist as one national population split into separate colonies due to the c genetic exchange and movement between camps throughout the species' entire geographic range (DoE, 2021). Irre patterns of camp occupancy are apparent for the species in the Offset Area locality based on the DCCEEW Interactiv Web Viewer (DCCEEW interactive map) monitoring data and Sunshine Coast Council's interactive BatMap (SCC BatM monitoring data. Twenty-nine roost sites are known to occur within a 40 km radius of the B2N Project Area. Roost s relation to the Project Area are presented in the Beerburrum to Nambour Rail Upgrade EPBC Act Preliminary Docun (EPBC PD) (ERM, DTMR 2021).
*Key source population for dispersal	5	As above, the grey-headed flying-fox is considered to exist as one national population split into separate colonies dt constant genetic exchange and movement between camps throughout the species' entire geographic range (DoE, 2 mapped Grey-Headed Flying-Fox habitat (vegetation communities) in the Offset Area (Appendix B) are considered a resource for the colonies utilising the abovementioned roost sites.
*Necessary for maintaining genetic diversity	15	As above, the grey-headed flying-fox is considered to exist as one national population split into separate colonies dt constant genetic exchange and movement between camps throughout the species' entire geographic range (DoE, 2 mapped Grey-Headed Flying-Fox habitat (vegetation communities) in the Offset Area (Appendix B) are considered a resource for the colonies utilising the abovementioned roost sites.
*Near the limit of the species range	0	GHFF are known to occur within urban and rural landscapes, utilising regrowth and remnant eucalypt dominated ve southeast Queensland.

OFFSET - Koala
Kirby's Rd

Assessment Unit - Regional Ecosystem	AU 1 - RE 12.12.15 non-remnant (Eucalyptus woodland)								AU 2 - RE 12.12.15 remnant (Eucalyptus woodland)								AU 3 - RE 12.12.1 remnant (Vine forest)								Total average score
Site Reference	Benchmark	Offset Site Name K2			Offset Site Name 2			Average	Benchmark	Offset Site Name K1			Offset Site Name K3			Average	Benchmark	Offset Site Name 1			Average				
	12.12.15	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Score	12.12.15	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Score	12.12.16	Raw Data	% Benchmark	Score	Score				
Site Condition																									
Recruitment of woody perennial species in EDL	100	70	70	3	100	100	5		100	75	75	5	75	75	5		100	50	50	3					
Native plant species richness - trees	8	5	62.5	2.5	4	50	2.5		8	5	62.5	2.5	4	50	2.5		45	29	64	2.5					
Native plant species richness - shrubs	6	3	50	2.5	2	33	2.5		6	4	67	2.5	4	67	2.5		38	24	63	2.5					
Native plant species richness - grasses	5	2	40	2.5	2	40	2.5		5	3	60	2.5	3	60	2.5		2	1	50	2.5					
Native plant species richness - forbes	17	6	35	2.5	6	35	2.5		17	6	35	2.5	7	41	2.5		25	12	48	2.5					
Tree canopy height (average of emergent, canopy, sub-canopy)	17	13.5	79	5	15	88	5		17	12.5	74	5	12	70	3		37	22	59	3					
Tree canopy cover (average of emergent, canopy, sub-canopy)	68.5	46.5	68	5	40	58	5		68.5	45	66	5	32	47	2		45	33	73	5					
Shrub canopy cover	5	25	500	3	30	600	3		5	2	40	3	2	40	3		35	20	57	5					
Native grass cover	23	5	22	1	5	22	1		23	12	52	3	10	43	1		1	1	100	5					
Organic litter	65	70	108	3	50	77	5		65	60	92	5	35	54	5		51	30	58	5					
Large trees (euc plus non-euc)	57	34	60	10	11	19	5		57	29	51	10	19	33	5		38	17	45	5					
Coarse woody debris	613	315	51	5	405	66	5		613	302	49	2	265	43	2		461	206	51	5					
Non-native plant cover	0	30	30	3	40	40	3		0	5	5	30	30	3			0	20	20	5					
Quality and availability of food and foraging habitat	25	25	100	10	20	80	8		25	25	100	10	15	60	6		25	20	80	8					
Quality and availability of shelter	25	25	100	10	20	80	8		25	25	100	10	15	60	6		25	20	80	8					
Scores for sampling sites				0.68			0.63					0.73			0.51					0.67					
Scores for assessment units								0.655								0.62					0.67				
Area-weighted scores for each assessment unit								0.244423								0.295689					0.072865				
MAX Site Condition Score				100			100	100				100			100					100	100	100			
Site Condition Score - out of 3								1.97													2.01	100			
Site Context																									
Size of patch	10			5			5					5			5					0					
Connectedness	5			4			4					4			4					4					
Context	5			4			4					4			4					4					
Ecological Corridors																									
Role of site location to species overall population in the state	10			6			6					5			5					5					
Threats to the species	10			6			6					6			6					6					
Species mobility capacity	10			7			7					6			6					6					
Scores for sampling sites				0.64			0.64					0.6			0.6					0.5		0			
Scores for assessment units								0.64								0.6					0.5				
Area-weighted scores for each assessment unit								0.238825								0.28615					0.054377				
MAX Site Context Score				50			50	50				50			50					50	50	50			
Site Context Score - out of 3								1.92													1.50	56			

Species Stocking Rate (SSR)					
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0	5	10	
		No	Yes - adjacent	Yes - on site	
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	
		Not habitat	Dispersal	Foraging	Breeding
Approximate density (per ha)	Score	0	10	20	30
		0%	X		
Role/importance of species population on site*	Score (Total from supplementary table below)	0	5	10	15
		0	5 - 15	20 - 35	40 - 45
Total SRR score (out of 70) 55					
SRR Score (out of 4) 3.142857143					

*SSR Supplementary Table				Score assigned
*Key source population for breeding	Score	0	10	10
		No	Yes/Possibly	
*Key source population for dispersal	Score	0	5	5
		No	Yes/Possibly	
*Necessary for maintaining genetic diversity	Score	0	15	15
		No	Yes/Possibly	
*Near the limit of the species range	Score	0	15	0
		No	Yes	
Total SSR				30

Final habitat quality score (weighted)	AU1	AU2	AU3	Average/Final
Site Condition score (out of 3)	1.97	1.86	2.01	6.03
Site Context Score (out of 3)	1.92	1.8	1.5	
Species Stocking Rate Score (out of 4)	2.2	3.14	1.7	
Habitat Quality score (out of 10)	6.085	6.8	5.21	
Assessment Unit area (ha)	70.89	90.6	20.66	
Total offset area (ha) for this MNES	189.97	189.97	189.97	
Size Weighting	0.37	0.48	0.11	
Weighted Habitat Quality Score	2.27	3.24	0.57	6.08

Site Context Attribute
Size of patch
Connectedness
Context
Ecological Corridors
Threats to the species
Quality and availability of habitat required for mobility

Size of Patch Scoring

Score	Description
0	< 5 hectares
2	5 - 25 hectares
5	26 - 100 hectares
7	101 - 200 hectares
10	> 200 hectares

Connectedness Scoring

Score	Description
0	The assessment unit: is not connected using any of the below descriptions.
2	The assessment unit: is connected with adjacent remnant vegetation along >10% to <50% of its perimeter OR is connected with adjacent remnant vegetation along <10% of its perimeter AND is connected with adjacent regrowth native vegetation > 25% of its perimeter.
4	The assessment unit: is connected with adjacent remnant vegetation along 50% to 75% of its perimeter
5	The assessment unit: is connected with adjacent remnant vegetation along >75% of its perimeter OR includes > 500 ha remnant vegetation

Ecological Corridors Scoring

Score	Description
0	Not within an ecological corridor.
3	Sharing a common boundary with an ecological corridor.
6	Within an ecological corridor.

Quality and availability of habitat required for mobility Scoring**

Score	Description
0	The assessment unit: is not connected using any surrounding Koala habitat.
4	The assessment unit: is connected with adjacent Koala habitat along >10% to <50% of its perimeter OR is connected with adjacent Koala habitat along <10% of its perimeter AND is connected with adjacent Koala habitat > 25% of its perimeter.
8	The assessment unit: is connected with adjacent Koala habitat along 50% to 75% of its perimeter
10	The assessment unit: is connected with adjacent Koala habitat along >75% of its perimeter OR includes > 500 ha Koala habitat

**Habitat required for mobility relates to the species' ability to move within the matter and, if relevant, to and from adjacent patches of habitat. Mobility capacity between adjacent patches of suitable habitat will only be relevant to species that naturally inhabit an area that is larger than the matter area

Context Scoring*

Score	Description
0	< 5 hectares
2	5 - 25 hectares
4	26 - 100 hectares
5	101 - 200 hectares

*The context attribute refers to the amount of native vegetation that is retained in the landscape proximal to the site being assessed. A 1 km radius buffer from the 50 m mark of the AU transect is used to delineate a circular spatial extent. The scoring relates to the proportion of native remnant vegetation and/or regrowth vegetation) is retained within the 1 km radius landscape.

Threats to Species Scoring^

Score	Description
1	High level of threats to species: 1 - 10 threat score.
5	Medium level of threats to species: 11 - 20 threat score.
10	Low level of threats to species: > 20 threat score.

Threat Matrix		Severity				
		Very High	High	Medium	Low	Very Low
Scope		1	2	3	4	5
Very High	1	1	2	3	4	5
High	2	2	4	6	8	10
Medium	3	3	6	9	12	15
Low	4	4	8	12	16	20
Very Low	5	5	10	15	20	25

Threats to Koala within Impact site^

Direct Threats	Scope	Severity	Score
Vehicle Strike	3	3	9
Direct Mortality (Wild dog)	5	4	20
Final score:			9

*NB: Threats remain consistent in both scope and severity across all assessment units due to the nature of the threats.

Species Stocking Rate (SSR) Attribute	Score	Justification
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	10	Habitat quality field surveys completed in 2021 and 2022 confirmed evidence of Koala presence at the Offset Area, through location of scats and scratch marks in areas of remnant vegetation. Evidence of Koala presence is depicted in Figures 3.
Species usage of the site (habitat type & evidenced usage)	15	The Offset Area contains known Koala food tree species including Eucalyptus microcorys, Eucalyptus tereticornis, Eucalyptus acmenoides, Eucalyptus resinifera and Corymbia intermedia. The Offset Area is mapped containing remnant vegetation RE 12.12.15 (Corymbia intermedia +/- Eucalyptus propinqua, E. siderophloia, E. microcorys, Lophostemon confertus open forest on Mesozoic to Proterozoic igneous rocks) and RE 12.12.1 (Simple notophyll vine forest usually with abundant Archontophoenix cunninghamiana (gully vine forest) on Mesozoic to Proterozoic igneous rocks). These RE types contain suitable foraging, breeding and shelter habitat for the Koala.
Approximate density (per ha)	20	Habitat quality field surveys completed in 2021 and 2022 confirmed evidence of Koala presence at the Offset Area, through location of scats and scratch marks in areas of remnant vegetation. Evidence of Koala presence is depicted in Figures 3.
Role/importance of species population on site*	10	Total from SSR Supplementary Table below is 10. A total score of 20- 35 from SSR Supplementary Table below results in a score of 10 for 'role/importance of species population on site'.

*SSR Supplementary Table	Score	Justification
*Key source population for breeding	10	Yes - The Offset Area contains known Koala food tree species including Eucalyptus microcorys, Eucalyptus tereticornis, Eucalyptus acmenoides, Eucalyptus resinifera and Corymbia intermedia. The Offset Area is mapped containing remnant vegetation RE 12.12.15 (Corymbia intermedia +/- Eucalyptus propinqua, E. siderophloia, E. microcorys, Lophostemon confertus open forest on Mesozoic to Proterozoic igneous rocks) and RE 12.12.1 (Simple notophyll vine forest usually with abundant Archontophoenix cunninghamiana (gully vine forest) on Mesozoic to Proterozoic igneous rocks). These RE types contain suitable foraging, breeding and shelter habitat for the Koala. Koalas present in the Offset Area are considered a key source population for breeding.
*Key source population for dispersal	5	Yes - as above, koalas and their habitat are known to occur within the Offset Area and where the species and habita are present they are considered a key source population for dispersal.
*Necessary for maintaining genetic diversity	15	Yes - Koala movement across the landscape can occur at the Offset Area. The Offset Area contains remnant and regrowth vegetation (See Figure 2) and is bordered by Maleny National Park and Kondalilla National Park as outlined in Figure 1.
*Near the limit of the species range	0	No - Koalas are known to occur within urban and rural landscapes, utilising regrowth and remnant eucalypt dominated vegetation in southeast Queensland.



APPENDIX E

FIRE MANAGEMENT PLAN



Beerburrum to Nambour Rail Upgrade Project

Offset Area Fire Management Plan

PREPARED FOR



Department of Transport and Main
Roads

DATE

11 November 2024

REFERENCE

0589458



DOCUMENT DETAILS

DOCUMENT DETAILS	
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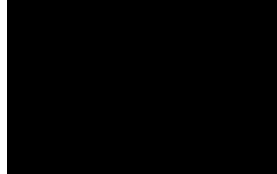
Beerburrum to Nambour Rail Upgrade Project

Offset Area Fire Management Plan

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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
B2N	Beerburum to Nambour
DAWE	Department of Agriculture, Water and the Environment
FMP	Fire Management Plan
ha	Hectare
OAMP	Offset Area Management Plan
QFES	Queensland Fire and Emergency Services
QR	Queensland Rail
RE	Regional Ecosystem
SCC	Sunshine Coast Council
TMR	Department of Transport and Main Roads
VM Act	Vegetation Management Act 1999

1. INTRODUCTION

The Beerburrum to Nambour Rail Upgrade (B2N) project involves upgrades of the rail line between Beerburrum and Nambour, including rail duplication between Beerburrum and Landsborough, and other infrastructure improvements (such as station upgrades and additional passing loops) between Landsborough and Nambour. The B2N project will address capacity constraints on this section of the rail line by providing additional track capacity and reliability, creating travel time savings for passenger and freight services.

The Queensland Government has adopted a staged delivery approach for the B2N project, based on available funding. The stages of the B2N project, also referred to for the purposes of the EPBC Act approval as the components of the action, include the Early Works, Stage 1 and Stage 2. Stage 2 is not currently funded and timing for delivery is unknown.

The Department of Transport and Main Roads (TMR, Approval Holder), in consultation with Queensland Rail (QR), is delivering the B2N project on behalf of the Australian and Queensland Governments.

Following an EPBC Act Referral to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) on 30 September 2020 (Reference: EPBC 2020-8803) the B2N project was determined to be a 'Controlled Action' on 12 January 2021 due to the project's impacts on the koala (*Phascolarctos cinereus*) and grey-headed flying-fox (*Pteropus poliocephalus*) assessed by submission of the *Beerburrum to Nambour Rail Upgrade EPBC Act Preliminary Documentation* (EPBC PD) (ERM, TMR 2021).

The B2N project was approved under the EPBC Act on 25 February 2022 with requirements to offset the removal of habitat for both the koala and grey-headed flying-fox. Kirby's Road Environmental Reserve, located in Obi Obi, Qld, was purchased by Sunshine Coast Council (SCC) in 2011 under the Environment Levy Land Acquisition Agreement. The 213.36 ha site provides an important habitat connection between Kondalilla National Park and Maleny National Park and is proposed to provide an environmental offset consistent under the *EPBC Act Environmental Offsets Policy* (the EPBC Offsets Policy) (DSEWPaC, 2012). An additional adjoining 68 ha site was acquired by SCC in 2022 and forms an extension of the Kirby's Road Environmental Reserve.

Condition 5 of the EPBC Act referral decision notice states the following:

The Approval Holder must submit an Offset Area Management Plan (OAMP) for the Minister's approval that, to the satisfaction of the Minister, compensates for the significant residual impact of clearing 64.15 ha of koala habitat and grey-headed flying-fox foraging habitat within the development area.

The Project Area refers to the area of study for consideration of direct and indirect impacts from the B2N project. It includes the Indicative Disturbance Footprint for the Early Works, Stage 1 and Stage 2 boundary and a 50m buffer either side.

This Fire Management Plan (FMP) has been prepared to address community safety and the maintenance of ecological values within the Offset Area and address requirements for the B2N project OAMP in relation to offset for impacts to koala and grey-headed flying-fox.

This FMP will outline specific management areas (Fire Management Units or FMU) specific to the proposed Offset Area.

1.1 SITE INFORMATION

The proposed Offset Area (Figure 3-1) is situated across sections of three freehold parcels (Lots 176 MCH798, 178 MCH865 and 36 MCH1164) and directly adjoins both the Maleny National Park and Kondalilla National Park. The combined three freehold lots were purchased by SCC under their 'Environmental Land Levy Acquisition Program' and is zoned as Environmental Management and Conservation Zone. TMR is responsible for the delivery of this offset, in collaboration with SCC as the landholder of the subject parcels of land.

The Offset Area is topographically diverse with a mixture of steep escarpment, hill slopes, gullies, ephemeral creeks, and alluvial flats and is described as 'Mesozoic to Proterozoic igneous rocks. Hills and lowlands on granitic rocks'. The Offset Area is dominated by sclerophyll woodland and contains both remnant and regrowth vegetation, with *Notophyll* vine forest vegetation communities present within gullies. The site contains six regional ecosystems (RE's), consisting of one endangered RE, two listed as Of Concern and three listed as Least Concern under the *Vegetation Management Act 1999*.

Historic and use practices have been predominantly agricultural, largely dairy. Current land uses serve urban and residential purposes interspersed with agricultural lands, state forest and national parks. A mosaic of vegetation quality is present throughout the proposed Offset Area, with land use practices having a noticeable impact on habitat quality in some area.

The proposed Offset Area was selected on required principles that it contains both remnant and regrowth koala and grey-headed flying-fox habitat and can be subject to ecological improvements through removing existing pressures on ecological values and management actions to enhance these values and reduce the risks to the species.

A summary of site information is provided in Table 1-1.

TABLE 1-1 OFFSET AREA SITE INFORMATION

Item	Description
Locality	OBI OBI QLD 4561
Size (hectares)	213.36
Lot/Plan (land tenure and gazetted purpose)	<p>Lot: 176 Plan: MCH798 (Freehold) – Kirby’s Rd road parcel exists to northeast boundary of this lot.</p> <p>Lot: 178 Plan: MCH865 (Freehold) – Easement lot/plan ARP127916 dissects this lot. Kirby’s Rd road parcel exists to southeast boundary of this lot.</p> <p>Lot: 36 Plan: MCH1164 (Freehold) - An unnamed road parcel dissects this lot.</p>
Registered land owner	Sunshine Coast Council (SCC)
Electorate: State / Council	<p>State: Queensland</p> <p>Council: Sunshine Coast Council</p> <p>Electoral Division: Glass House</p>
Catchment / sub-catchment	Mary / Upper Mary River
Geology & Soils	Landzone 12. Mesozoic to Proterozoic igneous rocks. Hills and lowlands on granitic rocks.
Planning Reports	<ul style="list-style-type: none"> • Flora assessment: Kirby’s Road Environmental Reserve FLORA AND FAUNA INVENTORY, BAM, 2010 Kirby’s Road Environmental Reserve Flora Assessment, Brush Turkey Enterprises, 2012 Vine forest Flora Assessment, Eco 9, 2015 • Fauna assessment: Kirby’s Road Environmental Reserve FLORA AND FAUNA INVENTORY, BAM, 2010, Kirby’s Road Environmental Reserve Fauna Survey Report, 02 Ecology, 2012 • BOA: Brush Turkey Enterprises 2012 • Regeneration Works Plan: Kirby’s Road Environmental Reserve (Lots 176 & 178) Rehabilitation Works Plan, Brush Turkey Enterprises, July 2012 • Management Plan: KIRBY ROAD, OBI OBI BUSHLAND RESERVE, FINAL MASTER PLAN 2016 Kirby’s Road, and Environmental Reserve Management Plan, 2017 • Cultural heritage search: yes / 2022 • Statement of Management Intent: no • Fire Management Plan: SCC Bushland Reserve Network Fire Management Guidelines, 2014. Kirby’s Rd Fire Management Plan 2015 • Nature Refuge Agreement: no

2. LEGISLATION AND POLICY

Legislation policies, plans, and strategies pertaining to bushfire risks associated with the Offset Area are detailed in this section.

2.1 QLD FIRE AND EMERGENCY SERVICES ACT (1990)

Sunshine Coast Council (SCC) and its corporatised entities as well as all other entities which are owned and/or managed on behalf of SCC and who are responsible for the management of land, are considered to be a land occupier under the *Fire and Emergency Services Act 1990* (s67). The *Fire and Emergency Services Act 1990* is the head of power for the Qld Fire and Emergency Services (QFES) who administers the provisions of the Act and Regulations.

The definition of a land occupier under the act is:

“occupier of land” includes, where there is no person in actual occupation of the land, the person charged by the owner or by law with the management of the land.

The act also defines the term occupier.

“occupier”, used with reference to any premises, means the person in actual occupation or, if there is no such person, the owner.

Section 67 of the Act requires SCC on becoming aware of a fire burning on land it occupies to take all reasonable steps to extinguish or control the fire and report the fire and its location to a fire officer as soon as possible.

The act also requires SCC to obtain a permit to burn from the closest QFES station or fire warden prior to conducting any burns within their property.

2.2 LOCAL LAW

Sunshine Coast Council Local Law No. 3 (Community Health and Environmental Management) 2011 and Sunshine Coast Council Subordinate Local Law No. 3 (Community Health and Environmental Management) 2011 are the local laws that regulate fires in urban areas. It applies specifically to fires that do not require a permit under the Fire and Emergency Services Act. All proposed burns undertaken within the Offset Area will be within the QFES permit system so the local laws do not apply.

3. FIRE MANAGEMENT FOR MNES

3.1 KOALA

Fire is listed as a key threatening process impacting the koala. Aside from direct mortality, a range of fire-related threats are described, including high frequency and/or severity fires, changing fire seasons, habitat loss, changes in biological relationships including reproductive cycles and interactions with predators, and habitat fragmentation which can be exacerbated by land clearing (DCCEE, 2024). Strategies listed under the approved conservation advice for koala include securing and improving the condition of existing koala habitat by managing fire on both private and public land (DAWE, 2022).

Koalas can benefit from controlled burning practices as it reduces the risk of high severity, uncontrolled wildfires which can lead to a reduction in koala mortality rates wildfire events. Further, controlled burns lead to long term benefits on koala habitat through recruitment of preferred feed trees, regulation of soil conditions around feed tree roots, and reducing mid-storey competition (Ashton, 2000; Close *et al.*, 2009; Crisp *et al.*, 2011; Turton and Duff, 1992 as cited in Negret *et al.*, 2021). With this in mind, controlled burning practices are required to be carefully planned and supervised to reduce the risk of direct impacts on the koala.

The success of prescribed burning depends on the timing and intensity of management regimes. Prescribed burns in the offset area must be cooler than unmanaged wildfire and the majority of the canopy must remain undisturbed (Beale *et al.* 2022).

3.2 GREY-HEADED FLYING-FOX

Although not specifically listed as a key threatening process, the effects of wildfires on grey-headed flying-fox need to be considered. One recent study found that during the 2019–2020 severe fire event, 134 out of 874 known grey-headed flying-fox roosts were situated within burnt areas equating to approximately 15% of the species' roost locations. Further, approximately 50% of unburnt roosts were considered to be close enough for the smoke to indirectly affect roosting and foraging individuals (Mo *et al.*, 2024).

Similarly to the koala, the grey-headed flying-fox can benefit from controlled burning practices as it reduces the risk of severe, uncontrolled fires that may have direct or indirect impacts to their roosts, foraging areas and feed tree availability.

3.3 OFFSET AREA VEGETATION

The Offset Area contains a number of vegetation classifications. State-based vegetation mapping, Version 13 of Regional Ecosystem Mapping, identifies four dominant REs within the Offset Area. RE's within the Offset Area have been subsequently ground-truthed, as presented in Figure 3-1. Each RE is assigned a state Fire Management Strategy based on the attributes of the ecosystem. Fire management within the Offset Area will consider these fire management guidelines and burning intervals to preserve the ecological values contained within these REs and respective MNES habitat values contained within.

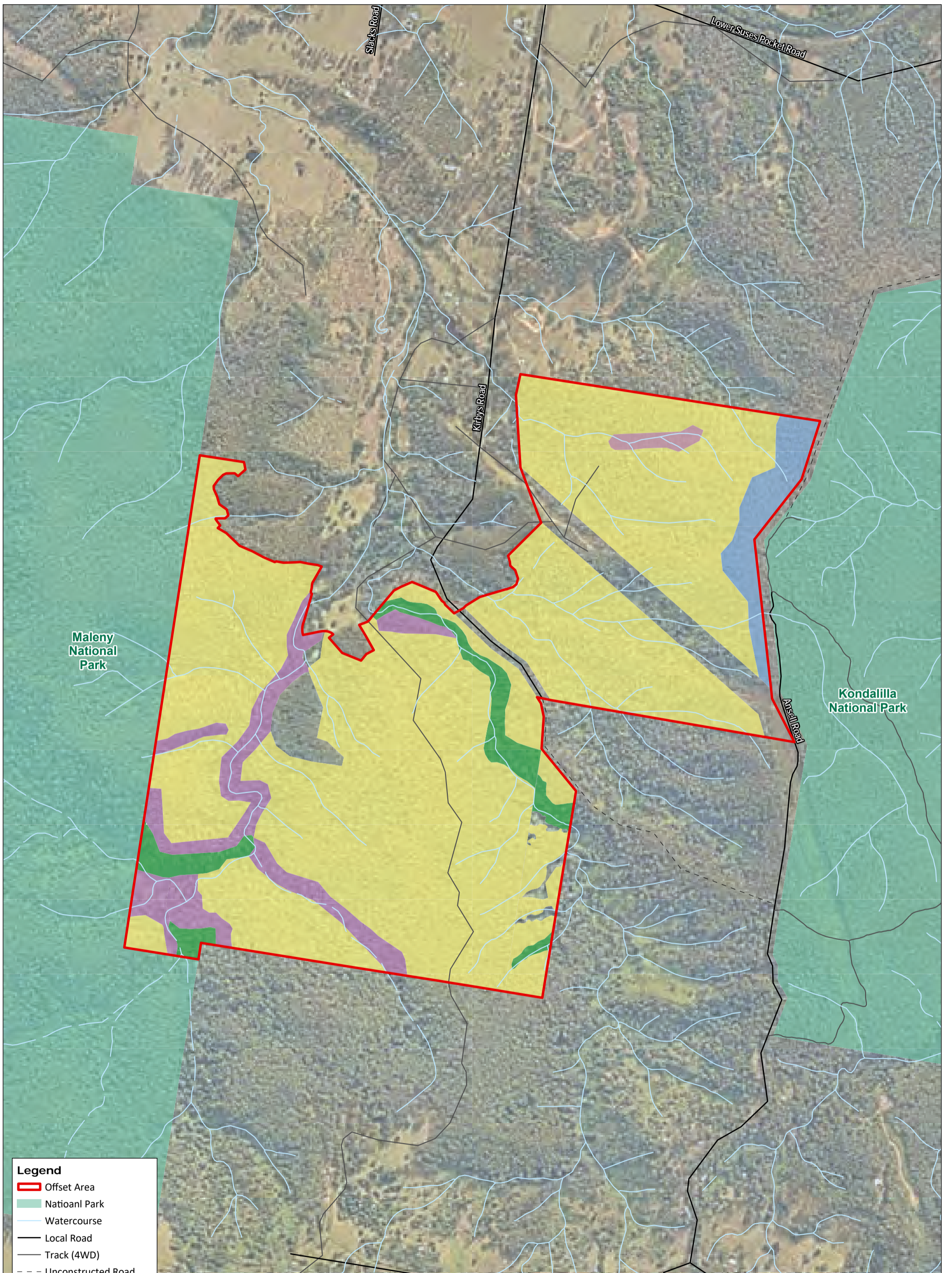
Table 3-1 below describes the ground-truthed REs and their corresponding fire management strategies. It is noted that two sub-vegetation communities occur in 12.12.15 (12.12.15a – 12.12.15b).

TABLE 3-1 OFFSET AREA SITE INFORMATION

Regional Ecosystem (RE)	Description	Fire Management Guidelines		
		Strategy	Season	Issues
12.12.16	<i>Notophyll</i> vine forest. Characteristic species include <i>Araucaria bidwillii</i> , <i>A. cunninghamii</i> , <i>Argyrodendron trifoliolatum</i> , <i>Argyrodendron sp.</i> (Kin Kin W.D.Francis AQ81198), <i>Backhousia subargentea</i> , <i>Brachychiton discolor</i> , <i>Beilschmiedia obtusifolia</i> , <i>Diospyros pentamera</i> , <i>Grevillea robusta</i> , <i>Gmelina leichhardtii</i> , <i>Ficus macrophylla</i> forma <i>macrophylla</i> and <i>Sloanea woollsii</i> . <i>Eucalyptus spp.</i> especially <i>E. siderophloia</i> , <i>E. propinqua</i> and <i>E. grandis</i> may be present as emergents. Occurs on Mesozoic to Proterozoic igneous rocks.	<u>Do not burn deliberately.</u> Protection relies on broad-scale management of surrounding country. May need active protection from wildfire in extreme conditions or after prolonged drought. Planned burns should not create a running fire into vine forest. Ensuring conditions of good soil moisture and moisture of litter in surrounding communities will limit fire behaviour/intensity.	No seasonal guidelines prescribed	Fire sensitive and not normally flammable. There may be issues with lantana and other weeds from fire and other disturbance. Remnants may be limited by frequent fire at the margins.
12.12.14	<i>Eucalyptus racemosa</i> subsp. <i>racemosa</i> +/- <i>Lophostemon confertus</i> , <i>Syncarpia glomulifera</i> , <i>Eucalyptus acmenoides</i> woodland to open forest usually on rocky near coastal areas on Mesozoic to Proterozoic igneous rocks	Aim for a burn mosaic of 40-60% over the burn area. A diversity of season and fire intensity is important, as well as spot ignition in cooler or moister periods to encourage mosaics. Late summer burns with adequate soil moisture assist with maintaining control of fire intensity.	Late summer to winter. Intensity: Low to Moderate. Interval: 7-20 years.	Avoid repeated low intensity fires. Fires that are too frequent will eliminate obligate seeding species. Fire frequency should be such as to allow obligate seeders to reach maturity and produce viable seed. If crown fires occur allow time for epicormic growth to replace structure.

Regional Ecosystem (RE)	Description	Fire Management Guidelines		
		Strategy	Season	Issues
12.12.15	12.12.15: Mixed open forest including combinations of <i>Eucalyptus propinqua</i> , <i>E. microcorys</i> , <i>E. siderophloia</i> , <i>Corymbia intermedia</i> , <i>Lophostemon confertus</i> . Other canopy species include <i>Eucalyptus acmenoides</i> , <i>E. moluccana</i> , <i>Angophora subvelutina</i> and occasional vine forest species. Patches of <i>Eucalyptus pilularis</i> sometimes present. Occurs on Mesozoic to Proterozoic igneous rocks.	Aim for 40-60% mosaic burn. Needs disturbance to maintain RE structure (eucalypt overstorey with open understorey of predominantly non-rainforest species).	Summer to winter.	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/resprouting mesic species.
12.12.15a	12.12.15a: <i>Eucalyptus grandis</i> and/or <i>E. saligna</i> tall open forest +/- vine forest understorey. Other canopy species include <i>E. microcorys</i> , <i>E. acmenoides</i> , <i>Lophostemon confertus</i> , <i>E. siderophloia</i> , <i>E. propinqua</i> , <i>Corymbia intermedia</i> , <i>E. tereticornis</i> . Occurs in wet gullies on Mesozoic to Proterozoic igneous rocks.	a, b: 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.	Intensity: Plan for low to moderate – Unplanned occasional high intensity wildfire will occur. Interval: 4-8 years maintains a healthy grassy system. 8-20 years for shrubby elements of understorey.	a, b: 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. If a,b sub-types are about maintaining rainforest then no burning necessary but if grasses are required then will need to maintain with shorter fire intervals.
12.12.15b	12.12.15b: <i>Lophostemon confertus</i> open forest +/- <i>Eucalyptus microcorys</i> , <i>E. siderophloia</i> , <i>E. carnea</i> , <i>E. propinqua</i> and vine forest species often present in understorey. Occurs in gullies and exposed ridges on Mesozoic to Proterozoic igneous rocks often amongst vine forest.			

Source: Queensland Government Regional Ecosystems Description Database (Queensland Government, 2024).



