

Appendix C: Matters of national environmental significance assessment



EPBC Act Controlled Action
Supplementary Assessment

Bluestone Hardrock Quarry

Elderslie, NSW



**Report prepared for:
Bluestone Hardrock Pty Ltd**

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Bluestone Hardrock Quarry

EPBC Act Supplementary Assessment

Elderslie, NSW

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1. INTRODUCTION

1.1 SCOPE

The proposed Bluestone Hard Rock Quarry Project (SSD-76210271) (i.e. the “proposed action”) was determined to be a “controlled action” under section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 26 March 2026. The EPBC Act controlling provision for the proposed action is; *listed threatened species and communities* (section 18 and 18A). The proposed action will be assessed under the Bilateral Agreement between New South Wales and the Commonwealth. The supplementary NSW Planning Secretary’s environmental assessment requirements (supplementary SEARs) in relation to the MNES identified in the Commonwealth Minister’s controlled action decision.

The following terms are used throughout to describe geographical areas applicable to the assessment:

- **Project Area** - Springvale Road, Elderslie and Blind Creek Road, Glendon Brook (Lot 65 DP 752473, Lots 903 & 904 DP1061259, and Lot 5 DP1102521)
- **Disturbance Footprint** - Areas subject to direct and indirect impacts
- **Locality** – Area within 5km of the Project Area.

The following assessment has been completed in accordance with the supplementary SEARs, Commonwealth Minister’s decision, and relevant EPBC assessment guidelines.

1.2 SUPPLEMENTARY SEARS

The supplementary SEARs in relation to the MNES identified in the Commonwealth’s Minister’s controlled action decision include the following:

1. *On 26 March 2026, a delegate of the Commonwealth Minister for the Environment and Water (Commonwealth Minister) determined that the Bluestone Hard Rock Quarry Project (SSD-76210 271) was a controlled action under section 75 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The EPBC Act controlling provision for the proposed action is:*
 - a) *listed threatened species and communities (sections 18 and 18A).*
2. *The proposed action will be assessed in accordance with the bilateral assessment agreement between the Australian and NSW governments (Amending Agreement No.1, 2020). The assessment documentation must include:*
 - a) *an assessment of all impacts that the action is likely to have on each matter protected by a provision of Part 3 of the EPBC Act;*
 - b) *enough information about the proposal and its relevant impacts to allow the Commonwealth Minister to make an informed decision on whether or not to approve; and*
 - c) *information addressing the matters outlined in Schedule 4 of the Environment Protection and Biodiversity Conservation Regulations 2000 (EPBC Regulations).*

3. *The Applicant must undertake an assessment of all protected matters that may be impacted by the development under the controlling provision identified in paragraph 1. The Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) considers that there is likely to be a significant impact on the following:*
 - a) *Central Hunter Valley eucalypt forest and woodland threatened ecological community (CHV TEC) – Critically endangered;*
 - b) *Large -eared Pied Bat (Chalinolobus dwyeri) – Endangered; and*
 - c) *Grey -headed Flying -fox (Pteropus poliocephalus) – Vulnerable*
4. *DCCEEW also considers that the proposed action may result in significant impacts to the following species:*
 - a) *Koala (Phascolarctos cinereus) (combined populations of Qld, NSW and the ACT) – Endangered;*
 - b) *Regent Honeyeater (Anthochaera phrygia) – Critically endangered;*
 - c) *Swift Parrot (Lathamus discolor) – Critically endangered;*
 - d) *Brown Treecreeper (south -eastern) (Climacteris picumnus victoriae) – Vulnerable; and*
 - e) *Spotted -tailed Quoll (Dasyurus maculatus) – Endangered;*

These species require further assessment, surveys and analysis to determine whether they are likely to be significantly impacted.

5. *The Applicant must consider each of the protected matters under the triggered controlling provision that may be impacted by the action. Note that the above may not be a complete list and it is the responsibility of the Applicant to undertake an analysis of the significance of the relevant impacts and ensure that all protected matters that are likely to be significantly impacted are assessed for the Commonwealth Minister’s consideration.*

General requirements

Relevant Regulations

6. *The Environmental Impact Statement (EIS) must address the matters outlined in Schedule 4 of the EPBC Regulations and the matters outlined below in relation to the controlling provisions.*

Project Description

7. *The title of the action, the background of the action and current status.*
8. *The precise location and description of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of the action that may have impacts on matters of national environment significance (MNES).*
9. *How the action relates to any other actions that have been or are being taken in the region affected by the action.*
10. *How the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts on MNES.*

Impacts

11. *The EIS must include an assessment of the relevant impacts 1 of the action on the matters protected by the controlling provisions, including:*
- a) *a description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long term relevant impacts;*
 - b) *a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;*
 - c) *analysis of the significance of the relevant impacts; and*
 - d) *any technical data and other information used or needed to make a detailed assessment of the relevant impacts.*

Avoidance , mitigation and offsetting

12. *For each of the relevant protected matters that are likely to be significantly impacted by the action, the EIS must provide information on proposed avoidance and mitigation measures to manage the relevant impacts of the action including:*
- a) *a description, and an assessment of the expected or predicted effectiveness of the mitigation measures ;*
 - b) *any statutory policy basis for the mitigation measures;*
 - c) *the cost of the mitigation measures;*
 - d) *an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing; and*
 - e) *the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.*
13. *Where a significant residual adverse impact to a relevant protected matter is considered likely, the EIS must provide information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy.*
14. *For each of the relevant matters likely to be impacted by the action the EIS must provide reference to, and consideration of, relevant Commonwealth guidelines and policy statements including any:*
- a) *conservation advice or recovery plan for the species or community;*
 - b) *relevant threat abatement plan for a process that threatens the species or community;*
 - c) *wildlife conservation plan for the species; and*
 - d) *any strategic assessment.*

[Note : the relevant guidelines and policy statements for each species and community are available from the Commonwealth DCCEEW Species Profiles and Threats Database: <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>]

Specific risks

15. *The key risk associated with the proposed action from the Commonwealth perspective includes likely and potential direct and indirect impacts to EPBC listed threatened species and ecological communities resulting from the clearing of vegetation, and indirect impacts from the construction and operation of the proposed action.*

Assessment Requirements

16. *The EIS must include the following information associated with the assessment of the proposed action.*

General

- a) *Discuss the potential interaction between the proposed action and the approved Queensland Hunter Gas Pipeline (EPBC 2009/4620) which intersects the project area.*
- b) *Identify, assess and mitigate social and economic impacts (both positive and negative) of the proposed action, including the impact on the local community, agricultural landowners, and First Nations peoples and communities.*
- c) *Assess the proposed action against the principles of Ecologically Sustainable Development (as defined in the EPBC Act), including the precautionary principle.*
- d) *Provide information on the environmental history of the person proposing to take the action as outlined in section 136(4) of the EPBC Act.*

Listed threatened species and communities

- a) *Undertake a detailed assessment of direct, indirect and cumulative impacts on the listed threatened species and TECs that are likely to be impacted from the stages of the proposed action, including:*
 - i. *Confirm the population/s present, species habitat and each habitat type and TECs (and each category) in both the project area (in hectares) and disturbance footprint (in hectares);*
 - ii. *Identify whether an important population of relevant vulnerable listed threatened species is present in the project area and its vicinity as described in relevant EPBC Act statutory documents and/ or the Significant Impact Guidelines 1.1: Matters of National Environmental Significance (2012) (Significant Impact Guidelines 1.1);*
 - iii. *Determine whether the suitable habitat and TEC category/ies form habitat critical to the survival of relevant listed threatened species and TECs as described in relevant EPBC Act statutory documents and/or the Significant Impact Guidelines 1.1;*
 - iv. *Maps of identified suitable habitat and TEC category/ies in both the project area and development footprint with consideration of DCCEEW's Guide to providing maps and boundary data for EPBC Act projects (2021);*
 - v. *Detail (with supporting evidence) of proposed measures to avoid, mitigate and manage the impacts of all stages of the proposed action on listed threatened*

species and ecological communities, including the use of enforceable language (e.g. 'will', 'must', etc.) and consideration of the S.M.A.R.T Principle;

- vi. Undertake a residual significant impact assessment for each relevant listed threatened species and ecological community in accordance with the Significant Impact Guidelines 1.1, with a conclusion on whether the proposed action will have any residual significant impacts ; and*
- vii. Detail of measures to compensate for any residual significant impacts on listed threatened species and ecological communities in accordance with the EPBC Act Environmental Offsets Policy (2012) or endorsed offset framework.*

Other approvals and conditions

17. Information in relation to any other approvals or conditions required must include the information prescribed in Schedule 4 Clause 5 (a) (b) (c) and (d) of the EPBC Regulations .

Environmental record of person proposing to take the action

18. Information in relation to the environmental record of a person proposing to take the action must include details as prescribed in Schedule 4 Clause 6 of the EPBC Regulations.

Information sources

19. For information given in a n EIS , the EIS must state the source of the information, how recent the information is, how the reliability of the information was tested; and what uncertainties (if any) are in the information.

Relevant References and guidelines

20. The international conventions, management plans and principles that must be considered in relation to this proposal include:

- a) Listed threatened species or ecological community:*
 - i. Australia's obligations under the:*
 - Convention on Biological Diversity (Biodiversity Convention);*
 - Convention on Conservation of Nature in the South Pacific (Apia Convention);*
 - the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); or*
 - ii. a recovery plan or threat abatement plan.*

21. The policies and plans that must be considered in relation to this proposal include:

- a) Significant Impact Guidelines 1.1: Matters of National Environmental Significance (2012)*
- b) Relevant conservation advices and other relevant policies available on DCCEEW 's Species Profile and Threats (SPRAT) Database and EPBC Act publications and resources – DCCEEW webpage;*
- c) Offsets Mitigation Hierarchy;*

- d) *EPBC Act Environmental Offsets Policy (2012);*
- e) *All relevant guidance documents for determining, avoiding, mitigating and managing likely impacts on the MNES identified above;*
- f) *bioregional plans ; and*
- g) *relevant strategic assessment reports .*

22. *Commonwealth listing advice, survey guidelines and referral guidelines contain information on threatened species and ecological communities which may provide further information for evaluating the significance of residual impacts on the action's controlling provisions. These documents may be found on the DCCEEW SPRAT Database .*

23. *Guidance on the biodiversity offset scheme for a major project where there are predicted to be impacts on matters on MNES can be found via the NSW Department of Planning, Housing and Infrastructure website below.*

Key Guidance – Biodiversity:

- <https://www.planningportal.nsw.gov.au/major-projects/assessment/policies-and-guidelines/key-guideance/biodiversity>

Guidelines for matters of environmental significance:

- https://www.planningportal.nsw.gov.au/sites/default/files/documents/2024/Guidance%20for%20Accredited%20Assessors%20-%20MNES%20form%20_0.pdf

24. Other references

- *Environment Protection and Biodiversity Conservation Act 1999 - section 51 -55, section 96A(3)(a)(b), 101A(3)(a)(b), section 136, section 527E*
- *Environment Protection and Biodiversity Conservation Regulations 2000 Schedule 4*
- *Commonwealth and NSW Governments Bilateral Agreement (Amending Agreement No.1, 2020) – Item 2 (a)(i) of Schedule 1*

1.3 APPROACH

The requirements of the Supplementary SEARs (see **Section 1.2**), will be met through the following detailed assessment provided in the following subsections:

- Project Description (**Section 2**)
- Detailed Assessment of relevant MNES including (**Section 3**):
 - Surveys completed (**Section 3.2**),
 - Area of suitable habitat within the Project Area and Disturbance Footprint (**Section 3.3**)
 - Presence of Important Populations or Habitat Critical to the Survival of the MNES (**Section 3.4**)
- Detailed proposed measures to avoid, mitigate and manage impacts to MNES (**Section 4**)
- Detailed assessment of impacts to MNES (direct, indirect and cumulative) (**Section 5**)
- Residual significant impact assessment in-line with the Significant Impact Guidelines 1.1 (**Section 6**)
- Detailed measures to compensate for residual significant impacts on MNES in accordance with the EPBC Act Environmental Offsets Policy (2012) or endorsed offset framework (**Section 7**)

2. PROJECT DESCRIPTION

2.1 DESCRIPTION OF WORKS

A general description of the proposed development and associated infrastructure works are outlined in Table 1 below.

Table 1 Proposed Development Summary

Project Element	Summary of the Project
Proposed Development	Hard Rock Quarry
Legal Property Description – Subject Land	<ul style="list-style-type: none"> ▪ Lot 65 DP 752473, Blind Creek Road, Glendon Brook. ▪ Lot 904 DP 1061259, Blind Creek Road, Elderslie. ▪ Lot 903 DP 1061259, Blind Creek Road, Elderslie. ▪ Lot 5 DP 1102521, 253 Springvale Road, Elderslie.
Resource Extraction Method	Traditional drilling and blasting, with excavation by excavator to load trucks for transport material for processing.
Resource	Quarry extraction of high-quality Tuff and Agglomerate from a reduced level (RL) of 218 m AHD down to RL 110 m AHD.
Project Site Area	200.40 ha
Disturbance Areas	Total Disturbance Area – 63.7 ha, broken down as per below.
	37.9 ha - Pit Area.
	4.1 ha – Stockpile and Laydown Area
	16.6 ha - Processing Area.
	0.6 ha - Weighbridge and Office Area
	1.3 ha – Haul Road 1
	2.9 ha – Haul Road 2
Annual Production	Up to 1,000,000 tonnes.
Quarry Life	Up to 30 years (under this application).
Potential Resource Life	Up to 50 years.
Hours of Operation	Extraction and processing operations <ul style="list-style-type: none"> ▪ Monday to Friday: 7:00am to 5:00pm. ▪ Saturday: 8:00am to 1:00pm.
	Internal product transfers to stockpiles <ul style="list-style-type: none"> ▪ Monday to Friday: 6:30am to 4:00pm. ▪ Saturday: 8:00am to 1:00pm.
	Haulage from the quarry site <ul style="list-style-type: none"> ▪ 6:00am to 6:00pm Monday to Friday. ▪ No haulage on Saturday, Sunday or a Public Holiday.
	Drilling and Blasting activities Blasting between 9:00am to 5:00pm Monday to Friday only. On average one (1) blast per week, carried out by an external contractor.
	Maintenance activities 6:00am to 6:00pm (Monday to Saturday). No work on Sundays and Public Holidays.