Legend

- Offset Area
- National Park
- Watercourse
- Local Road
- Track (4WD)
- Unconstructed Road

RE

- 12.12.15
- 12.12.16
- RE 12.12.15a-RE 12.12.15b
- RE 12.12.14

Coordinate System:
GDA2020 MGA Zone 56

Date: 11/07/2024

Created By: VN

Drawing Size: A3

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3-1 Ground truthed Regional Ecosystems within the Offset Area

Schultz Road

Beerburrum to Nambour Rail Upgrade
Proposed Offset Area

Client: Qld Department of Transport and Main Roads

3.4 RELATION TO OFFSET MATTERS

The Offset Area contains vegetation consistent with RE 12.12.15 (*Corymbia intermedia* +/- *Eucalyptus propinqua*, *E. siderophloia*, *E. microcorys*, *Lophostemon confertus* open forest on Mesozoic to Proterozoic igneous rocks) and RE 12.12.16 (*Notophyll* vine forest on Mesozoic to Proterozoic igneous rocks). These RE types contain suitable foraging, breeding and shelter habitat for the koala.

Further, RE 12.12.15 (*Corymbia intermedia* +/- *Eucalyptus propinqua*, *E. siderophloia*, *E. microcorys*, *Lophostemon confertus* open forest on Mesozoic to Proterozoic igneous rocks) and RE 12.12.16 (*Notophyll* vine forest on Mesozoic to Proterozoic igneous rocks) found within the Offset Area are suitable foraging and shelter habitat for grey-headed flying-fox.

Impacts to habitat suitable for koala and grey-headed flying-fox resulting from the construction and operation of the B2N project is to be offset within this Offset Area. To ensure that vegetation within the Offset Area is managed so that habitat value for both species is maintained and improved, appropriate fire management strategies will be undertaken including prevention / protection from unplanned fires and planned burns for ecological restoration. Fire Management Guidelines, described in Section 3.3 above, will align to improve habitat for the two MNES for which this offset is proposed by:

- Promoting growth and recruitment of canopy and feed tree species;
- Protecting existing canopy from destructive, high severity fires;
- Reduce competition from weeds and mid-storey species; and
- Maintaining and improving connective habitat to aid koala and grey-headed flying-fox dispersal through the landscape.

3.5 SUMMARY OF ECOLOGICAL ISSUES

Large areas within the proposed Offset Area are dominated by open forest and vegetation mapped as non-remnant. For the purposes of this assessment, these areas have been classified into respective REs based on ground-truthed data. These areas will require periodic fires to maintain the open understorey. In addition, areas of *Notophyll* vine forest, consistent with RE 12.12.16, scattered throughout the Offset Area require fire exclusion.

Whilst the proposed offset is for koala and grey-headed flying-fox, all native fauna known to inhabit the Offset Area must be considered and maintenance of the range of habitat types utilised by these species within the offset is essential. Where it is possible to burn safely, fire will be used to maintain the open forest structure to ensure there is minimal mid-storey vegetation. For areas where it is not possible to contain a burn within the Offset Area, fires will be less frequent. This will result in a thicker vegetation structure with an established mid-storey. Where resources or site conditions do not allow planned burns to be undertaken, mid-storey management can be achieved by mechanical treatments.

4. FIRE HAZARD

4.1 STATE PLANNING POLICY – FIRE HAZARD ASSESSMENT METHODOLOGY

The State Government replaced State Planning Policy (SPP) (SPP01/03) with a new single SPP in 2013. This SPP also includes state-wide mapping of bushfire hazards.

The SPP is predominantly to be referred to with respect to new development within Queensland. The SPP mapping data provides a trigger for local governments to investigate and consider the relevant interest and does not automatically preclude development. Bushfire Prone Area Mapping is presented in Figure 4-1.

In 2011, SCC prepared regional bushfire hazard mapping for the inclusion with the Sunshine Coast Planning Scheme 2014. These maps were prepared using the superseded State Planning Policy (SPP) 1/03, where bushfire hazard was assessed using RE vegetation communities, slope, and aspect to display regions of high, medium and low bushfire hazard. Bushfire hazard values from 0-10 were assigned to each RE as per the Queensland Fire and Emergency Services. Slope and aspect are generated using LiDAR digital elevation models with values from 1-5 for slope and 0-5 for aspect. The overall bushfire hazard score was the cumulative scores which was classified into the three hazard categories (SCC, 2020) (Table 4-1). SCC Bushfire Hazard Areas are presented in Figure 4-2.

TABLE 4-1 SEVERITY OF BUSHFIRE HAZARD SCORES ACROSS SUNSHINE COAST COUNCIL

Total Hazard Score	Severity of Bushfire Hazard
13 or Greater	High – Very High
6 to 12.5	Medium
1 to 5.5	Low

Both mapping products show the Offset Area has a mixture of medium and high to very high bushfire hazard influenced largely by the steep slopes and the sclerophyll dominated vegetation communities. Areas of low hazard are also present within the Offset Area and are characterized by rainforest species, particularly in gullies (Figure 4-1 and Figure 4-2).



Legend

- Offset Area
- Local Road
- Track (RW/CO)
- Unconstructed Road
- Very High Potential Bushfire Intensity
- High Potential Bushfire Intensity
- Medium Potential Bushfire Intensity
- Potential Impact Buffer

Coordinate System
GDA2020 MGA Zone 58

Date: 25/01/2024

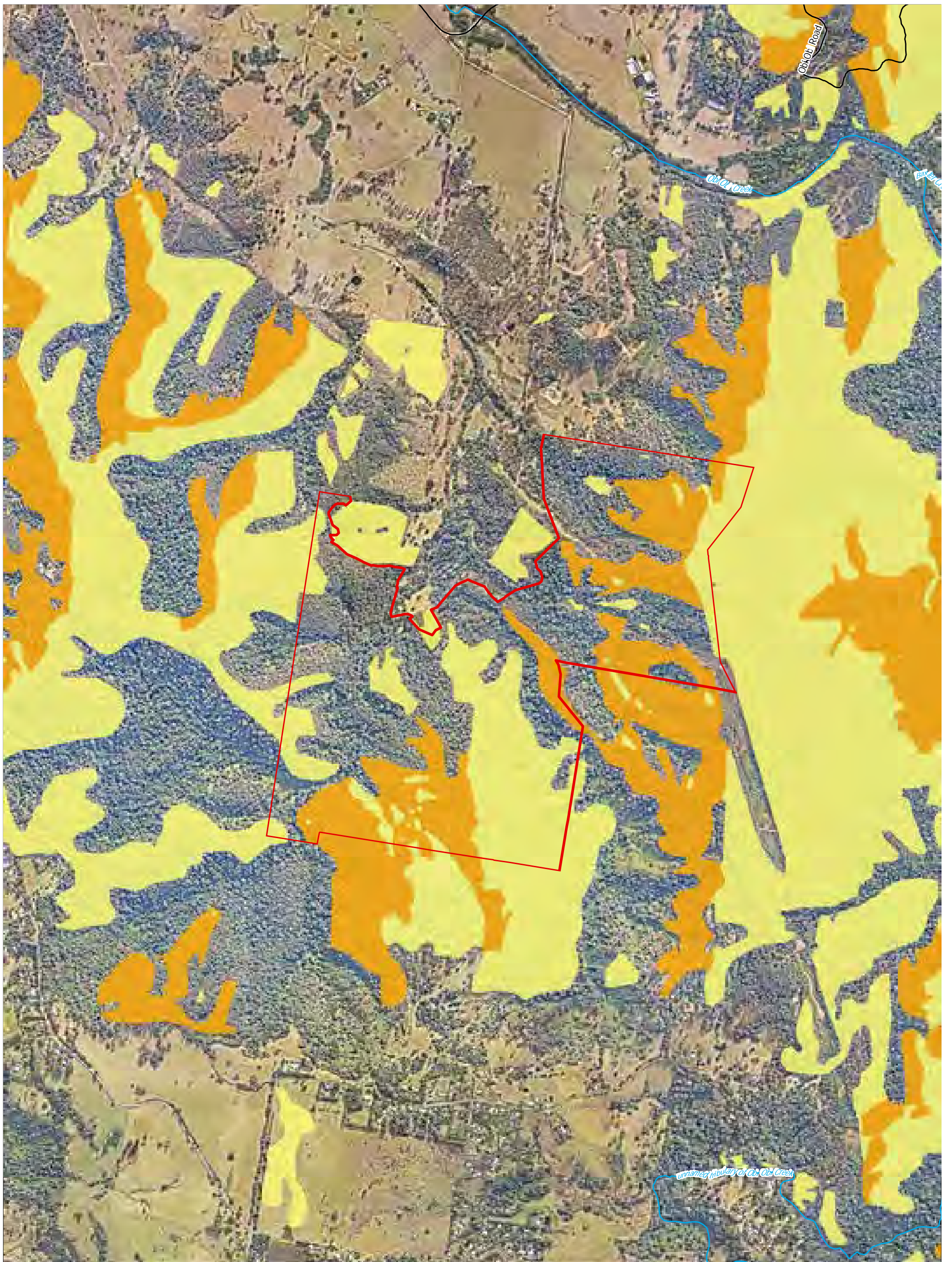
Created By: VS

Drawing No: 43






0 100 200 300m

4-1 Bushfire Prone Area Mapping

Beerburrum to Nambour Rail Upgrade
Fire Management Plan
 Client: Qld Department of Transport and Main Roads



Legend

-  Watercourse
-  State Controlled Roads
-  Offset Area
-  Medium Bushfire Hazard Area
-  High Bushfire Hazard Area

Data Source:
 Nearmap Imagery June 2024
 Sunshine Coast Council regional
 bushfire hazard mapping Sunshine
 Coast Planning Scheme 2014

Coordinate System:
 GDA2020 MGA Zone 56

Date: 19/08/2024
 Created By: CB
 Drawing Size: A3
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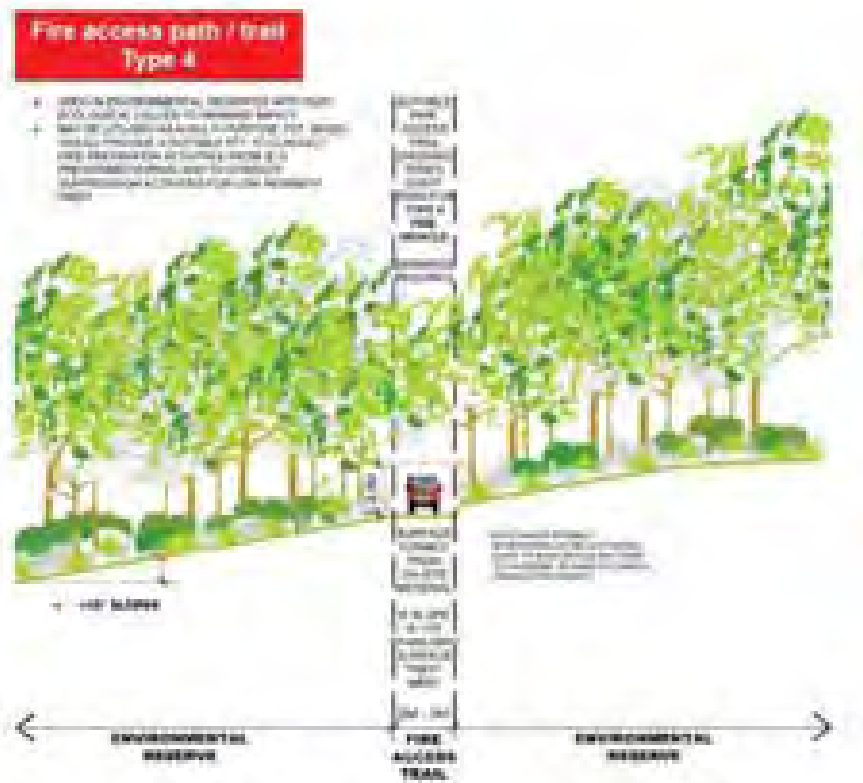
4-2 SSC Bushfire Hazard Areas within the Offset Area

Beerburrum to Nambour Rail Upgrade
 Fire Management Plan
 Qld Department of Transport and



4.2 OTHER CONSIDERATIONS

The Offset Area is surrounded by large, vegetated land parcels to the east and west, which increases the overall area of vegetation available during a bushfire and the potential for landscape scale bushfires. The Offset Area itself only makes up a small portion of the total surrounding vegetated landscape which includes the 1550ha Kondalilla National Park to the east and the 1880 ha Maleny National Park to the west. Noting, that QPWS regularly conduct maintenance on the fire trails within Kondalilla and Maleny Nation Parks and also conduct regular controlled burns to reduce fuel loads.



Overall, the fire hazard has been assessed as being high, given the large size and steep slopes of the Offset Area. Whilst fires can and may occur within the Offset Area, there is only one house adjacent to the boundary of Kirby’s Reserve. The dwelling is situated approximately 145m west from the northern boundary. Kirby’s road sits between the dwelling and the boundary and behaves as a firebreak, reducing the potential impacts of wildfire to life and property. The Offset Area is situated within a larger council reserve and is bordered by National Parks and freehold properties. Prescribed burns and preventative management measures will need to consider these stakeholders. There are several areas of hardwood plantation within Kirby’s Reserve established by a former landowner. These plantations require fire exclusion and protection from wildfire. These areas have been identified as a specific Fire Management Unit within this Plan.

4.3 FIRE MANAGEMENT ACTIONS

Fire management will be undertaken in accordance with the Queensland Government Planned Burn Guidelines (Melzer and Hines 2022).

4.3.1 FUEL REDUCTION

The alteration of fuel loads to reduce the hazard of uncontrolled burns is an important management consideration of SCC's bushfire management practices (SCC, 2020). Fuel load assessment/monitoring will occur within 3 months of the OAMP being approved and thereafter be conducted annually.

Activities will be determined on a case-by-case basis for each Management Unit at the time of assessment as to which fuel reduction strategy or combination is most suitable. Fuel reduction activities will include raking or manual removal of fine fuels, removal of ground fuels such as fallen leaves, twigs and bark in areas where canopy scorching may occur is recommended, reduction of grasses and forbs by mowing, slashing or brush cutting; and removal of weedy shrubs, understory and exotic grasses with high fuel loads by manual removal or brush cutting. Management of fuel loads through controlled burns is further discussed in Section 4.3.3, with corrective actions described in Table 4-5. Fuel load assessments and monitoring will be conducted by a suitably qualified fire ecologist.

Fuel load thresholds have been derived from Table B3 VEGETATION CLASSIFICATION AND FUEL LOAD in AS3959-2018 (Committee FP-020, 2018).

83% of the Offset Area is consistent with 'forest' in accordance with vegetation classification outlined within AS3959-2018 (Committee FP-020, 2018). For areas consistent with open forest, fuel load will not exceed 25t/ha in understory fuel load. Fuel reduction will not occur within vine forest (RE 12.12.16) and rainforest vegetation communities.

4.3.2 FIRE BREAKS AND TRAILS

Fire breaks and trails are located, designed and constructed to mitigate bushfire hazards by ensuring adequate access to fire fighting and other emergency vehicles, and providing barriers between the Offset Area and surrounding bushland. Suitable locations for fire breaks have been identified to allow for the strategic protection of areas of higher habitat value for the koala and the grey-headed flying-fox. The Offset Area contains six existing vehicle trails as outlined in Figure 4-3, which will be utilized to implement the management practices within this Management Plan. It is important to note that in the event of an unplanned high-intensity bushfire, control may not be possible from these trails due to their size.

SCC maintains 4.65 km of vehicle access trail within the reserve which services as a Type 4 fire access path. A type 4 provides access to small fire vehicles (type 4 vehicles) such as 4WD fire units. Access is suitable to conduct fire prevention activities such as prescribed burns and suppression activities for low intensity fires. Trails are also slashed four times a year to maintain access and reduce fuel loads.

Fire breaks are prone to erosion and natural regeneration of vegetation and will therefore be monitored annually for the duration of the offset. Monitoring will be undertaken by a suitably qualified fire ecologist and a report will be prepared outlining required maintenance. Where maintenance requirements are identified, repairs to firebreaks in the form of vegetation management, grading and erosion control will occur within 3 months, to ensure adequate access for QFES and fire resistance during the event of an uncontrolled fire.

4.3.3 BURN INTENSITY

Unplanned fires or planned burns which have greater than intended intensity are identified as a threat to koala and grey-headed flying-fox. High intensity fires reduce availability of food resources in the short term until such times as regeneration can occur. This is in addition to direct mortality to these MNES associated with unplanned fires (wildfires) and high intensity planned burns.

In addition to management of MNES habitat identified in Section 3.4, further specific considerations must be made for the provision of vegetation management and fire hazard reduction relative to the MNES and their respective habitat. These are detailed in Section 4.4.

Planning for management of controlled burns is key to ensuring the success of the Offset Area MNES.

Management of burn intensity

Burn intensity will be managed through timing and manipulation of fuel loads present within patches of vegetation. Factors influencing fire intensity include physical factors such as fuel load, fuel moisture, temperature, humidity, wind conditions, topography and slope, and burn techniques.

Burn techniques to be considered for a controlled and low intensity burn as required include:

- Spot lighting patterns rather than strip lighting;
- Lighting at the top of slopes (encouraging the fire to 'trickle' downslope);
- Burning away from high-risk/high fuel load areas;
- Time of day, lighting and year, e.g. Cooler burns in colder months; and
- Strategic placement of containment lines (protecting assets and encouraging 'mosaics').

Reduction of canopy scorch

Both koala and grey-headed flying-fox utilise the canopy as roosting, resting, breeding and foraging resource. As such, consideration must be made to reducing impact of planned burns on canopy and sub canopy.

Occasional scorching of lower canopy is common during low intensity planned burns. Habitat with a dense shrub layer and/or mid-storey, such as that observed within the Offset Area, will lead to a higher degree of canopy scorch even under low intensity conditions. The topography of an area will also influence localised canopy 'flare-ups' even under low intensity conditions.

Reducing fuel load, and in particular invasive shrubs and vines such as those observed within the Offset Area (e.g. lantana) surrounding canopy trees consistent with habitat for MNES, must be undertaken prior to a planned burn to avoid a deleterious impact to the offset.

Prior to burning, to achieve a low intensity burn, Table 4-2 (NSW Rural Fire Service, 2017) must be consulted with respect to available fuel load.

TABLE 4-2 FOREST FIRE DANGER INDEX LIMITS (LOW INTENSITY BUSHFIRE HAZARD REDUCTION BURNING)

FUEL LOAD (t/ha)	Forest Fire Danger Index (FFDI)						
	2	4	6	8	10	15	>15
5	Burn	Burn	Burn	Burn	Burn	Burn	Don't
10	Burn	Burn	Burn	Burn	Burn	Don't	Don't
15	Burn	Burn	Burn	Burn	Don't	Don't	Don't
20	Burn	Burn	Don't	Don't	Don't	Don't	Don't
>25	Burn	Don't	Don't	Don't	Don't	Don't	Don't

Reduction in Fuel Load

Fuel load can be managed and reduced prior to a controlled burn in several ways. It will need to be determined on a case-by-case basis for each zone within the Offset Area at the time of assessment as to which fuel reduction strategy or combination is most suitable. Fuel load around areas of suitable habitat and canopy trees in avoidance of canopy scorch and reduction in habitat quality can be achieved in the following ways:

- Raking or manual removal of fine ground fuels such as fallen leaves, twigs and bark should occur around areas where canopy scorching may occur;
- Reduction of grasses and forbs by mowing, slashing or brush cutting; and
- Removal of weedy shrubs, understorey and exotic grasses with high fuel loads by manual removal or brush cutting.

Following slashing, mowing or brush cutting of weeds, debris resulting from the process will be placed in contact with the ground to reduce elevated fine fuels which would otherwise contribute to fire spread.

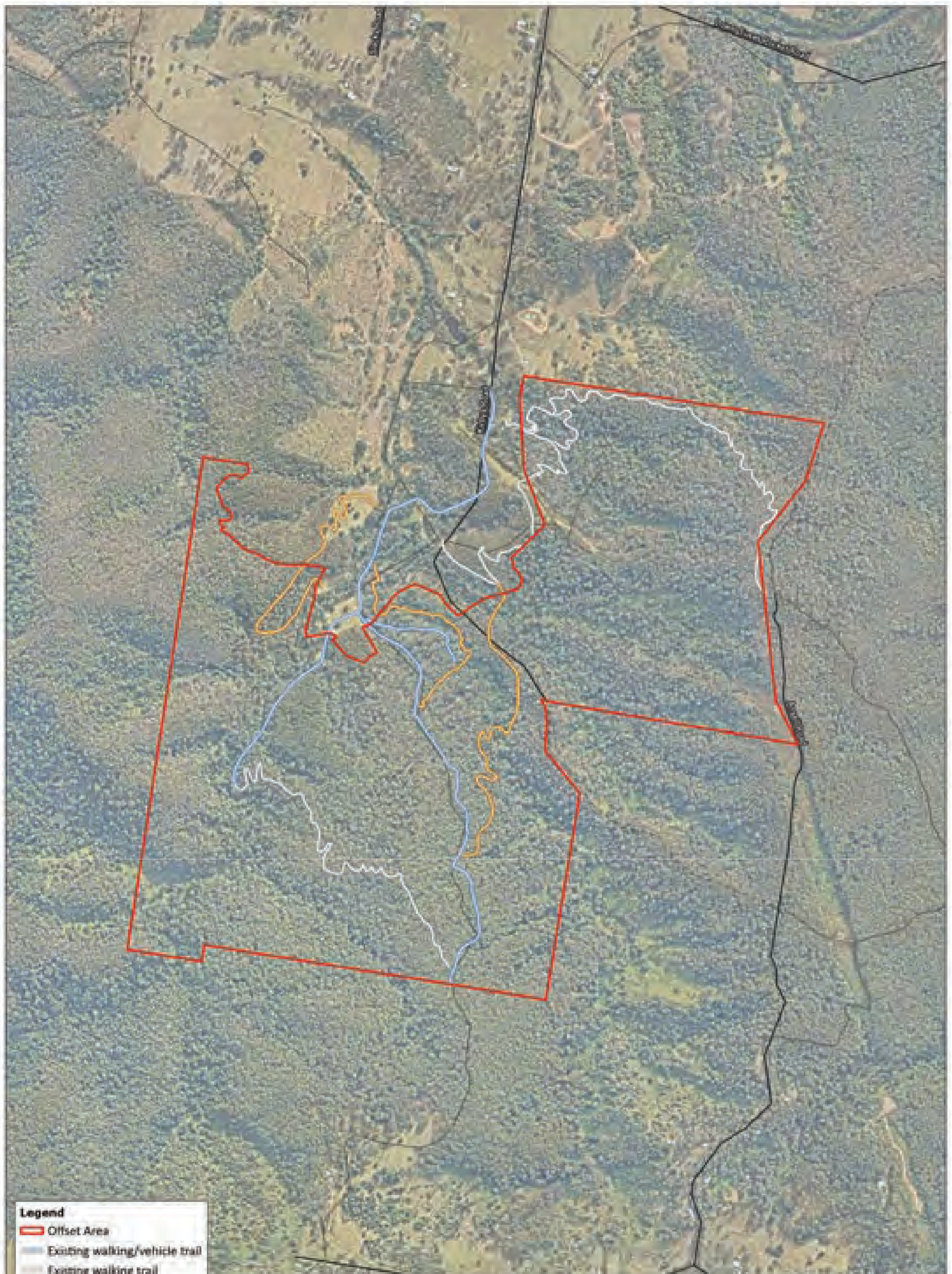
Mosaic Burning

Planned burns will be conducted in a mosaic pattern in accordance with the Planned Burn Guidelines (Melzer and Hines 2022). This is the process of creating burned and non-burned areas within a particular zone. In achieving a mosaic, 50% burned and 50% unburned is recommended in habitat for MNES within the offset.








4.3.4 PUBLIC ACCESS

In addition to the Fire Management Actions detailed in this FMP, the risk of any unauthorised fire within the Offset Area associated with public access will be managed in line with the OAMP. This includes:

- Only fires implemented and managed by authorised personnel, in accordance with controlled burning activities outlined in the FMP, will be permitted within the Offset Area;
- Clear and prominent signs will be placed at the entrances to the Offset Area (within 3 months of approval of the proposed Offset Area), indicating that lighting fires is prohibited within the Offset Area and outlining the associated penalties for non-compliance.



Legend

-  Offset Area
-  Existing walking/vehicle trail
-  Existing walking trail
-  Proposed walking trail
-  Local Road
-  Track (4WD)
-  Unconstructed Road

Coordinate System:
 GDA2020 MGA Zone 58
 Date: 25/07/2024
 Created By: VS
 Drawing No: 43
 0 100 200 300m



4-3 Access Tracks and Trails

**Beerburrum to Nambour Rail Upgrade
 Fire Management Plan**
 Client: Qld Department of Transport and Main Roads



4.4 ASSESSMENT OF FIRE RISK TO OFFSET SITE MONITORING AND CORRECTIVE ACTIONS

Potential risks have been assessed against a risk matrix supplied by DCCEEW and provides trigger thresholds and corrective actions to mitigate the potential impacts of these risks.

The risk assessment:

- Identified events that will, may, or are likely to impact the attainment of the completion criteria;
- assessed the likelihood and consequences of those events, and characterizes residual risk levels, taking into consideration the mitigation of the risk by implementing the management actions; and
- identified the level of uncertainty in mitigating the risk with the management actions, trigger criteria and corrective actions until the risk is reduced to an acceptable level.

An 'incident' is defined in the conditions of approval as any event which has the potential to, or does, impact on one or more MNES. In context to the OAMP and this FMP, an incident is considered to be an impact to the offset for an MNES that escalates the risk matrix ranking for that risk. As an example, if it was found during an annual monitoring inspection that the OAMP had not been implemented, then it could result in a change of the risk for habitat degradation from low to medium (refer to the risk matrix and the management actions Table 4-3, Table 4-4 and Table 4-5). This 'incident' would be reportable in the Annual Report.

An example of an incident requiring reporting to DCCEEW within 2 days would be a force majeure event such as an uncontrolled fire or a flood.

TABLE 4-3 RISK CATEGORY CRITERIA

Risk Category	Category Criteria and Detail
Highly Likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

TABLE 4-4 RISK CATEGORY - QUALITATIVE MEASURES

Risk Category	Qualitative Measure of Consequences					
Minor	<i>Minor incident of environmental damage that can be reversed (e.g. short-term delays to achieving plan objectives, implementing low-cost, well-characterised corrective actions)</i>					
Moderate	<i>Isolated but substantial instances of environmental damage that could be reversed with intensive efforts (e.g. short-term delays to achieving plan objectives, implementing well-characterised, high-cost/effort corrective actions)</i>					
High	<i>Substantial instances of environmental damage that could be reversed with intensive efforts (e.g. medium-long term delays to achieving objectives, implementing uncertain, high-cost/effort corrective actions)</i>					
Major	<i>Major loss of environmental amenity and real danger of continuing (e.g. plan objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies)</i>					
Critical	<i>Severe widespread loss of environmental amenity and irrecoverable environmental damage (e.g. plan objectives are unable to be achieved, with no evidenced mitigation strategies)</i>					
Likelihood Criteria	Consequence Criteria					
		Minor	Moderate	High	Major	Critical
	Highly Likely	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

TABLE 4-5 MANAGEMENT AND CORRECTIVE ACTIONS

Risk	L	C	R	Management Action	Performance objectives	Timing	Triggers for Corrective Actions	Corrective Actions	L	C	R
Unauthorised or non-controlled fire in the Offset Area	Likely	Moderate	Medium	Only fires implemented and managed by authorised personnel, permitted within the Offset Area. Clear and prominent signs placed at the entrances indicating that lighting fires is prohibited.	No uncontrolled fires in the Offset Area.	At all times Signage installed within 3 months of OAMP approval.	The occurrence of uncontrolled or deliberately lit fires (e.g. arson).	Ongoing occurrence of unplanned fires will be reported to the Offset Area manager. Surveillance and additional signage will be installed to monitor any identified high-risk sections of the Offset Area.	Unlikely	Moderate	Low
				Maintain and Repair Fire Breaks.	No uncontrolled fires in the Offset Area.	Quarterly inspection of fire breaks.	The occurrence of uncontrolled or deliberately lit fires (e.g. arson). Occurrence of regrowth vegetation within fire break which obstructs access or aids in fire mobility No trees or shrubs greater than 1 m in height and no ground cover (grasses, forbs, sedges etc.) greater than 20cm in height.	Removal of regrowth vegetation within extent of fire break. Inspect, repair and widen fire break if necessary.			

Risk	L	C	R	Management Action	Performance objectives	Timing	Triggers for Corrective Actions	Corrective Actions	L	C	R
				Conduct Fuel Load Assessments.	No uncontrolled fires in the Offset Area.	Quarterly assessments of total fuel load at fire breaks, trails and access tracks. Annual assessment of fuel loads throughout broader areas of vegetation within the Offset.	Fuel load shall not exceed 25 t/ha within Management Zones of forest vegetation communities. Increase in fallen timber beyond relevant Regional Ecosystem benchmark, or occurrence of deliberately lit fires.	Increase the frequency and intensity of weed removal. Reduction and modification of fuel structure and load.			
Increased fire risk due to high fuel load	Possible	High	Medium	Fuel Reduction	No uncontrolled fires in the Offset Area.	Annual weed assessments. Quarterly assessments of total fuel load at fire breaks, trails and access tracks. An initial fuel load assessment throughout broader Offset Area will occur within 3 months of the OAMP being approved and thereafter be conducted annually.	Fuel load shall not exceed 25 t/ha within Management Zones of forest vegetation communities. Increase in fallen timber beyond relevant Regional Ecosystem benchmark, or occurrence of deliberately lit fires.	Increase the frequency and intensity of fuel load removal and techniques recommended in Section 4.3.3.	Unlikely	Moderate	Low
				Controlled Burn	Prescribed burns implemented as per the FMP. No uncontrolled fires in the Offset Area.	Controlled burns at minimum 3 year intervals in areas of vegetation without a prescription described in Section 3.	The occurrence of uncontrolled or deliberately lit fires (e.g. arson).	Application of burn in line with fire guidelines of associated RES and techniques recommended in Section 4.3.3. TMR to investigate and			

Risk	L	C	R	Management Action	Performance objectives	Timing	Triggers for Corrective Actions	Corrective Actions	L	C	R
								engage burning contractor for management action works.			
Reduction in habitat quality for MNES due to fire	Likely	High	High	Assessment of the condition of habitat and vegetation for MNES within the Offset Area.	Restore MNES habitat values and vegetation condition post uncontrolled fire event.	3 months following uncontrolled fire event.	Occurrence of uncontrolled fire within the Offset Area.	Implementation of actions within the Regeneration Works Plan (RWP) accounting for the results of the management action "Assessment of the condition of habitat and vegetation for MNES within the Offset Area".	Possible	Moderate	Medium
				Fuel Reduction	No uncontrolled fires in the Offset Area.	Annual weed assessments. Quarterly assessments of total fuel load at fire breaks, trails and access tracks. An initial fuel load assessment throughout broader Offset Area will occur within 3 months of the OAMP being approved and thereafter be conducted annually.	Fuel load shall not exceed 25 t/ha within Management Zones of forest vegetation communities. Destruction or significant damage to regrowth, increase in fallen timber, or occurrence of deliberately lit fires.	Increase the frequency and intensity of fuel load removal and techniques recommended in Section 4.3.3.			

Risk	L	C	R	Management Action	Performance objectives	Timing	Triggers for Corrective Actions	Corrective Actions	L	C	R
				Controlled Burn	Prescribed burns implemented as per the FMP. No uncontrolled fires in the Offset Area.	Controlled burns at minimum 3 year intervals in areas of vegetation without a prescription described in Section 3.	The occurrence of deliberately lit fires.	Application of burn in line with fire guidelines of associated REs.			

4.5 UNPLANNED FIRE RESULTING IN HABITAT DETERIORATION

Where an unplanned or uncontrolled fire affects the Offset Area, an assessment will be required to determine the extent and severity of impact. This will include an assessment of the condition of habitat and vegetation for MNES and will be undertaken within 3 months following the event. This will ensure that actions can be taken to restore habitat within a timely manner. Management and corrective actions will be specific and targeted to improve the condition of habitat and/or prevent further reduction in quality.

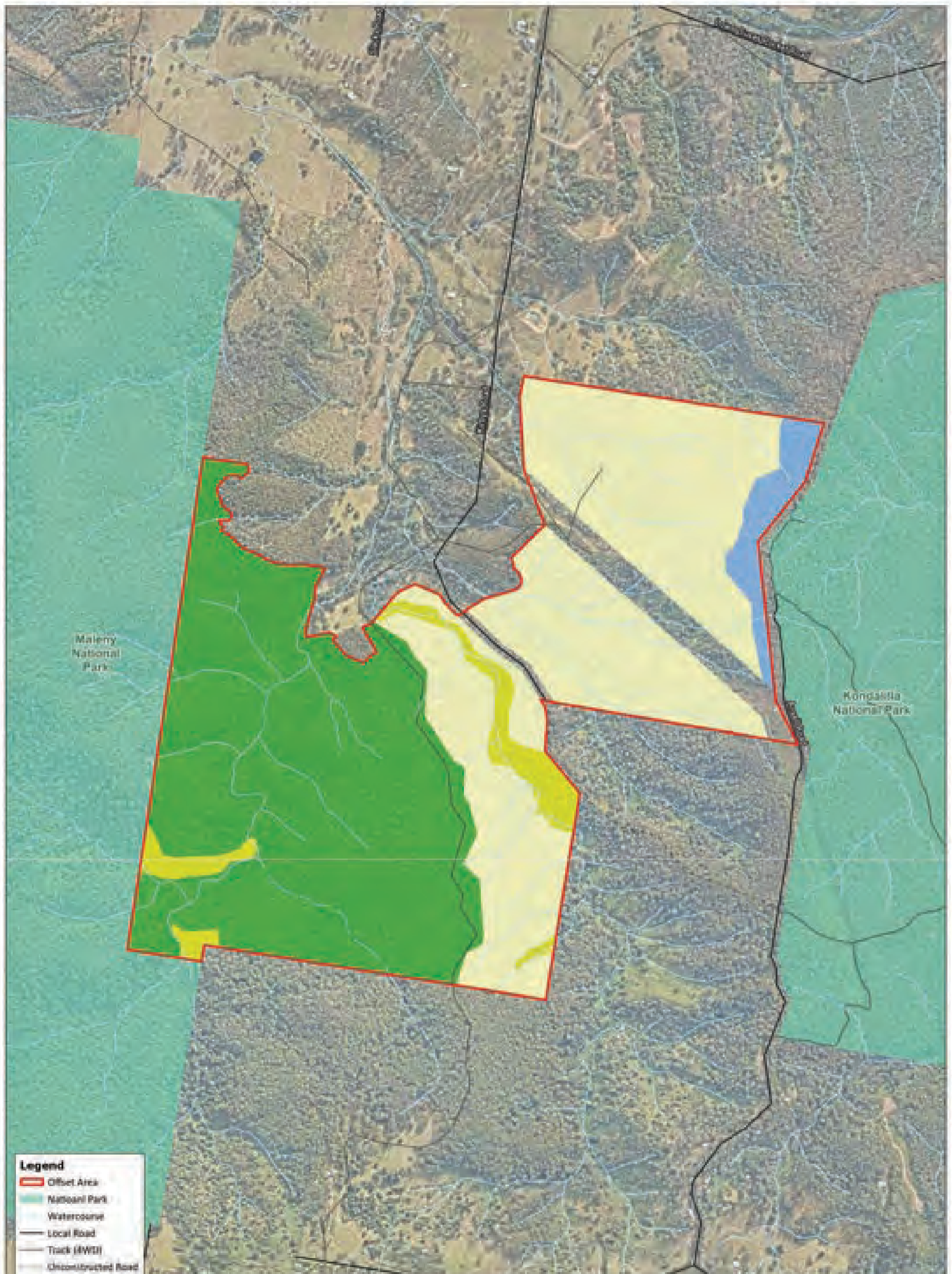
Actions to improve the Modified Habitat Quality Assessment (MHQA) following an unplanned fire event will be tailored to be in line with the extent and severity of the impact. These actions will be covered as part of a Regeneration Works Plan (RWP) specific to the unplanned event. Specific measures to be included and captured in RWP are:

- MHQA within 3 months of unplanned fire event at monitoring locations and or affected areas within the Offset Area;
- Corrective management measures developed for all affected areas (areas where MHQA scoring has decreased in value from previous monitoring event) within 5 months of unplanned fire event; and
- Corrective management actions, specific to condition of habitat and vegetation within affected areas (e.g. habitat restoration, revegetation, weed suppression and removal) commenced within 8 months.

5. PLANNING METHODOLOGY

A Site assessment was undertaken by SCC which focused on attributes relevant to fire management including vegetation surveys, slope assessment, fuel loads, aspect, dominant species associations. These assessments culminated in the production of Fire Management Units (FMU). FMUs are in part delineated by existing fire breaks, fire trails, lot boundaries, internal tracks and property boundaries and largely correspond to the dominant RE designation within each unit.

The FMUs allows for the development and application of management objectives which have relevance to either property protection; protection of sensitive and significant vegetation or habitats including offset matters (koala and grey-headed flying-fox); and management of appropriate fuel loads. FMUs relevant to the Offset Area are presented and detailed below in Figure 5-1 and Section 5.1. The delineation of these units identifies fire management protocols suitable for the protection of habitat values for the koala and grey-headed flying-fox as well as the maintenance of RE structure. In addition, all FMUs described below will be managed in accordance with Table 4-5.



Legend

- Offset Area
- National Park
- Watercourse
- Local Road
- Track (RWD)
- Unconstructed Road

Fire Management Unit

- 1
- 2
- 3
- 4

Coordinate System:
GDA2020 MGA Zone 58
Date: 25/07/2024
Created By: VS
Drawing Size: A3
0 100 200 300m



5-1 Fire Management Units

**Beerburrum to Nambour Rail Upgrade
Fire Management Plan**
Client: Qld Department of Transport and Main Roads



5.1 FIRE MANAGEMENT UNITS

TABLE 5-1 FIRE MANAGEMENT UNIT 1

Block Number	Fire Management Unit 1
Description	This management area covers a large area of the north and east of the Project Area, broken up by a transmission line, property boundaries (FMU 3 & FMU 5). The eastern section runs along the property boundary before connecting to FMU 2 along a fire trail in the south.
Access to FMU	Access is via Kirby's Road, as well as rely on internal tracks present within the Offset Area and may require traversing steep terrain to gain access.
Water Sources	There are no fire hydrants in the area. Water may be available from the creek within the reserve or from dams on adjacent private properties. A water truck may be required during dry conditions.
Vegetation communities	This area is comprised of remnant mixed open forest, which is mapped as RE 12.12.15 – <i>Eucalyptus propinqua</i> , <i>E. propinqua</i> , <i>Corymbia intermedia</i> , <i>E. siderophloia</i> , <i>Lophostemon confertus</i> open forest with occasional vine forest species on Mesozoic to Proterozoic igneous rocks.
Management objectives	No unintentional fires to occur within management unit. Protection of sensitive and significant vegetation or habitats.
Management prescriptions	Extinguish all unplanned fires should they commence within the Management Unit. Controlled burns are to be managed to minimise fires from encroaching into the neighbouring fire sensitive FMU2.
Burning regime	Burning unit (4-20+ years), strategy to burn mosaic of 40-60% over the burn area with a low to moderate intensity from late summer to winter. Cooperation is required from residents on neighbouring properties as it is not practical to contain a burn within the reserve.

TABLE 5-2 FIRE MANAGEMENT UNIT 2

Block Number	Fire Management Unit 2
Description	This management area covers a large section of the southwest of the Project Area. It is bordered by property boundaries and different vegetation units (FMU3, FMU4). On its eastern boundary, it borders FMU1 along a fire trail running north to south.
Access to FMU	Access to these areas will rely on internal tracks present within the Offset Area and may require traversing steep terrain to gain access.
Water Sources	There are no fire hydrants in the area. Water may be available from the creek within the reserve or from dams on adjacent private properties. A water truck may be required during dry conditions.
Vegetation communities	This area is comprised of remnant mixed open forest, which is mapped as RE 12.12.15 – <i>Eucalyptus propinqua</i> , <i>E. propinqua</i> , <i>Corymbia intermedia</i> , <i>E. siderophloia</i> , <i>Lophostemon confertus</i> open forest with occasional vine forest species on Mesozoic to Proterozoic igneous rocks. A small section is mapped as RE 12.12.15a & 12.12.15c. RE 12.12.15a is made up of <i>Eucalyptus grandis</i> +/- <i>E. saligna</i> tall open forest +/- vine forest understory, occurring in wetter gullies on Mesozoic to Proterozoic igneous rocks. While RE 12.12.15c is consists of <i>Lophostemon confertus</i> open forest +/- <i>Eucalyptus microcorys</i> , <i>E. siderophloia</i> , <i>E. carnea</i> , <i>E. propinqua</i> and vine forest species often present in understory, occurring in gullies and exposed ridges on Mesozoic to Proterozoic igneous rocks.
Management objectives	No unintentional fires to occur within management unit. Protection of sensitive and significant vegetation or habitats.
Management prescriptions	Extinguish all unplanned fires should they commence within the Management Unit. Controlled burns are to be managed to minimise fires from encroaching into the neighbouring fire sensitive FMU2.
Burning regime	Burning unit (4-20+ years), Cooperation is required from residents on neighbouring properties as it is not practical to contain a burn within the reserve.

TABLE 5-3 FIRE MANAGEMENT UNIT 3

Block Number	Fire Management Unit 3
Description	This majority of this management area covers gulleys, creek lines and southern facing slopes. Unit 3 is broken into four areas, two on the western border of the Offset Area and two areas along the southeastern border. This management unit is consistent with closed forest generally dominated by rainforest species in all levels of strata and typically occur in wetter areas with shelter and less exposure to sunlight.
Access to FMU	Access to these areas will rely on internal tracks present within the Offset Area and may require traversing steep terrain to gain access.
Water sources	There are no fire hydrants in the area. Water may be available from the creek within the reserve or from dams on adjacent private properties. A water truck may be required during dry conditions.
Vegetation communities	Unit 3 has been created to manage areas identified as RE 12.12.16 - Notophyll vine forest on Mesozoic to Proterozoic igneous rocks. Full description: Notophyll vine forest. Characteristic species include <i>Araucaria bidwillii</i> , <i>A. cunninghamii</i> , <i>Argyrodendron trifoliolatum</i> , <i>Argyrodendron sp.</i> (<i>Kin Kin W.D. Francis AQ81198</i>), <i>Backhousia subargentea</i> , <i>Brachychiton discolor</i> , <i>Beilschmiedia obtusifolia</i> , <i>Diospyros pentamera</i> , <i>Grevillea robusta</i> , <i>Gmelina leichhardtii</i> , <i>Ficus macrophylla</i> forma <i>macrophylla</i> and <i>Sloanea woollsii</i> . <i>Eucalyptus spp.</i> especially <i>E. siderophloia</i> , <i>E. propinqua</i> and <i>E. grandis</i> may be present as emergent. Occurs on Mesozoic to Proterozoic igneous rocks.
Management objectives	No fires to occur within management unit. Protection of sensitive and significant vegetation or habitats.
Management prescriptions	Extinguish all unplanned fires should they commence within the Management Unit. Manage all adjacent management units to prevent fire encroaching on this unit 3. Unit 3 is to remain unburnt. Habitat and vegetation within this unit is sensitive to impacts associated with fire. Vegetation within unit 3 is not flammable under normal circumstances. Management for protection from fire within management unit requires removal of category 3 invasive biosecurity matters and Weeds of National Significance (e.g. <i>Lantana camara</i> , <i>Dolichandra unguis-cati</i>)
Burning regime	Non-burning unit. Do not intentionally burn for management of fuel load.

TABLE 5-4 FIRE MANAGEMENT UNIT 4

Block Number	Fire Management Unit 4
Description	<p>This management area is located in the northeast corner of the Project Area and covers gulleys, creek lines and southern and western facing slopes. Unit 4 is boarded by the property boundaries and FMU 1.</p> <p>This management unit is consistent with closed forest generally dominated by open forest.</p>
Access to FMU	Access to this area will rely on internal tracks present within the Offset Area and may require traversing steep terrain to gain access. Access may also be achieved through the high voltage power line cleared area.
Water sources	There are no fire hydrants in the area. Water may be available from the creek within the reserve or from dams on adjacent private properties. A water truck may be required during dry conditions.
Vegetation communities	This area is comprised of remnant mixed open forest, which is mapped as RE 12.12.14 – <i>Eucalyptus racemosa</i> +/- <i>Lophostemon confertus</i> , <i>Syncarpia glomulifera</i> , <i>E. acmenoides</i> woodland to open forest usually on rocky near coastal areas on Mesozoic to Proterozoic igneous rocks.
Management objectives	No unintentional fires to occur within management unit. Protection of sensitive and significant vegetation or habitats.
Management prescriptions	Extinguish all unplanned fires should they commence within the Management Unit.
Burning regime	Burning unit (7-20 years), strategy to burn mosaic of 40-60% over the burn area with a low to moderate intensity from late summer to winter. Cooperation is required from residents on neighbouring properties as it is not practical to contain a burn within the reserve.

6. REFERENCES

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APPENDIX F

PEST ANIMAL MANAGEMENT PLAN



Beerburrum to Nambour Rail Upgrade Project

Pest Animal Management Plan

PREPARED FOR



Department of Transport and Main
Roads

DATE

11 November 2024

REFERENCE

0589458



DOCUMENT DETAILS

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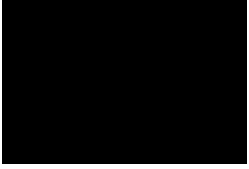
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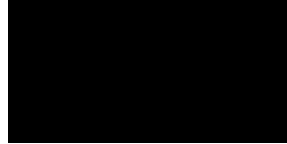
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Pest Animal Management Plan

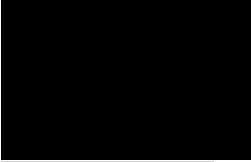
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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
B2N	Beerburrum to Nambour Rail Upgrade
DAF	Department of Agriculture and Fisheries
DAWE	Department of Agriculture, Water and the Environment
EPBC Act	Environment Protection and Biodiversity Conservation Act
GBO	General Biosecurity Obligation
ha	Hectare
NCL	North Coast Line
OAMP	Offset Area Management Plan
PAMP	Pest Animal Management Plan
QR	Queensland Rail
RE	Regional Ecosystem
SCC	Sunshine Coast Council
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
TMR	Department of Transport and Main Roads

1. INTRODUCTION AND PROJECT OVERVIEW

The Beerburrum to Nambour Rail Upgrade (B2N) project involves upgrades of the rail line between Beerburrum and Nambour, including rail duplication between Beerburrum and Landsborough and other infrastructure improvements such as station upgrades and additional passing loops between Landsborough and Nambour. The B2N project will address capacity constraints on this section of the rail line by providing additional track capacity and reliability, creating travel time savings for passenger and freight services.

The Queensland Government has adopted a staged delivery approach for the B2N project, based on available funding. The stages of the B2N project, also referred to for the purposes of the EPBC Act approval as the components of the action, include the Early Works, Stage 1 and Stage 2. Stage 2 is not currently funded and timing for delivery is unknown.

The Department of Transport and Main Roads (TMR, Approval Holder), in consultation with Queensland Rail (QR), is delivering the B2N project on behalf of the Australian and Queensland Governments.

Following an EPBC Act Referral to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) on 30 September 2020 (Reference: EPBC 2020-8803) the B2N project was determined to be a 'Controlled Action' on 12 January 2021 due to the project's impacts on the koala (*Phascolarctos cinereus*) and grey-headed flying-fox (*Pteropus poliocephalus*) assessed by submission of the *Beerburrum to Nambour Rail Upgrade EPBC Act Preliminary Documentation* (EPBC PD) (ERM, TMR 2021).

The B2N project was approved under the EPBC Act on 25 February 2022 with requirements to offset the removal of habitat for both the koala and grey-headed flying-fox. Kirby's Road Environmental Reserve, located in Obi Obi, Qld, was purchased by Sunshine Coast Council (SCC) in 2011 under the Environment Levy Land Acquisition Agreement. The 213.36 ha site (of which 189.97 ha makes up the Total Offset Area) provides an important habitat connection between Kondalilla National Park and Maleny National Park and is proposed to provide an environmental offset consistent under the *EPBC Act Environmental Offsets Policy* (the EPBC Offsets Policy) (SEWPaC, 2012). An additional adjoining 68 ha site was acquired by SCC in 2022 and forms an extension of the Kirby's Road Environmental Reserve.

Condition 5 of the EPBC Act referral decision notice states the following:

The Approval Holder must submit an Offset Area Management Plan (OAMP) for the Minister's approval that, to the satisfaction of the Minister, compensates for the significant residual impact of clearing 64.15 ha of koala habitat and grey-headed flying-fox foraging habitat within the development area.

The Project Area refers to the area of study for consideration of direct and indirect impacts from the B2N project. It includes the Indicative Disturbance Footprint for the Early Works, Stage 1 and Stage 2 boundary and a 50m buffer either side.

This Pest Animal Management Plan (PAMP) has been prepared in accordance with the EPBC Offsets Policy to set out the management actions to be implemented on the Offset Area, as well as establishing the monitoring requirements relevant to delivering the required offsets in relation to pest animals.

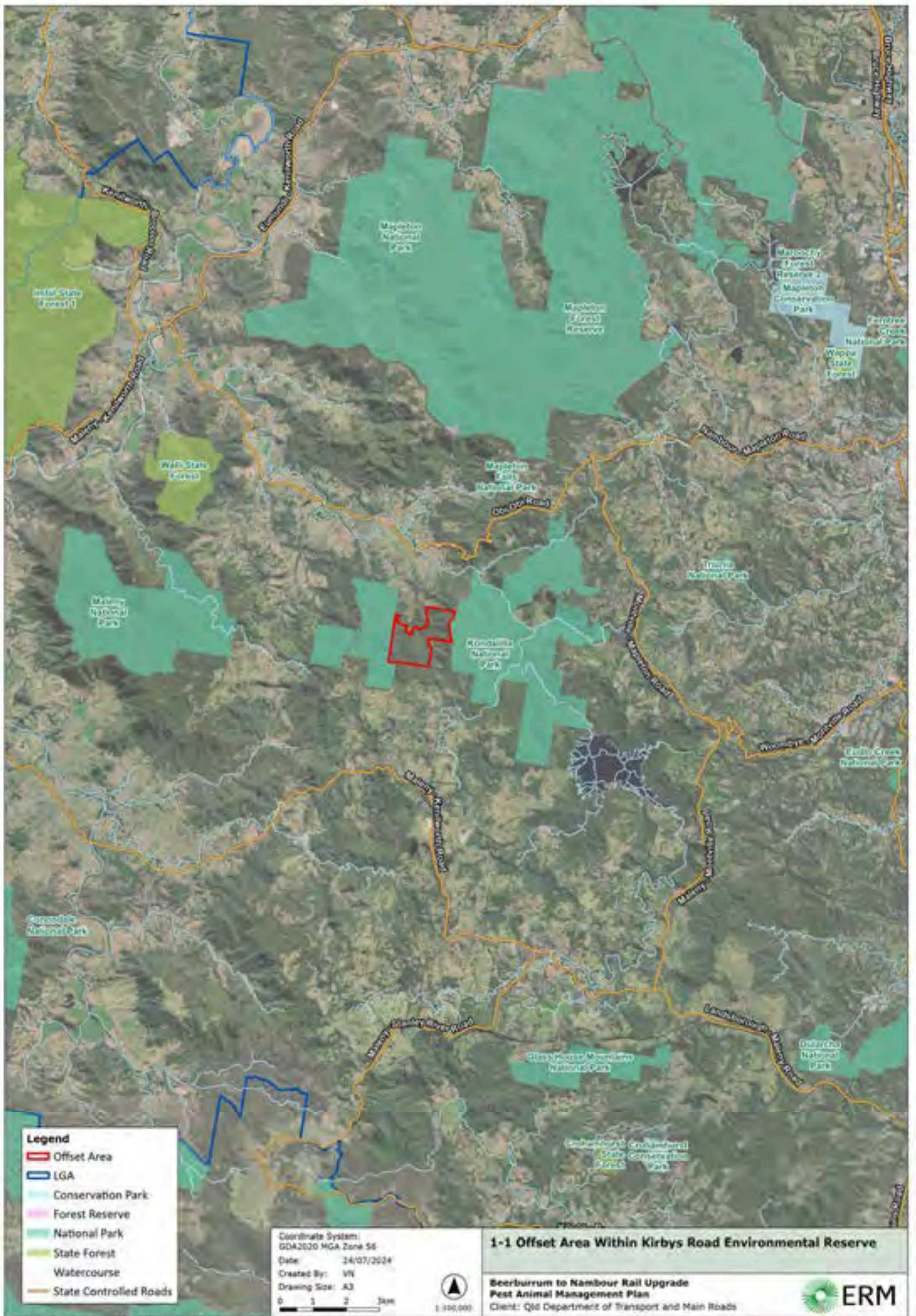
1.1 SITE INFORMATION

The proposed Offset Area is contained within the Kirby's Road Environmental Reserve (Figure 1-1) and is located in the Upper Mary River sub-catchment of the Mary River catchment which flows into Obi Obi Creek.

The Offset Area is topographically diverse with a mixture of steep escarpment, hill slopes, gullies, ephemeral creeks, and alluvial flats and is described as 'Mesozoic to Proterozoic igneous rocks. Hills and lowlands on granitic rocks'. The Offset Area is dominated by sclerophyll woodland and contains both remnant and regrowth vegetation, with Notophyll vine forest vegetation communities present within gullies. The site contains six regional ecosystems (RE's), consisting of one 'Endangered' RE, two listed as 'Of Concern' and three listed as 'Least Concern' under the Vegetation Management Act 1999.

Historic land use practices have been predominantly agricultural, largely dairy. Current land uses serve urban and residential purposes interspersed with agricultural lands, state forest and National Parks. A mosaic of vegetation quality is present throughout the proposed Offset Area, with land use practices having a noticeable impact on habitat quality in some areas.

The proposed Offset Area was selected on the required principles that it contains both remnant and regrowth koala and grey-headed flying-fox habitat and can be subject to ecological improvements through removing existing pressures on ecological values and management actions to enhance these values and reduce the risks to the species.



Legend

- ▭ Offset Area
- ▭ LGA
- ▭ Conservation Park
- ▭ Forest Reserve
- ▭ National Park
- ▭ State Forest
- ▭ Watercourse
- ▭ State Controlled Roads

Coordinate System:
GDA2020 MGA Zone 56
Date: 24/07/2024
Created By: VN
Drawing Size: A3
0 1 2 3km
1:100,000

1-1 Offset Area Within Kirbys Road Environmental Reserve

Beerburrum to Nambour Rail Upgrade
Pest Animal Management Plan
Client: Qld Department of Transport and Main Roads



1.2 PURPOSE AND OBJECTIVES

Pest animals degrade the quality and suitability of habitat for native fauna and flora. In high densities pest animals can lead to a decline in tree health, disrupted recruitment, the spread of weeds and reductions in soil and water quality. For the koala and the grey-headed flying-fox, this degradation and fragmentation of habitat is considered a key ecological threatening process and has the potential to further disrupt population movements and the availability of critical foraging resources (DAWE, 2022; DAWE, 2021). Pest animals also have the potential to cause direct impacts to MNES species, particularly the koala, and are known to cause injury and mortality (DAWE, 2022).

The purpose of this PAMP is to support the Offset Area Management Plan (OAMP) by providing detailed conditions on management of pest animals to achieve offset outcomes.

The PAMP identifies existing and potential biosecurity risks associated with pest vertebrate animals and identifies management actions designed to prevent the entry, establishment or spread of, and manage, reduce or eradicate, any pest animal species in an area that poses a significant biosecurity risk.

As outlined in the OAMP, these management actions will protect the quality of habitat required for koala and grey-headed flying-fox and will establish ongoing monitoring of direct threats within the Offset Area.

2. LEGISLATION

The following sections provide a description of the relevant legislative context. This document addresses the objectives and requirements of the legislation, in addition to offset requirements under the EPBC Act Offsets Policy (DSEWPC, 2012) that relate to the identification and management of existing and potential biosecurity risks within the Offset Area.

2.1 BIOSECURITY ACT 2014

The *Biosecurity Act 2014* (the Act) commenced in 2016 as the overarching legislation guiding pest management throughout the state. The Act is underpinned by the *Biosecurity Regulation 2016*, which prescribes how the Act is implemented and applied. The Act establishes a system to minimise biosecurity risks and facilitate a reasonable and practicable response to biosecurity risks.

Under the Act, any landholder and/or council have a General Biosecurity Obligation (GBO) to manage declared pest species on land under their control. Under the GBO, individuals and corporations whose activities pose a biosecurity risk must:

- Take all reasonable and practical steps to prevent or minimise each biosecurity risk;
- Minimise the likelihood of causing a 'biosecurity event' and limit the consequences if such an event is caused; and
- Prevent or minimise the harmful effects a risk could have, and not do anything that might make any harmful effects worse.

2.2 ANIMAL CARE AND PROTECTION ACT 2001

The *Queensland Animal Care and Protection Act 2001* (the Act) promotes the responsible care and use of animals. It places a legal duty of care on people interacting with animals to meet those animals' needs in an appropriate way. The Act covers all living vertebrate animals, including feral and pest animals, as well as wildlife (DAF, 2024).

The Act protects animals against certain practices that may cause unreasonable suffering, such as poison baits or traps. There are no specific types of traps banned in Queensland, though care must be taken that any traps used are designed to minimise pain for the trapped animal. Under the Act, causing an animal pain that, in the circumstances, is unjustifiable, unnecessary or unreasonable is animal cruelty.

It is an offence under the Act to administer, feed or lay a bait, or a harmful or poisonous substance, with the intention of injuring or killing an animal. Those killing feral or pest animals are exempt, though this exemption applies only if the act is done in a way that causes the animal as little pain as is reasonable and complies with any regulations.

3. ROLES AND RESPONSIBILITIES

All personnel involved with Offset Area Management Actions are responsible to:

- Minimise biosecurity risks, including spread of pest species;
- Participate in biosecurity training if required;
- Undertake mitigation and control measures such as washdown and communication procedures;
- Implement Weed and Pest Animal Management Plan procedures; and
- Adhere to the General Biosecurity Obligation (GBO).

The Queensland Department of Transport and Main Roads (TMR) and delegated environmental managers and/or supervisors (including SCC) are responsible for implementing the monitoring and Management Strategy. Specialist or technical experts may be engaged by TMR to undertake the management of pests in line with this PAMP.

55.5 In the case that additional species not currently included in the PAMP are identified following pest animal baseline monitoring, adaptive management will be applied to ensure the threat is managed in accordance with this PAMP. In the event that changes to the objectives described in the PAMP are required, those changes will be subject to the approval of DCCEEW prior to their implementation. This is inclusive of changes to the Management Strategy (Section 5) and Monitoring Program (Section 5.5) detailed for targeted pest animals in the Offset Area.

4. TARGETED PEST ANIMALS

Initial fauna surveys and desktop analysis of the Offset Area as well as consultation with current land managers at SCC identified six pest animal species listed under the Queensland *Biosecurity Act 2014* as known or likely to occur within the Offset Area. These are the targeted pest animal species referred to in this PAMP (Table 4-1). The targeted species list may be reviewed based on results of the initial detailed pest assessment (see Section 5.1).

TABLE 4-1: TARGETED PEST ANIMAL SPECIES

Scientific Name	Common Name	QLD Restricted Species Classification	Species presence within the Offset Area
<i>Canis familiaris</i>	Domestic dog only ¹	Category 3, 4 & 6	Likely to occur within the Offset Area, known to occur in the surrounding area
<i>Vulpes vulpes</i>	Red fox	Category 3, 4, 5 & 6	Known to occur within the Offset Area (O2 Ecology, 2012)
<i>Felis catus</i>	Feral cat	Category 3, 4 & 6	Known to occur within the Offset Area (O2 Ecology, 2012)
<i>Sus scrofa</i>	Feral pig	Category 3, 4 & 6	Likely to occur within the Offset Area, known to occur in the surrounding area
<i>Cervus timorensis</i>	Feral rusa deer	Category 3, 4 & 6	Likely to occur within the Offset Area, known to occur in the surrounding area
<i>Cervus elaphus</i>	Feral red deer	Category 3, 4 & 6	Likely to occur within the Offset Area, known to occur in the surrounding area

¹ Under the *Nature Conservation Act 1992*, the dingo is protected within protected areas.
 Category 3: The invasive animal must not be distributed either by sale or gift or released into the environment.
 Category 4: The invasive animal must not be moved.
 Category 5: The invasive animal must not be kept.
 Category 6: The invasive animal must not be fed.

These species can present a direct threat to the koala and grey-headed flying-fox as well as to the environment and ecosystems depended on by these species. These pest animal species:

- Aid in the spread of invasive plants;
- Degrade waterholes and wetlands;
- Cause soil erosion;
- Prey on a wide range of native species, including koalas;
- Carry diseases that affect native animals;
- Damage native flora throughout regrowth and recruitment;
- Compete with native wildlife for food and habitat; and
- Damage fences and infrastructure.

5. MANAGEMENT STRATEGY

The Management Strategy within the PAMP prioritises monitoring for the early detection of pest animal species, with treatment and control measures used for existing biosecurity matters and in the event of detected incursions. The Management Actions within this strategy aim to minimise the risk of spreading or introducing pest animal species and potential pathogens to the Offset Area, including surrounding areas and will, where possible, remove and dispose of pest animal species. A monitoring program with performance measures and criteria is provided in Section 5.5.

Prevention methods are prioritised as they are the most cost and outcome focused way of managing pest species. Once a pest species becomes established in an area, eradication and control methods are more expensive and time consuming, with greater effort will being required to control further spread and contain its impact.

5.1 BASELINE PEST ANIMAL ASSESSMENT

Surveys to date, along with advice from current land managers Sunshine Coast Council (SCC), have assessed the presence of pest animal species in the Offset Area. The following species have been confirmed or are considered likely to occur:

- Dog (domestic or wild) (Likely);
- Red fox (Known);
- Feral cat (Known);
- Feral pig (Likely);
- Rusa deer (Likely); and
- Red deer (Likely).

A detailed pest animal assessment will be undertaken following approval of the OAMP by a suitably qualified expert. Pest animal presence and abundance is dynamic and a detailed assessment prior to active control is required to ensure control is responding to the most up to date information regarding pest incursions. While the information obtained by surveys to date has supported the development of this PAMP, the ongoing adjustments in pest animal presence requires ongoing monitoring and adaptive management.

Monitoring, with analysis against the performance objectives outlined in the OAMP, will provide an indication of the success of the management and monitoring actions being implemented to improve the quality of koala and grey-headed flying-fox habitat within the Offset Area. These will also serve to trigger implementation of corrective actions where targets and criteria are not being met.

5.2 AWARENESS AND TRAINING

Personnel including contractors involved with activities outlined in the PAMP will have relevant training and/or resources to ensure that all biosecurity management procedures, OAMP objectives and animal ethics obligations are made aware of and understood, including:

- Access procedures;
- How to identify and report possible biosecurity events;
- Roles and responsibilities;

- Duty of care on people interacting with animals;
- Record keeping procedures; and
- Their GBO.

Licenses, certification, training and resources will be tracked through the use of an appropriate register by SCC.

5.3 ACCESS PROCEDURE

To mitigate the potential for impacts to MNES and minimise the potential for incursions of pest animals, public access to the Offset Area will be restricted to walk-in access only. Gates at the entrance of Offset Area that prevent the entry of horses and other large domestic animals are currently in place and will be maintained in line with the OAMP. Compliance with prohibiting domestic animals within the Offset Area will occur through visual monitoring by ecological restoration practitioners working on-site, and cameras to be deployed under the monitoring program in the PAMP (see Table 5-1). Non-compliances will be reported to SCC for action under local laws. Gates and entrances will be inspected in conjunction with quarterly pest animal monitoring within the Offset Area. Where practicable, damage noted during the inspection will be repaired within three months of being identified.

5.3.1 EMPLOYEES, CONTRACTORS, AND VISITORS

A visitor register will be kept to document access records and will contain details of works carried out within the Offset Area. Entry and exit times and dates of employees and contractors visiting the Offset Area will be recorded in the visitor register. Employees and contractors are required to notify the Offset Area manager upon entry and exit. A designated parking area for vehicles and equipment, including visitor vehicles, will be established outside the Offset Area to minimise impacts and disturbance to protected flora and fauna.

5.3.2 SIGNAGE

Signage will be erected and displayed at the Offset Area entrance clearly stipulating contact details and access requirements (such as: *Dogs and other domestic animals are prohibited*). These signs will also provide details regarding penalties for non-compliance. Signage will also provide details of community hotlines and reserve management for reporting observations of pest animals and signs of activity. Signage will be maintained in line with the OAMP.

5.4 PEST ANIMAL MANAGEMENT

The six priority pest animals listed in Table 4-1 will be targeted, monitored, controlled and reduced under this program. Pest animal management will align with performance objectives outlined in the OAMP to improve the quality of koala and grey-headed flying-fox habitat within the Offset Area.