Project Element	Summary of the Project
	Construction hours <ul style="list-style-type: none"> ▪ 7:00am to 5:00pm (Monday to Saturday). ▪ 8:00am to 3:00pm (Saturday). ▪ No work on Sundays and Public Holidays.
Operational Workforce	At full operation, up to 15 full-time staff, with further support from the local and regional construction industry and associated haulage contractors.
Product Transport	Road haulage of product via semi-trailer / truck and dog trailer.
	On average 110 laden trucks per day in order to meet peak production.
	Maximum of 30 laden trucks per hour at peak rates.
	Maximum daily extraction rate of 7,000 tonnes per day.
Transport Route	The road transport route from the site extends over approximately 13km from the site entrance to the Hunter Expressway interchange at Branxton. The road transport route incorporates Springvale Road, Stanhope Road, Elderslie Road and the New England Highway. Elderslie Road was previously used by the Great Greta Coal Mine to haul coal.
	The road transport route includes use of the Elderslie Bridge which crosses the Hunter River. The bridge is located 600m south of the intersection of Elderslie Road and Stanhope Road and has a mass restriction of 50 tonnes.
Water Management	Erosion and sediment control devices such as catch drains, road drainage, dirty water dams and clean water dams.
Utilities	Power supply from existing electricity network and diesel generators. Water supply sourced from onsite dams, surface water runoff, and rainwater tanks. Potable water imported as needed
Operational Activities and Areas	<ul style="list-style-type: none"> ▪ Site office and employee facilities. ▪ Car parking. ▪ Existing site access from Springvale Road via Haul Road 1 (sealed) to Weighbridge and Office Area. ▪ Use of Haul Road 1 and Haul Road 2. ▪ Workshop and fuel storage – to be initially located at the Weighbridge and Office Area. ▪ Fuel and supply deliveries. ▪ Equipment storage. ▪ Waste management. ▪ Equipment parking areas. ▪ Processing Area including crusher and screening plant. ▪ Raw material stockpiles. ▪ Product stockpiles and truck loading areas. ▪ Truck parking. ▪ Weighbridge. ▪ Environmental management measures including road watering, site rehabilitation, etc. ▪ Use of ancillary plant and equipment.
Rehabilitation	Rehabilitation will initially be limited to areas of immediate disturbance such as road batters, access road construction and sediment dams. Progressive rehabilitation of the quarry benches will occur as they become available, with the majority of the rehabilitation taking place at the completion of resource extraction when the quarry floor, stockpile areas, and portions of the infrastructure areas will be rehabilitated.

2.2 ACTIONS THAT MAY IMPACT MNES

The following actions are likely to impact MNES:

- Vegetation clearing, earthworks and installation of surface water management controls to facilitate construction of the first section of Haul Road 1 which will be a sealed road approximately 600 m in length from the northern end of Springvale Road to the western end of the proposed Weighbridge and Office Area. Construction of Haul Road 1 along this section will include a minor culvert crossing of a third order un-named drainage line.
- Vegetation clearing, earthworks and installation of surface water management controls for the construction of the Weighbridge and Office Area. Construction works will include erection of temporary buildings and facilities, installation of a weighbridge, installation of necessary infrastructure and other supporting services to facilitate operations at the site.
- Vegetation clearing, earthworks and installation of surface water management controls to facilitate construction of the second section of Haul Road 1 which will be unsealed and will extend approximately 150m from the Weighbridge and Office Area to the Processing Area. Construction of Haul Road 1 along this section will include minor culvert crossings of two un-named drainage lines, one being a first order and the second being a third order drainage line.
- Clearing of vegetation, installation of surface water management controls and overburden removal for the creation of the Processing Area. Establishment of the Processing Area may require extraction of hard rock from to achieve finished design levels. Extraction in these parts will be undertaken through a combination of drilling and blasting with the resultant material, once processed, suitable for commercial sale.
- A mobile crusher and screening plant will be located in the Processing Area to process extracted material from within the Processing Area and ultimately the resource material from within the Pit Area. Once operations within the Pit Area are fully established the mobile crusher and screening plant will become fixed plant.
- Vegetation clearing, earthworks and installation of surface water management controls to facilitate construction of Haul Road 2, approximately 1,620 m in length, from the Processing Area to a point approximately 750 m within the Pit Area.
- Vegetation clearing, earthworks and installation of surface water management controls to facilitate construction of the Stockpile and Laydown Area immediately southwest of the Pit Area.
- Progressive vegetation clearing and extraction of the Pit Area with the high-quality resource being drilled, blasted and extracted, prior to transporting to the Processing Area.
- Installation of surface water management controls to manage runoff within the Pit Area and the Processing Area.
- Stripping and stockpiling of topsoil for future rehabilitation will be carried out during all stages of construction and operation. Topsoil will be stockpiled in the Stockpile Area immediately southwest of the Pit Area.
- Extraction and processing of up to 1 million tonnes of resource per annum, for 30 years.

- Transport of processed material along Springvale Road, Stanhope Road, Elderslie Road to the New England Highway, Wine Country Drive, the Hunter Expressway and the local region.
- Existing fencing around the site will be modified as necessary to exclude stock and unauthorised personnel from operational areas. For the majority of areas this will be a typical rural fence, unless dictated by any other safety requirements.
- Progressive rehabilitation works within the Pit Area.

2.3 INDICATIVE STAGING OF IMPACTS

The Project will be completed in the following indicative stages (**Figure 3**):

Stage 1 – Years 1–4

Construction of Haul Road 1 from Springvale Road to the Processing Area including the sealing of the haul road to the Weighbridge and Office Area and construction of creek crossings, sediment basins and water storage dams. This stage will also include construction of the weighbridge, office, amenities and workshop and installation of weighbridge equipment.

The construction of the Processing Area will involve drilling and blasting to achieve finished design levels for this area. The materials created from this area will be suitable for construction of roads and infrastructure for the Project and any surplus materials will be stockpiled and sold.

Stage 2 – Years 4–5

Construction of Haul Road 2 from the Processing Area to the Pit Area, passing the proposed Stockpile and Laydown Area. This will involve the use of materials created from the construction of the Processing Area. Haul Road 2 will extend approximately 750m into the Pit Area to create access to the northern end of the pit to allow extraction in that area of the pit.

Extraction of materials from the Stage 2 Pit Area using drilling and blasting and then loading and haulage of materials to the Processing Area where materials will be sold and transported via registered haulage trucks to their end use market

Stage 3 – Years 4–5

Clearing and establishment of Stockpiling and Laydown Area.

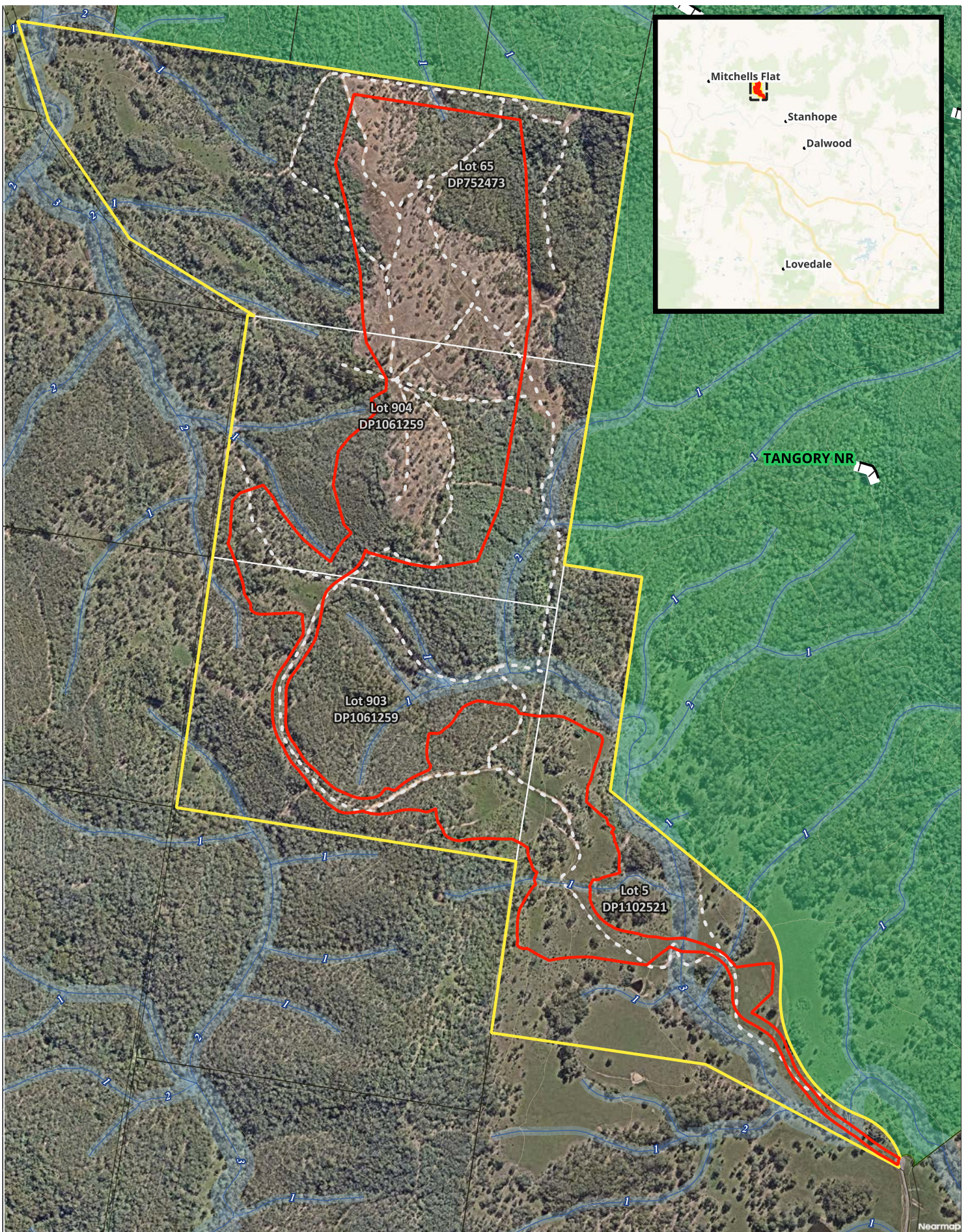
Stage 4 – Years 5–30

Extraction of materials from the Stage 4 Pit Area using drilling and blasting and then loading and haulage of materials to the Processing Area where materials will be sold and transported via registered haulage trucks to their end use market.

Stage 5 – Dependent on needs

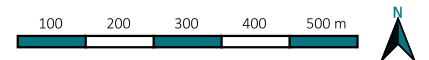
Extraction of materials from the Stage 5 Area dependent on needs.

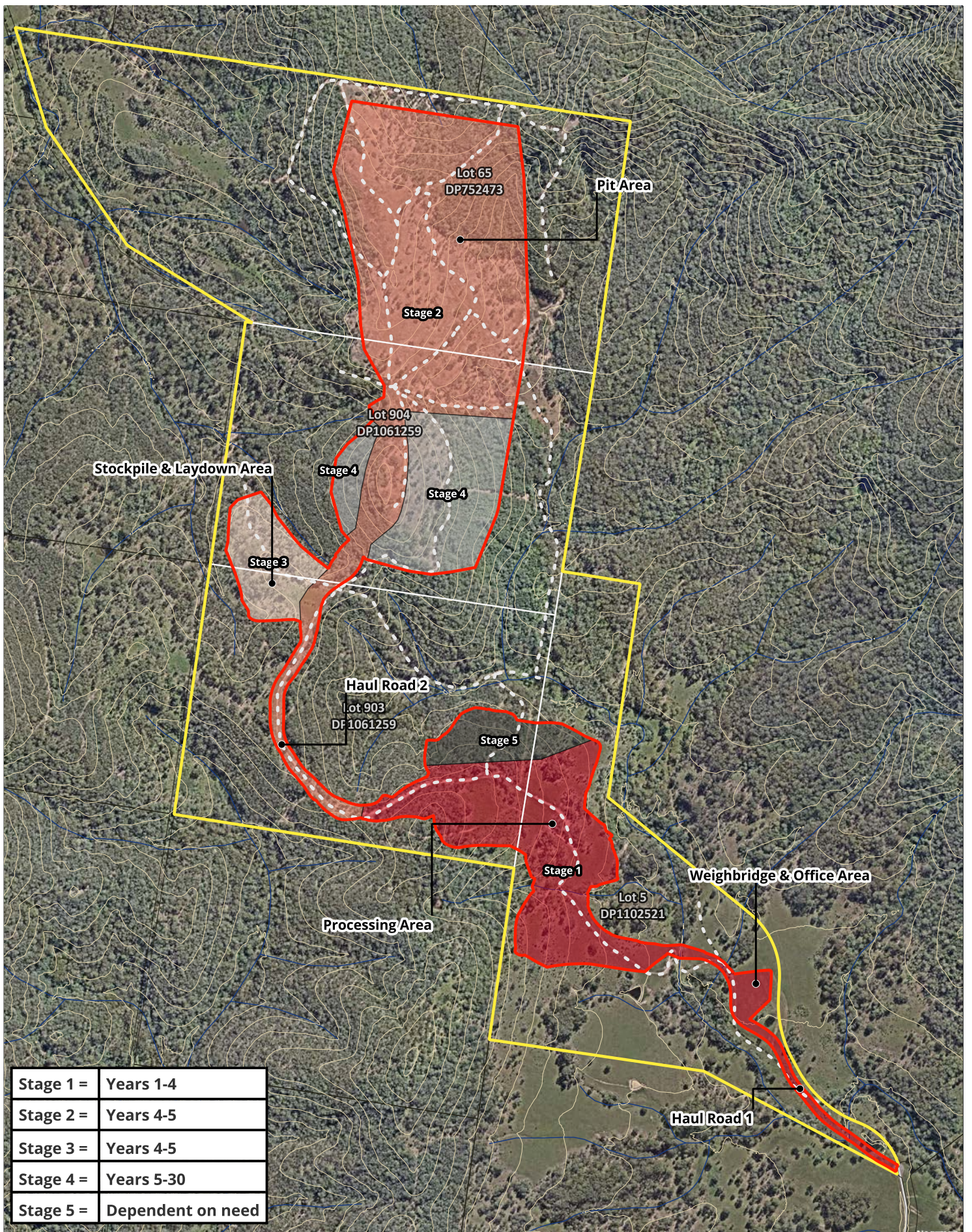
Pit closure and rehabilitation



- | | | | |
|-----------------------|----------------------|---------------|---------------|
| Project area | Track | Escarpment | Contour (20m) |
| Disturbance footprint | Cadastre | Watercourse | |
| Subject lot | National park (NPWS) | Riparian zone | |

Figure 1: Project Area and Disturbance Footprint

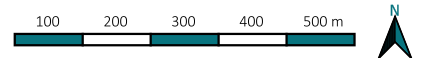




Stage 1 =	Years 1-4
Stage 2 =	Years 4-5
Stage 3 =	Years 4-5
Stage 4 =	Years 5-30
Stage 5 =	Dependent on need

- ▭ Project area
- Development footprint
- Subject lot
- Cadastre
- Stage 1 (Access and Processing)
- Stage 2 (Quarry Pit S2)
- Stage 3 (Stockpile Area)
- Stage 4 (Quarry Pit South)
- Stage 5 (Processing North Extension)
- Local Road
- Track
- Watercourse
- Contour (10m)

Figure 2: Project Staging



2.4 PROJECT JUSTIFICATION

2.4.1 Project Design

The extraction area has been sited to avoid the more sensitive areas of the site with avoidance measures incorporated into the design and layout. The pit shell has been specifically designed to avoid areas of high biodiversity value and waterways.

The Project will be completed in four stages with construction of Haul Road 1 from Springvale Road to the proposed Processing Area including the sealing of the haul road to the Weighbridge and Office Area and construction of creek crossings, sediment basins and water storage dams. This stage will also include construction of the weighbridge, office, amenities and workshop and installation of weighbridge equipment. Stage 2 will see construction of Haul Road 2 from the Processing Area to the Pit Area and will involve the use of materials created from the construction of the Processing Area. Haul Road 2 will extend approximately 750m into the Pit Area to create access to the northern end of the pit to allow extraction in that area of the pit. Extraction will continue in a southerly direction from this point.

Relationship with the approved Queensland – Hunter Gas Pipeline (EPBC 2008/4620)

The Applicant has made significant and reasonable efforts to engage and negotiate with the proponent (current and former) of the Queensland-Hunter Gas Pipeline Project with respect to ensuring both projects can co-exist. The Queensland-Hunter Gas Pipeline Project was approved in 2009 and to date only early works have commenced at sites for temporary laydown yards at Quipolly, 8km north of Quirindi. No easements or other interests (such as an Authority to Survey) have been registered on the Certificate of Title of any of the lands within the Project site. The Applicant has provided information, in the form of a route change request, to Santos to ensure that the Project and the Queensland-Hunter Gas Pipeline Project can both proceed concurrently or independently without making either project physically or legally incompatible. A response from the Gas Pipeline proponent to the route change request (or other alternatives), as also suggested by the Applicant, in order to resolve potential conflict with the known extractive resource has not been forthcoming. The Project is a permissible land use with development consent and will provide a much-needed local resource for the housing, infrastructure and construction industries.

Overall, the site presents a strategically located, low-conflict setting for quarry development, capable of supplying essential construction materials while avoiding or minimising environmental and social impacts.

As outlined in Section 6 of the EIS, the potential environmental, cultural and social impacts associated with the Project can be appropriately managed through the implementation of appropriate management, mitigation and monitoring measures.

The 833 km long Queensland-Hunter Gas Pipeline Project was referred to the Commonwealth in 2008 and determined to not be a controlled action in 2008 (EPBC 2008/4620). Reconsideration of the decision was sought in 2023 and determined to not be a controlled action under the EPBC Act.

Relevant Matters of National Environmental Significance (MNES) within this project that directly relate to this proposed action include the following:

- *Central Hunter Valley Eucalypt Forest and Woodland* CEEC – This TEC was not listed at the time of the Queensland-Hunter Gas Pipeline Project Referral (referred in 2008, while the TEC was listed May 2015), as such, impacts to this critically endangered ecological community were not assessed by the Commonwealth DCCEEW in 2008 or during the reconsideration.

- Large -eared Pied Bat (*Chalinolobus dwyeri*) – Similar to this proposed action, foraging habitat for the species was recorded within the Project Area, however no breeding habitat will be impacted by the proposed action. Reconsideration in 2023 determined that the action is unlikely to amount to a significant impact to the species due to the linear nature of impacts, location of impacts within historically cleared agricultural land, and the avoidance of reserves. The Commonwealth ultimately determined that *“considering the impacts of the proposed action, given the existing environment, linear nature of the impact and the generalist nature of the grey-headed flying-fox, I considered that any impact to this species resulting from the proposed action, would not be of sufficient nature to have or be likely to have a significant impact”*
- Grey -headed Flying -fox (*Pteropus poliocephalus*) – The species was not included in the original referral in 2008, however it was considered during the reconsideration in 2023. The Commonwealth determined that *“a total of approximately 287 ha of habitat critical to the survival of the species will be cleared as part of the action”*. However, the reconsideration determined that impacts would occur to small patches of habitat and that *“given the high mobility of this species, I considered that while the action will result in the loss of habitat, the scale and nature of the clearing means that habitat loss will not occur to an extent that the species is likely to decline or result in adverse effects on habitat critical to the survival of a species”*.
- Regent Honeyeater (*Anthochaera phrygia*) – Originally referred to the Commonwealth in 2008 as *“species or species habitat likely to occur within area”*. The department determined that areas to be impacted by the action *“are not considered likely to support an ecologically significant proportion of any listed species. Therefore, a significant impact on listed species (and ecological communities as discussed below) is not expected or considered likely”*.
- Spotted -tailed Quoll (*Dasyurus maculatus*) – The department determined that areas to be impacted by the action *“are not considered likely to support an ecologically significant proportion of any listed species. Therefore, a significant impact on listed species (and ecological communities as discussed below) is not expected or considered likely”*.

Assessment of impacts to MNES associated with this proposed action are detailed further in **Section 3**.

2.4.2 Social and economic impacts of the proposed action

The potential impacts of the proposed quarry have been identified through a process involving:

- Assessment of the site characteristics.
- Consultation with government agencies and Councils.
- Consultation with surrounding landowners and other stakeholders; and
- Expert technical assessments.

The key issues identified have been the subject of comprehensive technical assessment to identify and assess the potential impacts of the development on the existing environment and community. The results of these assessments are detailed within Section 6 of the EIS and its appendices.

The impacts of the proposed quarry have been avoided or minimised by utilising the sites topography and existing cleared areas, refining the project design in consideration of environmental constraints and stakeholder input, and implementation of appropriate control measures as part of an interactive

project design process. Therefore, through the implementation of appropriate measures to avoid, minimise and/or manage impacts, it is considered that the proposed quarry can proceed without significant impacts to the environment and local community.

Community Consultation

Engagement with Community Stakeholders occurred in a variety of ways during the preparation of the EIS, including:

- Establishment of a Project specific website by the applicant.
- Project introduction letter - distributed in hardcopy to approximately 2,354 properties surrounding the Project site.
- Online survey - The online survey form was prepared and distributed to the Project stakeholders on 23 November 2025
- Interviews – Conducted by Social Aspect, interviews were conducted in a semi-structured format using a list of predetermined questions to be used selectively and as a guide only. This format provided a flexible structure which allowed the interviewer to create and ask questions about situations as they emerged and the interviewee to digress and express views freely.
- Stakeholder meetings – Social Aspect personnel met with representatives from Wanaruah Local Aboriginal Land Council, Singleton Council, Business Singleton as well as two property owners with strong opinions about the Project.
- Community ‘drop-in’ information sessions - The Project team hosted two community ‘drop-in’ information sessions to provide Project details and collect community feedback about the Project.

Views and concerns identified during consultation with the community and affected stakeholders have influenced the proposed development. Consequently, haulage from the development site on a Saturday will not be carried out and hours of operation for haulage of product on Mondays through to Fridays will be reduced.

Public Interest

Key benefits associated with the Bluestone Hard Rock Quarry include:

- Provision of high-quality supply of high-quality Tuff and Agglomerate for construction and infrastructure projects locally and regionally to meet the identified and growing needs for this resource.
- Continued growth and development within the area through the supply of high-quality Tuff and Agglomerate for construction.
- The location of the site away from major population centres and incompatible land uses and topographic shielding for neighboring residences.
- Employment of 15 staff for operation of the proposed quarry.
- Direct economic benefits in capital expenditure, plus continued ongoing expenditure associated with quarry operations and labour, providing an ongoing contribution to the local and regional economies.

- Contribution to Singleton Council and Cessnock City Council for the maintenance of the surrounding local road network.

2.4.3 Ecological Sustainable Development

Schedule 2(4) of the EP&A Regulations outlines the four principles of ecologically sustainable development (ESD) that have been considered in this EIS.

The Precautionary Principle

In accordance with the principles of ESD, the precautionary principle has been considered in the planning and assessment of the Project. This principle states that where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

A precautionary approach has been applied throughout the design and impact assessment processes to ensure that potential environmental impacts are identified early, and that appropriate mitigation and management measures are incorporated into the Project. This includes detailed investigations into potential impacts on air quality, noise and vibration, surface water and groundwater and biodiversity. These technical studies were conducted by qualified experts using conservative assumptions to account for uncertainty and variability in environmental conditions.

Where potential risks or uncertainties were identified—such as impacts to water quality or sensitive ecological values—the Project design was modified to avoid or minimise those risks, and mitigation strategies were developed to manage any residual impacts. These include staged site disturbance, progressive rehabilitation, sediment and erosion controls, and the implementation of a site-specific Environmental Management Plan.

Furthermore, ongoing monitoring programs and adaptive management frameworks will be established to detect unexpected environmental changes and respond accordingly. This proactive, risk-averse approach reflects the Project's commitment to applying the precautionary principle in line with State planning policies and the EP&A Act 1979.

The Principle of Intergenerational Equity

The principle of intergenerational equity recognises the responsibility to manage natural resources and the environment in a way that does not compromise the ability of future generations to meet their own needs. In the context of the proposed quarry project, this principle has been carefully considered during project design, environmental assessment, and the development of long-term management strategies.

The quarry will extract a high-quality hard rock resource that is essential for supporting current infrastructure and development needs in the region and across New South Wales. The responsible use of this resource is justified by its contribution to essential public infrastructure, housing, and economic growth. However, the project has also been designed to minimise long-term environmental impacts, ensuring that the surrounding landscape and ecosystems are protected for future generations.

Key measures supporting intergenerational equity include:

- Progressive rehabilitation of disturbed areas to restore the land to a stable and productive condition over the life of the project.

- Minimisation of land disturbance by adopting a staged development approach aligned with actual production needs.
- Protection of environmental values, including surface water, biodiversity, and air quality, through mitigation measures and ongoing environmental monitoring.
- Avoidance of long-term land use conflicts through careful site selection, adequate buffer zones, and engagement with the local community.

To support long-term environmental sustainability, a range of mitigation and management strategies have been carefully developed. These measures are integrated into the Project design to ensure potential environmental impacts are minimised wherever practicable.

Through these commitments, the Project seeks to safeguard environmental quality and resilience, helping to maintain ecological function and natural resources for the benefit of future generations.

At the completion of the quarry's operational life, the site will be rehabilitated to support post-extraction land uses that are compatible with the surrounding environment, ensuring that the land remains productive and ecologically functional. In this way, the Project aligns with the principle of intergenerational equity by balancing present-day resource needs with long-term environmental stewardship.

The Principle of Conserving Biological Diversity and Ecological Integrity

The principle of conserving biological diversity and maintaining ecological integrity is a core element of ESD and has been considered throughout the planning and assessment of the Project.

A Biodiversity Development Assessment Report (BDAR) has been prepared in accordance with the requirements of the BC Act and associated guidelines. The BDAR provides a detailed evaluation of the potential impacts of the Project on biodiversity values, including native vegetation, threatened species, and habitat connectivity within the region. The assessment identified and quantified the biodiversity values on-site and considered potential direct and indirect impacts resulting from the proposed quarry operations.

The quarry footprint has been designed to minimise disturbance to native vegetation and ecological communities as far as practicable. The majority of the Project area comprises previously cleared or disturbed land used for agriculture, which reduces the potential for significant biodiversity impacts. Where impacts to native vegetation or habitat are unavoidable, biodiversity offsets will be secured in accordance with the NSW Biodiversity Offset Scheme, ensuring that there is no net loss of biodiversity values as a result of the development.

Key commitments to conserving biodiversity and ecological integrity include:

- Minimising clearing of native vegetation and avoiding remnant habitat wherever possible.
- Implementing erosion and sediment controls to prevent degradation of nearby watercourses and downstream habitats.
- Progressive rehabilitation of disturbed areas to promote ecological restoration and landscape stability.
- Managing weeds and pests to support the resilience of avoided and rehabilitated areas.
- Securing appropriate biodiversity offsets to compensate for residual impacts, as determined through the BDAR process.

Through careful site planning, impact avoidance, targeted mitigation, and offsetting, the Project demonstrates a commitment to protecting and enhancing biodiversity and ecological integrity in line with statutory obligations and ESD principles.

2.4.4 Environmental history of the person proposing to take the action

The person acting on behalf of the Proponent has no previous proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against them.

Bluestone Hardrock Pty Ltd is a newly formed company created to extract the resource from the Bluestone Hardrock Quarry Project, the company does not currently have a detailed environmental policy or framework. However, the Project will be regulated by the NSW EP&A Act development consent that will include requirements for a Environmental Management Strategy and comprehensive set of management plans to manage the potential community and environmental impacts of the Project.

3. ASSESSMENT OF MNES

3.1 SCOPE

Following the determination that the Bluestone Hard Rock Quarry (SSD-76210 271) was a controlled action the Commonwealth Minister detailed the requirement that the applicant undertake an assessment of all protected matters that may be impacted by the proposed action.

DCCEEW considered that there is likely to be a significant impact on the following MNES:

- Central Hunter Valley eucalypt forest and woodland threatened ecological community (CHV TEC) – Critically endangered;
- Large -eared Pied Bat (*Chalinolobus dwyeri*) – Endangered; and
- Grey -headed Flying -fox (*Pteropus poliocephalus*) – Vulnerable

DCCEEW also considers that the proposed action may result in significant impacts to the following:

- Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) – Endangered;
- Regent Honeyeater (*Anthochaera phrygia*) – Critically endangered;
- Swift Parrot (*Lathamus discolor*) – Critically endangered;
- Brown Treecreeper (south -eastern) (*Climacteris picumnus victoriae*) – Vulnerable; and
- Spotted -tailed Quoll (*Dasyurus maculatus*) – Endangered;

3.2 SURVEYS COMPLETED

Targeted surveys were completed for listed MNES in accordance with the NSW Biodiversity Assessment Method (BAM 2020), Threatened Biodiversity Database Collection (TBDC), and relevant NSW and Commonwealth guidelines including:

- *Surveying threatened plants and their habitats: NSW survey guide for the Biodiversity Assessment Method (DPIE 2020)*
- *Survey Guidelines for Australia's threatened bats (DEWHA 2010a)*
- *Survey Guidelines for Australia's threatened birds (DEWHA 2010b)*
- *Survey Guidelines for Australia's threatened frogs (DEWHA 2010c)*
- *Survey guidelines for Australia's threatened fish (DSEWPC 2011a)*
- *Survey guidelines for Australia's threatened mammals (DSEWPC 2011b)*
- *Survey guidelines for Australia's threatened reptiles (DSEWPC 2011d).*
- *NSW Survey Guide for Threatened Frogs (DPIE 2020b).*
- *'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method (OEH 2018).*
- *Koala (Phascolarctos cinereus) Biodiversity Assessment Method Guide (DPE 2022)*

Surveys completed for each MNES is detailed below in **Table 2**.