Pest animal monitoring and control will be undertaken by a Suitably Qualified Expert in accordance with guidance provided by the Centre for Invasive Species Solutions, the Biosecurity Act and the Animal Care and Protection Act.

Dog

Dogs are considered likely to occur in the Offset area and will be controlled as part of offset area management, in accordance with this PAMP. Dog attacks on koalas are a major cause of mortality and trauma, particularly in rapidly expanding urban areas (DAWE, 2022). Threats from predators are currently managed on Environmental Reserves in partnership with SCC's Healthy Places team. Pest animal predators are a threat to native wildlife, however the loss of the ecological function of native predators such as quolls and dingos in the landscape is also an important management issue impacting biodiversity. Therefore, the current control program on Environmental Reserves also takes into account the ecological importance of predator/prey relationships in maintaining healthy ecosystems (SCC, 2017) Dog abundance and density can vary over time and is difficult to quantify due to their highly mobile nature (State of Queensland, 2014). Impacts of dogs within the Offset Area are likely to be limited to escaped, released or off-lead domestic dogs; however, wild dogs could occur. As outlined in the Management Strategy, signage will be erected to prohibit visitors bringing domestic animals into the Offset Area and provide details regarding penalties for non-compliance (see Section 5.3.2). This will reduce the likelihood of attacks on koalas by off-lead domestic dogs.

As outlined within the *National Wild Dog Action Plan 2020-2030*, corrective actions for dogs include baiting (ground and aerial application), trapping and exclusion fencing. Exclusion fencing is not proposed within the Offset Area, due to connectivity concerns with adjacent koala habitat.

Baiting for dogs is a targeted ground-based technique and can be an economical and effective control method. Baiting programs must be undertaken using approved poisons (such as 1080 and para-aminopropiophenone). Trapping can be time-consuming and labour-intensive, and success often depends on the operator's skill. Benefits to trapping are that it can be utilised adjacent urban areas, and it has a minimal impact on non-target species if used correctly. Only the use of padded or offset laminated jawed traps is acceptable (DAF, 2024a).

Active control will be undertaken in accordance with the relevant national operating Procedure as a minimum. The Offset Area pest control program will support regional/local dog management programs through liaison with SCC and their Prevention and Control Program for feral animals for the Sunshine Coast Area. This may include additional control measures including baiting and trapping within the Offset Area.

Red Fox

European red foxes attack livestock and native animals and spread weeds. While impacts to either the koala or the grey-headed flying-fox is not quantified, there is the potential for injury and or/mortality of individuals of either species when at ground level. While juvenile grey-headed flying-fox may fall to the ground during flight attempts, koalas are considered of higher risk to predation or injury to foxes due to the frequency in which individuals may descend to the ground to move between trees. Red foxes have previously been observed within the Offset Area (O2 Ecology, 2012).

As outlined within *the Threat Abatement Plan for Predation by European Red Fox*, control methods for European red foxes include baiting, trapping, exclusion fencing and harbour destruction. The Approval Holder will support and be involved in strategic red fox management programs. This may include additional control measures including baiting and trapping within the Offset Area. Active control will be undertaken in accordance with the relevant national operating Procedure as a minimum.

Feral Cat

Predation by feral cats has a severe impact on native fauna species, and also lesser impacts through competition and disease transmission (DoE, 2015). Although the impacts of feral cats on koalas have not been quantified, diet studies have confirmed potential predation of koalas by cats (Woolley, et al., 2019). While adult koalas may be of a sufficient size to avoid predation, joeys may be at risk at ground level while females are moving between trees. Injury to individuals resulting from cats may also pose a risk to koalas within the Offset Area resulting in decline in overall health and breeding potential. Feral cats are solitary and predominantly nocturnal, spending most of the day in burrows, logs or rock piles. Feral cats have previously been observed within the Offset Area (O2 Ecology, 2012).

As outlined within the Threat Abatement Plan for Predation by Feral Cats the focus of management is generally on impact abatement rather than eradication. Fenced enclosures are a resource-intensive but effective way to control feral cat impacts. An example of a direct method is trapping. The Approval Holder will support and be involved in strategic feral cat management programs. This may include additional control measures within the Offset Area. Active control will be undertaken in accordance with the relevant national operating Procedure as a minimum.

Feral Pig

Feral pigs are un-owned pigs that live in the wild and are descended from domesticated pigs of the species *Sus scrofa*, family Suidae. Feral pigs cause significant environmental damage to ecosystems, biodiversity, habitats and cultural and social assets. Large groups are known to degrade soil quality, disrupt vegetation recruitment, spread invasive plants, and cause permanent damage to established canopy trees. While injury and mortality to MNES is unlikely to occur as a direct result of feral pigs, koalas moving along the ground between trees may be at risk. Impacts to MNES within the Offset Area are likely to be restricted to the degradation of critical habitat for both the koala and the grey-headed flying-fox. Feral pigs also pose biosecurity and disease risks to Australia (Australian Pork Limited, 2021). Feral pigs have not been observed within the Offset Area but are known from the surrounding area.

As outlined within the *National Feral Pig Action Plan and Threat Abatement Plan*, direct methods of control include baiting, trapping and exclusionary fencing (not proposed within the Offset Area). The Approval Holder will support and be involved in strategic feral pig management programs relevant to the Offset Area. Active control will be undertaken in accordance with the relevant national operating Procedure as a minimum.

Feral Deer (Rusa Deer and Red Deer)

Rusa deer are medium-sized deer with distinctive light fur on the chest and throat. Red deer have a glossy red-brown to brown coat in summer and a grey-brown coat in winter, with a straw-coloured patch of fur on their rear. Wild populations of feral deer in Australia are attributed to animals that have escaped or been released from farms. Farmed deer that escape captivity will rapidly regress to a wild state, any deer not within an appropriate fence is considered feral and subject to control. Feral deer degrade habitats by damaging waterways, browsing and trampling understory vegetation and seedlings, and ring-barking immature trees (DAF, 2023). Impacts to MNES within the Offset Area are likely to be restricted to the degradation of critical habitat for both the koala and the grey-headed flying-fox. Feral deer have not been observed within the Offset Area but are known from the surrounding area.

Control methods for feral deer involve trapping (self-muster trapping) and exclusion fencing (not proposed within the Offset Area). Deer control in an area is often best carried out as a collaborative effort, involving all local landowners, councils and Landcare groups. The Approval Holder will support and be involved in strategic feral deer management programs relevant to the Offset Area. Active control will be undertaken in accordance with the relevant national operating Procedure as a minimum.

5.5 MONITORING PROGRAM

Prior to the commencement of targeted control measures, a detailed pest animal assessment will be undertaken within six months of OAMP approval by a suitably qualified expert. The assessment will re-establish a baseline dataset and will include detailed mapping of targeted pest animals within the Offset Area.

To achieve the early detection of pest species incursions, ongoing targeted pest animal monitoring will take place quarterly within the Offset Area. Surveys will monitor pest animal presence within the Offset Area and implement control measures if triggers relating to fluctuations in densities are met.

Incidental observations of pest animal activity will also be reported by employees and contractors working in the Offset Area as well as members of the public through provided hotlines (see Section 5.3.2). Opportunistic monitoring evidence of any pest animals within the Offset Area and surrounding areas will be reported to the Offset Area manager and SCC and recorded to action control measures. This includes:

- Pest animal sightings;
- Pest animal signs (e.g., digging by feral pigs, predation on fauna); and
- Pest animal habitat (e.g., fox dens).

Species-specific triggers for corrective actions have been provided below in Table 5-1. Where it is deemed that trigger thresholds for corrective actions are met, species-specific control programs will be developed in line with the methods and objectives of the PAMP.

TABLE 5-1: PEST ANIMAL MANAGEMENT ACTIONS

Dog (domestic or wild)	<ul style="list-style-type: none"> • Mortality of individuals, particularly koalas • Injury of individuals, resulting in lowered survivorship and reduced breeding potential 	<ul style="list-style-type: none"> • Monitoring of presence using a minimum of three (3) cameras to be checked on a monthly basis • Quarterly pest assessment surveys • Incidental observations, public / SCC reports (to be made via signage detailing contact details for reporting) 			TMR or delegated environmental managers and/or supervisors, with support from SCC
				Implement baiting and/or trapping in Offset Area within one (1) month of assessment completion.	
Red Fox	<ul style="list-style-type: none"> • Mortality of individuals, particularly juveniles • Injury of individuals resulting in lowered survivorship 	<ul style="list-style-type: none"> • Monitoring of presence using a minimum of three (3) cameras to be checked on a monthly basis • Quarterly pest assessment surveys 	1. One (1) or more incidental observations or public reports at any time including instances of injury or mortality to MNES attributed to red fox.	Additional assessment (e.g., targeted survey) within one (1) month of trigger to confirm presence of pest animal, if confirmed immediate corrective actions will be put in place (e.g. targeted control and / or increased monitoring). These findings will be incorporated into next pest assessment.	TMR or delegated environmental managers and/or supervisors, with support from SCC

	<ul style="list-style-type: none"> and reduced breeding potential • Spread weeds 	<ul style="list-style-type: none"> • Incidental observations, public / SCC reports (to be made via signage detailing contact details for reporting) 			
Feral Cat	<ul style="list-style-type: none"> • Mortality of individuals, particularly juveniles • Injury of individuals resulting in lowered survivorship and reduced breeding potential • Potential transfer of disease 	<ul style="list-style-type: none"> • Monitoring of presence using a minimum of 3 (three) cameras to be checked on a monthly basis • Quarterly pest assessment surveys • Incidental observations, public / SCC reports (to be made via signage detailing contact details for reporting) 	<ol style="list-style-type: none"> 1. One (1) or more incidental observations or public reports within at any time, including instances of injury or mortality to MNES attributed to feral cat. 	<p>Additional assessment (e.g., targeted survey) within one (1) month of trigger to confirm presence of pest animal, if confirmed immediate corrective actions will be put in place (e.g. targeted control and / or increased monitoring). These findings will be incorporated into next pest assessment.</p> <p>Implement baiting and/or trapping in Offset Area within one (1) month of assessment completion.</p>	TMR or delegated environmental managers and/or supervisors, with support from SCC

Pest animal	Impacts to MNES	Monitoring / reporting	Triggers for corrective actions	Adaptive management / corrective actions	Responsibility
			<p>of three (3) animals observed within the Offset Area will serve as a trigger for additional corrective actions.</p>		
<p>Feral Pig</p>	<ul style="list-style-type: none"> Reduction In quality of critical habitat for koala and grey-headed flying-fox Declines in tree health due to extensive rubbing behavior Reduction in recruitment of canopy species due to browsed vegetation Potential injury and/or mortality of ground active individuals 	<ul style="list-style-type: none"> Monitoring of presence using a minimum of three (3) cameras to be checked on a monthly basis Quarterly pest assessment surveys Incidental observations, public / SCC reports (to be made via signage detailing contact details for reporting) 	<ol style="list-style-type: none"> One (1) or more incidental observations or public reports at any time. Confirmed presence of any feral pigs including detection of wallows or evidence of rooting of 4m² or greater. Pest animal management actions unsuccessful, density becomes equal to or higher than baseline density. In the case where baseline data is not available, a maximum acceptable absolute density of three (3) animals observed within the Offset Area will serve as a trigger for additional corrective actions. 	<p>Additional assessment (e.g., targeted survey) within one (1) month of trigger to confirm presence of pest animal, if confirmed immediate corrective actions will be put in place (e.g. targeted control and / or increased monitoring). These findings will be incorporated into next pest assessment.</p> <p>Implement baiting and/or trapping in Offset Area within three (3) months of assessment completion. Implement restoration plantings in areas of extensive wallows and rooting. Removal of woody weeds providing suitable breeding habitat.</p> <p>Undertake and complete all additional corrective actions necessary to reduce pest animal density to baseline numbers or fewer. Review PAMP and Management Strategy to ensure control measures are sufficient.</p>	<p>TMR or delegated environmental managers and/or supervisors, with support from SCC</p>

Pest animal	Impacts to MNES	Monitoring / reporting	Triggers for corrective actions	Adaptive management / corrective actions	Responsibility
Feral Deer (Rusa Deer and Red Deer)	<ul style="list-style-type: none"> Reduction in quality of critical habitat for koala and grey-headed flying-fox Declines in tree health due to extensive rubbing behavior Reduction in recruitment of canopy species due to browsed vegetation and rubbing 	<ul style="list-style-type: none"> Monitoring of presence using a minimum of three (3) cameras to be checked on a monthly basis Quarterly pest monitoring Incidental observations, public / SCC reports (to be made via signage detailing contact details for reporting) 	1. One (1) or more incidental observations or public reports at any time.	Additional assessment (e.g., targeted survey) within one (1) month of trigger to confirm presence of pest animal, if confirmed immediate corrective actions will be put in place (e.g. targeted control and / or increased monitoring). These findings will be incorporated into next pest assessment.	TMR or delegated environmental managers and/or supervisors, with support from SCC
			2. Confirmed presence during two (4) consecutive monitoring events, including detection of degraded waterways/riparian areas, damaged/browsed vegetation.	Implement trapping in Offset Area within three (3) months of assessment completion. Implement restoration plantings in areas of extensive vegetation browsing/rubbing. Removal of woody weeds providing suitable breeding habitat.	
			3. Pest animal management actions unsuccessful, density becomes equal to or higher than baseline density. In the case where baseline data is not available, a maximum acceptable absolute density of three (3) animals observed within the Offset Area will serve as a trigger for additional corrective actions.	Undertake and complete all additional corrective actions necessary to reduce pest animal density to baseline numbers or fewer. Review PAMP and Management Strategy to ensure control measures are sufficient.	

5.6 RESPONSE TO BIOSECURITY INCIDENT OR RISK

Biosecurity matters detected within the Offset Area during surveys or during the course of standard activities, must be reported to the Offset Area manager and SCC and investigated in accordance with the Monitoring Program detailed in this section.

Additionally, if a suspected Prohibited Matter pest animal (schedule 2 of *Biosecurity Act 2014*) is detected, it must be reported within 24 hours. Biosecurity Queensland must be contacted on 13 25 23 and all reasonable steps taken to minimise the risks of the prohibited matter and not make the situation worse.

The following information must be supplied:

- Full name and contact phone number;
- The suspected pest species you are reporting;
- The location of the suspected pest;
- Details of any significant biosecurity impact; and
- Any other information requested by the person or body to whom the notification is required to be given.

5.7 POST-FIRE PEST ANIMAL MONITORING AND MANAGEMENT

Pest animals can pose a significant threat to the survival of native species after a fire event. Pest animal species often move into an area post-fire, damaging native vegetation, competing with native herbivores for reduced resources and resulting in additional risk of predation to native fauna (DEECA, 2023).

Where an unplanned or uncontrolled fire affects the Offset Area, an assessment will be undertaken to determine the extent and severity of impact to habitat quality (as outlined in the Fire Management Plan (FMP)). This assessment will also aim to determine if the impact of the unplanned fire is likely to result in changes in the number of pest animals present.

In this scenario, a review of the management actions outlined in the PAMP will be carried out to ensure targeted pest animal species are being adequately monitored. Where targeted pest animal densities are found to increase after a fire event, immediate application of corrective actions will be carried out to mitigate any additional risk to koala and grey-headed flying-fox as soon as possible. For example, where an increase in the number of feral cats or foxes are observed post-fire event, additional control programs (baiting, trapping) will be immediately implemented to reduce risk to MNES.

6. SUCCESS CRITERIA

Success Criteria for the Pest Animal Management Plan aligns with the Offset Area Management Actions associated with improving habitat quality for koala and grey-headed flying-fox. The following Success Criteria will be applied:

- No targeted pest animal population will exceed baseline survey results throughout the Offset Area AND overall population trends of all targeted pest animal species will show decreasing trends over the life of the Offset delivery program;
- Any injury or mortality of koala and grey-headed flying-fox attributed to targeted pest animals will not have a significant impact on species population health or viability (to be determined using results from the 5-yearly targeted surveys outlined in the OAMP);
- No reduction in quality of habitat for koala and grey-headed flying-fox, and subsequent detraction from MHQA score objectives described in the OAMP, directly linked to the targeted pest animals will occur; and
- Recruitment of critical habitat trees for koala and grey-headed flying-fox will not be directly impacted by the targeted pest animals.

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APPENDIX G

REGENERATION WORKS PLAN



Beerburrum to Nambour Rail Upgrade Project

Offset Area Regeneration Works Plan

PREPARED FOR



Department of Transport and Main
Roads

DATE

11 November 2024

REFERENCE

0589458



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Beerburrum to Nambour Rail Upgrade Project

Offset Area Regeneration Works Plan

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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
BOA	Bushland Operational Assessment
B2N	Beerburrum to Nambour
BMAD	Bell Miner Associated Dieback
DAWE	Department of Agriculture, Water and the Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ha	Hectare
MHQA	Modified Habitat Quality Assessment
OAMP	Offset Area Management Plan
QR	Queensland Rail
RE	Regional Ecosystem
RWP	Regeneration Works Plan
SCC	Sunshine Coast Council
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
TMR	Department of Transport and Main Roads
WoNS	Weeds of National Significance

1. INTRODUCTION

The Beerburrum to Nambour Rail Upgrade (B2N) Project involves upgrades of the rail line between Beerburrum and Nambour, including rail duplication between Beerburrum and Landsborough, and other infrastructure improvements (such as station upgrades and additional passing loops) between Landsborough and Nambour. The B2N project will address capacity constraints on this section of the rail line by providing additional track capacity and reliability, creating travel time savings for passenger and freight services.

The Queensland Government has adopted a staged delivery approach for the B2N project, based on available funding. The stages of the B2N project, also referred to for the purposes of the EPBC Act Approval as the components of the Action, include the Early Works, Stage 1 and Stage 2. Stage 2 is not currently funded and timing for delivery is unknown.

The Department of Transport and Main Roads (TMR, Approval Holder), in consultation with Queensland Rail (QR), is delivering the B2N project on behalf of the Australian and Queensland Governments.

Following an EPBC Act Referral to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) on 30 September 2020 (Reference: EPBC 2020-8803) the B2N project was determined to be a 'Controlled Action' on 12 January 2021 due to the project's impacts on the koala (*Phascolarctos cinereus*) and grey-headed flying-fox (*Pteropus poliocephalus*) assessed by submission of the *Beerburrum to Nambour Rail Upgrade EPBC Act Preliminary Documentation* (EPBC PD) (ERM, TMR 2021).

The B2N project was approved under the EPBC Act on 25 February 2022 with requirements to offset the removal of habitat for both the koala and grey-headed flying-fox. Kirby's Road Environmental Reserve, located in Obi Obi, Qld, was purchased by Sunshine Coast Council (SCC) in 2011 under the Environment Levy Land Acquisition Agreement. The 213.36 ha site provides an important habitat connection between Kondalilla National Park and Maleny National Park and is proposed to provide an environmental offset consistent under the *EPBC Act Environmental Offsets Policy* (the EPBC Offsets Policy) (DSEWPaC, 2012).

An additional adjoining 68 ha site was acquired by SCC in 2022 and forms an extension of the Kirby's Road Environmental Reserve. The 189.97 ha Offset Area is additional to the ecological restoration currently undertaken in the reserve and provides multiple benefits alike forming large connectivity corridors for fauna movement from Maleny National Park to Kondalilla National Park and provides further valuable habitat for local fauna and flora. Employing active management to legacy infestations and preventing new weed incursions will improve the condition and resilience of koala and grey-headed flying-fox foraging habitat within the Offset Area.

Kirby's Road Environment Reserve has a history of grazing pressure from historical dairy production and infrequent encroachment from neighboring livestock from the northern lot boundary. Due to this, a variety of weeds have established within the Offset Area and contribute to degradation of habitat quality associated with the koala and the grey-headed flying-fox.

Condition 5 of the EPBC Act referral decision notice states the following:

The approval holder must submit an Offset Area Management Plan (OAMP) for the Minister's approval that, to the satisfaction of the Minister, compensates for the significant residual impact of clearing 64.15 ha of koala habitat and grey-headed flying-fox foraging habitat within the development area.

This Regeneration Works Plan (RWP) has been prepared, in accordance with the EPBC Offsets Policy, to identify management actions aimed at enhancing the ecological function and health of native vegetation within the Offset Area. This RWP identifies discrete Management Zones within the Offset Area and outlines specific objectives, timeframes and activities for each Management Zone.

2. SITE INFORMATION

The proposed Offset Area (Figure 2-1) is situated across three freehold lots (Lots 176 MCH798, 178 MCH865 and 36 MCH1164) and directly adjoins both the Maleny National Park and Kondalilla National Park. The combined freehold lots were purchased by SCC under the Council's 'Environmental Land Levy Acquisition Program' and is zoned as Environmental Management and Conservation Zone. The delivery of this offset will be delivered by TMR in collaboration with SCC as the landholder.

The Offset Area is topographically diverse with a mixture of steep escarpment, hill slopes, gullies, ephemeral creeks, and alluvial flats and is described as "*Mesozoic to Proterozoic igneous rocks. Hills and lowlands on granitic rocks*". The Offset Area is dominated by sclerophyll woodland and contains both remnant and regrowth vegetation, with *notophyll* vine forest vegetation communities present within gullies. The site contains six Regional Ecosystems (RE's), consisting of one Endangered' RE, two listed as 'Of Concern' and three listed as 'Least Concern' under the *Vegetation Management Act 1999*.

Historic and land use practices have been predominantly agricultural, largely dairy. Current land uses serve urban and residential purposes interspersed with agricultural lands, state forest and National Parks. A mosaic of vegetation quality is present throughout the proposed Offset Area, with land use practices having a noticeable impact on habitat quality in some areas.

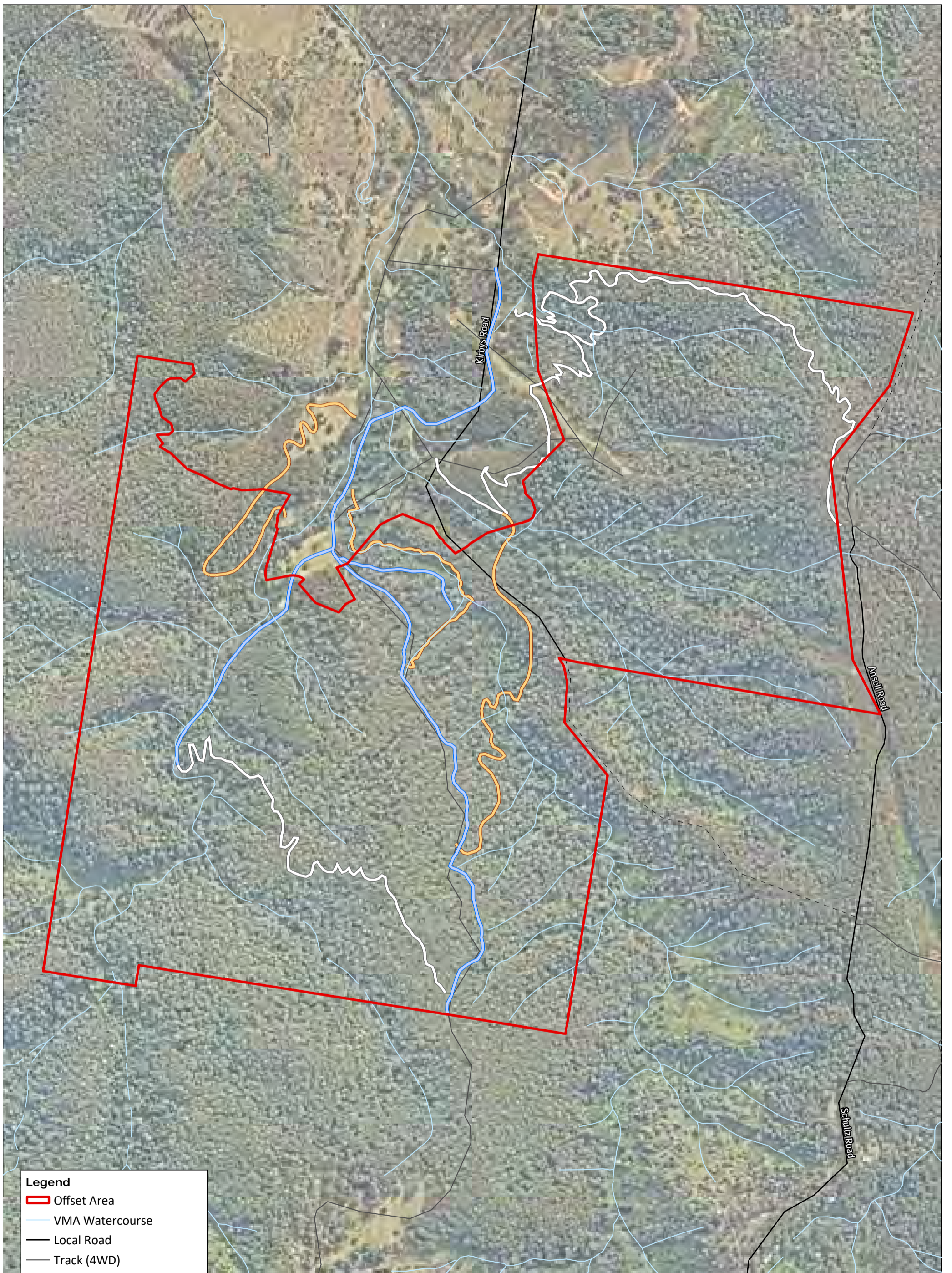
The proposed Offset Area was selected on the required principles that it contains both remnant and regrowth koala and grey-headed flying-fox habitat and can be subject to ecological improvements through removing existing pressures on ecological values through management actions used to enhance value and reduce the risk to the species. A summary of site information is provided in Table 2.1.

TABLE 2.1 OFFSET AREA SITE INFORMATION

Features	Specifics
Locality	OBI OBI QLD 4561
Size (hectares)	189.97 ha
Lot/Plan (land tenure and gazetted purpose)	Lot: 176 Plan: MCH798 (Freehold) – Kirby's Rd road parcel exists to northeast boundary of this lot. Lot: 178 Plan: MCH865 (Freehold) – Easement lot/plan ARP127916 dissects this lot. Kirby's Rd road parcel exists to southeast boundary of this lot. Lot: 36 Plan: MCH1164 (Freehold) An unnamed road parcel dissects this lot.
Electorate: State / Council	State: Queensland Council: Sunshine Coast Council Electoral Division: Glass House
Catchment / sub-catchment	Mary / Upper Mary River
Geology & Soils	Land zone 12. Mesozoic to Proterozoic igneous rocks. Hills and lowlands on granitic rocks.

Features	Specifics
Planning Reports	<ul style="list-style-type: none"> • Flora assessment: Kirby's Road Environmental Reserve FLORA AND FAUNA INVENTORY, BAM, 2010 Kirby's Road Environmental Reserve Flora Assessment, Brush Turkey Enterprises, 2012 Vine forest Flora Assessment, Eco 9, 2015. • Fauna assessment: Kirby's Road Environmental Reserve FLORA AND FAUNA INVENTORY, BAM, 2010, Kirby's Road Environmental Reserve Fauna Survey Report, 02 Ecology, 2012. • Bushland Operational Assessment (BOA): Brush Turkey Enterprises 2012. • Regeneration Works Plan: Kirby's Road Environmental Reserve (Lots 176 & 178) Rehabilitation Works Plan, Brush Turkey Enterprises, July 2012. • Management Plan: KIRBY ROAD, OBI OBI BUSHLAND RESERVE, FINAL MASTER PLAN 2016 Kirby's Road, and Environmental Reserve Management Plan, 2017. • Cultural heritage search: yes / 2022. • Statement of Management Intent: no. • Fire Management Plan: SCC Bushland Reserve Network Fire Management Guidelines, 2014. Kirby's Rd Fire Management Plan 2015.
Regional Ecosystems (Status)	Property Scale Regional Ecosystems
	<p>12.3.1: Gallery rainforest (notophyll vine forest) on alluvial plains</p> <p>12.12.1: Simple notophyll vine forest usually with abundant <i>Archontophoenix cunninghamiana</i> (gully vine forest) on Mesozoic to Proterozoic igneous rocks</p> <p>12.12.14: <i>Eucalyptus racemosa</i> subsp. <i>racemosa</i> +/- <i>Lophostemon confertus</i>, <i>Syncarpia glomulifera</i>, <i>Eucalyptus acmenoides</i> woodland usually on rocky near coastal areas on Mesozoic to Proterozoic igneous rocks</p> <p>12.12.15: <i>Corymbia intermedia</i> +/- <i>Eucalyptus propinqua</i>, <i>E. siderophloia</i>, <i>E. microcorys</i>, <i>Lophostemon confertus</i> open forest on Mesozoic to Proterozoic igneous rocks</p> <p>12.12.15a: <i>Eucalyptus grandis</i> and/or <i>E. saligna</i> tall open forest +/- vine forest understory. Other canopy species include <i>E. microcorys</i>, <i>E. acmenoides</i>, <i>Lophostemon confertus</i>, <i>E. siderophloia</i>, <i>E. propinqua</i>, <i>Corymbia intermedia</i>. Occurs in wet gullies on Mesozoic to Proterozoic igneous rocks. (BVG1M: 8a)</p> <p>12.12.15b: <i>Lophostemon confertus</i> open forest +/- <i>Eucalyptus microcorys</i>, <i>E. siderophloia</i>, <i>E. carnea</i> and <i>E. propinqua</i>. Vine forest species are often present in understory. Occurs in gullies and exposed ridges on Mesozoic to Proterozoic igneous rocks often amongst vine forest. (BVG1M: 8a)</p> <p>12.12.16: Notophyll vine forest on Mesozoic to Proterozoic igneous rocks</p>
EPBC Act Threatened Ecological Community	Lowland Rainforest of Subtropical Australia (Critically Endangered)
Scheduled Species present (or essential habitat for)	Yes Refer to Appendix A for details
Notable Weed Species Present within the Offset Area	<ul style="list-style-type: none"> • Lantana camara. • Macrotyloma axillare var. axillare. • Melinis minutiflora. • Ageratina Adenophora. • Nephrolepis cordifolia. • Giant rat's tail grasses (<i>Sporobolus</i> spp.). • Urochloa decumbens. • Setaria sphacelate. • Cenchrus ciliaris.

Features	Specifics
	<ul style="list-style-type: none"> • Anredera cordifolia. • Thunbergia alata. • Passiflora suberosa. • Urochloa decumbens. • Megathyrsus maximus.
Baseline weed cover	<p>Weed cover varies across the Offset Area and each AU. The ranges below reflect the ranges of weed cover within each AU. The weed baseline shows a maximum of 40% cover.</p> <p><i>Assessment Unit 1: 30 – 40%</i></p> <p><i>Assessment Unit 2: 5 – 30%</i></p> <p><i>Assessment Unit 3: 20%</i></p>
Bell Miner Associated Dieback (BMAD)	<p>One observation of bell miner associated dieback (BMAD) was recorded, though the occurrence is currently localised and not extensive. Monitoring of this threat will continue within the Offset Area.</p>



Legend

- ▭ Offset Area
- VMA Watercourse
- Local Road
- Track (4WD)
- - - Unconstructed Road
- Existing walking/vehicle trail
- Existing walking trail
- Proposed walking trail

Coordinate System:
GDA2020 MGA Zone 56
Date: 04/07/2024
Created By: VN
Drawing Size: A3


0 100 200 300m

1:8,000

2-1 B2N Offset Area

**Beerburrum to Nambour Rail Upgrade
Regeneration Works Plan**

Client: Qld Department of Transport and Main Roads



3. CURRENT MANAGEMENT AND ACTIVITIES

Current environmental management actions undertaken within the proposed Offset Area include:

- Assisted bush regeneration;
- Revegetation;
- Fauna monitoring; and
- Constructed walking trail.

Proposed additional management actions beyond what is already occurring within the Offset Area are outlined in Section 5.