Table 2: MNES Surveys Completed

MNES	Status	Survey requirements	Surveys Completed	Timing of surveys
<i>Central Hunter Valley eucalypt forest and woodland threatened ecological community</i>	Critically Endangered Ecological Community (CEEC)	Mapping Plots (spring-early autumn) Condition assessment	Mapping Plots Condition assessment	Mapping (2023-2025) Plots (April 2025)
Large -eared Pied Bat <i>Chalinolobus dwyeri</i>	Endangered	Habitat assessment Unattended bat detectors – 16 detector nights, minimum 4 nights Attended bat detectors – 6 detector nights, minimum 3 nights Harp traps and/or mist nets – 16 trap or net nights, minimum 4 nights	Habitat Assessment Anabat Surveys (4)	Habitat Assessment (April 2025) Anabat Surveys (March 2025)
Grey -headed Flying -fox <i>Pteropus poliocephalus</i>	Vulnerable	Habitat assessment Camp Search Spotlighting	Habitat assessment (7 days) Camp Search (4 days) Spotlighting (6 nights)	Habitat assessment (April, July, Nov 2025) Camp Search (March 2025) Spotlighting (March-April 2025)
Koala (combined populations of Qld, NSW and the ACT) <i>Phascolarctos cinereus</i>	Endangered	Habitat Assessment Direct Surveys Indirect Surveys	Habitat Assessment Spotlighting (6 nights), Remote Cameras (44) SATs	Habitat Assessment (April, July, Nov 2025) Spotlighting (March-April 2025), Remote Cameras (March-April 2025) SATs (March 2025)
Regent Honeyeater <i>Anthochaera phrygia</i>	Critically Endangered	Habitat Assessment Bird Surveys	Habitat Assessment Bird Surveys	Habitat Assessment (April, July, Nov 2025) Bird Surveys (March, June, Oct, Nov 2025)
Swift Parrot <i>Lathamus discolor</i>	Critically Endangered	Habitat Assessment Bird Surveys	Habitat Assessment Bird Surveys	Habitat Assessment (April, July, Nov 2025) Bird Surveys (March, June, Oct, Nov 2025)
Brown Treecreeper (south -eastern) <i>Climacteris picumnus victoriae</i>	Vulnerable	Area Search	Area Search	31 October 2025 and dawn on 3, 4, and 5 November 2025
Spotted -tailed Quoll <i>Dasyurus maculatus</i>	Endangered	Habitat Assessment (diurnal) Hair Funnels Remote Cameras	Remote Cameras	32 nights between 12 March and 15 April 2025

3.2.1 Central Hunter Valley Eucalypt Forest and Woodland

Surveys to determine the presence, condition and extent of *Central Hunter Valley Eucalypt Forest and Woodland* TEC is detailed in the Conservation Advice (DEE 2016) including;

- Defining a patch – Where there is a break in native vegetation cover from the edge of the tree canopy of 30 m or more, then the gap indicates that separate patches are present.
- Buffer zone – The recommended minimum buffer zone is 30 m from the outer edge of the patch. This typically accounts for the maximum height of the vegetation and likely influences on the root zone.
- Sampling protocol – Plots of 0.04 ha (quadrats of 20 x 20 m) may be suitable (Tozer, 2003; Tozer et al., 2010).
- Timing of surveys – Assessment should occur in spring and summer to early autumn, when the greatest number of species is likely to be detectable and identifiable.
- Area critical to the survival of the ecological community – Areas that meet the minimum (Moderate quality condition class) Condition thresholds, or are within the buffer zone, are considered critical to the survival of the Central Hunter Valley eucalypt forest and woodland ecological community. Additional areas such as adjoining native vegetation and areas that meet the description of the ecological community but not the Condition thresholds are also important to the survival of the ecological community and should be taken into consideration as part of the surrounding environment and landscape context

Surveys Completed

Surveys completed as part of this assessment include:

- Vegetation Mapping – 2023-2025
- Sampling Plots - Vegetation Integrity Plots – 15, 16, 17, and 24 April, 10 and 14 July, and 5 November 2025

Desktop assessments completed for this species include:

- *Conservation Advice – Central Hunter Valley Eucalypt Forest and Woodland* (DEE 2016)
- Commonwealth Environment Protection and Biodiversity Conservation Act 1999 Species Profile and Threats Database [EPBC Act SPRAT Database];
- The Vegetation of the Central Hunter Valley, New South Wales. A report on the findings of the Hunter Remnant Vegetation Project (Peake TC 2006)

3.2.2 Large -eared Pied Bat (*Chalinolobus dwyeri*)

Recommended surveys for the Large-eared Pied Bat are detailed in the Survey Guidelines for Australia's Threatened Bats. EPBC Act survey guidelines 6.1 (DEWHA 2010) and include the following:

- The use of electronic bat detectors is the best means of non-invasive survey, and the most efficient in terms of data collection and area coverage. Trapping with harp traps and mistnets, and roost searches in caves, mines, rock overhangs, culverts and crevices could be undertaken to confirm presence or roosting. Recommended survey methods include:

- Survey effort (for a Project Area <50ha) includes a combination of the following:
 - Unattended bat detectors – 16 detector nights, minimum 4 nights
 - Attended bat detectors – 6 detector nights, minimum 3 nights
 - Harp traps and/or mist nets – 16 trap or net nights, minimum 4 nights

Habitat for the species is known as:

- Known to roost in mines, caves, and rock overhangs, especially in sandstone outcrops and gorges. Also uses fairy martin nests and possibly tree hollows (Hoye and Dwyer 1995, Schulz 1998; Schulz et al. 1999). Recorded from a range of habitats, including wet and dry sclerophyll forest, Cyprus pine dominated forest, tall open eucalypt forest with a rainforest sub-canopy, subalpine woodland, but typically in association with sandstone relief. In south-eastern Queensland it has been recorded primarily from higher altitude moist tall open forest adjacent to rainforest (Schulz et al. 1999).
- Habitat Assessment (roosting habitat desktop) - Determine the potential for rocky outcrops, caves and mines to occur in the area by examining topographic and geological maps, and contacting state government mines and forestry departments, Queensland Parks and Wildlife Service, caving groups, bat researchers and local councils. Where appropriate, information on caves and mines may be obtained from local residents.

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment (foraging habitat) - Vegetation Integrity Plots – 15, 16, 17, and 24 April, 10 and 14 July, and 5 November 2025
- Habitat Assessment (roost search) – 4, 5, 6, and 18 March 2025
- Unattended bat detectors - Anabat™ bat-call detectors were used passively to record the calls of passing microbats. A total of four (4) Anabats™ were set up within suitable microchiropteran bat habitat and along potential flyways and left to record between 12–13/03/2025 and 21/04/2025 in accordance with the requirements of the *'Species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method* (OEH 2018). Bat calls were analysed by senior fauna ecologist Mark Dean using ANABAT info software.

Desktop assessments completed for this species include:

- *'Species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method* (OEH 2018).
- Bionet Threatened Species Records (DCCEEW 2026)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

3.2.3 Grey-headed Flying-fox (*Pteropus poliocephalus*)

Recommended surveys for the Grey-headed Flying-fox are detailed in the Survey Guidelines for Australia's Threatened Bats. EPBC Act survey guidelines 6.1 (DEWHA 2010) and include the following:

- Habitat Assessment (foraging habitat) – The primary native food plant species for flying fox species are well known (Hall and Richards 2000) and the presence of these plant species at a site should be used to assess the potential importance of the site to flying foxes (P. Eby, unpubl.).
- Habitat Assessment (camps) - The primary method for determining the presence of unrecorded day roosts is to conduct field surveys. Flying foxes are recognised easily from a distance while they roost or are in flight, and have distinctive audible calls that are heard most frequently in the early morning or under sunny conditions. Other signs include their distinctive odour and droppings. Both the ground and foliage should be examined for flying fox scats. Some project areas may require access by boat. Note that this species rarely vocalises during rain and some periods of the day. Roosts can also be located by surveying for animals exiting at dusk. For very large and/or inaccessible project areas, it may be necessary to conduct an aerial survey for camps from a light aircraft
- Spotlighting - Conduct walking transects (100 m apart) looking for feeding and flying bats. Smell can also provide a sign of their presence. Alternative methods may include night time audio recordings made at selected sites or fruiting food plants within the project area.

Habitat critical to the survival of the species is detailed in the *National Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus* (DEW 2021) and described as:

- Vegetation communities containing winter and spring flowering species including; 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 citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia or Syncarpia glomulifera.
- Or vegetation communities not containing the above species, but which:
 - contain native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May)
 - contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer, or
 - contain native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-Fox camp as identified on the Department's interactive flying-fox web viewer.

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment (foraging habitat) - Vegetation Integrity Plots – 15, 16, 17, and 24 April, 10 and 14 July, and 5 November 2025

- Habitat Assessment (camp search) – 4, 5, 6, and 18 March 2025
- Spotlighting surveys were conducted on the 13 March 2025, and 14, 15, 16, 23 and 24 April 2025 using high-powered headtorches to search for all types of nocturnal fauna (Figure 14). Spotlighting was undertaken via random meanders for 1 hr on each night by two fauna ecologists.

Desktop assessments completed for this species include:

- The Flying fox Foraging Habitat Mapping NSW (Eby et. al. 2019)
- Bionet Threatened Species Records (DCCEEW 2026)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

3.2.4 Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT)

Recommended surveys for the Koala are detailed in a number of Commonwealth and NSW Guidelines, along with best practice survey methods including; *A review of koala habitat assessment criteria and methods* (ANU 2021), Koala (*Phascolarctos cinereus*), *Biodiversity Assessment Method Survey Guide* (DPE 2022), and Phillips & Callaghan (2011).

Commonwealth Guidelines support the completion of the following surveys:

- Direct observation techniques including; transect and point surveys, Spotlighting, Detection Dogs, Mark-resight or mark-recapture, Thermal Detection drones, Radio-tracking, and Camera traps
- Indirect survey techniques including; faecal pellet (scat) surveys (i.e. spot assessment technique [SAT] surveys), Call playback, Passive acoustics, and Landscape nutritional quality surveys

NSW Guidelines require the completion of a combination of habitat assessments along with at least one “scat detection method” and one “non-scat detection method” including the following:

- Habitat assessments – Suitable habitat for koala is any Plant Community Type (PCT) that is associated with koala in the TBDC and with a minimum of one (1) koala use tree present, for the relevant region.
- Scat detection method – including Spot Assessment Technique (SAT) or detection dogs
- Non-scat detection method – including Spotlighting, passive acoustic, or drones,

Other (best practice survey methodology) include SATs as described by Phillips & Callaghan (2011):

- SATs are completed in accordance with the protocol detailed in Phillips & Callaghan (2011). The SAT technique is a simplified version of the Koala Habitat Atlas method, assessing tree species preferences and koala activity by detecting faecal pellets. Smaller plots (20x20m) yield similar results, but for accuracy, at least 30 trees with a minimum 100mm diameter must be sampled.

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment - Vegetation Integrity Plots – 15, 16, 17, and 24 April, 10 and 14 July, and 5 November 2025
- Spot Assessment Technique (SATs) - A total of 24 SAT surveys (Phillips and Callaghan, 2011) were undertaken across the Disturbance Footprint on the 18, 19 and 21 March 2025. This technique involves the selection of a centre tree (survey point) which is selected according to the following criteria:
 - A tree of any species beneath which one or more Koala faecal pellets have been observed; and/or
 - A tree in which a Koala is observed; and/or
 - Any other tree known or considered to be potentially important for Koalas, or for other assessment purposes.
 - A minimum of 30 trees (including the centre tree) with a DBH of 100 mm or greater are then surveyed. Surveys involve the inspection of the ground surface within 100 cm from the base of the tree. The base of each tree was inspected for 2 person minutes.
- Spotlighting surveys were conducted on the 13 March 2025, and 14, 15, 16, 23 and 24 April 2025 using high-powered headtorches to search for all types of nocturnal fauna (Figure 14). Spotlighting was undertaken via random meanders for 1 hr on each night by two fauna ecologists.
- Additional surveys (Remote Cameras) - A total of 44 Boly Guard remote motion-sensor cameras (hereafter “remote cameras”) were installed at heights of approximately 3 m, targeting arboreal fauna species. Cameras were installed for at least four (4) weeks between 12 March and 15 April 2025 and were re-baited once during the survey period (24-25/03/2025). Additionally, batteries were changed within the cameras where they were getting low during the re-baiting effort. Images were analysed to identify species captured on camera by an experienced ecologist.

Desktop assessments completed for this species include:

- Bionet Threatened Species Records (DCCEEW 2026)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

3.2.5 Regent Honeyeater (*Anthochaera phrygia*)

Recommended surveys for the Regent Honeyeater (*Anthochaera phrygia*) are detailed in the *Survey Guidelines for Australia's threatened birds* (DEWHA 2010b). This includes:

- Area searches in suitable habitat, preferably in the morning but other times may also be appropriate. Detection by call is possible when birds are most vocal (outside the breeding season). Otherwise, detection is by sighting. Targeted searches of woodland patches with

heavily flowering trees is useful, especially around waterpoints such as dams and creeklines. Also check among flocks of other blossom nomads such as lorikeets and other honeyeaters. Broadcast surveys immediately before and during the breeding season may also be useful.

- Survey effort: Area searches or Transect surveys (in areas of less than 50 ha) require 20hrs over 10 days. Targeted surveys (targeting areas of heavily flowering trees and flocks of other blossom feeders) require 20hrs over 5 days.

Habitat for the species is defined as the following:

- *Mostly occurs in box-ironbark eucalypt associations. Prefers the wettest, most fertile sites within these associations such as along creek flats, broad river valleys and foothills. In New South Wales, riparian forests of river oak with needle-leaf mistletoe are also important for feeding and breeding. At times of food shortage, uses other woodland types and wet lowland coastal forest dominated by swamp mahogany *E. robusta* or spotted gum *Corymbia maculata* (Franklin et al. 1989; Webster & Menkhorst 1992; Geering & French 1998; Oliver et al. 1998).*

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment and Opportunistic Bird Surveys – 4, 5, 6, 18 March 2025
- Targeted visual and auditory bird surveys were conducted at dusk on 11 and 12 June 2025, 31 October 2025 and dawn on 3, 4, and 5 November 2025. Surveys were a combination of 20 minute bird surveys and general meander through the Subject Land. Species were identified visually with the aid of binoculars or aurally from call identification.
- Vegetation Integrity Plots – 15, 16, 17, and 24 April, 10 and 14 July, and 5 November 2025

Desktop assessments completed for this species include:

- Bionet Threatened Species Records (DCCEEW 2026)
- NSW Important Area Mapping (Regent Honeyeater)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

3.2.6 Swift Parrot (*Lathamus discolor*)

Recommended surveys for the Swift Parrot (*Lathamus discolor*) are detailed in the *Survey Guidelines for Australia's threatened birds* (DEWHA 2010b). This includes:

- *Area searches or transect surveys of suitable habitat, preferably in the early morning and afternoon when birds are most active and vocal. Detection by sighting or call. Slow-moving vehicle transects also effective in expansive areas, detecting loud, distinctive 'clinking' call that can be heard over noise of engine. Targeted surveys of patches of heavily flowering eucalypts may be useful.*
- *Timing: surveys on the mainland should be conducted between March and July. Surveys in Tasmania should be conducted between August and February.*

- Survey effort: Area searches or Transect surveys (in areas of less than 50 ha) require 20hrs over 8 days. Targeted surveys (targeting areas of heavily flowering eucalypts) require 20hrs over 8 days.

Habitat for the species is defined as the following:

- *On mainland, inhabits dry sclerophyll eucalypt forests and woodlands, in particular, temperate box ironbark woodlands. Also in forests of Eucalyptus tereticornis, E. robusta, Corymbia maculata and C. gummifera in coastal New South Wales/Queensland. Occasionally occurs in wet sclerophyll forests (Higgins 1999; Brereton 2002). In Tasmania, nests in tree hollows and frequents forests dominated by blue gum Eucalyptus globulus and swamp gum E. ovata.*

National Recovery Plan for the Swift Parrot

When considering habitat loss, alteration or degradation to habitat in any part of the Swift Parrot's range, including in areas where the species 'may occur', surveys for occupancy at the appropriate times of the year and identifying preferred foraging species remain an important tool in refining understanding of the area's relative importance for Swift Parrots.

In addition, it is also important to note that Swift Parrots opportunistically use areas depending on the occurrence of eucalypt flowering. As a result, the absence of Swift Parrots from a given location at a given time cannot be taken as evidence that that location is unsuitable habitat. Rather, if there are potential food plants present (that include resources such as lerps, not just flowers) then that site may be utilised by Swift Parrots if conditions become favourable. This opportunistic habitat use means survey data and historical records need to be considered when assessing the relative importance of a local area or region for Swift Parrots, in addition to the knowledge that variation in local conditions is a crucial predictor of Swift Parrot presence/absence and site utilisation (Webb et al. 2019).

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment and Opportunistic Bird Surveys – 4, 5, 6, 18 March 2025
- Targeted visual and auditory bird surveys were conducted at dusk on 11 and 12 June 2025, 31 October 2025 and dawn on 3, 4, and 5 November 2025. Surveys were a combination of 20 minute bird surveys and general meander through the Subject Land. Species were identified visually with the aid of binoculars or aurally from call identification.
- Vegetation Integrity Plots – 15, 16, 17, and 24 April, 10 and 14 July, and 5 November 2025

Desktop assessments completed for this species include:

- Bionet Threatened Species Records (DCCEEW 2026)
- NSW Important Area Mapping (Swift Parrot)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

3.2.7 Brown Treecreeper (south -eastern) (*Climacteris picumnus victoriae*)

There are no species-specific survey guidelines for this species, however the most commonly used survey methods for birds are detailed in the Survey Guidelines for Australia's threatened birds (DEWHA 2010b). This includes area searches:

- *Area searches usually involve searching a plot of predetermined size for a predetermined period of time. Each selected area is searched systematically, while stopping or moving to investigate sightings, calls or signs of presence (Loyn 1986; Recher 1988; Hewish & Loyn 1989; Bibby et al. 1992).*
- *When sampling is required, area searches are typically conducted over plots of about 1–3 ha, for 10–20 min, though larger plots may be surveyed over hours, days and even months (for example, Blakers et al. 1984).*
- *The ideal amount of time to search plots of a given size depends on the aim of the search and the habitat type (Hewish & Loyn 1989). For example, if the aim is to locate a highly conspicuous species in open woodland, far less search time is required than if the aim is to detect a cryptic species in dense forest.*
- *Area searches will generally be the best of the random or systematic sampling methods to use to detect target species because of its easy application and flexibility of observer movement. Free movement allows the investigator to more thoroughly explore any noises, indicative signs or favoured habitat features, than other more structured searches such as transects and point counts.*

Surveys Completed

Surveys completed as part of this assessment include:

- Habitat Assessment and Opportunistic Bird Surveys – 4, 5, 6, 18 March 2025
- Targeted visual and auditory bird surveys were conducted at dusk on 31 October 2025 and dawn on 3, 4, and 5 November 2025. Surveys were a combination of 20 minute bird surveys and general meander through the Subject Land. Species were identified visually with the aid of binoculars or aurally from call identification.

Desktop assessments completed for this species include:

- Bionet Threatened Species Records (DCCEEW 2026)
- NSW Important Area Mapping (Swift Parrot)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

3.2.8 Spotted -tailed Quoll (*Dasyurus maculatus*)

Recommended surveys for the Spotted-tailed Quoll (*Dasyurus maculatus*) are detailed in the *Survey guidelines for Australia's threatened mammals* (DSEWPC 2011b), including the following:

- **Habitat Assessment (diurnal)** - daytime searches for potentially suitable habitat resources, such as areas associated with a gully or a ridge and potential den sites (caves, hollow logs or even dense understorey vegetation such as *Lantana* species that provides suitable cover)
- **Habitat Assessment (latrine search)** - daytime searches for signs of activity, scats and latrines (description of the survey technique and recommended effort is outlined in Section 3.2 of the Guidelines). Latrine searches should be limited to areas where there are rocky habitats which can be targeted for searching. Where the spotted-tailed quoll occurs in sympatry with the eastern quoll, *Dasyurus viverrinus* in Tasmania, the species present may need to be identified through the application of direct detection survey techniques. Hair samples may be present in scats as a result of grooming, and species identification may be possible from an analysis of such hairs if they occur.
 - **Section 3.2** of the Guideline recommends a survey effort “two hours search time for each one hectare survey site of a stratified sampling program undertaken in a subject site up to 5 hectares in size (that is, 50 000 square metres)”.
- **Hair funnels** - hair sampling device (hair funnels) surveys, following the description of the technique and recommended effort provided in Section 3.3.7, placed 100 metres apart and using a mixture of sardines, tuna oil and flour for bait. Hair funnels should be set for a minimum of 14 consecutive nights. The spotted-tailed quoll is included among those known to be distinguishable from hair samples which will provide a high probability of detection (see Table 2, Section 3.3.7 of the Guideline). Forty widely spaced hair-tubes within a 100 hectare sampling unit has approximately 96% likelihood of detection on occupied sites (Nelson 2007)
- **Remote cameras** - recent surveys have found remote cameras to be the most cost-effective technique and allow concurrent data to be collected on other carnivores, particularly cats and foxes (Nelson 2008) (see Section 3.3.6 of the Guideline). Cameras should be left on site for a minimum of three weeks.
 - **Section 3.3.6** of the Guidelines recommends that remote cameras be “deployed for at least 14 nights, and approximately 10 cameras should be deployed per hectare”

Surveys Completed

Surveys completed as part of this assessment include:

A total of nine (9) remote cameras were installed at approximately 0.5 m targeting terrestrial fauna for a total of 32 nights between 12 March and 15 April 2025. Cameras were baited with an oats, peanut butter, treacle, vanilla essence and truffle oil mixture in a mesh canister, and the surrounding area (tree trunk) was sprayed with honey water. Images from the cameras were analysed by an experienced ecologist to identify species captured on camera.

Desktop assessments completed for this species include:

- Bionet Threatened Species Records (DCCEEW 2026)
- Species of National Environmental Significance and selected marine and cetacean species – GDB Mapping (DCCEEW 2023)

3.3 AREA OF SUITABLE HABITAT FOR MNES

The following confirms the population/s present, species habitat and each habitat type and TECs (and each category) in both the project area (in hectares) and disturbance footprint (in hectares) for each identified MNES (see **Table 3**). Areas of habitat considered 'Important Habitat' or 'Habitat Critical to the Survival of the Species' are detailed in **Section 3.4**.

Table 3: MNES Area of Habitat

MNES	Status	Habitat Type	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
<i>Central Hunter Valley eucalypt forest and woodland threatened ecological community</i>	Critically Endangered Ecological Community (CEEC)	Occurrence	32.67 ha	128.70 ha
Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)	Endangered	Foraging Habitat	61.63 ha	196.88 ha
Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)	Vulnerable	Supplementary Foraging Habitat	41.3 ha	158.13 ha
Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT)	Endangered	Potential Foraging Habitat	41.29 ha	156.01 ha
Regent Honeyeater (<i>Anthochaera phrygia</i>)	Critically Endangered	Potential Foraging Habitat	41.29 ha	156.01 ha
Swift Parrot (<i>Lathamus discolor</i>)	Critically Endangered	Potential Foraging Habitat	41.29 ha	156.01 ha
Brown Treecreeper (south-eastern) (<i>Climacteris picumnus victoriae</i>)	Vulnerable	Potential Foraging Habitat	41.3 ha	156.01 ha
Spotted-tailed Quoll (<i>Dasyurus maculatus</i>)	Endangered	Potential Foraging Habitat	41.3 ha	156.01 ha

3.4 IMPORTANT HABITAT OR HABITAT CRITICAL TO THE SURVIVAL OF THE MNES

Below details the presence/absence of important habitat or habitat critical to the survival of the species/community for each listed MNES:

- I. Identify whether an important population of relevant vulnerable listed threatened species is present in the project area and its vicinity as described in relevant EPBC Act statutory documents and/ or the Significant Impact Guidelines 1.1: Matters of National Environmental Significance (2012) (Significant Impact Guidelines 1.1);
- II. Determine whether the suitable habitat and TEC category/ies form habitat critical to the survival of relevant listed threatened species and TECs as described in relevant EPBC Act statutory documents and/or the Significant Impact Guidelines 1.1;

3.4.1 Central Hunter Valley Eucalypt Forest and Woodland

Areas critical to the survival of the TEC are defined as:

“Areas that meet the minimum (Moderate quality condition class) Condition thresholds, or are within the buffer zone, are considered critical to the survival of the Central Hunter Valley eucalypt forest and woodland ecological community. Additional areas such as adjoining native vegetation and areas that meet the description of the ecological community but not the Condition thresholds are also important to the survival of the ecological community and should be taken into consideration as part of the surrounding environment and landscape context”

Assessment

The vegetation within the Project Area was assessed in accordance with the key diagnostic features of Central Hunter eucalypt forest and woodland ecological community CEEC and condition thresholds as described in the Approved Conservation Advice for the TEC (DEE 2015). In summary:

- **Vegetation Zone 2** – Meets the key diagnostic features and minimum condition thresholds described below, therefore is commensurate with the TEC. The vegetation zone is consistent with Class A. High Quality Condition TEC, therefore meets the definition of “areas critical to the survival” of the TEC.
- **Vegetation Zone 3** - Meets the key diagnostic features and minimum condition thresholds described below, therefore is commensurate with the TEC. The vegetation zone is consistent with Class A. High Quality Condition TEC, therefore meets the definition of “areas critical to the survival” of the TEC.
- **Vegetation Zone 4** - The vegetation within this vegetation zone does not meet the diagnostic characteristics or minimum condition thresholds for the TEC.

A summary of areas critical to the survival of this TEC within the Disturbance Footprint and the Project Area are outlined below in **Table 4**. The assessment results are detailed below in **Table 5**.

Table 4: CHVEFW CEEC – Areas critical to the survival of the MNES

Vegetation Zone	Meets Diagnostic Features	Meets Minimum Condition Thresholds	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 2 (PCT 3315 Forest)	Yes	Yes	Yes	22.43	101.36
Vegetation Zone 3 (PCT 3315 Managed)	Yes	Yes	Yes	10.24	27.34
Vegetation Zone 4 (PCT 3315 High Weed)	No	No	No	-	-
Vegetation Zone 5 (PCT 3315 DNG)	No	N/A	-	-	-
Vegetation Zone 6 (PCT 3315 Exotic Grassland)	No	N/A	-	-	-
Total Area				32.67	128.70

Table 5 Key Diagnostic Features of Central Hunter Valley eucalypt forest and woodland ecological community CEEC from Approved Conservation Advice (2015)

Determination Criteria	Meets Criteria	Justification
It occurs in the Hunter River catchment (typically called the Hunter Valley region), AND	Yes	The Disturbance Footprint is located within the Hunter River catchment.
It typically occurs on lower hillslopes and low ridges, or valley floors in undulating country; on soils derived from Permian⁸ sedimentary rocks ; AND	Partially	The Study Area occurs on the Central Hunter Foothills Mitchell landscape (Mitchell, 2002), which are described as undulating lowlands with steep hills and rock outcrops. The geology of the site is Carboniferous volcanic, with tuff the dominant rock type. This rock weathers to soil with a high clay content and higher fertility than sedimentary soils. The absence or occurrence of the TEC on Carboniferous volcanics is not explicitly stated, only that it “typically” occurs on soils derived from sedimentary rock, conservatively it has not been used to exclude the TEC within the Disturbance Footprint.
It does not occur on alluvial flats, river terraces, aeolian sands ⁹ , Triassic sediments, or escarpments ¹⁰ ; AND	Yes	The vegetation within the Disturbance Footprint does not occur on alluvial flats, river terraces, aeolian sands, Triassic sediments, or escarpments. It is of note that the site does occur less than 1km from escarpment within the Tangory Nature Reserve and portions of the site have very shallow soils overlying bedrock.
It is woodland or forest, with a projected canopy cover ¹¹ of trees of 10% or more; or with a native tree density of at least 10 native tree stems per 0.5 ha (at least 20 native tree stems/ha) that are at least one metre in height ¹² ; AND	Yes	The vegetation within the Disturbance Footprint is a woodland/open forest with a projected canopy cover >10%.
The canopy of the ecological community is dominated ¹³ by one or more of the following four eucalypt species: <i>Eucalyptus crebra</i> (narrow-leaved ironbark), <i>Corymbia maculata</i> (syn. <i>E. maculata</i>) (spotted gum), <i>E. dawsonii</i> (slaty gum) and <i>E. moluccana</i> (grey box); OR a fifth species, <i>Allocasuarina luehmannii</i> (bulloak, buloke) dominates in combination with one or more of the above four eucalypt species, in sites previously dominated by one or more of the above four eucalypt species ¹⁴ ; AND	Yes	The community is characterised by an open canopy dominated by <i>Corymbia maculata</i> and <i>Eucalyptus crebra</i> throughout most of its extent. Other overstorey species varying in local dominance include <i>Eucalyptus tereticornis</i> which is locally dominant in a few small patches.

<p><i>Allocasuarina torulosa</i> (forest oak/ she-oak, rose she-oak/oak), <i>Eucalyptus acmenoides</i> (white mahogany) and <i>E. fibrosa</i> (red/broad-leaved ironbark) are largely absent¹⁵ from the canopy of a patch¹⁶;</p> <p>AND</p>	Yes	While <i>Allocasuarina torulosa</i> and <i>Eucalyptus acmenoides</i> occur within the mapped PCT 3315, they are in very low abundance and can be considered largely absent.
<p>A ground layer is present (although it may vary in development and composition), as a sparse to thick layer of native grasses and other native herbs and/or native shrubs.</p>	Yes	<p>Shrubs including <i>Acacia</i> spp., <i>Breynia oblongifolia</i>, <i>Bursaria spinosa</i> subsp. <i>spinosa</i>, <i>Jacksonia scoparia</i>, <i>Leucopogon juniperinus</i>, and <i>Pittosporum undulatum</i> occur within this vegetation, typically at <5% cover.</p> <p>Groundcover is present and varies in composition and density.</p>
Other diagnostic considerations (Section 1.5.2)		
<p>A number of other tree species may be sub-dominant¹⁷ (or locally dominant within a patch). These include <i>Angophora floribunda</i> (rough barked apple), <i>Eucalyptus blakelyi</i> (Blakely's red gum), <i>E. glaucina</i> (slaty red gum) and <i>E. tereticornis</i> (forest red gum);</p>	Yes	<p>The community is characterised by an open canopy dominated by <i>Corymbia maculata</i> and <i>Eucalyptus crebra</i> throughout most of its extent. Other overstorey species varying in local dominance include <i>Eucalyptus tereticornis</i> which is locally dominant in a few small patches.</p>
<p>Patches that are dominated solely by <i>Allocasuarina luehmannii</i> (bulloak, buloke) are excluded (i.e. patches in which all four of the typically dominant eucalypt species are entirely or mostly absent);</p>	N/A	<p>The vegetation mapped as PCT 3315 within the Disturbance Footprint does not include patches dominated by <i>Allocasuarina luehmannii</i> (Bulloak).</p>
<p>Hybrids of eucalypt species may be present¹⁸ and where possible relevant hybrids should be included when assessing dominance of key diagnostic canopy tree species (e.g. <i>Eucalyptus moluccana</i> x <i>E. albens</i> counts towards <i>E. moluccana</i> dominance) - Areas with hybrid eucalypt species are included in the ecological community (i.e. areas should not be excluded on the basis of hybridisation);</p>	N/A	<p>Hybrids including <i>Eucalyptus moluccana</i> x <i>E. albens</i> do not occur within the Disturbance Footprint.</p>
<p>The ecological community may contain fauna species listed in Appendix B, Table B2;</p>	N/A	Not Applicable
<p>Derived native grasslands and shrublands are not included in this nationally protected ecological community. The exceptions are where there is a gap, in or at the edge of a patch; or connecting two patches across a short distance (i.e. 30 m)¹⁹;</p>	Yes	<p>Derived forms of PCT 3315 (VZ 4, 5, 6) are not commensurate with the TEC.</p>
<p>The Hunter River catchment includes the catchment of the Goulburn River.</p>	N/A	<p>The Disturbance Footprint does not occur within the Goulburn River Catchment.</p>
<p>The ecological community predominantly occurs in the Sydney Basin (SYB) and the NSW North Coast (NNC) IBRA (Version 7) bioregions in New South Wales²⁰;</p>	Yes	<p>The Disturbance Footprint is located within the NSW North Coast IBRA Region</p>
<p>It also occurs in IBRA subregions that are adjacent to the Hunter Valley IBRA subregion - for example in the Hunter (Mooki) Thrust Fault Zone in the Upper Hunter IBRA subregion</p>	Yes	<p>The Disturbance Footprint occurs north of the Hunter (Mooki) Thrust Fault within the Upper Hunter IBRA Subregion.</p>