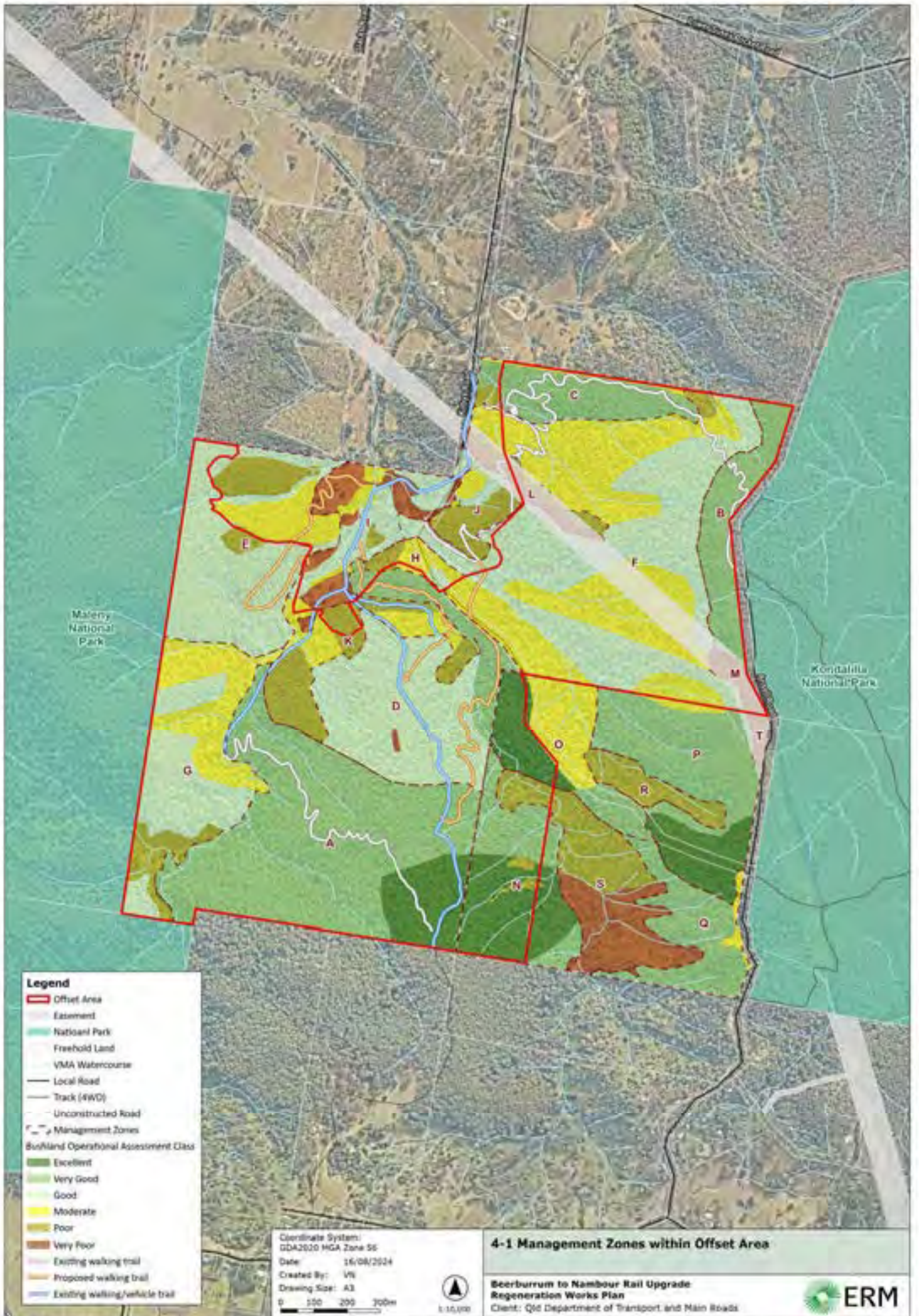
4. MANAGEMENT ZONES

To identify and effectively prioritize management actions, the Offset Area has been delineated into Management Zones based on RE boundaries, topographical features, water courses, and site access. To provide an assessment of vegetation condition, the Bushland Operational Assessment (BOA) Tool, a resilience-based condition classification method, was used to assign each Management Zone with a condition class to inform the prioritization of management actions (McDonald, 2015). The criteria for assessment of these condition classes are presented in Table 4.1. Each Management Zone is described in the tables in Section 5, which include an outline of timelines, the service provider and suggested activities required to improve the zones BOA classification. Zones with similar characteristics and resource requirements may be labelled as one zone (e.g. "A"), as illustrated in Table 4.1. The zones are listed in order of priority (i.e. 'A' being highest 'Z' being lowest).

TABLE 4.1 BUSHLAND OPERATIONAL ASSESSMENT CONDITION INDICATORS

Condition Class Indicators	Expected Symptoms	Expected Resilience	Restoration Approach/ Treatment Notes
Excellent Resilience	<ul style="list-style-type: none"> No degradation (no weeds) All species and structure appear intact 	Will rapidly and fully recover as strong soil seed bank of all species is likely (Including resprouters) and fresh seed rain	Maintenance: Maintain appropriate disturbance regimes, protect from weeds, etc
Very Good Resilience	<ul style="list-style-type: none"> Minor symptoms (<10%) All expected species and vegetation structures appear intact but signs of degradation starting e.g. minor weeds present 	Will fully recover as strong seed bank of all species likely (including resprouters) and fresh seed rain	Assisted Regeneration: Treat causes and symptoms over large areas without triggering large follow up requirement
Good Resilience	<ul style="list-style-type: none"> Minor symptoms (<25% weed cover) Strong resilience with signs of degradation however native presence still strong 	Will fully recover from soil seed, rootstocks and fresh seed rain	Assisted Regeneration: Treat causes and symptoms over large areas without triggering large follow up requirement
Moderate Resilience	<ul style="list-style-type: none"> Moderate Symptoms (25-50% weed cover) Native vegetation still strong on close inspection but degradation equally evident 	Will fully recover from soil seed, rootstocks and fresh seed rain however is likely to be slower	Assisted Regeneration: Can treat fairly large areas but restrict, as regular follow up is needed
Poor Resilience	<ul style="list-style-type: none"> Substantial symptoms (75-100% weed cover) The only natives visible above ground are long-lived dominants (and these are widely spaced) Soil profile remains intact 	Full recovery is expected to take longer. Has potential for regeneration from soil seed bank and resprouting but not fresh soil seed bank	Assisted Regeneration: Need to reduce the size of areas being managed with regular follow ups to ensure progress. Some disturbance is needed

Condition Class Indicators	Expected Symptoms	Expected Resilience	Restoration Approach/ Treatment Notes
Very Poor Resilience	<ul style="list-style-type: none"> • Very high Symptoms (circa 100% weed cover) • Large areas somewhat distant from native edge with no natives visible (except ruderals) • Soil profile may be intact or at least conditions can be amended relatively easily 	<p>Reduced recovery potential but still can have strong soil seed bank of important species if appropriately disturbed. Recolonization of other species may be possible over time</p>	<p>Reconstruction Assisted Regeneration: Amend substrate and reintroduce species and habitat. Will still require follow up</p>
Nil Resilience of Original Vegetation Community	<ul style="list-style-type: none"> • Extreme Symptoms (Circum 100% weed cover) • Substrate conditions highly modified • Soil profile not intact (Substrate amendment difficult or impossible) 	<p>Unlikely to have a soil seed bank and colonization potential likely to be low. Some natives unlikely to survive even if reintroduced</p>	<p>Fabrication/Type Conversion: Change to alternative community. Will require follow up</p>



Legend

- Offset Area
- Ezzenent
- National Park
- Freehold Land
- VMA Watercourse
- Local Road
- Track (4WD)
- Unconstructed Road
- Management Zones
- Bushland Operational Assessment Class**
- Excellent
- Very Good
- Good
- Moderate
- Poor
- Very Poor
- Existing walking trail
- Proposed walking trail
- Existing walking/vehicle trail

Coordinate System:
GDA2020 MGA Zone 56
Date: 16/08/2024
Created By: VN
Drawing Size: A3
0 100 200 300m
1:10,000



4-1 Management Zones within Offset Area

Beerburrum to Nambour Rail Upgrade
Regeneration Works Plan
Client: Qld Department of Transport and Main Roads



5. MANAGEMENT ACTIVITIES

As described in Section 4, the Offset Area has been divided into Management Zones based on the following factors: the BOA Tool, RE types, site access and degrading features such as invasive species. The following tables describe each Management Zone and outlines the timeline, the service provider and suggested activities required to improve the zones BOA classification. The overall intent is to work as a matter of priority from high quality vegetation (until stabilised) to poor quality vegetation. All zones may be worked on concurrently depending on threat levels and site-specific requirements.

Relevant management actions and measures include:

- Mapping for Weeds of National Significance (WoNS) and locally significant weeds that are most relevant to the threatened species (in particular *Lantana camara*) within the Offset Area and site-specific treatment techniques developed per site location and extent of weed coverage. Mapping will also include identification of site-specific areas that require revegetation aimed at improving habitat quality. This will be undertaken within the first six months of commencement of offset management as per commencement of Stage 1 under the EPBC Act approval;
- Treatment using best practice bush regeneration techniques as per the South-East Queensland (SEQ) Ecological Restoration Framework, on all identified WoNS and locally significant weeds within the offset sites within 12 months of commencement. This will be undertaken through to complete restoration to be achieved within 20 years after commencement, and will include:
 - Removal of plant matter that is Restricted and is listed as Categories 1 through to 5 under the Queensland Biosecurity Act;
 - Consideration of the timing and staging of any weed removal, given species will flower and disperse at different times of the year, as it is important to remove or reduce the weed species before the seed become viable; and
 - Consideration of the growth rate of each weed species. If the weed is a fast-growing species that out-competes or smothers native recruitment or remnant vegetation, it will be prioritised for removal.
- A qualified and experienced bush regeneration contractor will be engaged to undertake the necessary control for the entire restoration period (20 years);
- When conducting activities in or around the Offset Area and to reduce the risk of weed spread, good biosecurity hygiene to avoid spreading weeds or pathogens will be practiced. This includes boot wash-down facilities at entry points, restriction of domestic animals (domestic dogs, cats, horses, etc.), restriction of motor vehicles (both motorbikes and cars), and consistent observations by ecological restoration practitioners (outlined in Table 5.3);
- Public access into the Kirby's Environmental Reserve and Offset Area to be managed via mitigation measures described within the OAMP to limit impact from spreading of weeds, domestic animals, rubbish dumping, illegal harvesting of timber, unplanned fires, construction and trail maintenance and habitat fragmentation (Table 6-1 OAMP);
- Any soil disturbance that may encourage weed establishment will be treated following commencement of Offset Area works;

- Weed treatment will be risk-based and managed to avoid any detrimental impacts on non-target species or having unintentional consequences (i.e. no management methods to weeds that may harm native species or expose spoil to erosion);
- WoNS or locally significant weeds will be detected and controlled annually as small infestations are more likely to be eradicated; and
- Active revegetation in the form of plantings will be undertaken within identified Management Zones (see Table 5.2) and will include a mix of relevant canopy species, selected with the aim to improve habitat quality for the two MNES.

Annual Monitoring and BioCondition Assessments will be undertaken to evaluate the condition of vegetation communities within the Offset Area. A decrease in the BOA Condition Score from April 2022 will trigger adaptive management and corrective action(s). Additional triggers will be prompted if a decrease in the BOA score is observed following each annual monitoring event. This in turn will trigger adaptive management and corrective actions. Once WoNS or locally significant weeds are no longer detected, comprehensive monitoring and treatment will be reduced to once every 2 years. In instances where weed proliferation is identified, weed control strategies will be implemented with an increased frequency of active management. Weed control will also be undertaken on an as-need basis until the weed outbreaks are eradicated. If further dieback or death of native flora species is observed (e.g. mis-use of herbicide product), replacement planting will be undertaken in conjunction with additional corrective actions to ensure no reoccurrence of the event. Table 5.4 identifies weeds with the potential to cause ecological decline within the Offset Area and provides the technical weed management specifications appropriate to each species.

Revegetation and planting of canopy species in identified Management Zones (see Table 5.2) will align with the RE's found within the Offset Area (see Table 2.1) and the habitat requirements of the two MNES. Revegetation will utilise local and native seeds and/or tube stock with a mix of tree species relevant to the Offset Area. Canopy species will be selected to provide shelter and foraging resources for koala and grey-headed flying-fox. Table 5.1 outlines canopy species and target stem densities in identified Management Zones, in accordance with relevant RE Technical Descriptions (Ryan, 2018). The revegetation program will be undertaken by a suitably qualified and experienced bush regeneration contractor and will include measures to ensure the maintenance and survival of foraging trees within the Offset Area. To allow for losses, the target stem density in identified Management Zones will be roughly 10% above the average RE stem density, including both natural recruitment and planted individuals. This rate may be increased upon advice from the regeneration contractor.

TABLE 5.1 CANOPY SPECIES AND STEM DENSITIES FOR RE'S WITHIN THE OFFSET AREA

Regional Ecosystem	Associated canopy species for revegetation effort	Average T1 Stem Density/ha	Target Stem Density/ha
12.12.14	<i>Eucalyptus carnea</i> , <i>E. racemosa</i> subsp. <i>racemosa</i> , <i>Lophostemon confertus</i> , <i>E. microcorys</i> , <i>E. fusiformis</i> .	800	880
12.12.15	<i>Lophostemon confertus</i> , <i>Eucalyptus propinqua</i> , <i>Corymbia intermedia</i> , <i>E. acmenoides</i> , <i>E. siderophloia</i> .	390	430

Regional Ecosystem	Associated canopy species for revegetation effort	Average T1 Stem Density/ha	Target Stem Density/ha
12.12.15a	<i>Lophostemon confertus</i> , <i>Eucalyptus propinqua</i> , <i>Corymbia intermedia</i> , <i>E. acmenoides</i> , <i>E. siderophloia</i> , <i>E. grandis</i> , <i>E. saligna</i> , <i>E. microcorys</i> , <i>E. tereticornis</i> .	390	430
12.12.15b	<i>Lophostemon confertus</i> , <i>Eucalyptus propinqua</i> , <i>Corymbia intermedia</i> , <i>E. acmenoides</i> , <i>E. siderophloia</i> , <i>E. microcorys</i> , <i>E. carnea</i> .	390	430

One observation of bell miner associated dieback (BMAD) was recorded. Although the occurrence is currently localised and not extensive, the presence of ongoing threatening processes, particularly weed incursion, suggests a potential for increased dieback in the future. The weed invasion creates conditions that favour bell miner populations, which in turn can exacerbate the dieback of eucalypt trees through their interactions with psyllids. Monitoring of this threat will continue, with ongoing efforts to manage weed incursion to help mitigate the spread of BMAD in the Offset Area.

Monitoring will occur annually with all weeds present being able to be identified throughout the year. Timing of the monitoring will be undertaken at similar times each year to ensure consistency with the baseline assessment. Monitoring frequency will be reduced from annual to bi-annual once the OAMP completion criteria have been successfully achieved (Table 8.1 OAMP). Reducing annual monitoring to bi-annual monitoring once the completion criteria are met allows for ongoing oversight while reducing the intensity of monitoring efforts.

Annual monitoring of WoNS and locally significant weeds and infill plantings will include:

- GPS coordinated mapping to determine the location of weed presence or infestation and the location of any regenerative planting effort within the Offset Area;
- A recorded datasheet, either hard-copy or tablet form, to identify the year, date, time observed weed species, photo location, direction, and any other notes about the weed coverage. Datasheets will also be used to record information on regenerative planting effort (species used, date/time planted, photos, ongoing condition of plantings);
- A copy of the previous year's data and baseline mapping will be made available before and after the assessments to determine any notable changes and establish the starting condition of the environment; and
 - Data from the previous year will be used to develop an excel document listing all GPS points and a weed/plantings survey map for ongoing monitoring purposes and annual compliance reporting.
- Monitoring results will be included in the SCC's Annual Report which will be submitted to TMR. These results will be in the form of a series of photographic monitoring points at key areas of infestation or one photograph for each management unit.

Performance criteria for management actions include:

- Revised baseline weed and revegetation mapping within the Offset Area has been completed within six months of OAMP approval;

- Initial treatment of all identified weeds and regenerative planting at required densities commenced within 12 months of OAMP approval in all areas identified in the baseline mapping;
- 80% planting survival rate of planted seedlings and target stem densities achieved in identified Management Zones within the first 5 years of offset commencement;
- Weed extent reduces to <5% cover at all monitoring locations within 10 years of offset commencement; and
- BOA Condition reaches 'Excellent' during the 20th year from offset commencement.

If identified performance criteria are not met, an Adaptive Management Strategy will be adopted to ensure compliance (i.e. in instances of disease, or planting failure) to the OAMP. In instances where weeds persist on site, or excessive mortality is observed within revegetation zones (>70% of seedlings / regrowth species), the listed management actions will be reevaluated and updated to ensure performance criteria and interim milestones are met. Reviews of the Offset Area management actions will occur annually until completion criteria is met. Should completion criteria not be met within the allocated timeframe, the following corrective actions will be adopted:

- Where the BOA Condition score is less than the previous assessment, management actions to restore and improve habitat will be increased in frequency and at a higher rate of control until the completion criteria is achieved;
- If increases in the presence of WoNS or locally significant weeds are identified, the management actions and frequency of the management actions will be increased until the completion criteria have been achieved;
- Where vegetation restoration has a success rate of below 60% (measured against Modified Habitat Quality Assessment (MHQA) and monitoring events habitat quality scores), active regeneration (habitat infill and direct plantings of relevant community species) will be repeated until the completion criteria for the OAMP and benchmark vegetation levels for the respective RE are achieved; and
- In the instance of unplanned fires or flooding during the monitoring interval, any negative impacts to the habitat quality score and BOA Condition will be taken into consideration and noted. Areas effected will be compared to those monitoring sites that remain unaffected and were previously at the same, or nearest to, the quality of the affected site. Any resulting disturbance as a consequence of these instances, for instance weed infestation, will be managed in parallel to the unaffected site to ensure the completion criteria for that value is attained.

Alterations to any component of this RWP will be approved by the relevant regulatory authority and will be accompanied by an Adaptive Management Statement (AMS) which will clearly outline the amended elements including a justification for the change.

TABLE 5.2 OFFSET AREA ENVIRONMENTAL RESERVE MANAGEMENT ACTIVITIES

Mgt Zone	Management Zone Description	Management Objective (Current BOA Conditions (April 2022) & Return to Good Bush Schedule)	Management Actions
A	Predominantly 'very good' to 'excellent' condition wet sclerophyll closed forest consisting of <i>Lophostemon confertus</i> , <i>Eucalyptus grandis</i> , <i>Syncarpia glomulifera</i> , <i>Eucalyptus propinqua</i> , <i>Corymbia intermedia</i> and <i>Eucalyptus microcorys</i> . Isolated woody weeds found throughout this area, predominately <i>Lantana camara</i> , particularly in wetter areas. Low density <i>Macrotyloma axillare</i> var. <i>axillare</i> on lower slopes. Isolated patches of <i>Melinis minutiflora</i> .	Weed management Very Good, Excellent 0-2 years	Monitoring of zone (in line with Weed and Revegetation Management Strategy) to maintain 'very good' to 'excellent' condition, while minimising disturbance. The walking track along the ridge line of the Offset Area will be inspected annually for weed incursions. Hand-pull juvenile woody weeds throughout zone. Cut and treat or drill and fill larger woody weeds and leave in-situ to minimise disturbance. Hand-pull exotic vines where possible through to eliminate risk of off-target damage, followed by a knapsack foliar spray. Foliar spray exotic grasses.
B	North-eastern ridge line including steep escarpment. Dry sclerophyll forest dominated by <i>Eucalyptus siderophloia</i> and <i>Eucalyptus propinqua</i> with pockets of <i>Allocasuarina torulosa</i> and <i>Allocasuarina littoralis</i> woodland in overall in 'very good' to 'excellent' condition. Intact native grass understory. Isolated, low density woody weeds, herbaceous weeds and exotic grasses including <i>Lantana camara</i> , <i>Melinis minutiflora</i> and <i>Ageratina adenophora</i> .	Weed Management Very Good 0-2 years	Monitoring of zone (in line with Weed and Revegetation Management Strategy) of zone to maintain 'very good' to 'excellent' condition, while minimising disturbance. The walking track along the ridge line of the Offset Area will be inspected annually for weed incursions. Hand-pull juvenile woody weeds throughout zone and stack as habitat piles. Cut and treat or drill and fill larger woody weeds. Hand-pull exotic vines where possible through native vegetation to eliminate risk of off-target damage, followed by a careful knapsack foliar spray. Foliar spray exotic grasses as required.
C	Diverse area containing remnant simple notophyll vine forest, wet sclerophyll forest regrowth and rainforest regrowth, with maturing revegetation present. Canopy consisting of <i>Eucalyptus grandis</i> , <i>Eucalyptus propinqua</i> , <i>Lophostemon confertus</i> and <i>Elaeocarpus angustifolius</i> . 'Very good' recruitment and structure in the area. <i>Lantana camara</i> is the dominant weed in the zone, mostly confined to previously cleared areas that are in the process of regenerating. Zone contains an open area at the site entrance with high suitability for recreational and educational facilities. Weed incursions and disturbance present along northern fence line with neighbouring property.	Weed Management Very Poor, Moderate, Very Good 2-5 years	Hand-pull or cut and treat <i>Lantana camara</i> and other woody weeds. Hand-pull or selective foliar spray <i>Macrotyloma axillare</i> var. <i>axillare</i> are required. Spot spray exotic grasses away from native vegetation, and hand-pull in sensitive areas. Focus on areas of high resilience, working outwards, to assist in natural regeneration.
D	Mature closed wet sclerophyll forest, predominately remnant vegetation with areas of regrowth to the western side of the zone. Mostly in 'good' to 'very good' condition, with a small clearing in 'very poor' condition showing limited signs of regeneration. Evidence of previous logging throughout accessible areas. Moderate density <i>Lantana camara</i> spread throughout zone, particularly in wetter and disturbed areas. Patches of <i>Melinis minutiflora</i> present, as well as small infestations of <i>Nephrolepis cordifolia</i> .	Weed Management and Revegetation Very Poor, Good, Very Good 2-5 years +	Revegetation will be undertaken in the one area in the south of the Management Zone with canopy species planting to assist in regrowth of canopy. Hand-pull or cut and treat <i>Lantana camara</i> and other woody weeds. Stack debris in small habitat piles. Hand-pull or selective foliar spray <i>Macrotyloma axillare</i> var. <i>axillare</i> are required. Spot spray exotic grasses away from native vegetation, and hand-pull in sensitive areas. Focus on areas of high resilience, working outwards, to assist in natural regeneration. Foliar spray or hand-pull <i>Nephrolepis cordifolia</i> .
E	Zone consisting of a mixture of mature <i>Eucalyptus cloeziana</i> plantation, remnant and regrowth dry sclerophyll forest, and wet sclerophyll regrowth along watercourses and wetter gullies. Exotic grasses are the dominant weeds in the zone, particularly giant rat's tail grasses (<i>Sporobolus</i> spp.). <i>Lantana camara</i> and <i>Macrotyloma axillare</i> var. <i>axillare</i> are also widespread in low to moderate density, particularly on the edges of disturbed areas and throughout the forestry plantations.	Weed Management Poor, Moderate, Good 5-10 years +	Remove exotic <i>Sporobolus</i> spp. seed heads, followed by foliar spray using grass selective. Scape and treat larger <i>Anredera cordifolia</i> vines, or foliar spray if required. Bag and remove tubers from site. Hand-pull or cut and treat <i>Lantana camara</i> and other woody weeds. Stack debris in small habitat piles. Hand-pull or selective foliar spray <i>Macrotyloma axillare</i> var. <i>axillare</i> where required. Spot spray exotic grasses away from native vegetation, and hand-pull in sensitive areas. Focus on areas of high resilience, working outwards, to assist in natural regeneration. Foliar spray or hand-pull <i>Nephrolepis cordifolia</i> .
F	Zone containing areas of remnant and regrowth wet sclerophyll closed forest ranging from 'poor' to 'good' condition. Evidence of previous clearing and selective logging throughout, resulting in fragmented areas of remnant vegetation. Good signs of natural recruitment and resilience on average, with high weed loads mostly confined to wetter gullies and open areas. <i>Lantana camara</i> is the dominant weed in the zone and is widespread. <i>Melinis minutiflora</i> is also widespread throughout zone in open areas.	Weed Management Poor, Moderate, Good 5-10 years +	Hand-pull or cut and treat <i>Lantana camara</i> . Splatter gun foliar application may be required to control larger infestations, with care taken to avoid any off-target damage. Foliar spray exotic grasses, including <i>Melinis minutiflora</i> and <i>Urochloa decumbens</i> . Hand-pull or scape and treat exotic vines as required.
G	Zone dominated by remnant wet sclerophyll forest in good condition at higher altitudes with large areas of wet sclerophyll and notophyll vine forest regrowth at lower elevations along creek lines and gullies.	Weed Management Poor, Moderate, Good 5-10 years +	Work edges of better condition area within zone to assist in the expansion of the good bush to increase connectivity between patches. Hand-pull, cut and treat or splatter gun foliar spray <i>Lantana camara</i> patches as necessary, minimising disturbance to native vegetation to encourage natural regeneration.

Mgt Zone	Management Zone Description	Management Objective (Current BOA Conditions (April 2022) & Return to Good Bush Schedule)	Management Actions
	Good signs of natural regeneration, however <i>Lantana camara</i> is abundant throughout the zone, particularly in regrowth areas along gullies. Large, cleared area at southwestern corner of zone in 'poor' condition due to previous clearing and heavy weed infestation with minimal native canopy cover.		Foliar spray exotic grasses away from native vegetation. Cut and treat, or scrape and treat invasive vines, or hand-pull to free up native vegetation. The large, disturbed area at south-west corner of zone will require planting of canopy species to ensure canopy is restored through restoration process.
H	Offset plantings area containing the flying fox offset, koala offset and flying fox extension plantings. Young to maturing revegetation plantings, predominately <i>Eucalyptus</i> spp. on slopes, with rainforest plantings along riparian zone. Plantings range from 5 years old to <1 year old. High competition from exotic grasses, in particular <i>Urochloa decumbens</i> , with low to moderate density <i>Macrotyloma axillare</i> var. <i>axillare</i> in areas. Scattered woody weeds throughout.	Weed Management Poor, Moderate, Good 5-10 years +	Hand-pull within tree guards and around bases of plantings, followed by foliar spray rings around the plantings to reduce competition from exotic grasses. Brush cut areas where grass overgrown if required. Spot spray <i>Macrotyloma axillare</i> var. <i>axillare</i> using selective herbicide. Foliar spray patches of <i>Melinis minutiflora</i> . Hand-pull or cut and treat woody weeds, stacking debris in habitat piles. Infill planting as required to replace unsuccessful plantings and assist with canopy closure.
I	Patchwork of previously cleared pasture with wet sclerophyll and rainforest regrowth along creek lines and gullies, ranging from very poor to good condition. Areas of mature and maturing revegetation, ranging from 1 year old to approximately 10 years. Several open paddocks exist in the zone, dominated by exotic grasses including <i>Sporobolus</i> spp, <i>Urochloa decumbens</i> , <i>Setaria sphacelata</i> and <i>Cenchrus ciliaris</i> . Regrowth areas dominated by <i>Lantana camara</i> in understory. Several isolated patches of <i>Anredera cordifolia</i> and <i>Thunbergia alata</i> .	Weed Management and Revegetation Very Poor, Poor, Moderate, Good 5-10 years +	Remove exotic <i>Sporobolus</i> spp. seed heads, followed by foliar spray using grass selective. Longline spraying recommended in open areas due to large infestations of giant rat's tail grasses. Scrape and treat larger <i>Anredera cordifolia</i> vines or foliar spray if required. Bag and remove tubers from site. Foliar spray or scape and treat <i>Thunbergia alata</i> . Hand-pull around bases of recent plantings, followed by foliar spray rings around the plantings to reduce competition from exotic grasses and herbaceous weeds. Hand-pull or cut and treat <i>Lantana camara</i> and other woody weeds. Stack debris in small habitat piles. Large scale revegetation zone in open areas to assist with canopy closure. Low levels of natural recruitment in open areas due to lack of canopy, and disturbance from grass slashing.
J	Zone containing two mature <i>Eucalyptus cloeziana</i> forestry coupes with wet sclerophyll regrowth in adjoining gully, in 'good' condition. Good recruitment of native <i>Acacia</i> and <i>Eucalyptus</i> species in mid-strata of northern coupe. Ground layer in forestry plantations dominated by <i>Urochloa decumbens</i> , <i>Macrotyloma axillare</i> and <i>Macroptilium atropureum</i> . Scattered <i>Lantana camara</i> throughout. Isolated patches of <i>Sporobolus</i> spp.	Weed Management Poor, Moderate, Good 5-10 years +	Foliar spray isolated patches of giant rat's tail grasses and <i>Melinis minutiflora</i> . Foliar spray exotic vines throughout <i>Eucalyptus cloeziana</i> forestry coupe, including <i>Macrotyloma axillare</i> and <i>Macroptilium atropureum</i> . Hand-pull or cut and treat <i>Lantana camara</i> , stacking debris in habitat piles. Focus on areas of high resilience to promote natural regeneration, working from central wet sclerophyll gully outwards.
K	Disturbed area in 'moderate' to 'poor' condition, consisting of two separate mature <i>Eucalyptus cloeziana</i> forestry coupes and several disturbed patches of regrowth vegetation dominated by <i>Lantana camara</i> , <i>Melinis minutiflora</i> and a variety of exotic vines such as <i>Macrotyloma axillare</i> and <i>Passiflora suberosa</i> , and exotic grasses including Giant Rats Tail grasses. Isolated patches of <i>Nephrolepis cordifolia</i> .	Weed Management Moderate, Poor 10 years +	Foliar spray exotic vines throughout forestry plantation areas using selective herbicide. Foliar spray isolated patches of <i>Nephrolepis cordifolia</i> to prevent further spread of infestations. Hand-pull or cut and treat <i>Lantana camara</i> and other woody weeds. Stack debris in small habitat piles. Bag and remove seed heads of Giant Rats Tail grasses, followed by grass selective herbicide application.
L	Zone consisting of powerline easement access track and adjacent vegetation. Patches of Giant Rats Tail grasses along mown areas vehicle access track. <i>Lantana camara</i> , <i>Urochloa decumbens</i> and <i>Melinis minutiflora</i> dominating ground layer.	Weed Management Poor, Very Poor 10 years +	Remove exotic <i>Sporobolus</i> spp. seed heads, followed by foliar spray using grass selective application. Hand-pull or cut and treat <i>Lantana camara</i> , and spot spray patches of <i>Melinis minutiflora</i> , focusing on edges of good push to encourage natural regeneration along zone edges. Monitor mown areas for spread of Giant Rats Tail grasses.
M	Cleared, disturbed area below powerline easement at the end of Schultz Road. Dominated by lantana. Some native recruitment lower down slope, but 'very poor' resilience overall.	Weed Management Very Poor 10 years +	Encourage natural regeneration along edges of 'good' bush. Sweep edges of zone to prevent weed encroachments into 'good' bush.
N	This zone is primarily 'good' – 'very good' condition sclerophyll forest <i>Lophostemon confertus</i> , <i>Eucalyptus grandis</i> , <i>Syncarpia glomulifera</i> , <i>Eucalyptus propinqua</i> , <i>Corymbia intermedia</i> and <i>Eucalyptus microcorys</i> . There are two large clearings in the centre of this zone, likely cleared for historical logging. The zone has low density <i>Lantana camara</i> and <i>Megathyrsus maximus</i> in isolated areas within the 'good' bush, particularly along the gullies, with scattered woody weeds. The clearings are dominated by high density <i>Lantana camara</i> and <i>Megathyrsus maximus</i> .	Weed Management and Revegetation Poor, Good, Very Good 2-5 years	Zone N requires enhancement of ecological function and connectivity of good vegetation throughout which will be completed via restoring the cleared areas and reducing the density of invasive plant species, particularly <i>Lantana camara</i> and <i>Megathyrsus maximus</i> . Hand-pull or cut and treat smaller infestations of <i>Lantana camara</i> in the 'good' bush. Splatter gun foliar application may be required to control larger lantana infestations, with care taken to avoid any off-target damage. Foliar spray exotic grasses, including <i>Megathyrsus maximus</i> , <i>Melinis minutiflora</i> and <i>Urochloa decumbens</i> . Following initial weed treatments, commence revegetation planting in the two clearings within this zone.