(NNC16); and in the Goulburn Valley in the Kerrabee subregion (SYB01).		
<p>The ecological community typically occurs on supporting soils with a high clay content (argillaceous), mid nutrient level soils that are not highly dispersible²¹ and that have formed in erosional or colluvial²² environments. These typically occur on Permian-aged strata. These Permian sediments are much older than nearby Triassic²³ sediments; and are finer grained, typically producing soils with a higher clay content, as opposed to the sandy soils associated with Triassic sediments.</p>	<p>Partially</p>	<p>The Disturbance Footprint is located on colluvial and insitu weathered soils derived from Carboniferous geology, (ie. older than Permian), that where present are clayey in nature with a moderately higher fertility than typical sedimentary soils. The Disturbance Footprint does not contain sandy soils associated with Triassic sediments.</p> <p>The absence of significant erosion onsite suggests the soils are not aggressively dispersive in nature.</p> <p>The geology of the site is primarily Carboniferous, characterised as part of the Breckin Ignimbrite Member (Cgimb) and Lambs Valley Ignimbrite Member (Cgiml), and Martins Creek Ignimbrite Member (Curim) stratigraphic units. The Disturbance Footprint primarily occurs on the Stanhope soil landscape, with a small area in the SW occupying the Lochinvar soil landscape. These soil landscapes are characterized by low to moderate soil fertility with moderate to high clay content. Observed soils within the Disturbance Footprint are generally high in clay content.</p>
<p>Determination</p>		<p>The vegetation within the Disturbance Footprint <u>does meet the diagnostic characteristics</u> for the Critically Endangered Ecological Community <i>Central Hunter Valley eucalypt forest and woodland ecological community</i> as listed under the Commonwealth's EPBC Act 1999.</p>
<p>8 - See the next section (1.5.2) and Appendix D for more information on soil types.</p> <p>9 - Aeolian sands: Sediment, which has been carried or weathered by the wind.</p> <p>10 - Escarpment: A steep slope or long cliff that separates two relatively level areas of differing elevations.</p> <p>11 - Projected cover of canopy trees is calculated by assuming a solid canopy.</p> <p>12 - This figure is to allow for woodland or forest with a sparse canopy and regenerating areas.</p> <p>13 - Dominant means that one, or more, of the four Eucalypt species, account(s) for more than 50% of the projected canopy cover. Projected canopy cover of trees is calculated by assuming a solid canopy. Projected canopy cover is the preferred benchmark for dominance; except in regenerating areas with few mature canopy trees. Where this is the case, tree basal area is the next best surrogate.</p> <p>14 - See footnote above (i.e. Allocasuarina luehmannii plus one or more of the four Eucalypt species above, should together account for more than 50% of the projected canopy cover). Evidence that in the past at least one of the four diagnostic Eucalypt species was amongst the most common canopy species could include aerial photography, past surveys, or historical journal entries / documents. Patches that are dominated solely by Allocasuarina luehmannii (bulloak, buloke) are excluded.</p> <p>15 - Largely absent: Meaning no more than two trees per hectare on average across a patch (of each of the three species) e.g. if there are three or more Allocasuarina torulosa trees per hectare on average across a patch it is not the ecological community. 'Confounding' hybrids (such as Eucalyptus fibrosa x E. moluccana) should be ignored when deciding whether to exclude areas because of contra-indicative species.</p> <p>16 - These exclusions (along with soil type) help to differentiate between the ecological community and other woodland types, such as 'Lower Hunter Spotted Gum-Ironbark Forest', with which it integrates (see also Section 1.6.1 Relationship to state-listed ecological communities).</p> <p>17 - Sub-dominant: Whilst a tree species may be locally dominant in a limited area, the species would still need to be <30% of overall projected canopy cover, within the patch, to be considered a sub-dominant.</p> <p>18 - Examples of possible hybrids in this ecological community include Eucalyptus moluccana x E. albens (grey box x white box), E. tereticornis x blakelyi (forest red gum x Blakely's red gum) and E. tereticornis x E. glaucina (forest red gum x slaty red gum).</p>		

- 19 - Where native grassland/shrubland (whether derived from the ecological community or not) connects discrete patches of the ecological community in close proximity (up to 30 m apart) then it should be treated as part of a single patch. Also native grassland/shrubland within a gap in, or at the edge of a patch, (up to 30 m from the edge of the tree canopy/saplings) is part of the patch. See also sections 1.5.4.1 (Defining a patch) and 1.3.4 (Derived native grassland/shrubland). "Native" here means vegetation 'dominated by native species'; i.e. that 50% or more of the perennial vegetation cover is native.
- 20 - There may be outliers just over the border, in the extreme south east of the Brigalow Belt South Bioregion.
- 21 - A dispersible soil: A soil that is structurally unstable in water, breaking down into its constituent particles (sand, silt and clay) and allowing the dispersive clay fraction to disperse and cloud the water.
- 22 - Colluvial material / Colluvium: A loose deposit of sharp edged rock debris and/or sediment that has moved downhill to the bottom of the slope (or cliff) without the help of running water in streams.
- 23 - Triassic: A geologic period (201 – 251 Ma).

Condition Thresholds

For the ecological community, classes C and D (**Table 6**) are considered Moderate quality condition and the minimum thresholds for a patch of the ecological community to be subject to the referral, assessment and compliance provisions of the EPBC Act. Classes A and B are considered the minimum thresholds for a patch of the ecological community to be regarded as an example of High quality condition.

Table 6 Condition Thresholds for EPBC Act Central Hunter Valley eucalypt forest and woodland ecological community CEEC

Category and rationale	Threshold	Justification
Class A. High Quality Condition E.g. A larger patch with good quality native understorey	Patch size is ≥ 5 ha; AND	Yes – the patch size is >5 ha
	$\geq 50\%$ of perennial understorey vegetative cover is native; AND	Vegetation Zone 2 and 3 Yes – Vegetation Zone 2 and 3 are characterised by $>50\%$ perennial native understorey consisting of grass, shrubs, fern and forb species. Vegetation Zone 4 No – Vegetation Zone 4 has a very high cover of perennial exotic shrubs in the form of <i>Olea europaea</i> and <i>Lantana camara</i> , which exceed 50% cover
	The patch contains at least 12 native understorey species	Vegetation Zones 2, 3, 4 Yes - All vegetation integrity plots completed within Vegetation Zone 2, 3, and 4 recorded at least 12 native understorey species.
Class A Conclusion	Vegetation Zone 2 and 3 meet the minimum condition thresholds for Class A Vegetation Zone 4 does not meet the minimum condition thresholds for Class A	
Class B. High Quality Condition E.g. A patch with high quality native understorey	Patch size is ≥ 0.5 ha; AND	Vegetation Zone 2 and 3 Not applicable – vegetation zones meet the condition thresholds for Class A.
	$\geq 70\%$ of perennial vegetative cover in each layer present is native; AND	Vegetation Zone 4 No - $<70\%$ of the perennial understorey vegetative cover is native.
	The patch contains at least 12 native understorey species	
Class C. Moderate Quality Condition	Patch size is ≥ 0.5 ha; AND	Vegetation Zone 2 and 3

<p>E.g. A patch with good quality native understorey</p>	<p>≥ 50% of perennial understorey vegetative cover is native; AND</p>	<p>Not applicable – vegetation zones meet the condition thresholds for Class A.</p>	
	<p>The patch contains at least 12 native understorey species</p>	<p>Vegetation Zone 4 No - <50% of the perennial understorey vegetative cover is native.</p>	
<p>Class D. Moderate Quality Condition E.g. A moderate to large sized patch with: connectivity to a native vegetation area; or a mature tree; or a tree with hollows.</p>	<p>Patch size is ≥ 2 ha; AND</p>	<p>Vegetation Zone 2 and 3 Not applicable – vegetation zones meet the condition thresholds for Class A.</p>	
	<p>≥ 50% of perennial understorey vegetative cover is native; AND</p>	<p>Vegetation Zone 4 No - <50% of the perennial vegetative cover for the understorey is native.</p>	
	<p>The patch is contiguous with another patch of native woody vegetation²⁵ ≥ 1 ha in area OR</p>	<p>The patch has at least one large locally indigenous tree (≥ 60 cm dbh²⁶), or at least one tree with hollows</p>	<p>Not applicable</p>
<p>Determination</p>	<p>Vegetation Zones 2 and 3 These two vegetation zones meet the minimum condition thresholds (Condition Class A) for the Critically Endangered Ecological Community Central Hunter Valley eucalypt forest and woodland ecological community as listed under the Commonwealth's EPBC Act 1999. Vegetation Zone 4 The vegetation within this vegetation zone does not meet the diagnostic characteristics or minimum condition thresholds for the Central Hunter Valley eucalypt forest and woodland ecological community CEEC. Vegetation Zones 5 and 6 These vegetation zones do not meet the diagnostic characteristics for the TEC.</p>		
<p>Perennial understorey vegetation cover (i.e. below the tree canopy) includes vascular plant species, of both the ground layer and the mid/shrub layer (where present), with a life-cycle of more than two growing seasons. The ground layer includes herbs (i.e. grasses and forbs) and some low shrubs (woody plants ≤ 0.5 m high). Measurement of perennial understorey vegetation cover excludes annuals, cryptogams, leaf litter or exposed soil. In addition, please see the footnotes below and Section 1.5.4 of the Conservation Advice for further information to assist in determining the presence of the ecological community and significant impacts (including on the timing of surveys and sampling protocols). 24 – Each layer present includes the canopy layer, as well as the ground layer and mid/shrub layer 25 – Contiguous with another patch of native woody vegetation means continuous with, or near (within 100 m of), another area of native woody vegetation. Native vegetation is 'dominated by native species'; meaning that 50% or more of the perennial vegetation cover is native (See also the 'Notes to the above', in Table 1). This condition is also met if the patch of the ecological community is ≥ 3 ha in size. 26 – dbh is diameter at breast height.</p>			

3.4.2 Large -eared Pied Bat (*Chalinolobus dwyeri*)

Important Population - An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

Habitat Critical to the Survival of the Species - Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

Assessment

The Disturbance Footprint contains suitable foraging habitat for the Large-eared Pied Bat. No suitable roosting / breeding sites occur within the Disturbance Footprint although potential habitat does occur within a 2 km proximity to the NE. Therefore, the Disturbance Footprint is unlikely to contain a key source population for breeding, or one that is necessary for maintaining genetic diversity. As such, it is unlikely the Disturbance Footprint comprises an important population of the Large-eared Pied Bat or habitat critical to the survival of a species.

Table 7: Large-eared Pied Bat – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Is an Important Population	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 (PCT 3244 Forest)	Potential Foraging	No	No	-	-
Vegetation Zone 2 (PCT 3315 Forest)	Potential Foraging	No	No	-	-
Vegetation Zone 3 (PCT 3315 Managed)	Potential Foraging	No	No	-	-
Vegetation Zone 4 (PCT 3315 High Weed)	Potential Foraging	No	No	-	-
Vegetation Zone 5 (PCT 3315 DNG)	Potential Foraging	No	No	-	-
Vegetation Zone 6 (PCT 3315 Exotic Grassland)	Potential Foraging	No	No	-	-
Vegetation Zone 7 (PCT 3110 High Weed)	Potential Foraging	No	No		
Total Area				0	0

3.4.3 Grey-headed Flying-fox (*Pteropus poliocephalus*)

Important Population - An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

Habitat Critical to the Survival of the Species - Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

In accordance with National Recovery Plan for the Grey-headed Flying-fox *Pteropus poliocephalus* (DEW 2021) habitat critical to the survival of the Grey-headed Flying-fox includes the following:

- Vegetation communities containing winter and spring flowering species including; *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 citriodora*, *C. eximia*, *C. maculata*, *Grevillea robusta*, *Melaleuca quinquenervia* or *Syncarpia glomulifera*.
- Or vegetation communities not containing the above species, but which:
 - contain native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May)
 - contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer, or
 - contain native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-Fox camp as identified on the Department's interactive flying-fox web viewer.

Assessment

The Project Area contains a number of myrtaceous tree species which may provide foraging habitat for the species. However, no breeding habitat (camps) were identified within the Project Area, therefore it is unlikely to contain a key source population for breeding, or one that is necessary for maintaining genetic diversity. The Project Area is also not located at the limit of this species' range. As such, it is unlikely the vegetation within the Project Area comprises an important population of the Grey-headed Flying-fox.

The Raymond Terrace Flying-fox Camp Management Plan (PSC 2017) highlights the importance of winter flowering species for the species. Table 5 of the Raymond Terrace Flying-fox Camp Management Plan (PSC 2017) identifies a total of six (6) species of tree that flower in winter that are preferential food sources for Flying-foxes, recommending that these species should be subject to protection to assist with Flying-fox survival in the region. These species are shown below for bi-monthly periods; December-January (D-J), February-March (F-M), April-May (A-M), June-July (J-J),

August-September (A-S), and October-November (O-N). Flowering period of each listed local foraging species is marked with “X”, each species found within the Project Area is bold and in green. Important winter-flowering species are those flowering in J-J and A-S. Only one (1) winter flowering foraging species was recorded within the Project Area, *Corymbia maculata*. As such, the vegetation within the Project Area likely represents supplementary foraging habitat for the species, and is unlikely to represent important habitat or habitat critical to the survival of the species (see list of foraging species in **Table 8**). See areas of habitat critical to the survival of the species summarised in **Table 9**.

The Flying fox Foraging Habitat Mapping NSW (Eby et. al. 2019) maps the following within the Project Area:

- **Overall Rank** - The vegetation within the Project Area is mapped as having an overall conservation rank of the habitat of mostly 2 and to a lesser extent 1 (with 1 being the lowest, and 4 being the highest rank):
- **Seasonality of Habitat** - The vegetation within the Disturbance Footprint is mapped in regards to the foraging resource productivity seasonally. Within the Disturbance Footprint vegetation is mapped based on modelled vegetation communities and assigned a productivity score in two-monthly periods from 0 (low productivity) to 1 (high productivity). The vegetation within the Project Area is largely mapped as a summer to autumn dominant foraging resource with average bimonthly results of:
 - December/January: 0.22
 - February/March: 0.25
 - April/May: 0.15
 - June/July: 0
 - August/September: 0.08
 - October/November: 0.16

See mapping in Appendix 1 (Figure 9, Figure 10, Figure 11, Figure 12, Figure 13, Figure 14, Figure 15, Figure 16, and Figure 17).

Table 8: Raymond Terrace Flying-Fox Camp Management Plan (PSC 2017) Foraging Species

Species	D-J	F-M	A-M	J-J	A-S	O-N
<i>Angophora costata</i>						X
<i>Angophora floribunda</i>	X					
<i>Banksia integrifolia</i>			X	X	X	
<i>Corymbia eximia</i>						X
<i>Corymbia gummifera</i>		X				
<i>Corymbia maculata</i>		X	X	X		
<i>Eucalyptus acmenoides</i>	X					X
<i>Eucalyptus albens</i>				X	X	
<i>Eucalyptus amplifolia</i>						X
<i>Eucalyptus botryoides</i>	X					
<i>Eucalyptus camaldulensis</i>	X					

<i>Eucalyptus deanei</i>	X	X				
<i>Eucalyptus fibrosa</i>	X					X
<i>Eucalyptus longifolia</i>			X			
<i>Eucalyptus moluccana</i>		X				
<i>Eucalyptus paniculata</i>	X					
<i>Eucalyptus parramattensis</i>	X					
<i>Eucalyptus pilularis</i>	X	X				
<i>Eucalyptus piperita</i>	X					
<i>Eucalyptus punctata</i>	X	X				
<i>Eucalyptus resinifera</i>	X	X				
<i>Eucalyptus robusta</i>			X	X		
<i>Eucalyptus saligna</i>	X	X				
<i>Eucalyptus siderophloia</i>	X					X
<i>Eucalyptus tereticornis</i>					X	X
<i>Melaleuca quinquenervia</i>		X	X			
<i>Syncarpia glomulifera</i>					X	X

Table 9: Grey-headed Flying Fox – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Is an Important Population	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 (PCT 3244 Forest)	Supplementary Foraging	No	No	-	-
Vegetation Zone 2 (PCT 3315 Forest)	Supplementary Foraging	No	No	-	-
Vegetation Zone 3 (PCT 3315 Managed)	Supplementary Foraging	No	No	-	-
Vegetation Zone 4 (PCT 3315 High Weed)	Supplementary Foraging	No	No	-	-
Vegetation Zone 5 (PCT 3315 DNG)	None	No	No	-	-
Vegetation Zone 6 (PCT 3315 Exotic Grassland)	None	No	No	-	-
Vegetation Zone 7 (PCT 3110 High Weed)	None	No	No		
Total Area				0	0

3.4.4 Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT)

In accordance with the National Recovery Plan for the Koala *habitat critical to the survival of a species* is the area that the species relies on to halt decline and promote the recovery of the species. Ideally this would be identified spatially; however, given the variety of factors that determine whether

habitat is suitable for Koalas or not, it is more appropriate to define habitat based on the characteristics required to meet their needs, than by spatial delineation.