Mgt Zone	Management Zone Description	Management Objective (Current BOA Conditions (April 2022) & Return to Good Bush Schedule)	Management Actions
			Recommended species include <i>Lophostemon confertus</i> , <i>Eucalyptus grandis</i> , <i>Syncarpia glomulifera</i> , <i>Eucalyptus propinqua</i> , <i>Corymbia intermedia</i> and <i>Eucalyptus microcorys</i> . Annual follow up maintenance will be undertaken to ensure the survival and growth of the planted species.
O	Wet sclerophyll forest transitioning to rainforest in 'very good' condition in the southern and eastern areas off the zone, with 'moderate' condition wet sclerophyll forest areas to the northern and eastern areas of the zone with a disturbed understory. The zone has low density <i>Lantana camara</i> and <i>Megathyrsus maximus</i> in isolated areas within the 'good' bush, with the same weeds in higher density in the northern and eastern areas due to historical clearing. There is minor evidence of bell miner (<i>Manorina melanophrys</i>) associated dieback (BMAD) in this zone, with several mature dead Eucalyptus trees and several showing evidence of progressive canopy death. A road easement runs through this zone	Weed Management Moderate, Very Good 2-5 years	Ecological restoration works in Zone O will focus on reducing the density of invasive species in the 'good' bush and allowing for natural recruitment to promote ecosystem recovery. This will involve the removal of invasive species such as <i>Lantana camara</i> , exotic grasses and <i>Passiflora suberosa</i> from the disturbed areas. Hand-pull or cut and treat smaller infestations of <i>Lantana camara</i> in the 'good' bush. Splatter gun foliar application may be required to control larger lantana infestations, with care taken to avoid any off-target damage. Exotic grasses should be spot sprayed where appropriate. Works should focus on the natural recruitment of species in the cleared areas with a focus on promoting canopy closure of the wet sclerophyll forest and gallery rainforest. Infill planting may be required in more open areas to assist with recovery if recruitment levels are low following weed control.
P	This area is a diverse wet sclerophyll forest in 'good' to 'very good' condition overall with a small, disturbed area to the north of the zone along the property boundary. Canopy species are primarily <i>Lophostemon confertus</i> , <i>Eucalyptus grandis</i> , <i>Syncarpia glomulifera</i> , <i>Eucalyptus propinqua</i> , <i>Corymbia intermedia</i> and <i>Eucalyptus microcorys</i> . Very good recruitment and structure in the area overall, with the main issue being scattered <i>Lantana camara</i> , with <i>Passiflora suberosa</i> and <i>Megathyrsus maximus</i> in smaller quantities.	Weed Management Moderate, Good, Very Good 2-5 years	Hand-pull or cut and treat <i>Lantana camara</i> and other woody weeds. Stack debris in small habitat piles. Hand-pull or spot spray <i>Macrotyloma axillare</i> var. <i>axillare</i> . Spot spray exotic grasses away from native vegetation and hand-pull in sensitive areas. Focus on areas of high resilience, working outwards, to assist in natural regeneration.
Q	This zone is heavily disturbed with evidence of historically clearing of sclerophyll vegetation. Areas of simple notophyll vine forest along creek margins. Isolated remnant and regrowth vegetation including <i>Lophostemon confertus</i> , <i>Corymbia intermedia</i> and <i>Eucalyptus grandis</i> . This zone is now dominated by <i>Lantana camara</i> and <i>Megathyrsus maximus</i> on the ground layer with other scattered woody weeds including <i>Rubus ellipticus</i> . Limited evidence of native recruitment due to high levels of weed competition on the ground layer. There is evidence of bell miner (<i>Manorina melanophrys</i>) associated dieback (BMAD) in this zone, with numerous mature dead Eucalyptus trees and several showing evidence of progressive canopy death. This is likely being exacerbated by the dominance of <i>Lantana camara</i> in the ground strata.	Weed Management and Revegetation Poor, Very Poor 5-10 years +	Hand-pull or cut and treat <i>Lantana camara</i> . Removal of <i>Lantana camara</i> should assist with preventing further BMAD. Foliar application may be required to control larger infestations with care taken to avoid any off-target damage. Spot spray exotic grasses. Hand-pull, spot spray or scape and treat exotic vines as required, with a focus on controlling the spread of <i>Macrotyloma axillare</i> . Edges with 'good' bush should be worked first to promote the extension of the 'good' bush into the zone and allow for increased canopy cover through natural regeneration. Once initial weed control has been undertaken, this zone will require revegetation planting of canopy species to close canopy, followed by mid strata and understory planting. Recommended canopy species include <i>Lophostemon confertus</i> , <i>Eucalyptus grandis</i> , <i>Syncarpia glomulifera</i> , <i>Eucalyptus propinqua</i> , <i>Corymbia intermedia</i> and <i>Eucalyptus microcorys</i> . Regular follow up maintenance is recommended to ensure the survival and growth of the planted species.
R	Cleared, disturbed area below a powerline easement at the end of Schultz Road. Dominated by <i>Lantana</i> . Some native recruitment lower down slope, but very poor resilience overall.	Weed Management Very Poor 10 years +	Encourage natural regeneration along edges of 'good' bush. Sweep edges of zone to prevent weed encroachments into good bush.

TABLE 5.3 MONITORING PROGRAM, PERFORMANCE CRITERIA AND CORRECTIVE ACTIONS FOR THE OFFSET AREA

Environmental Objectives	Management Actions	Performance Criteria	Monitoring (incl. timing, frequency, etc.)	Trigger for Adapting Management and corrective action(s)	Corrective Offset management Actions
<p>Survey, maintain and actively manage legacy infestations of weeds. Protect and promote native regrowth vegetation and recruitment of canopy tree species, so that an improvement in eucalypt open forest MHQA habitat quality increases from a score of 6 to a score of 7 within 20-years from commencement of the offset.</p>	<p>Implementation of weed control and revegetation activities and management activities outlined in Section 5 Management Activities.</p>	<ul style="list-style-type: none"> Revised baseline weed and revegetation mapping within the Offset Area completed within 6 months of OAMP approval; Initial treatment of all WoNS and planting in revegetation areas identified in the baseline mapping commenced within 12 months of OAMP approval; 80% planting survival rate of planted seedlings and target stem densities achieved in identified Management Zones within the first 5 years of offset commencement; Weed extent reduces to <5% cover at all monitoring locations within 10 years of offset commencement; and BOA Condition reaches 'Excellent' during the 20th year from offset commencement 	<p>Annual monitoring of WoNS, locally significant weeds and any infill plantings will include:</p> <ul style="list-style-type: none"> GPS coordinated mapping to determine the location of weed presence or infestation and the location of any regenerative planting effort within the Offset Area; A recorded datasheet, either hard-copy or tablet form, to identify the year, date, time observed weed species, photo location, direction, and any other notes about the weed coverage; A recorded datasheet, either hard-copy or tablet form, to identify the year, date, planted species, photo location, condition, direction, and any other notes about the infill plantings in revegetation areas; A copy of the previous year's data and baseline mapping will be consulted before and after the assessments to determine any notable changes and establish the starting condition of the environment; Collate data with previous years to develop an excel document listing all GPS points and a weed survey map for ongoing monitoring purposes and annual compliance reporting; and Monitoring results will be included in SCC's annual report submitted to TMR. These results will be in the form of a series of photographic monitoring points at key areas of infestation or one photograph for each management unit. <p>The Annual Compliance Report compiled by the Approval Holder and submitted to DCCEWW will provide an update on activities and monitoring of weeds within the Offset Area.</p> <p><i>Note:</i> Monitoring frequency will be reduced from annual to bi-annual once the OAMP completion criteria have been successfully achieved (see OAMP, Section 8.2).</p>	<p>When becoming aware of a new weed species (other than a WoNS) being present in greater than 5% of the Offset Area. Habitat Quality Scores from MHQA assessments and monitoring do not indicate improvements on habitat quality scores after yearly monitoring events. Any new WoNS species is identified in the Offset Area, that was not previously present. Weed extent increases from the baseline level. When seedlings in a particular area and/or general survival rate of seedlings does not exceed 80% within the first 5 years of offset commencement.</p>	<p>Step 1: Investigate the cause of the trigger. Determine whether any factors (public access, weather event, fire or biosecurity incident) have contributed to the incursion of a weed species.</p> <p>Step 2: Implement corrective actions If seedlings are not surviving within an area or in general, a review must take place and consultation with experts to understand issues arising with seedling success rate and make appropriate changes to the management approach. Implement additional weed control actions (i.e. eradicate invasive weeds via physical, chemical, or biological methods as discussed in the RWP) weed within two months of detection. Implement new hygiene controls (i.e. ensuring all personnel / vehicles and equipment visiting the Offset Area have no weed contaminants present, limit dispersal mechanisms from anthropogenic causes, and ensure the Offset Area has physical barriers to limit weed dispersal). Review the Offset Area RWP and revise if necessary</p> <p>Step 3: Trigger for Corrective Action is resolved and reported within Annual Compliance Monitoring.</p>

TABLE 5.4 TECHNICAL WEED MANAGEMENT SPECIFICATIONS

Plant Name	SCC Biosecurity Plan Status (2017)	WONS	Priority	Impact on Site Ecology	Ecological Value	Control Methodology Options
Ageratina adenophora Crofton weed	'Locally Significant'	No	Medium	Environmental weed is now prevalent in South East Queensland, invading pastures and colonising roadsides and forest edges. Crofton weed is also poisonous to horses.	<ul style="list-style-type: none"> • Soil stability • Shelter • 	<ul style="list-style-type: none"> • Hand-pull in sensitive areas, keep stems off ground, don't leave rootlets • Cut & paint with Glyphosate 360G/L & water at 1:1.5 • Spot spray with frog friendly Glyphosate 360 g/L @ 5ml/L water (non-selective requires preparation around natives)
Araujia sericifera Moth Vine	'Locally Significant'	No	High	An environmental weed / garden escapee; smothering threat to native plant; produces profuse wind-borne seeds; flowers Summer-Autumn; sap can be toxic to skin.	<ul style="list-style-type: none"> • Food source • Shelter • 	<ul style="list-style-type: none"> • Remove & bag fruit • Hand-pull • Cut, & paint stems with Glyphosate 360g/L & water at 1:1.5
Anredera Cordifolia Madeira vine	'Restricted'	Yes	High	Native to South America. Invasive climber. Produces large volume of tubers that readily germinate in moist conditions. High potential to smother recruitment and mature trees.	<ul style="list-style-type: none"> • Food source 	<ul style="list-style-type: none"> • Collect, bag and remove tubers • Foliar spray with S333g/L Starane 3ml/1L • Scrape and treat with Vigilant II herbicide
Archontopheonx alexandae Alexander palm	'Locally Significant'	No	Low	Significant food source for bird and bat species. Fills ecological niche of native palms with the same environment. Has a tendency to hybridize with/displace native palm species.	<ul style="list-style-type: none"> • Food source for birds, bats, insects • Provides shelter/nesting space 	<ul style="list-style-type: none"> • Hand-pull small plants • Bag fruit/seed where practicable • Cut and paste with Glyphosate 360g/L 1:1 with water
Ardisia crenata Coral berry	'Locally Significant'	No	Medium	Environmental weed / garden escapee; prolific fruiter - collect red fruits and bag;	<ul style="list-style-type: none"> • Soil stability • Shelter 	<ul style="list-style-type: none"> • Remove & bag fruit • Hand-pull seedlings

Plant Name	SCC Biosecurity Plan Status (2017)	WONS	Priority	Impact on Site Ecology	Ecological Value	Control Methodology Options
				deep fleshy tap root that snaps easily; fruits most of the year; forms dense monocultures; shade tolerant.	<ul style="list-style-type: none"> • Food source for birds, native fauna 	<ul style="list-style-type: none"> • Larger plants cut, & paint with Glyphosate 360g/L & water 1:1.5 •
disia elliptica Coral berry	'Locally Significant'	No	Medium - High	Medium sized woody weed; prolific fruiter. Seedlings form dense carpets underneath parent plants and forms dense monotypic stands within understory. Found predominantly within the riparian area.	<ul style="list-style-type: none"> • Soil stability • Food source for native birds and mammals 	<ul style="list-style-type: none"> • Remove & bag fruit • Hand-pull seedlings • Larger plants cut, & paint with Glyphosate 360g/L & water 1:1.5
ens pilosa Cobblers pegs	'Locally Significant'	No	Low	Environmental weed; seeds can remain dormant for 3-5 years; soil disturbance will cause prolific germination; seeds are dispersed very easily by wind, water, animals and clothing; out-compete native species on exposed margins and in revegetation sites.	<ul style="list-style-type: none"> • Soil stabilizer 	<ul style="list-style-type: none"> • Hand-pull small populations • Foliar spray Glyphosate 360g/L @ 5-7ml/L water • Where appropriate foliar spray with selective Metsulufon-methyl @ 0.5g+ 2mL BS1000 /10L water •
Celtis sinensis Celtis	'Locally Significant'	No	Medium	A fast growing woody tree that forms dense, monotypic infestations found predominantly in riparian areas. Dense populations of this species remove large amounts of water from the water table, and have a tendency to outcompete native flora species, causing gradual destruction of native habitat.	<ul style="list-style-type: none"> • Roosting/nesting space • Food source for birds and bats. • 	<ul style="list-style-type: none"> • Remove & bag fruit • Hand-pull seedlings • Larger plants cut, & paint with Glyphosate 360g/L & water 1:1.5

Plant Name	SCC Biosecurity Plan Status (2017)	WONS	Priority	Impact on Site Ecology	Ecological Value	Control Methodology Options
Cinnamomum camphora Camphor laurel	'Restricted'	No	Medium	Environmental weed; large tree; aggressively replaces native vegetation; black fruits & seeds are spread by birds, water & seed fall; selective reduction to utilize canopy cover & frugivore attractant properties; strong root system makes this tree very resilient so best practice herbicide application is needed.	<ul style="list-style-type: none"> • Riverbank stability Canopy cover and shelter • Food source for birds, native fauna • 	<ul style="list-style-type: none"> • Hand-pull seedlings • Cut and paste/ frill with Glyphosate 360g/L from 1 : 1.5 glyphosate and water to undiluted •
Corymbia torelliana Cadghi	'Locally Significant'	No	Low	Large tree that creates a heavy shade over the native understorey plants and prevents them from growing.	<ul style="list-style-type: none"> • Soil stability • Food source for native birds, fauna • Canopy cover • 	<ul style="list-style-type: none"> • Remove & bag fruit • Hand-pull seedlings • Larger plants cut, & paint with Glyphosate 360g/L & water 1:1.5 •
Desmodium uncinatum Silver leafed desmodium	'Locally significant'	No	Medium	A lower groundcover that has the ability to climb. It has been known to kill animals such as frogs, lizards and microbats.	<ul style="list-style-type: none"> • Soil stabilizer. • 	<ul style="list-style-type: none"> • Cut & paint using Glyphosate 360G/L & water at 1:1 •
Lantana camara Lantana	'Restricted'	Yes	High	Lantana grows in a diverse range of habitats. Seed bank remain viable for 4 years. If left touching the ground it has the ability to readily reshoot. Can exacerbate BMAD due to the protection for scale insects and bell miners.	<ul style="list-style-type: none"> • Soil stability Shelter • Food source for native birds, fauna • 	<ul style="list-style-type: none"> • Hand-pull when soil conditions permit • Cut and paint Glyphosate 360g/L undiluted • Consider splatter gun for large areas (Glyphosate 360g/L: water 1:9, Oct-April) • Mechanical disturbance like ripping or repeated slashing can reduce volume of herbicide needed & trigger native regeneration

Plant Name	SCC Biosecurity Plan Status (2017)	WONS	Priority	Impact on Site Ecology	Ecological Value	Control Methodology Options
Ligustrum lucidum Large Leaved Privet/Broad Leaf Privet	'Restricted'	No	High	Birds distribute seeds; suckering from roots; prolific purple-black berries; highly invasive, especially in disturbed native bushland; tolerant of poor soil, pollution and neglect; leaves & fruit are poisonous to both humans & animals; plants with dense leaf cover, shade out native vegetation; consider utilizing canopy cover & to attract frugivore with gradual reduction, monitoring seed production	<ul style="list-style-type: none"> • Soil stability • Food source for native birds, fauna • Canopy cover eradicates groundcover weeds • Landscape Connectivity 	<ul style="list-style-type: none"> • Hand-pull small plants • Bag fruit/seed where practicable • Cut and paste with Glyphosate 360g/L 1:1 with water • At high density populations consider basal bark using Fluroxypyr 200g/L @ 35ml/L kerosene •
Macrotyloma axillaris Perennial horse gram	'Locally Significant'	No	High	Serious weed in open forest; climbs >10m; pasture plant that is naturalised; may have use in renovating degraded soil; recovers from fire which also stimulates seed germination; seed dispersed animals	<ul style="list-style-type: none"> • Nil • 	<ul style="list-style-type: none"> • Cut / &paint with Glyphosate 360G/L & water at 1:1.5 • Consider 2,4-D 625g/L as foliar spray at 3ml/Lt water
Megathyrsus maximus Guinea Grass	'Locally Significant'	No	Medium-High	Tufted perennial grass to 2m; pasture grass can dominate understorey; usually restricted to forest edges; provides biomass that promotes intense fires that are detrimental to rain forest; work edges reducing area.	<ul style="list-style-type: none"> • Soil stability • Shelter • Food source for birds 	<ul style="list-style-type: none"> • Hand-pull or crown out • Consider Bag seed heads • Consider brush cutting before foliar spray of new growth • Foliar spray with Glyphosate 360g/L 10-15ml/Lt water

Plant Name	SCC Biosecurity Plan Status (2017)	WONS	Priority	Impact on Site Ecology	Ecological Value	Control Methodology Options
Melinis minutiflora Molasses grass	'Locally significant'	No	Medium	Perennial grass native to Africa. Its seeds are dispersed by wind. Molasses grass usually grows to be thirty to sixty inches tall, and it forms mats when its long, slender stems lay on top of each other in layers	<ul style="list-style-type: none"> • Soil stabilizer 	<ul style="list-style-type: none"> • Hand-pull or crown out in sensitive areas • Foliar spray with Glyphosate 360g/L 10ml/Lt water + surfactant.
Neonotonia wightii Glycine	'Locally significant'	No	Medium	Glycine will smother native vegetation and eventually bring down trees and eventually dominate the landscape	<ul style="list-style-type: none"> • Animals 	<ul style="list-style-type: none"> • Hand-pull small plants • Cut & paint using Glyphosate 360G/L & water at 1:1 • Spot spray with Glyphosate 360g/L 10ml/L water after preparation to protect native plants (active growth in spring)
Nephrolepis cordifolia Fishbone Fern	'Locally Significant'	No	Medium	Native to north QLD with potential for endemic populations. Endemic genetics tend not to form large monocultures and are generally found in remnant areas growing as lithophytes in small populations. Northern genetics readily colonise disturbed areas.	<ul style="list-style-type: none"> • Holds soil. Used as refugia for ground dwelling animals. Nesting habitat for smaller birds. 	<ul style="list-style-type: none"> • Hand-pull and bag small populations; including vegetative tubers. • Foliar spray with Metsulfuron-methyl@ 1g+ 3mL BS1000 /10L water; will require follow up visits to reduce tuber biomass.
Paspalum mandiocanum Broad-leaf paspalum	'Locally Significant'	No	High	Tufting grass up to 1m wide; roots from nodes; out-competes native grasses and ground covers; tolerates areas from dense shade to drought; produces large number of seeds; work edges reducing area.	<ul style="list-style-type: none"> • Soil stabilizer 	<ul style="list-style-type: none"> • Hand-pull or crown out • Consider Bag seed heads • Spot spray with Glyphosate 360g/L 10ml/L water after preparation to protect native plants (active growth in spring)

Plant Name	SCC Biosecurity Plan Status (2017)	WONS	Priority	Impact on Site Ecology	Ecological Value	Control Methodology Options
Passiflora suberosa Corky passion vine	'Locally Significant'	No	Medium-high	Environmental weed with purple-black, globose berry; slender vine, with older stems becoming corky; fruits autumn-winter; smothers native vegetation; seed drop and bird dispersed; penetrant is required with herbicide because of waxy coating.	<ul style="list-style-type: none"> • Food source for birds, native fauna. • 	<ul style="list-style-type: none"> • Carefully hand-pull young plants & paint or cut, & paint using Glyphosate 360g/L @ 400mL + Metsulfuron-methyl @ 1g/1L water • Foliar spray using Glyphosate 360g/L @ 15mL/L water + penetrant (Pulse) may require some preparation.
Passiflora subpeltata White passion-flower	'Locally Significant'	No	Medium-high	Environmental weed with green fruit; slender vine, with older stems becoming corky; Fruits Autumn-Winter; smothers native vegetation; seed drop and bird dispersed; penetrant is required with herbicide because of waxy coating.	<ul style="list-style-type: none"> • Food source for birds, native fauna. • 	<ul style="list-style-type: none"> • Bag and remove any fruit • Carefully hand-pull young plants (roots break easily) & paint or cut, & paint using Glyphosate 360g/L @ 400mL + Metsulfuron-methyl @ 1g/1L water • Foliar spray using Glyphosate 360g/L @ 15mL/L water + penetrant (Pulse) may require some preparation. •
Pinus elliottii Slash pine	'Locally Significant'	No	Medium	Environmental weed; seeds are dispersed by wind & birds; heavy seed drop; escaped from commercial production sites; invades bushland.	<ul style="list-style-type: none"> • Soil stability • Canopy cover and shelter for fauna • Outcompetes other weeds • Cones food source for Yellow-tailed Black Cockatoo 	<ul style="list-style-type: none"> • Cut & paste smaller plants or frill larger ones with Glyphosate 360g/L 1:1 water •

Plant Name	SCC Biosecurity Plan Status (2017)	WONS	Priority	Impact on Site Ecology	Ecological Value	Control Methodology Options
Ricinus communis Castor oil plant	'Locally significant'	No		Native to Africa and India, castor oil plant is a large, flowering shrub with seeds that are poisonous to both humans and animals.	<ul style="list-style-type: none"> • Nil 	<ul style="list-style-type: none"> • Hand-pull juvenile plants • Foliar spray with Fluroxypyr 333 g/L (e.g Starane Advanced) 30 mL/10 L water
Rubus ellipticus Yellowberry	'Locally significant'	No	Medium	Environmental weed; garden escapee.	<ul style="list-style-type: none"> • Soil stabilizer • 	<ul style="list-style-type: none"> • Hand-pull juvenile plants • Cut & paste with Glyphosate 360g/L 1:1.5 water
Heptapleurum actinophylla Queensland umbrella tree	'Locally significant'	No	Medium	Tree from north Queensland that can invade disturbed areas and remnant bushland.	<ul style="list-style-type: none"> • Shelter • Canopy Cover • Food source for birds, native fauna 	<ul style="list-style-type: none"> • Hand-pull small individuals • Drill and fill with Glyphosate 360g/L 1:1.5 water
Solanum mauritianum Wild tobacco	'Locally significant'	No	Low - Medium	Invades disturbed areas; shrub to 3-4m; spread by birds and bats; Consider successional weed management; frugivore attractor and large leaf pioneer	<ul style="list-style-type: none"> • Shelter • Canopy Cover • Food source for birds, native fauna • Good pioneer in absence of native pioneers 	<ul style="list-style-type: none"> • Consider retaining as beneficial until canopy capture achieved • Hand-pull smaller plants • Cut & Paste with Glyphosate 360g/L 1:1.5 water •
Solanum seafortianum – Brazilian nightshade	'Locally significant'	No	Medium	Native to Mexico, Central America. A long-lived scrambling or climbing vine. Widely naturalised in the coastal districts of eastern Australia.	<ul style="list-style-type: none"> • Nil 	<ul style="list-style-type: none"> • Juvenile plants can be hand-pulled in sensitive areas. • Foliar spray plant with 10ml/1L Glyphosate 360g/L • Cut and treat mature vines with Glyphosate 360g/L 1:1. water

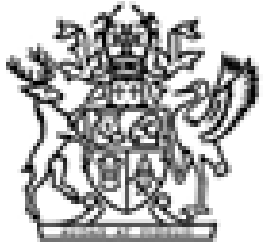
Plant Name	SCC Biosecurity Plan Status (2017)	WONS	Priority	Impact on Site Ecology	Ecological Value	Control Methodology Options
Sporobolus natalensis / Sporobolus pyramidalis Giant Rats Tail Grasses	'Restricted'	No	High	Native to central and southern Africa. An upright and perennial grass growing 60-170 cm tall, and forming large tussocks. Can form monocultures.	<ul style="list-style-type: none"> • Nil • 	<ul style="list-style-type: none"> • Cut and bag seed head • Foliar spray plant with 10ml/1L Glyphosate 360g/L • Spray 1m buffer zone around plant with 20ml/10L Flupropanate • Small infestations can be crowned and bagged
Thunbergia alata Black eyed susan	'Locally significant'	No	High	Black-eyed Susan is a vigorous invasive vine native to northern India and tropical Africa. Can smother native vegetation and outcompete native vegetation.	<ul style="list-style-type: none"> • Shelter • Soil stabiliser • 	<ul style="list-style-type: none"> • Hand-pull roots. • Mulch heavily to prevent regrowth. • Foliar spray plant with 10ml/1L Glyphosate 360g/L
Urena lobata	'Locally significant'	No		Native to Asia, although probably spread by Aboriginal voyagers. Can outcompete native vegetation such as native hibiscus species.	<ul style="list-style-type: none"> • Food • Shelter 	<ul style="list-style-type: none"> • Hand-pull smaller plants • Cut & Paste with Glyphosate 360g/L 1:1.5 water
Urochloa decumbens Signal grass	'Locally significant'	No		Environmental weed which displaces native grasses and native vegetation.	<ul style="list-style-type: none"> • Food • Shelter • Soil stabiliser 	<ul style="list-style-type: none"> • Foliar spray with Glyphosate 360/L at a rate of 10ml/1L water. Hand-pull small patches in sensitive areas

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APPENDIX A WILDNET RECORDS



Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Queensland status: Rare and threatened species
Records: All
Date: Since 1980
Latitude: -26.6738
Longitude: 152.8129
Distance: 10
Email: [REDACTED]
Date submitted: Tuesday 09 Jul 2024 10:34:46
Date extracted: Tuesday 09 Jul 2024 10:40:07

The number of records retrieved = 43

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Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Hylidae	<i>Litoria pearsoniana</i>	cascade treefrog		V		68
animals	amphibians	Limnodynastidae	<i>Adelotus brevis</i>	tusked frog		V		410
animals	amphibians	Myobatrachidae	<i>Assa darlingtoni</i>	pouched frog		V	V	8
animals	amphibians	Myobatrachidae	<i>Mixophyes iteratus</i>	giant barred frog		V	V	105
animals	birds	Accipitridae	<i>Erythrotriorchis radiatus</i>	red goshawk		E	E	2
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		V	V	63
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami lathami</i>	glossy black-cockatoo (eastern)		V	V	3
animals	birds	Meliphagidae	<i>Anthochaera phrygia</i>	regent honeyeater		CR	CE	1
animals	birds	Menuridae	<i>Menura alberti</i>	Albert's lyrebird		NT		1
animals	birds	Phaethontidae	<i>Phaethon rubricauda</i>	red-tailed tropicbird		V		1
animals	birds	Podargidae	<i>Podargus ocellatus plumiferus</i>	plumed frogmouth		V		36
animals	birds	Rostratulidae	<i>Rostratula australis</i>	Australian painted-snipe		E	E	2
animals	birds	Scolopacidae	<i>Calidris ferruginea</i>	curlew sandpiper		CR	CE	1
animals	birds	Strigidae	<i>Ninox strenua</i>	powerful owl		V		3
animals	birds	Turnicidae	<i>Turnix melanogaster</i>	black-breasted button-quail		V	V	1
animals	insects	Papilionidae	<i>Ornithoptera richmondia</i>	Richmond birdwing		V		12
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		E	E	331
animals	mammals	Pseudocheiridae	<i>Petauroides volans volans</i>	southern greater glider		E	E	6
animals	reptiles	Chelidae	<i>Eseya albagula</i>	white-throated snapping turtle		CR	CE	36
animals	reptiles	Chelidae	<i>Elusor macrurus</i>	Mary River turtle		E	E	65
plants	land plants	Acanthaceae	<i>Graptophyllum reticulatum</i>	reticulated holly		E	E	13/11
plants	land plants	Aristolochiaceae	<i>Pararistolochia praevenusa</i>			NT		11/8
plants	land plants	Corynocarpaceae	<i>Corynocarpus rupestris subsp. arborescens</i>	southern corynocarpus		V		6/5
plants	land plants	Cucurbitaceae	<i>Nothoalsomitra suberosa</i>			NT		7/4
plants	land plants	Euphorbiaceae	<i>Mallotus megadontus</i>			E		4/4
plants	land plants	Lamiaceae	<i>Coleus torrenticola</i>			E	E	10/10
plants	land plants	Lamiaceae	<i>Westringia blakeana</i>			NT		1/1
plants	land plants	Laxmanniaceae	<i>Romnaldia strobilacea</i>			V	V	17/11
plants	land plants	Myrtaceae	<i>Gossia hillii</i>			CR		3/1
plants	land plants	Myrtaceae	<i>Gossia inophloia</i>			CR		7/6
plants	land plants	Myrtaceae	<i>Rhodamnia dumicola</i>	rib-fruited malletwood		E		3/2
plants	land plants	Myrtaceae	<i>Rhodamnia rubescens</i>	scrub turpentine		CR	CE	4
plants	land plants	Myrtaceae	<i>Syzygium hodgkinsoniae</i>	red lilly pilly		V	V	2/1
plants	land plants	Oleaceae	<i>Jasminum jenniae</i>			E		2/2
plants	land plants	Orchidaceae	<i>Plectorrhiza beckleri</i>			NT		3/3
plants	land plants	Orchidaceae	<i>Sarcochilus fitzgeraldii</i>	ravine orchid		E	V	1/1
plants	land plants	Proteaceae	<i>Floydia praealta</i>	ball nut		V	V	3/2
plants	land plants	Proteaceae	<i>Macadamia integrifolia</i>	macadamia nut		V	V	6/4
plants	land plants	Proteaceae	<i>Macadamia ternifolia</i>	bopple nut		V	V	26/15
plants	land plants	Proteaceae	<i>Triunia robusta</i>			E	E	14/13
plants	land plants	Rutaceae	<i>Zieria bifida</i>			E	E	12/10
plants	land plants	Sapotaceae	<i>Planchonella eerwah</i>			E	E	8/4
plants	land plants	Symplocaceae	<i>Symplocos harroldii</i>	hairy hazelwood		NT		1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*.

The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*.

The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).

This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.



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APPENDIX H

WALKING TRAIL DOCUMENTS



Our ref Beerburrum to Nambour Rail Upgrade Project
Your ref 2020/8803
Enquiries [REDACTED]

Department of
Transport and Main Roads

17 June 2024

[REDACTED]

Dear [REDACTED]

With reference to:

- The Department of Climate Change, Energy, the Environment and Water's (DCCEEW) review of plan against conditions of approval and other relevant requirements for Beerburrum to Nambour Rail Upgrade Project Offset Area Management Plan (7 February 2024) dated 3 May 2024; and
- Online meeting between the assessing officers from DCCEEW and Transport and Main Roads project staff on 21 May 2024.
- Condition 5 of Approval 2020/8803 (Beerburrum to Nambour Rail Upgrade Project, Queensland) "The approval holder must submit an Offset Area Management Plan (OAMP) for the Minister's approval that, to the satisfaction of the Minister, compensates for the significant residual impact of clearing 64.15 ha of Koala habitat and Grey-Headed Flying-fox foraging habitat within the development area."

This letter has been prepared to specifically address DCCEEW's comments associated with allowing public access walking trails through the Beerburrum to Nambour Rail Upgrade Project's proposed offset area. The intent of this memorandum is to seek initial endorsement for allowing public walking trails within the offset area, prior to amending the OAMP and formally resubmitting for Minister approval. All accepted mitigation measures will be adopted within the next revision of the OAMP, along with any additional measures proposed by DCCEEW and agreed by TMR.

Background

The proposed offset area is situated across sections of three freehold lots (176 MCH798, 178 MCH865 and 36 MCH1164) and directly adjoins both the Maleny National Park and Kondalilla National Park. The combined three freehold lots were purchased by Sunshine Coast Council under Council's 'Environmental Land Levy Acquisition Program' and is zoned as Environmental Management and Conservation Zone. The delivery of this offset will be delivered in partnership between TMR and Sunshine Coast Council.

Since acquisition, 4 dedicated walking trails within the offset area have been constructed, with an additional 3 proposed. The locations of the constructed and proposed walking trails are provided in Attachment A. These walking trails have been designed by specialist consultants and have been constructed in general accordance with design drawings provided in Attachment A. Photographs of the constructed walking trails within the offset area have been provided as Attachment B.

During the delivery of this project's offset, public access to these walking trails will be maintained and restricted to the trails presented in Attachment A. Those walking trails which enter into the offset area are proposed to be managed under the management measures outlined within OAMP.

DCCEEW Comments

TMR received formal comments on the Beerburrum to Nambour Rail Upgrade Project Offset Area Management Plan, which included specific concerns around the management of public access within the offset area and the potential risks to protected matters (specifically the Koala and Grey-headed Flying-fox). The sections below provide TMR's proposed measures to mitigate potential risks to demonstrate that the offset can effectively deliver on the conservation gain for the protected matters while managing low impact public access to designated walking trails within offset area.