The functional ecology of the Koala is described in terms of the combined assemblage of habitat qualities (extent, arrangement, attributes) theoretically required to stop decline and promote recovery. Key questions to ask in evaluating habitat for Koalas are:

- 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 (e.g. foraging, breeding, social behaviour, dispersal)*
- 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*
- g) *any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community (EPBC Act).*

Assessment of the vegetation within the Project Area against the above criteria is provided below. Habitat for the Koala (*Phascolarctos cinereus*) is highly variable across the species' broad geographic range spanning coastal and inland areas from far-north Queensland to the south-east corner of South Australia. Koala habitat suitability is regionally variable and influenced by the availability and nutritional quality of food trees, presence of suitable resting trees and microclimates, age structure of habitat, management history, and barriers to dispersal (DAWE, 2022a). Measures of Koala habitat suitability and quality in the following subsections is based on the following measures

- Foraging Habitat Availability
- Habitat Suitability (Regional)
- Population Connectivity

Foraging Habitat

The koala is a specialist herbivore feeding almost entirely on the leaves of eucalypts, across a variety of vegetation types ranging from tropical forests to semi-arid woodlands throughout their geographic range. In New South Wales (NSW) alone, koalas have been recorded to use 66 eucalypt species and seven (7) non-eucalypts (DECC, 2008; Phillips and Callaghan, 2011). However, species selection is highly dependent on the region, with koalas in any one area feeding almost exclusively on a small number of preferred species (preferred food trees). Koalas are also known to use a number of tree and shrub species for purposes other than primary food species, including supplementary food species and shelter.

Multiple resources providing assignment, and ranking, of feed tree species for the koala are available across the species' broad range. We have used three (3) resources to assess koala foraging habitat value within the Project Area:

Commonwealth Guidelines

The Review of Koala Tree Use Across New South Wales (OEH 2018) provides a summary of koala use species including 'regional high use', 'local high use', 'significant use', 'irregular use', and 'low use' species, for each Koala Management Area.

State Koala Habitat Protections

At the time of the assessment the relevant State Environmental Planning Policy governing Koala habitat protection was SEPP 44. This policy has been replaced by Chapter 3 of the State Environmental Planning Policy (Biodiversity and Conservation) 2021. This SEPP provides a list of Feed Tree Species (Schedule 1) used to assess Koala foraging habitat quality within the Project Area. These include; *Eucalyptus tereticornis* (Forest red gum), *Eucalyptus microcorys* (Tallowwood), *Eucalyptus punctata* (Grey Gum), *Eucalyptus viminalis* (Ribbon or manna gum), *Eucalyptus camaldulensis* (River red gum), *Eucalyptus haemastoma* (Broad leaved scribbly gum), *Eucalyptus signata* (Scribbly gum), *Eucalyptus albens* (White box), *Eucalyptus populnea* (Bimble box or poplar box), and *Eucalyptus robusta* (Swamp Mahogany).

Habitat Suitability

Koala habitat suitability is a product of several factors in addition to that of preferred feed tree occurrence with the core drivers of habitat suitability varying at different scales, including at the site level (e.g. food, shelter, breeding needs), to the broader landscape (e.g. climate, habitat connectivity). The Koala Habitat Information Base (DPIE 2019) provides a series of spatial datasets detailing koala habitat suitability and occupancy across New South Wales. The Koala Habitat Information Base datasets reviewed in relation to koala habitat within the Project Area include the following:

- The Koala Habitat Suitability Model (KHSM)
- The Koala Tree Index (KTI)
- Koala Likelihood Map (1999 – 2018)
- Areas of regional koala significance (ARKS)

The Koala Habitat Suitability Model

The KHSM provides a measure of koala habitat suitability at any location. The model predicts the likelihood of finding habitat that is ecologically similar to where koalas have been observed over the past 40 years. The model predicts the spatial distribution of potential koala habitat across NSW using a value between 0 and 1 (i.e. a higher value represents a higher probability that a specific location will contain habitat suitable for koalas).

The Koala Tree Index

The KTI provides a measure of the probability of finding a tree species that koalas are known to prefer for food or shelter.

Koala Likelihood Map (1999 – 2018)

The Koala Likelihood Map (KLM) provides the likelihood of koalas occurring across a 10-square-kilometre grid covering NSW, based on available arboreal mammal records from the past 20 years.

Areas of regional koala significance

This dataset provides mapping of regions that have high known koala occurrence using analysis of koala observation densities.

Population Connectivity (Dispersal)

The home range of the koala is estimated to be 80-90 ha. If the koala utilises the vegetation within the Project Area it is likely to be part of a much larger area of habitat extending into highly connected habitat surrounding the Project Area.

Assessment

The Project Area contains foraging habitat and potential movement corridors for the species. The extent, location and value of these habitats is outlined below.

Foraging Habitat

Foraging Habitat occurs within the Project Area, extent and value is summarised below:

Feed Tree Occurrence: Reviewing available resources detailing koala food tree species, the following applies to the Project Area:

- Commonwealth - The Project Area contains one (1) 'High Use' (*Eucalyptus tereticornis*), two (2) trees recognised as 'Significant Use' (*Eucalyptus crebra* and *Eucalyptus moluccana*), three (3) 'Irregular Use' trees (*Angophora floribunda*, *Corymbia maculata*, *Eucalyptus acmenoides*), and one (1) tree with no evidence of use (*Eucalyptus canaliculata*).
- State – A total of one (1) species listed as KFTs in Schedule 1 of the Biodiversity and Conservation SEPP 2021 (Chapter 3) occur within the Project Area; *E. tereticornis*.

Feed tree use: SAT tests completed within the Project Area and targeted surveys did not detect koalas.

Associated PCTs

All three (3) PCTs within the Project Area are associated with the species in the NSW Bionet Threatened Biodiversity Database System (TBDC);

- *PCT 3244: Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest*
- *PCT 3315: Central Hunter Ironbark-Spotted Gum Forest*
- *PCT 4073: Lower North Hinterland River Oak Forest*

The total area of suitable foraging habitat for Koala within the Disturbance Footprint (41.29ha) representing a small proportion of associated PCTs (i.e. available foraging habitat) within the locality (see **Figure 20**).

Key Questions for Koala Habitat

To determine whether habitat critical to the survival of the species the following questions were answered:

1. whether the habitat is used during periods of stress (examples flood, drought or fire)

The vegetation does not represent important refugia in times of stress including flood, drought or fire. The exposed location along the ridgeline indicates the vegetation within the

Disturbance Footprint is likely to be sensitive to environmental stresses including drought and fire.

2. whether the habitat is used to meet essential life cycle requirements (e.g. foraging, breeding, social behaviour, dispersal)

The species was not recorded within the Project Area, as such it is unlikely that the vegetation within the Project Area represents important habitat for the species, including important habitat essential for foraging, breeding, social behaviour or dispersal.

3. the extent to which the habitat is used by important populations

The species was not recorded within the Project Area during targeted surveys, as such the vegetation within the Project Area is unlikely to be habitat for an important population of the species.

4. whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development

The species was not recorded within the Project Area, as such the habitat within the Project Area is unlikely to be important for the maintenance of genetic diversity and long-term evolutionary development for the species.

5. 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

The vegetation within the Project Area may represent part of a local population's range and habitat. However, considering the large area of similar habitat surrounding the Project Area it is unlikely to represent an important corridor for the species.

6. whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation

The species was not recorded within the Project Area, as such the vegetation is unlikely to be habitat necessary for the long-term survival of the species.

7. any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community (EPBC Act).

Not applicable.

Considering the above the vegetation within the Project Area is considered potential foraging habitat for the species but is not considered 'habitat critical to the survival of the species'.

Table 10: Koala – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Area Foraging Habitat (ha)	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 (PCT 3244 Forest)	Potential Foraging	1.65	Yes	1.65	8.82
Vegetation Zone 2 (PCT 3315 Forest)	Potential Foraging	22.43	Yes	22.43	101.36
Vegetation Zone 3 (PCT 3315 Managed)	Potential Foraging	10.24	Yes	10.24	27.34

Vegetation Zone 4 (PCT 3315 High Weed)	Potential Foraging	6.97	Yes	6.97	16.44
Vegetation Zone 5 (PCT 3315 DNG)	None	N/A	No	-	-
Vegetation Zone 6 (PCT 3315 Exotic Grassland)	None	N/A	No	-	-
Vegetation Zone 7 (PCT 3110 High Weed)	None	N/A	No		
Total Area				41.29	153.96

3.4.5 Regent Honeyeater (*Anthochaera phrygia*)

Habitat Critical to the Survival of the Species - Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

Habitat critical to the survival of the regent honeyeater is defined under the National Recovery Plan for the Regent Honeyeater (*Anthochaera phrygia*) as:

- Any breeding or foraging habitat in areas where the species is likely to occur (based on commonwealth mapping); and
- Any newly discovered breeding or foraging locations.

Key areas include the Bundarra-Barraba, Pilliga Woodlands, Mudgee-Wollar and the Capertee Valley and Hunter Valley areas in New South Wales, and the Chiltern and Lurg-Benalla regions of north-east Victoria

Habitat - Most records of regent honeyeaters come from box-ironbark eucalypt associations, where the species seems to prefer more fertile sites with higher soil water content, including creek flats, broad river valleys and lower slopes. Other forest types regularly utilised by regent honeyeaters include wet lowland coastal forest dominated by swamp mahogany (*Eucalyptus robusta*), spotted gum-ironbark associations and riverine woodlands (where it is known to feed on nectar from *Amyema cambagei*) (Menkhorst, 1997; Geering & French, 1998; Oliver et al., 1998; Oliver et al., 1999).

Key tree and mistletoe species for the regent honeyeater include:

- Mugga (or Red) Ironbark (*Eucalyptus sideroxylon*)
- Yellow Box (*E. melliodora*)
- White Box (*E. albens*)
- Yellow Gum (*E. leucoxylon*)
- Spotted Gum (*Corymbia maculata*)
- Swamp Mahogany (*E. robusta*)
- Needle-leaf Mistletoe (*Amyema cambagei*) on River Sheoak (*Casuarina cunninghamiana*)

- Box Mistletoe (*A. miquelii*)
- Long-flower Mistletoe (*Dendrothoe vitellina*)

Other tree species may be regionally important. For example the Lower Hunter Spotted Gum forests have recently been demonstrated to support regular breeding events of regent honeyeaters. Flowering of associated species such as thin-leaved stringybark (*E. eugenioides*) and other stringybark species, and broad-leaved ironbark (*E. fibrosa*) can also contribute important nectar flows at times. Mature, large individual trees tend to be more important as they are more productive, particularly on highly fertile sites and in riparian areas (Webster & Menkhorst 1992; Oliver 2000). Trees in such areas tend to grow larger (Soderquist & MacNally 2000) and produce more flowers (Wilson & Bennett 1999).

Assessment

No mapped Important Bird Areas for the Species (i.e. Key breeding areas or other breeding areas) are mapped within the Project Area. The vegetation within the Project Area does contain key foraging species for the Regent Honeyeater including *Corymbia maculata* (Spotted Gum), as such the vegetation meets the definition of “any foraging habitat in areas where the species is likely to occur”. Therefore, the vegetation within the Project Area broadly meets the definition of “Habitat critical to the survival of the species”.

Table 11: Regent Honeyeater – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Is an Important Population	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 (PCT 3244 Forest)	Potential Foraging	N/A	Yes	1.65	8.82
Vegetation Zone 2 (PCT 3315 Forest)	Potential Foraging	N/A	Yes	22.43	101.36
Vegetation Zone 3 (PCT 3315 Managed)	Potential Foraging	N/A	Yes	10.24	27.34
Vegetation Zone 4 (PCT 3315 High Weed)	Potential Foraging	N/A	Yes	6.97	16.44
Vegetation Zone 5 (PCT 3315 DNG)	Potential Foraging	N/A	No	-	-
Vegetation Zone 6 (PCT 3315 Exotic Grassland)	Potential Foraging	N/A	No	-	-
Vegetation Zone 7 (PCT 3110 High Weed)	Potential Foraging	N/A	No		
Total Area				41.29	153.96

3.4.6 Swift Parrot (*Lathamus discolor*)

Habitat critical to the survival of a species or ecological community refers to areas that are necessary:

- For activities such as foraging, breeding, roosting, or dispersal;

- For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
- To maintain genetic diversity and long-term evolutionary development; or
- For the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the Minister under the EPBC Act.

The Swift Parrot breeds mostly on the east and south-east coast of Tasmania during summer and migrates to mainland Australia in autumn. During winter the species disperses across forests and woodlands, foraging on nectar and lerps mainly in Victoria and New South Wales. Small numbers of Swift Parrots are also recorded in the Australian Capital Territory, south eastern South Australia and southern Queensland. Within these habitats, Swift Parrots preferentially forage in large, mature trees (Kennedy 2000; Kennedy and Overs 2001; Kennedy and Tzaros 2005) that provide more reliable foraging resources than younger trees (Wilson and Bennett 1999; Law et al. 2000). The migratory nature of the species means that they require a large network of resources both during and between annual cycles. Actions that directly and/or indirectly affect the species or their habitats could compromise recovery.

Noting the requirements of the species, habitat critical to the survival for the Swift Parrot includes:

Breeding and foraging habitat in Tasmania

- In different years the majority of the breeding population may be concentrated within a subset of the potential breeding range, according to spatially and temporally variable flowering patterns of preferred foraging species.
- Therefore, within areas where breeding is most likely to occur based on known breeding records, scientific literature and expert opinion, habitat critical to survival of Swift Parrots comprises both potential foraging habitat – which is native forest and woodland containing either Blue Gum (*E. globulus*) and/or Black Gum (*E. ovata*) as a dominant, subdominant or low density species, and potential nesting habitat – which is forests or woodlands containing hollow-bearing eucalypt trees within foraging range (~10 km) of potential foraging habitat that is old enough to flower.

Foraging habitat on the Australian mainland

- All preferred foraging species within known and likely foraging habitat on the mainland including Yellow Gum (*E. leucoxyton*); Red Ironbark (*E. tricarpa*); Mugga Ironbark (*E. sideroxyton*); Grey Box (*E. macrocarpa*); White Box (*E. albens*); Yellow Box (*E. melliodora*); Swamp Mahogany (*E. robusta*); Forest Red Gum (*E. tereticornis*); Blackbutt (*E. pilularis*); and Spotted Gum (*Corymbia maculata*).