Spreading of weeds

To mitigate the potential of weeds being spread within the offset area from allowing public access to utilise these designated walking trails, TMR proposes the following mitigation measures:

- Bicycles, horses and unauthorised vehicles will all be prohibited within the offset area and wider council reserve. Public access to the reserve and offset area is restricted to one access point at the end of Kirby's Road. Currently there is a steel gate preventing unauthorised vehicle access from the public road into the reserve and offset area. It is proposed that this existing access point would be upgraded to further prevent motorbikes, bicycles and horses. Public access into the offset area would be restricted to walk-in access only.
- A footwear wash station for those entering the walking trails is proposed to be installed at the entrance of the reserve. Due to the single access point at the end of Kirby's Road and restricted walking access only, all visitors entering the reserve will be required to clean their footwear before and after hiking. These stations typically provide brushes and instructions for removing soil and plant material that could carry weed seeds.

¹ Note existing vehicle tracks which will be used by offset staff are also identified on this map. These tracks intersect with some of the dedicated trails and may be infrequently used by walkers. These existing vehicle tracks will be managed in accordance with the mitigation measures outlined for the dedicated public trails.

- In addition to the footwear wash station, additional signage outlining the rules and regulations for the reserve and adjacent offset area are proposed. These signs would outline enforcement actions applicable under council local laws.
- Management actions outlined in the OAMP Regeneration Works Plan will address the risk of weed incursions caused by public access. The primary objective of the Offset Area Management Plan is to enhance rainforest and eucalyptus-dominated vegetation communities within the offset area, providing foraging resources for Koalas and Grey-headed Flying-foxes. Since weed control is the primary management action needed to achieve this goal, the Regeneration Works Plan includes a comprehensive weed control program. It should be noted that walking trails used by the public will serve as the main access routes for ecological restoration practitioners conducting weed control in the offset area. Consequently, it can be assumed that these trails and the adjacent vegetation will be the easiest areas to consistently treat and monitor for weed incursions.

Domestic animals

To mitigate the potential for domestic animals to impact on MNES matters within the offset area, TMR proposes the following mitigation measures:

- All domestic animals will be prohibited from entry to the reserve and offset area, with enforcement carried out under Council's local laws.
- Gates will be installed at the entrance to the reserve to prevent horses and other large domestic animals from entering the reserve.
- Clear and visible signs will be placed to inform the public that dogs and other domestic animals are not permitted. These signs will include information about the penalties for non-compliance.
- Council will impose fines on individuals who bring dogs into prohibited areas. These fines serve as a deterrent and encourage compliance with the regulations.
- Compliance with prohibiting domestic animals within the reserve and offset area will occur through visual monitoring by ecological restoration practitioners conducting operational works within the offset area and camera monitoring proposed under the OAMP's wild dog monitoring program. Non compliance would be reported to Sunshine Coast Council for action under local laws.

Rubbish dumping

To mitigate the potential for illegal rubbish dumping associated with publicly available walking trails within the offset area, TMR proposes the following mitigation measures:

- Clear and visible signs will be placed at the entrance to the reserve and offset area to inform the public about the legal consequences of illegal dumping and the importance of protecting natural habitats.
- Gates will be installed at the entrance to the reserve, which will restrict the volume of potential illegal dumping to personal miscellaneous volumes only within the offset area.
- The walking trails used by the public will serve as the main access routes for the ecological restoration practitioners conducting management operations within the offset area. Any miscellaneous rubbish observed during operational works would be

collected and appropriately disposed of, a task which will form part of the OAMP works plan. Ongoing occurrence of rubbish would be reported to Sunshine Coast Council, for management under local laws. Where ongoing miscellaneous rubbish is observed, additional mitigation measures would be considered, including but not limited to installing a rubbish collection system within the offset area.

- Council will impose fines on individuals caught illegally dumping rubbish. These penalties serve as a deterrent. Fines for illegal dumping range from \$2300 to \$143,750 (SCC Illegal Dumping Webpage). Additional information regarding illegal dumping can be obtained from www.sunshinecoast.qld.gov.au/illegaldumping.

Illegal harvesting of timber from the offset area

To mitigate the risk for timber harvesting from allowing public walking trails within the offset area, TMR proposes the following mitigation measures:

- Clear and prominent signs will be placed at the entrances to the reserve and offset area, indicating that harvesting of timber is prohibited.
- Gates will be installed at the entrance to the reserve, removing vehicle access and limiting any potential harvesting of timber within the offset.
- Any observations of timber harvesting observed by ecological restoration practitioners within the offset area will be immediately reported to Sunshine Coast Council for investigation and enforcement under local laws.
- Where required, surveillance may be utilised to monitor high risk sections of the offset area.
- No harvesting of timber (including from Council's forestry coops) will be permitted within the offset area. Forestry coops contained within the offset area will be managed in accordance with the OAMP for the benefit of the protected matters.

Unplanned fires

To mitigate the potential for unplanned fires to occur from publicly available walking trails within the offset area, TMR proposes the following mitigation measures:

- Fires are not permitted within the offset area, unless undertaken by or under supervision of TMR's ecological restoration practitioners in accordance with the OAMP.
- Clear and prominent signs will be placed at the entrances to the reserve and offset area, indicating that lighting fires is prohibited within the offset area and outlining the associated penalties for non-compliance.
- Any unplanned fires observed by ecological restoration practitioners within the offset area will be immediately reported to Sunshine Coast Council for investigation and enforcement under local laws.
- Any unplanned fires will enact all measures outlined within the OAMP's fire management plan.
- Where evidence of unplanned fires is observed, video surveillance may be utilised to monitor high risk sections of the offset area for enforcement under local laws by Sunshine Coast Council.

Construction and trail maintenance (including erosion)

To mitigate the potential for impacts to Koala and Grey-headed Flying-fox habitat to occur from the construction and maintenance of the walking trails within the offset area, TMR proposes the following mitigation measures:

- All current and proposed walking trails have been designed by specialist consultants, which considered locations and construction methodologies to align with existing vegetation and topography. Walking trails have and will be constructed in accordance with the general design drawings provided in Attachment A and have been kept to a minimum (refer Attachment A, depicting locations of current and proposed walking trails). Where required to facilitate track construction, select vegetation removal will be limited to groundcovers and regrowth, prohibiting removal of vegetation providing Koala or Grey-headed Flying-fox habitat.
- These walking trails will be used by TMR's ecological restoration practitioners and where track erosion is evident and causing increased sediment load within the offset area, restoration works shall occur under the scope of the OAMP. Regular maintenance, such as repairing damaged sections and managing water drainage, is expected to mitigate the risk of erosion caused by public access to walking trails.
- All construction and maintenance works of the walking trails within the offset area will be managed under the OAMP.
- Where unauthorised access tracks are identified which deviate from the approved path by TMR's ecological restoration practitioners, these sections will be flagged off to prevent further use and appropriate awareness signage installed under the OAMP.

Due to the small scale and localised nature of the walking trail construction and maintenance, ongoing erosion from the walking trails within the offset area is not expected. Existing walking trails constructed in 2020 and are stable and showing no evidence of erosion as depicted within in photographs provided in Attachment B.

Based on the construction methodology, design, location and number of proposed tracks, it is the opinion of TMR's ecologist specialist that the impact to Koala and Grey-headed Flying-fox habitat associated with the construction and maintenance of these walking trails is negligible.

Fragmentation of habitat

TMR's Principal Ecologist and consulting team responsible for preparing the OAMP have reviewed the construction, maintenance and ongoing use of the proposed walking trails and it is their professional opinion that the existing and proposed trails will not fragment natural habitats within the offset area or disturb the movement or habitat connectivity of Koalas or Grey-headed Flying-foxes.

The above statement is based on:

- the small scale and localised nature of the walking trail construction and maintenance.
- The limited use expected of the walking trails, which has been successfully implemented in all National Parks within Australia, including Maleny National Park and Kondalilla National Park.
- Grey-headed Flying-foxes, being highly mobile, will face no barriers to accessing foraging resources in the offset area due to the presence of walking trails.
- Koalas persist throughout South-East Queensland and have adapted to navigating urban areas, including reserves within the urban matrix and so there is little evidence

to suggest that limited use of walking trails will affect the species as they are largely arboreal, and tend to move at night when the walking trails are less likely to be used. Koalas and Koala populations can persist in highly fragmented landscapes such as peri-urban areas and scattered paddock trees in agricultural land where Koalas regularly move across the ground for tens or even hundreds of meters (Youngentob et al., 2021). Koalas will navigate the offset area with ease, encountering minimal barriers from walking trails. Moreover, considering the offset area's adjacency to national parks to the east and west, it will serve as a crucial corridor for Koala dispersal and maintenance of diversity.

Summary

TMR has carefully considered DCCEEW's comments with respect to the risks from allowing public access to utilise walking trails within the proposed offset area. As provided above, TMR has proposed a number of additional measures which will be incorporated within the delivery of our offset in partnership with Sunshine Coast Council as the landowner of the reserve.

The implementation of the above measures through the project's OAMP, will ensure habitat connectivity within the offset area is maintained, allowing Koalas and Grey-headed Flying-foxes to navigate the area seamlessly, as well as providing a documented and measurable response strategy for potential risks. Overall, these management actions collectively support the primary objective of enhancing eucalyptus-dominated vegetation communities, providing essential foraging resources for Koalas and Grey-headed Flying-foxes. The enhancement of habitat quality, increased availability of foraging resources, and improved connectivity to National Parks represent significant conservation gains for local Koala and Grey-headed Flying-fox populations.

TMR is committed to managing public access under its OAMP, in partnership with Sunshine Coast Council to ensure it does not compromise the site's ecological values or hinder successful conservation outcomes.

Based on the information provided within this letter, TMR is seeking initial endorsement from DCCEEW to allow public access to utilise walking trails (existing and proposed) within the offset area, prior to amending the OAMP and formally resubmitting for Ministerial approval.

Following endorsement, all measures will be incorporated within the next revision of the OAMP, along with any additional measures proposed by DCCEEW subsequent to this memo.

Yours sincerely

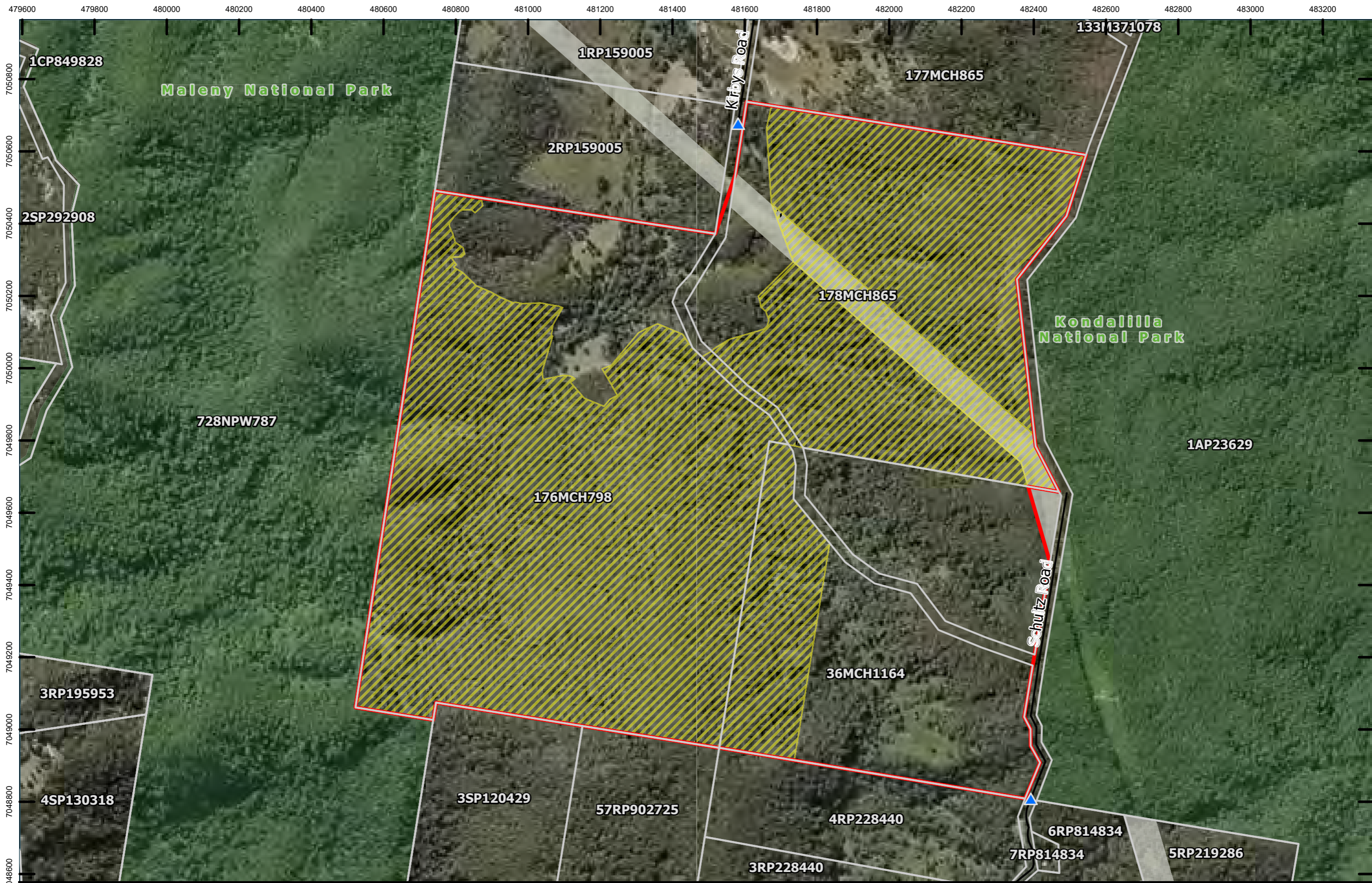


Project Manager (B2N)








Attachment A

Kirby's Road Trail Network

Trailworx construction drawings



B2N Rail Upgrade Offset Project: Kirby's Road ER - Offset Area

 End of public road / vehicle access	 Total Reserve Area - 286 ha
 Roads	 Total Offset Area - 190 ha (indicative)
 Freehold Land	
 Protected Estate	
 Easement	

0 200 m
Scale: 1:10,000

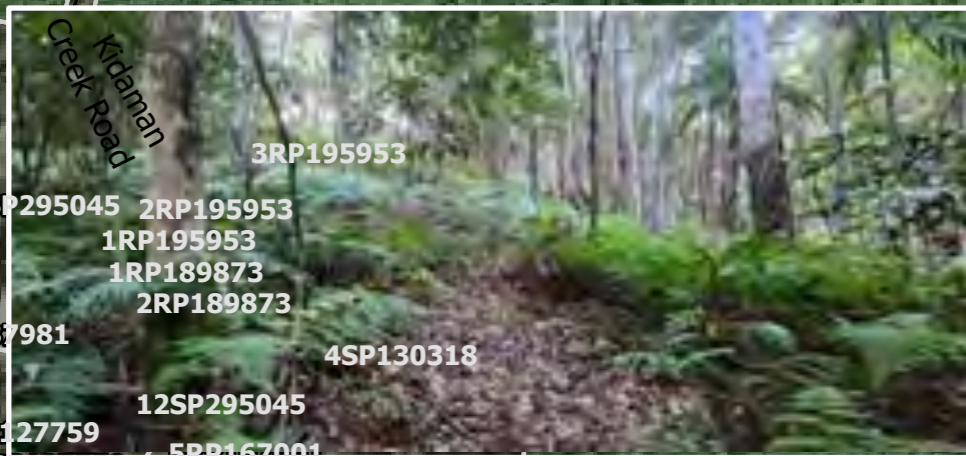
Coordinate System: GDA2020 MGA Zone 56

Source:
 Trails, Reserve Area, and Offset Area: Sunshine Coast Council, 2024
 Roads, Freehold Land: QLD Department of Resources, 2024
 Protected Estate: QLD Department of Environment and Science 2023
 Aerial Imagery: Sunshine Coast Council and QLD Department of Resources 2023

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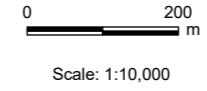
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B2N Rail Upgrade Offset Project: Kirby's Road ER - Trails Network

- Legend**
- End of public road / vehicle access
 - Roads
 - Existing walking trail
 - Proposed walking trail
 - Existing walking/vehicle trail
 - Total Reserve Area - 286 ha
 - Total Offset Area - 190 ha (indicative)
 - Freehold Land
 - Protected Estate
 - Easement



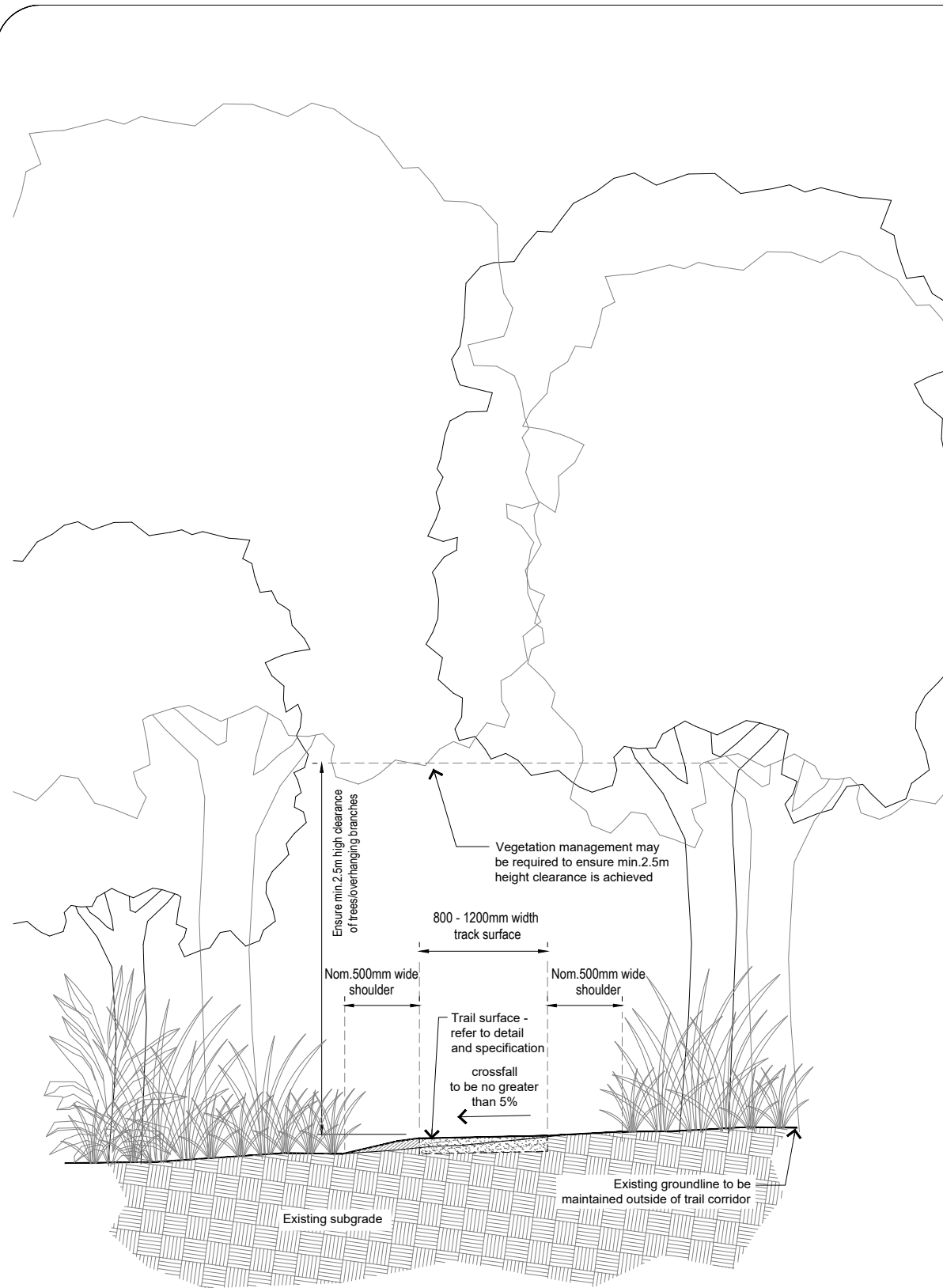
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Source:
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 Roads, Freehold Land: QLD Department of Resources, 2024
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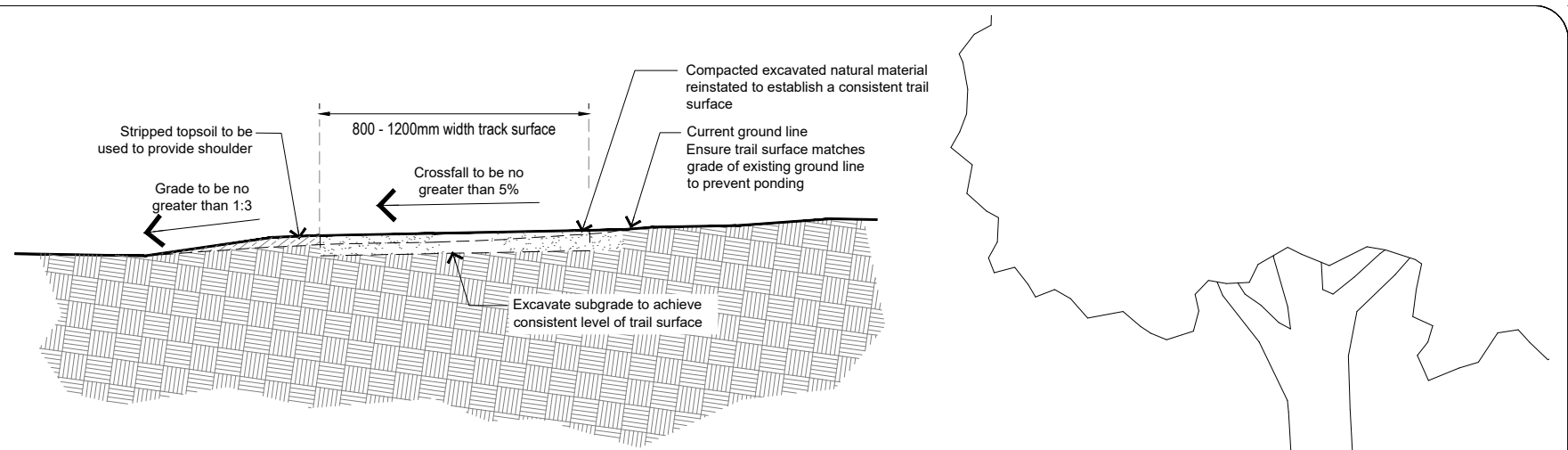
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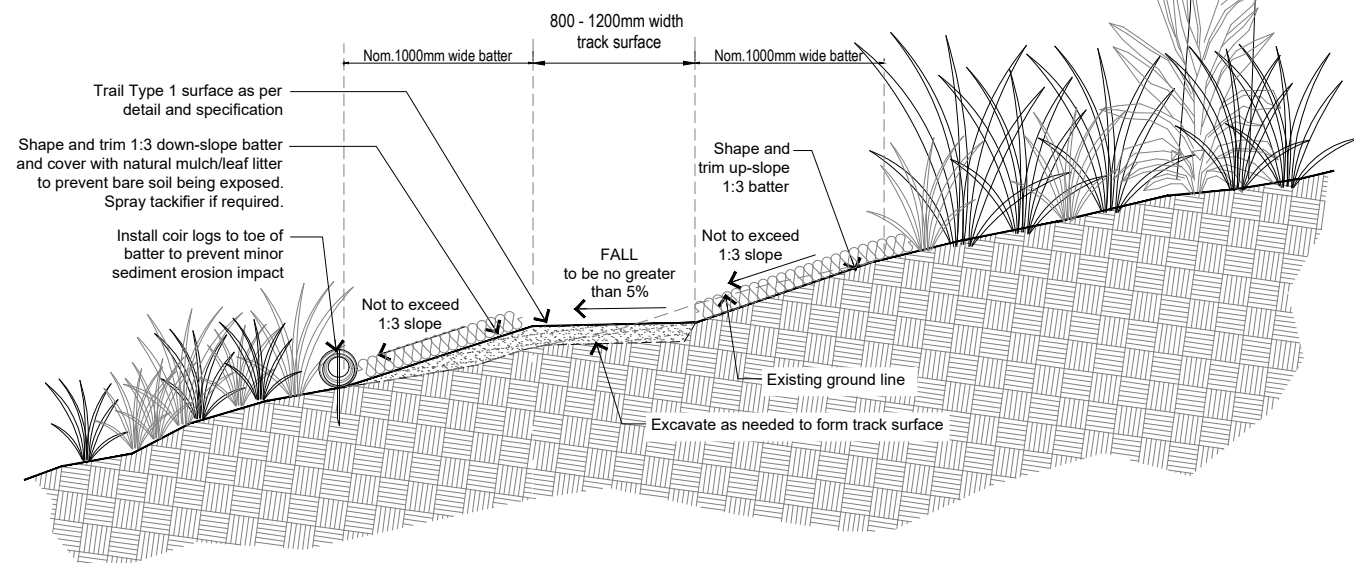
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TYPICAL TRAIL CROSS SECTION
1:40@A3



TYPICAL TRAIL SURFACE NATURAL SURFACE
1:20@A3



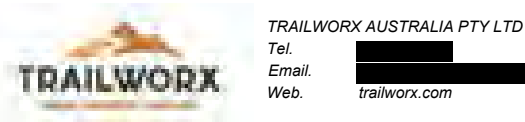
TYPICAL BENCH-CUT TRAIL SECTION
1:40@A3

SPECIFICATION NOTES

Trail upgrade construction works

- Trail construction to remain within the proposed trail corridor.
- Trail surface to be compacted **natural surface** with a minimum overall width as specified.
- For **Class 3 trail alignments**, machine construction will offer the most efficient method. This will result in a 1.2m wide trail corridor.
- For **Class 4 / 5 trail alignments**, hand built construction will offer the least impact method. This will result in a 800mm wide trail corridor.
- Trail surface is to be typically out sloped to suit site drainage constraints. Ensure no greater than 5% crossfall (outslope) across trail surface.
- Trail corridor to be no greater than 2m wide (1m max. trail surface width with Nom. 500mm wide shoulder each side) and ensure a min. 2.5m height clearance is achieved where vegetation is in close proximity to trail edge. Trail Builder to make good any construction damage or adverse impacts on existing ground conditions and vegetation outside of trail corridor.
- Excavate existing natural subgrade to establish a consistent even surface. Reinstated material and compact to create new trail surface.
- Utilise stripped topsoil to instate shoulders along trail edge - ensure grade is no greater than 1:3 to enable safe maintenance procedures.
- Where bench cut is required, utilise up-slope excavation material to form down-slope batter. Batters typically not to exceed 1:3 slope - batter slope dependant on trail alignment location. If a steeper slope is unavoidable, install pinned jute mesh to batter surface to provide additional erosion prevention. Install coir logs to toe of batter using driven re-bar - ensure top of re-bar is flush with top of coir log. Spread reclaimed vegetative material as mulch to batter surface to assist with erosion prevention. If further erosion control is required, spray liquid tackifier to bare earth. Suggested product: RST 'Hydromulch Liquid Tackifier'.
- Where trail corridor traverses areas displaying poor drainage qualities or insubstantial overland flow, install selected subsurface drainage methods.
- **Subsurface Drainage Type 1** - Utilise 65mmØ soaked Ag-line installed with min. 2% crossfall to ensure positive drainage at outlet. Excavate soak pit on trail high side and install 50-90mmØ drainage aggregate, ensuring coverage to pipe to prevent blockage from surrounding natural mulch. Provide drainage aggregate dissipater area to outlet. Refer to detail.
- **Subsurface Drainage Type 2** - Utilise rock mattress subsurface drainage by installing 50-90mmØ drainage aggregate to a Nom. 150mm depth in low-lying section. Install 100mm depth compacted stabilised road base as capping surface. Refer to detail.
- Where trail corridor intersects an established low-flow waterway install rock armour crossing utilising Nom. 300mmØ rock sourced from site to provide hardened surface at flow point. Refer to detail.

Checked - SC			
Design - SC	Drawn - JC		
Scales - AS SHOWN	Date -		
Document Stage - APPROVAL	Issue Date	Description	By
	A 20-04-2023	PRELIMINARY FOR APPROVAL	JC

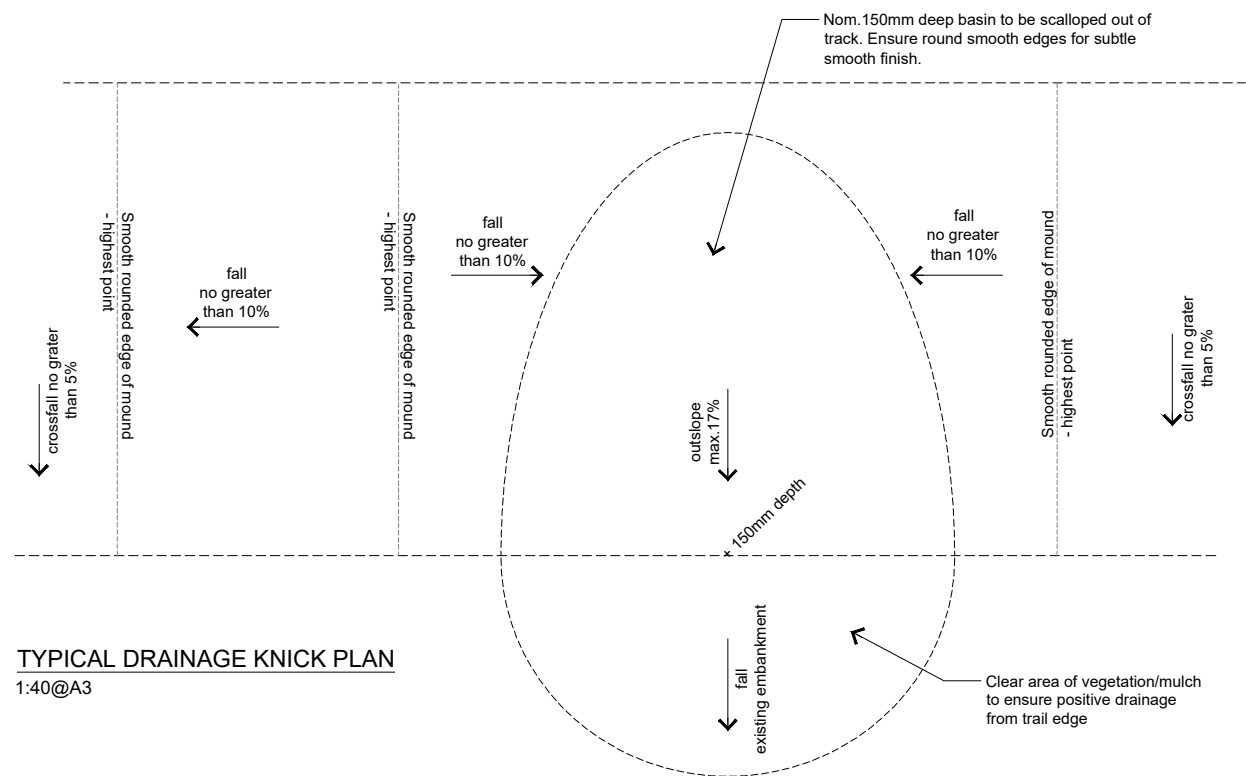


Drawing title -
CONSTRUCTION DETAILS
SHEET 1 OF 4

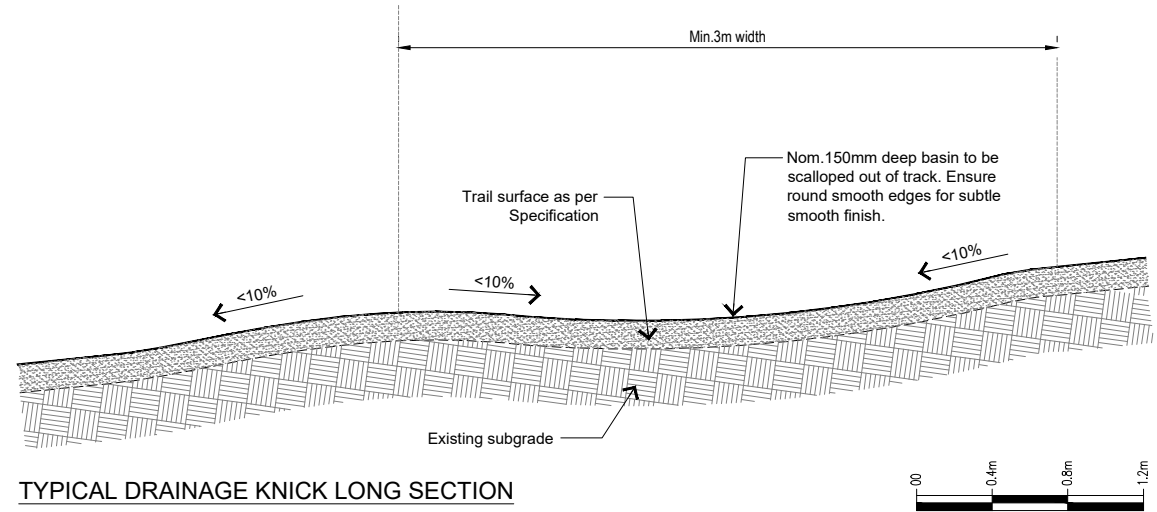
Project - KIRBYS ROAD ENVIRONMENT RESERVE TRAIL NETWORK
Client - SUNSHINE COAST COUNCIL Q2253

Site - KIRBYS ROAD ENVIRONMENT RESERVE LOT 176 MCH798 / LOT 178 MCH865

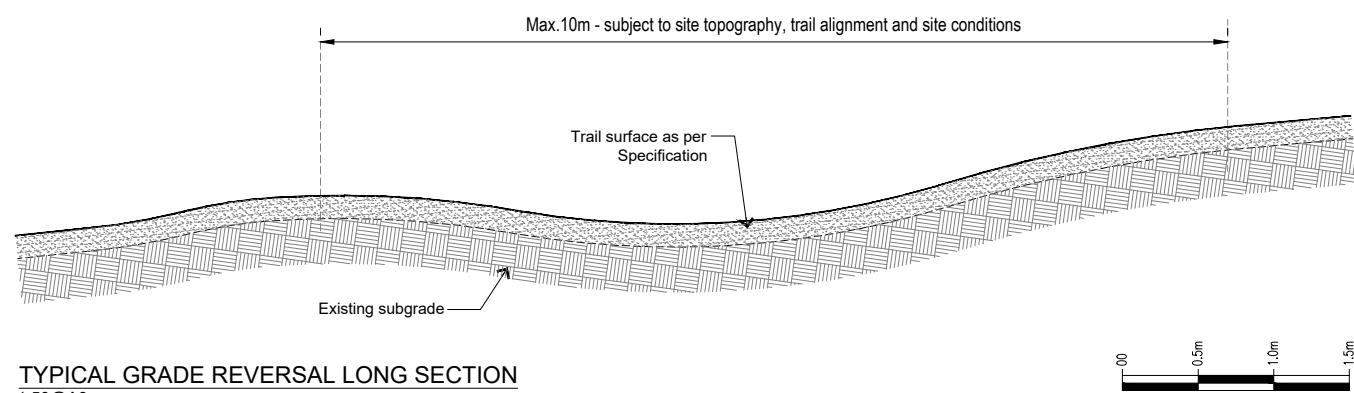
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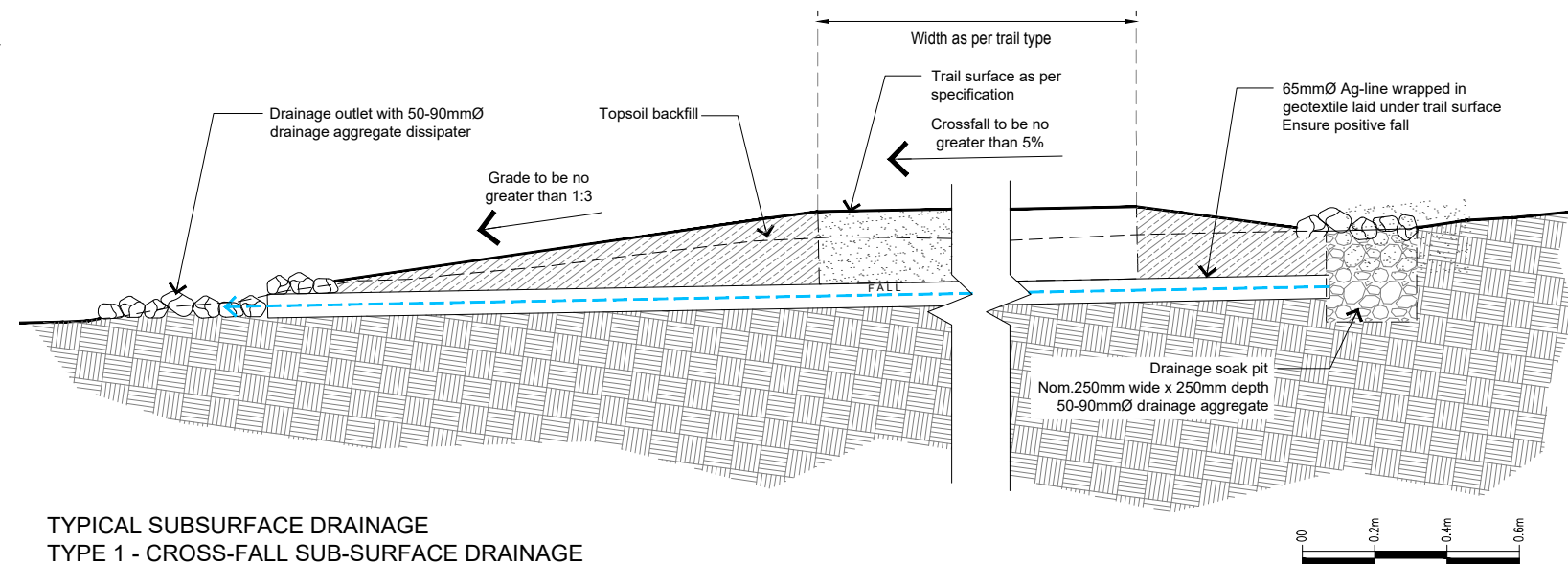
TYPICAL DRAINAGE KNICK PLAN
1:40@A3



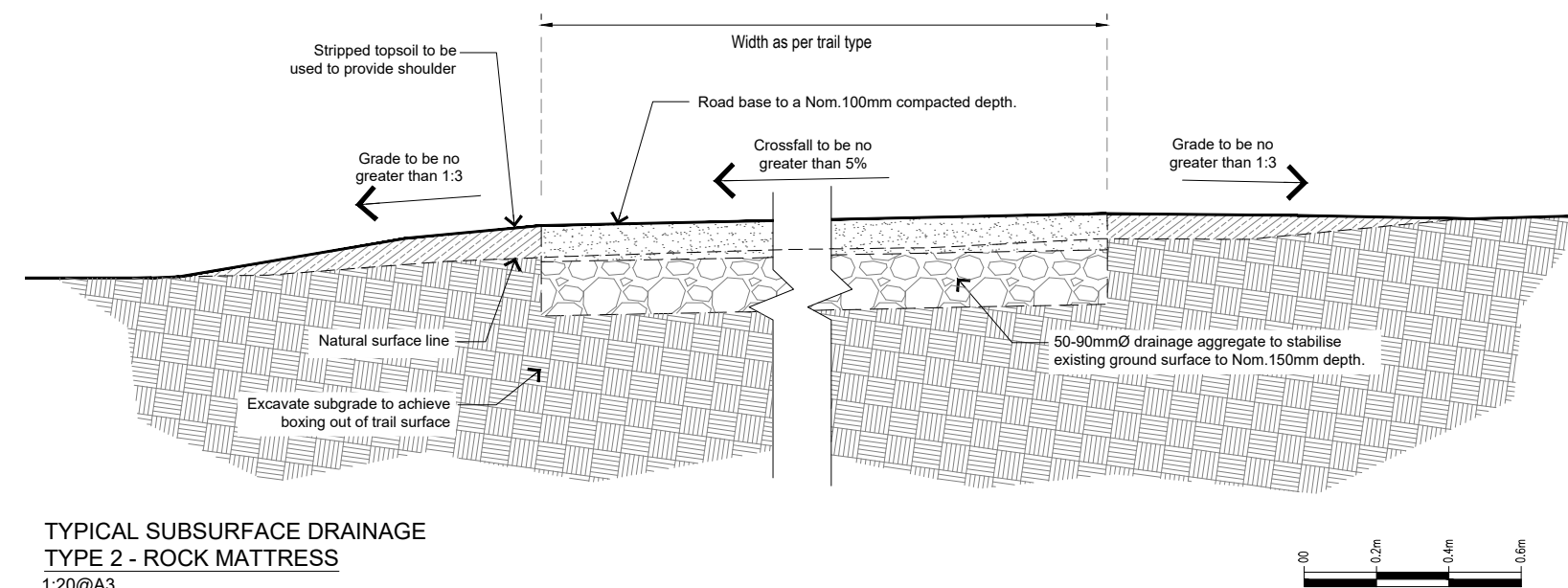
TYPICAL DRAINAGE KNICK LONG SECTION
1:40@A3



TYPICAL GRADE REVERSAL LONG SECTION
1:50@A3



TYPICAL SUBSURFACE DRAINAGE
TYPE 1 - CROSS-FALL SUB-SURFACE DRAINAGE
1:20@A3



TYPICAL SUBSURFACE DRAINAGE
TYPE 2 - ROCK MATTRESS
1:20@A3

SPECIFICATION NOTES

- All drainage infrastructure and construction to remain within trail corridor.
- Trail surface to be constructed as per 'Trail Surface' specifications and details.
- Install Type 2 - Rock Mattress subsurface drainage in low-lying or boggy sections where natural drainage is poor.
- Rock and stone material to be sourced on site or from agreed location. If stone is to be imported, select material that reflects the site landscape characteristics.
- Council to undertake annual inspection to ensure condition and functionality are sound.

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Design - SC	Drawn - JC	
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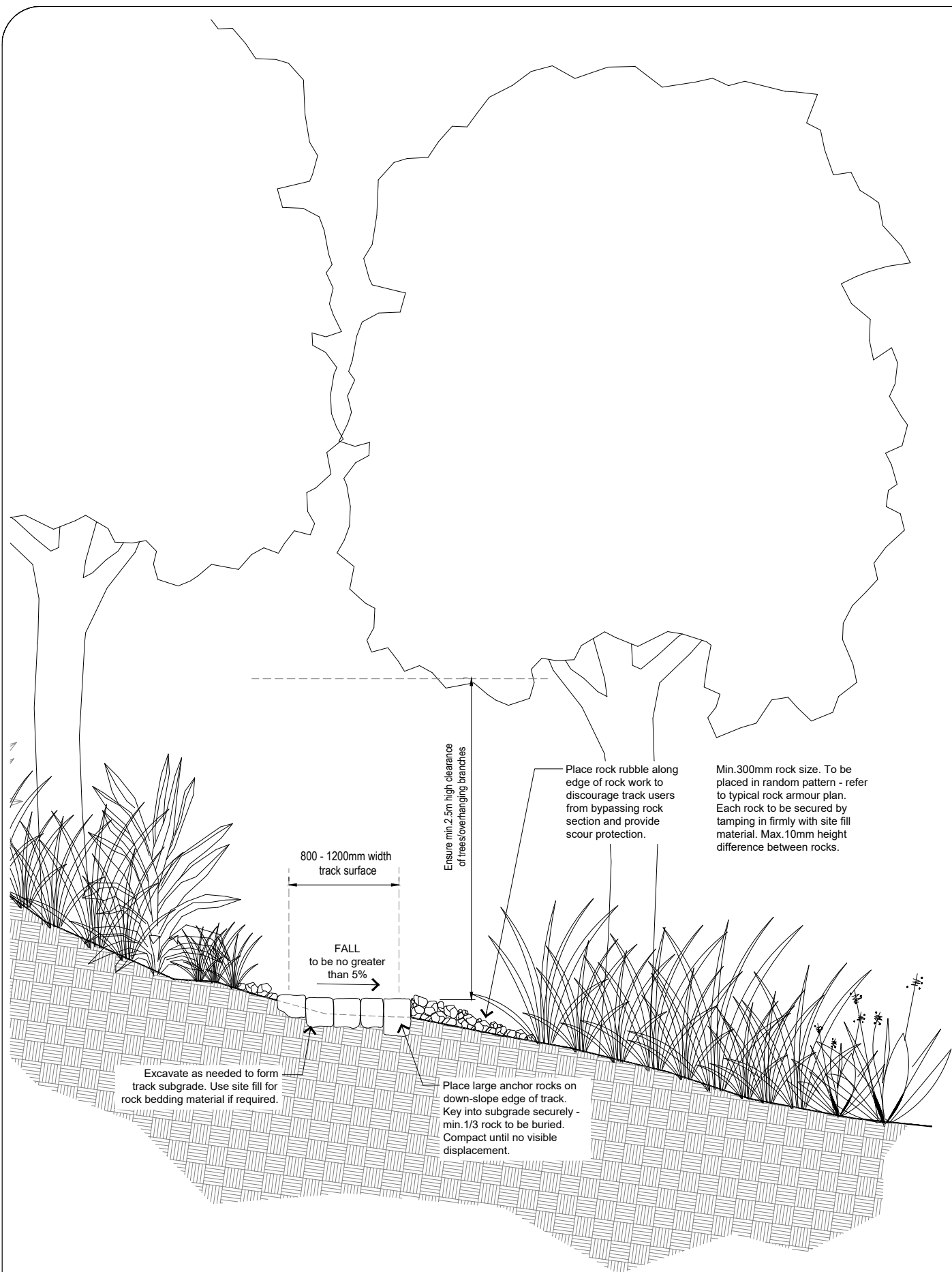
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CONSTRUCTION DETAILS
SHEET 2 OF 4

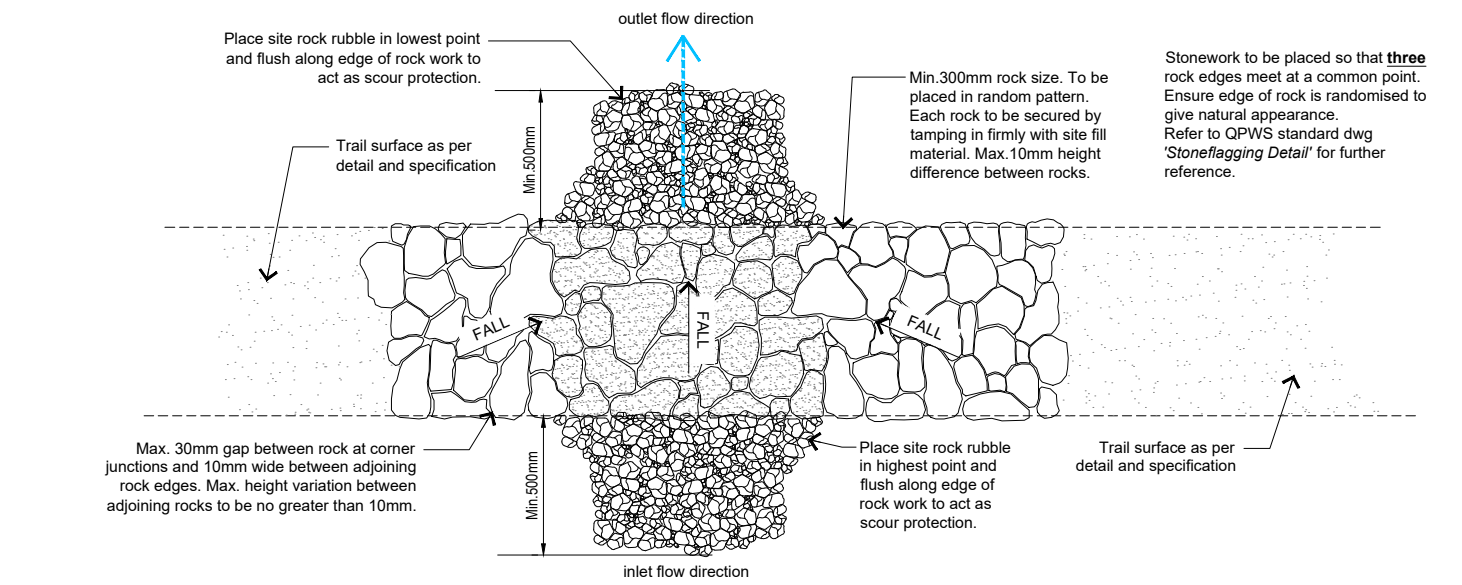
Project - KIRBYS ROAD ENVIRONMENT
RESERVE TRAIL NETWORK
Client - SUNSHINE COAST COUNCIL
Q2253

Site -
KIRBYS ROAD ENVIRONMENT RESERVE
LOT 176 MCH798 / LOT 178 MCH865

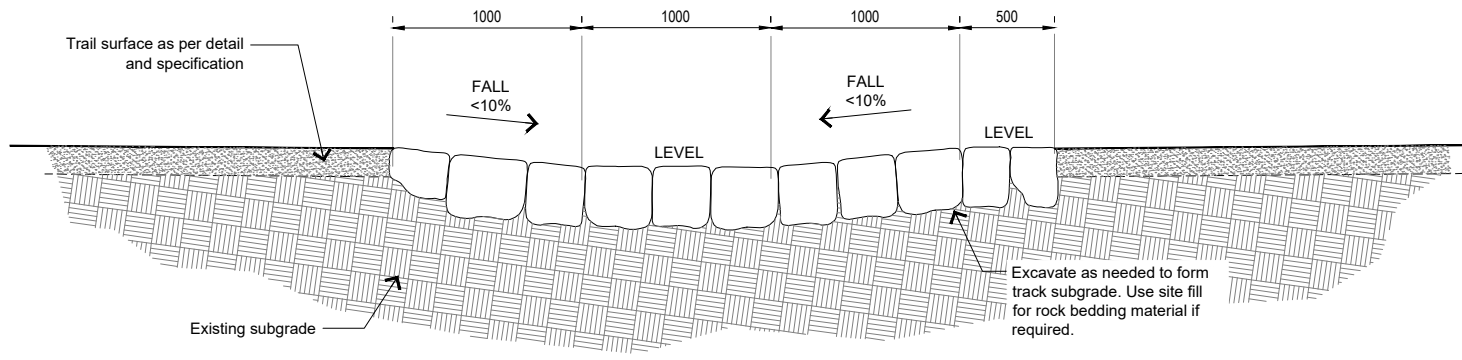
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TYPICAL ROCK ARMOUR DRAIN CROSS SECTION
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TYPICAL ROCK ARMOUR DRAIN PLAN



TYPICAL ROCK ARMOUR DRAIN LONG SECTION

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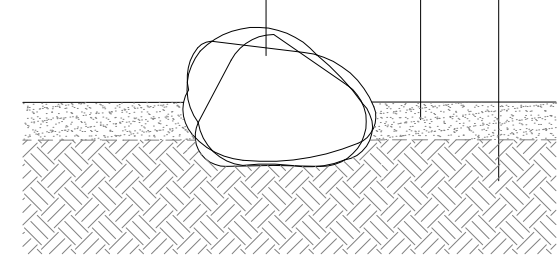
SPECIFICATION NOTES

ROCK ARMOUR CROSS DRAIN

- All drainage infrastructure and construction to remain within trail corridor
- Trail surface to be constructed as per 'Trail Surface' specifications and details.
- Install where trail intersects an overland flow path - note this low impact on-ground solution is in lieu of sub-surface drainage.
- Rock armour stone material to be sourced on site or from agreed location. If stone is to be imported, select material that reflects the site landscape characteristics.
- Rock armour stonework to be constructed with Nom.300mm size placed in a random pattern.

NOTES:

- 1 Bush Rock / Boulder - Minimum weight - 75Kg to prevent from being moved. A rounded shape of selected boulders is preferable. Boulder to be bedded $\frac{1}{3}$ into finished grade. Place boulder in a natural stable or supported position. Preference to lie boulder horizontally as a single or as a multiple install.
- 2 Trail surface.
- 3 Existing subgrade.



BUSH ROCK / BOULDER PLACEMENT

NTS

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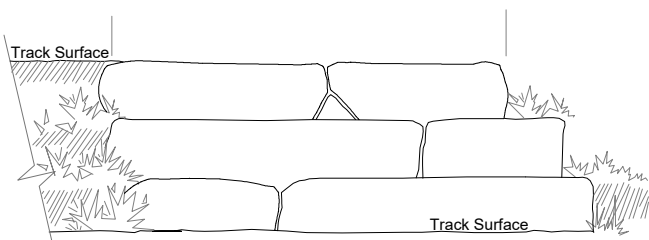
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SHEET 3 OF 4

Project - KIRBYS ROAD ENVIRONMENT RESERVE TRAIL NETWORK
Client - SUNSHINE COAST COUNCIL Q2253

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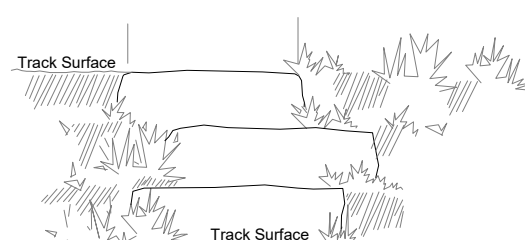


ELEVATION

SPECIFICATION NOTES

NATURAL STONE STEP NOTES

- Ensure 2 x riser (step height) + 1 tread (step width) = 650 to 680mm.
- Constructed height of risers and depth of treads are to be consistent.
- Stagger rock joints horizontally and avoid large gaps between rocks where possible.
- Individual rocks can be stabilized and set into place by using smaller pieces of rock as wedges.
- Multiples of five risers between landings are recommended where possible to allow for stride alteration between left and right. A minimum of three risers is desirable.
- Refer to **AS2156.2 Walking Tracks Part 2: Infrastructure Design** and QPWS Walking Track (WT) details for further guidance.
- To be installed in Landscape Setting - Class 5, 6 & 7.

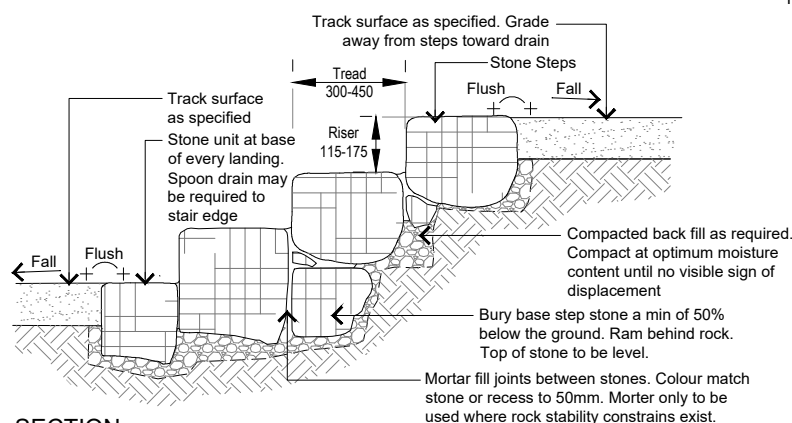


ELEVATION

SPECIFICATION NOTES

NATURAL STONE STEP NOTES

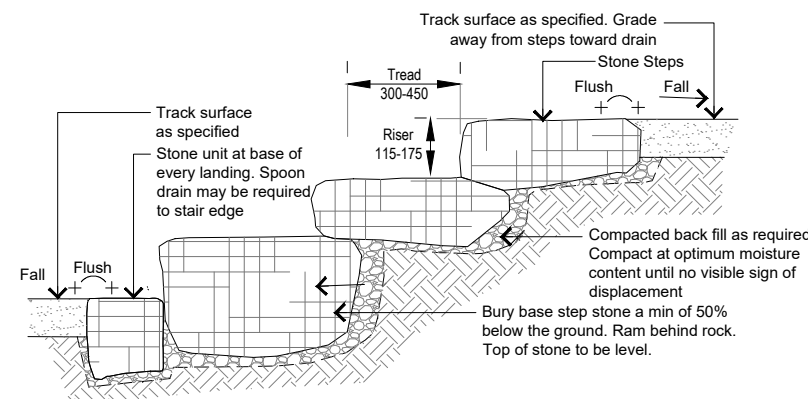
- Ensure 2 x riser (step height) + 1 tread (step width) = 650 to 680mm.
- Constructed height of risers and depth of treads are to be consistent.
- Multiples of five risers between landings are recommended where possible to allow for stride alteration between left and right. A minimum of three risers is desirable.
- Refer to **AS2156.2 Walking Tracks Part 2: Infrastructure Design** and QPWS Walking Track (WT) details for further guidance.
- To be installed in Landscape Setting - Class 5, 6 & 7.



SECTION

NATURAL STONE STEPS - >1M WIDTH

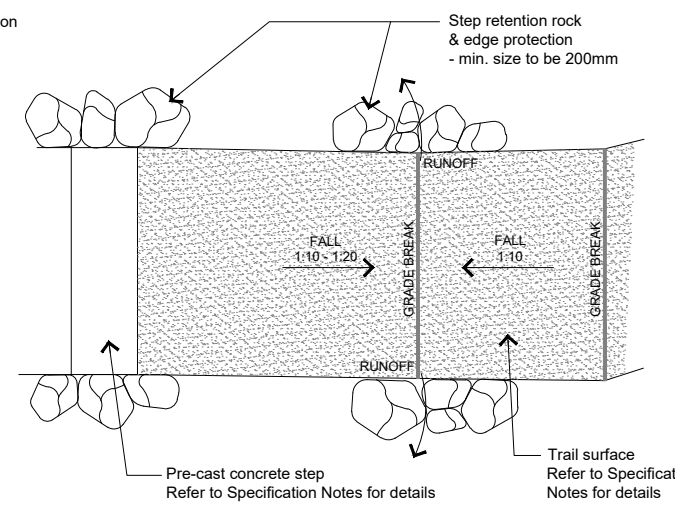
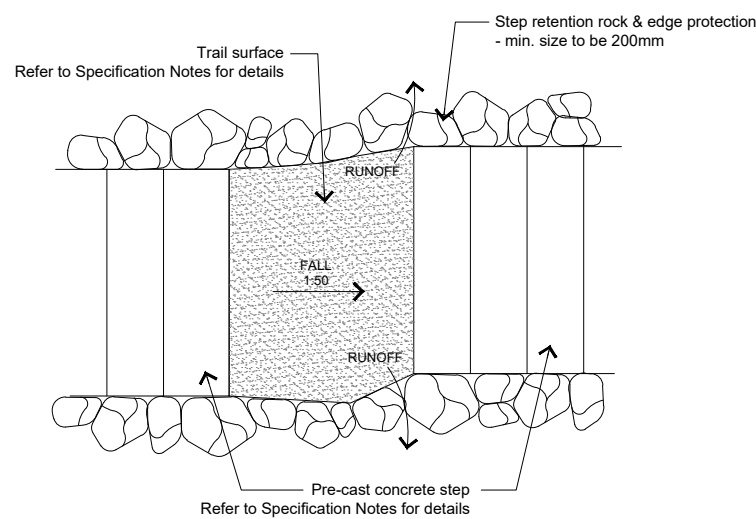
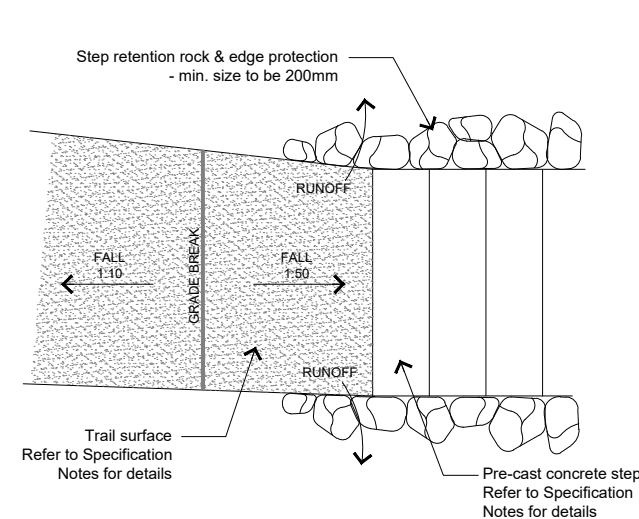
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SECTION

NATURAL STONE STEPS - <1M WIDTH

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SPECIFICATION NOTES

PRE-CAST CONCRETE STEP NOTES

GENERAL

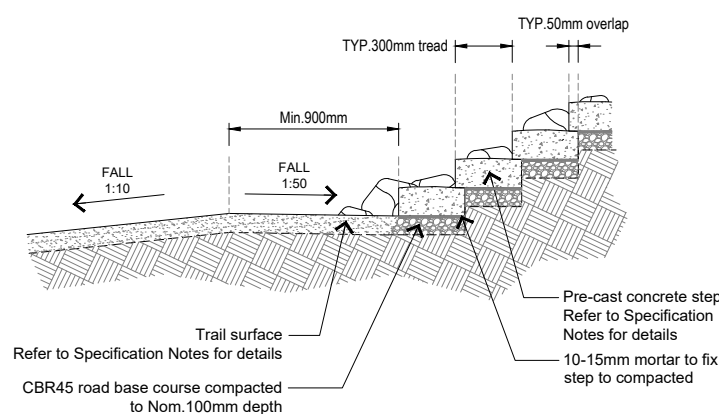
- Step treads to be pre-cast from a 4:1 white Portland cement mix using screened crushed granite, high grade quartz/sandstone washed sand and fibre reinforcing
- Steps to meet 55MPa material strength
- Steps treads to be 900mm width
- Ensure 50mm overlap occurs between treads
- Maximum 36 steps in a row before a landing is required - as per AS 2156.2-2001 Class 3 Walking Track
- Landings are to be a minimum of 900mm deep
- Ensure correct handling procedures are followed - handling should minimise the risk of cracking or fracture. Damaged treads are not to be installed due to risk of failure that will lead to later replacement and could lead to user injury

PLACEMENT

- Install pre-cast steps onto a compacted base course - CBR45 or similar approved to a compacted depth of 100mm. Secure in place with a 4:1 mortar mix to a Nom. depth between 10-15mm.
- Ensure the compacted road base extends to the full width of the pre-cast concrete step - use site rock or back-filled site soil to retain edges.
- Ensure the mortar mix is placed in a continuous layer around the bottom edge of the step and allow mortar to flow up into the hollow part of the step unit to assist in holding the step in place - use site rock or back-filled site soil to retain edges.
- Ensure mortar mix is placed on solid material to achieve good bonding - flaky or loose material is to be removed.
- Ensure required step rise is achieved inclusive of mortar layer.
- Ensure step tread patterns are installed to achieve a 'natural look' - avoid installing continuous repetition of the same pattern or any obvious symmetry.

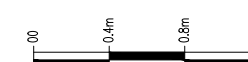
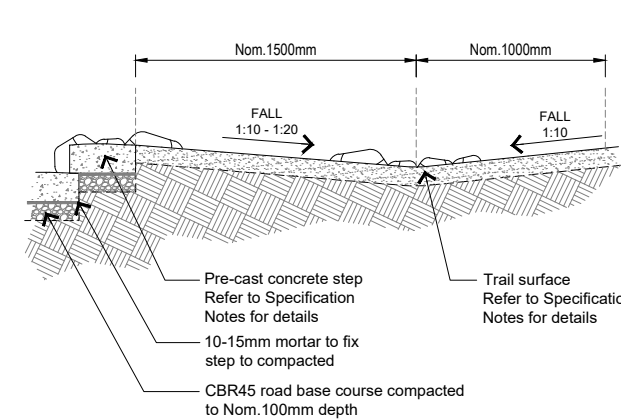
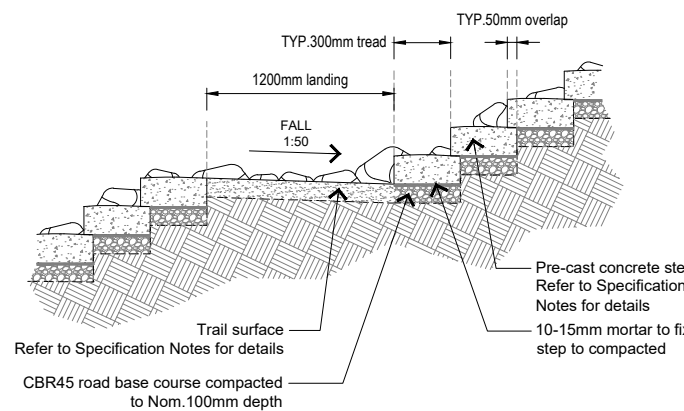
NOTE:

If installation is on an unstable surface, such as a sandy surface, a concrete slab footing of Nom.100mm depth should be installed to the base of the first step. Ensure the slab footing is the minimum of the width and length of the pre-cast concrete step and is a minimum 15MPa (fence post mix or rapid set premix is acceptable).



PRE-CAST CONCRETE STEPS

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SHEET 4 OF 4

Project - **KIRBYS ROAD ENVIRONMENT RESERVE TRAIL NETWORK**
Client - **SUNSHINE COAST COUNCIL Q2253**

Site - **KIRBYS ROAD ENVIRONMENT RESERVE LOT 176 MCH798 / LOT 178 MCH865**

Project: KIRBYS Sheet No. CD04
Digital Ref: Kirbys Reserve_DD Issue: A
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Attachment B

Site photographs of existing walking trails taken 23 May 2024









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