Assessment

In accordance with the National Recovery Plan for the species “habitat critical for the survival of the species” is defined as important breeding or foraging habitat, assessed below:

- Breeding habitat – The species is known to only breed in Tasmania. Therefore, the Project Area does not contain breeding habitat for the species

- Foraging habitat – The Project Area contains two (2) foraging tree species; Spotted Gum (*Corymbia maculata*) and Forest Red Gum (*E. tereticornis*) including:
 - PCT 3244: contains no foraging species
 - PCT 3315: contains Spotted Gum (20%) and Forest Red Gum (6.5%)
 - Veg Zone 2: Spotted Gum (24%), low density of “mature trees”
 - Veg Zone 3: None
 - Veg Zone 4: None
 - Veg Zone 5: None
 - Veg Zone 6: None
 - PCT 4073: contains no foraging species

Vegetation Zone 2 contains key foraging species and a low density of mature trees (approx. 5 mature trees a hectare – based on BAM plot data). Therefore, Vegetation Zone 2 broadly meets the definition of “habitat critical to the survival of the species”, however in accordance with the Recovery Plan for the species; “*survey data and historical records need to be considered when assessing the relative importance of a local area or region for Swift Parrots*”. The nearest records of Swift Parrot is >11km to the south of the Project Area. As such, while the vegetation is potential foraging habitat for the species it is unlikely to represent important foraging habitat based on the low density of mature trees and the lack of historical records for the species within the locality. Therefore, it is unlikely to represent “*habitat critical to the survival of the species*”.

Table 12: Swift Parrot – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Is an Important Population	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 (PCT 3244 Forest)	None	N/A	No	-	-
Vegetation Zone 2 (PCT 3315 Forest)	Potential Foraging	N/A	No	-	-
Vegetation Zone 3 (PCT 3315 Managed)	None	N/A	No	-	-
Vegetation Zone 4 (PCT 3315 High Weed)	None	N/A	No	-	-
Vegetation Zone 5 (PCT 3315 DNG)	None	N/A	No	-	-
Vegetation Zone 6 (PCT 3315 Exotic Grassland)	None	N/A	No	-	-
Vegetation Zone 7 (PCT 3110 High Weed)	None	N/A	No		
Total Area				0	0

3.4.7 Brown Treecreeper (south -eastern) (*Climacteris picumnus victoriae*)

Habitat critical to the survival or important habitats of a species or ecological community refers to areas that are necessary:

- For activities such as foraging, breeding, roosting, or dispersal;
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
- to maintain genetic diversity and long-term evolutionary development; or
- for the reintroduction of populations or recovery of the species or ecological community.

Habitat critical to the survival of the brown treecreeper (south-eastern) includes areas that have:

- Relatively undisturbed grassy woodland with native understorey.
 - Habitat structure should be quite open at ground level so that birds are able to feed on or near the ground and maintain vigilance against predators.
 - The required degree of openness is mostly likely to be created by moderate levels of disturbance by fire and/or grazing.
- large living and dead trees which are essential for roosting and nesting sites and for foraging;
- fallen timber which provides essential foraging habitat and;
- hollows in standing dead or live trees and tree stumps are also essential for nesting.

Assessment

The Disturbance Footprint and Project Area contains broadly suitable foraging habitat for the Brown Treecreeper. There is a low abundance of nesting hollows within the Project Area and Disturbance Area owing to the extent of historical vegetation clearing, while ongoing management of the property has reduced the availability of shrubs and midstorey resources for the species. The species was not recorded within the Project Area during targeted bird surveys and there are no records of the species within 5km of the Project Area. As such, it is unlikely the Disturbance Footprint comprises an important population of the Brown Treecreeper or habitat critical to the survival of a species.

Table 13: Brown Treecreeper – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Is an Important Population	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 (PCT 3244 Forest)	Potential Foraging	No	No	-	-
Vegetation Zone 2 (PCT 3315 Forest)	Potential Foraging	No	No	-	-
Vegetation Zone 3 (PCT 3315 Managed)	Potential Foraging	No	No	-	-
Vegetation Zone 4 (PCT 3315 High Weed)	Potential Foraging	No	No	-	-

Vegetation Zone 5 (PCT 3315 DNG)	None	No	No	-	-
Vegetation Zone 6 (PCT 3315 Exotic Grassland)	None	No	No	-	-
Vegetation Zone 7 (PCT 3110 High Weed)	Potential Foraging	No	No		
Total Area				0	0

3.4.8 Spotted -tailed Quoll (*Dasyurus maculatus*)

Habitat critical to the survival or important habitats of a species or ecological community refers to areas that are necessary:

- For activities such as foraging, breeding, roosting, or dispersal;
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
- to maintain genetic diversity and long-term evolutionary development; or
- for the reintroduction of populations or recovery of the species or ecological community.

In accordance with the National Recovery Plan for the Spotted-tailed Quoll (DELWP 2016) *habitat critical to the survival of the Spotted-tailed Quoll includes large patches of forest with adequate denning resources and relatively high densities of medium-sized mammalian prey (Belcher 2000; Belcher & Darrant 2006b; Glen & Dickman 2006a, b). However, the threshold densities of these critical components required to support quoll populations are unknown. Consequently, it is currently not possible to define (or map) habitat critical to the survival of the Spotted-tailed Quoll. An action proposed in this Recovery Plan is to determine factors that influence habitat quality and to identify and map high quality habitat throughout the species' range (Action 1.3). Given the threatened status of the Spotted-tailed Quoll, all habitats within its current distribution that are known to be occupied are considered important. There is currently insufficient information to identify potential habitat that the species may recolonise or to which it could be reintroduced.*

Habitat for the species is known to include:

- The southern subspecies, *D. m. maculatus*, has been recorded from a wide range of habitat types including rainforest, wet and dry sclerophyll forest, coastal heathland, scrub and dunes, woodland, heathy woodland, swamp forest, mangroves, on beaches and sometimes in grassland or pastoral areas adjacent to forested areas
- The Spotted-tailed Quoll occupies home ranges of several hundred to several thousand hectares in size.

Important populations for the species are listed in Table 1 of the Recovery Plan and include:

- Marylands National Park and adjacent freehold property 'Mowamba'
- Northern Tablelands (Tenterfield, Glen Innes, Armidale/Walcha, Dorrigo Plateau, Barrington)
- North Coast (Yuragir, Mariah, Limeburners Creek)

- Greater Blue Mountains (Wolgan, Goulburn River, Jenolan)
- South Coast (Barren Grounds / Budderoo, Escarpment forests from Morton National Park to Victorian border, Tallaganda / Badja)
- Kosciuszko National Park / Snowy Mountains, Byadbo

No Important Populations occur within the locality.

Assessment

The Disturbance Footprint and Project Area contains broadly suitable foraging habitat for the Spotted-tailed Quoll. As a result of ongoing management of the vegetation within the Disturbance Footprint there is a lack of denning resources for the species. The species was not recorded within the Project Area during targeted surveys and there is only one (1) record of the species within 5km of the Project Area. As such, it is unlikely the Disturbance Footprint comprises an important population of the Spotted-tailed Quoll (not listed) or habitat critical to the survival of a species.

Table 14: Brown Treecreeper – Areas critical to the survival of the MNES

Vegetation Zone	Habitat Type	Is an Important Population	Is an Area critical to the survival of the MNES	Area within Disturbance Footprint (ha)	Area within Project Area (ha)
Vegetation Zone 1 (PCT 3244 Forest)	Potential Foraging	No	No	-	-
Vegetation Zone 2 (PCT 3315 Forest)	Potential Foraging	No	No	-	-
Vegetation Zone 3 (PCT 3315 Managed)	Potential Foraging	No	No	-	-
Vegetation Zone 4 (PCT 3315 High Weed)	Potential Foraging	No	No	-	-
Vegetation Zone 5 (PCT 3315 DNG)	None	No	No	-	-
Vegetation Zone 6 (PCT 3315 Exotic Grassland)	None	No	No	-	-
Vegetation Zone 7 (PCT 3110 High Weed)	Potential Foraging	No	No		
Total Area				0	0

4. AVOID, MITIGATE AND MANAGE IMPACTS TO MNES

The current proposed layout of the quarry and associated infrastructure has undergone an iterative design process, taking into consideration engineering, surface water, traffic and transport and biodiversity values. Avoidance of impacts on native vegetation, fauna habitats watercourses and other biodiversity values have been taken into consideration in the design.

Mitigation measures are detailed in Section 8.4 of the BDAR.

The Bluestone Hardrock Quarry design and avoidance process is summarised below:

1. Investigated land holdings for hard rock and conglomerate resources (refer **Plate 2**).
2. Undertook further resource assessment of areas that appeared to show better potential.
3. Adopted the current resource and disturbance boundary considering a complex mix of factors including:
 - a. Ability to transport material from the site:
 - i. Considered four potential site haulage options including:
 1. To Springvale Road along the valley floor using several different routes, adopted the most practical route considering grades and crossing locations of the creeklines.
 2. Blind Creek Road is not a suitable option, as the pit design incorporates a graded downhill alignment to the processing area, with continued downhill access to the weighbridge and final egress via Stanhope Road, thereby minimising actual haulage distance and overall environmental and social impacts
 3. Via a more elevated route to the south avoiding Springvale Road, avoided due to greater potential noise and additional intersection limitations on Stanhope Road.
 4. Alternative quarry access road following the creek line closer to Tangory Nature Reserve, discounted due to the additional creek crossings and required grades to reach top of resource area
 - b. Removed smaller quarry to the north of current processing area due to location adjacent to creeks and proximity to Nature Reserve.
 - c. Location of surrounding private land holdings and receptors to limit noise and dust impacts.
 - d. Likely extent of overburden, adopted areas where overburden was shallowest, this is most evident on the northern portion of the quarry pit.
 - e. Ability to have more than one material for extraction (ie conglomerate gravels in the south and hard rock reserves in the north)
 - f. Avoidance of the Tangory Nature Reserve:

- i. 50m buffer for resource extraction area, This buffer aligns with the aims of the *Developments adjacent to NPWS lands: Guidelines for consent and planning authorities* (DPIE 2022).
 - ii. 30m buffer for the resource processing area, noting the reserve in this area was substantially cleared for agriculture.
 - iii. 18m buffer for the office and weighbridge area, noting the reserve in this area is open grasslands cleared for agriculture.
- g. Avoidance of mapped drainage lines in the resource area and limiting the extent of crossings by haulage roads
- h. Maximising resource within the smallest footprint, whilst avoiding the creating a void on completion. The proposed development has been positioned on more elevated landforms with suitable geology to maximise the resource availability within the applications spatial extent. This reduces the long term footprint of the quarry whilst enabling a free draining final landform at the conclusion of resource extraction. The application is for 30 years of quarrying from an estimated resource extent of at least 50 years.
- i. The resource area is effectively screened to the north east and south west by higher ridgelines limiting the extent of visibility.
- j. Engineering feasibility to create haulage roads and processing areas with suitable grades for access.
- k. The extent of previously cleared lands within the disturbance area, aiming to utilise areas that had been more cleared in the past, and which also had higher spread of weeds.
- l. Considering the extent of higher quality vegetation, including the Commonwealth protected CEEC, the current Disturbance Footprint targets areas of lower quality vegetation.

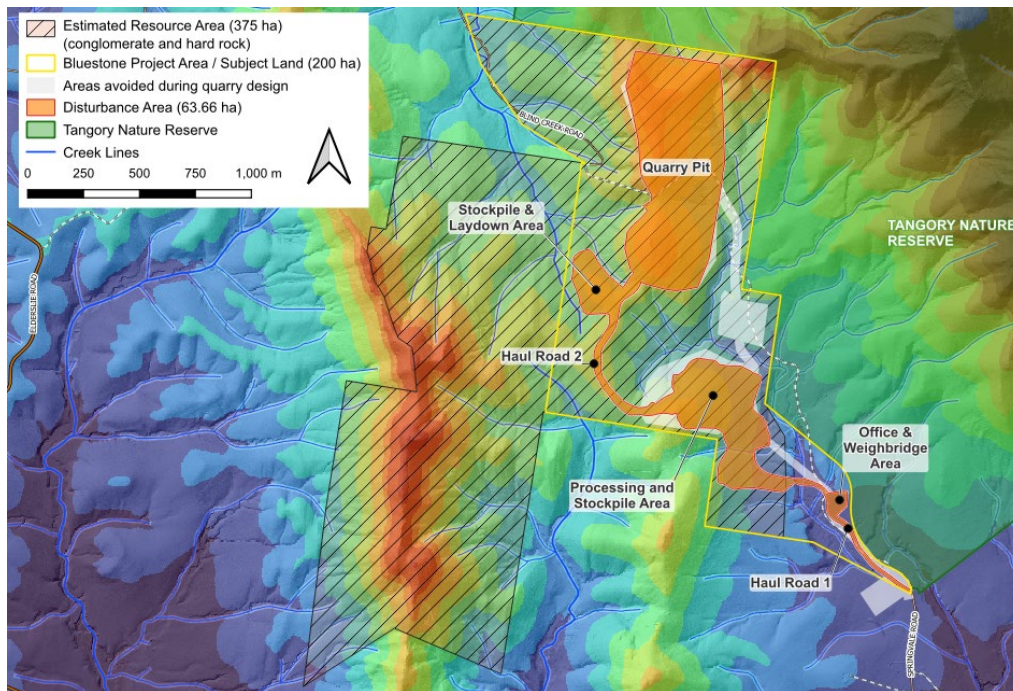


Plate 1: Quarry design and avoidance considerations

Direct and indirect impacts have been avoided and minimised through locating and designing the proposal in the following ways:

- The full extent of the lots owned by the proponent within the Project Area have large potential for hardrock quarrying beyond the Disturbance Footprint. The proposed development has been located within the Project Site to avoid impacts on the majority of the vegetation within the property, including the following:
 - 1.55 ha of PCT 3110 Greater Sydney Enriched Grey Myrtle Dry Rainforest
 - 7.17 ha of PCT 3244 Lower North Spotted Gum - Mahogany - Ironbark Sheltered Forest
 - 105.49 ha of PCT 3315 Central Hunter Ironbark - Spotted Gum Forest equivalent to the TEC *Central Hunter ironbark - Spotted Gum Forest is associated with the Central Hunter Ironbark-Spotted Gum-Grey Box Forest in New South Wales North Coast and Sydney Basin Bioregions*
 - 17.56 ha of derived native grassland assigned to PCT 3315 Central Hunter Ironbark - Spotted Gum Forest (non-TEC)
 - 0.51 ha of PCT 3444 Lower Hunter Spotted Gum - Ironbark Forest associated with the TEC *Lower Hunter Spotted Gum - Ironbark Forest in the Sydney Basin Bioregion*
 - 2.10 ha of PCT 4073 Lower North Hinterland River Oak Forest
- The proposed development has been located to minimise impacts to higher condition vegetation zones (VZ 1, VZ 2 and VZ 7), prioritising impacts to lower condition vegetation zones (VZ 3, VZ 4, VZ 5 and VZ 6) and Category 1-exempt land mapped by the NVR map. Substantial areas of the site where remnant vegetation existed in 1961 have been avoided.

- Haul roads have been located to utilise existing tracks and fire trails within the property, minimising the level of impact for road construction. Access to the Disturbance Footprint will be achieved by upgrade of the existing property access track (as an alternative to construction along a new track alignment, which would involve substantial vegetation clearing) so that minimal clearing of native vegetation is required.
- Alternative design with eastern haul road would impact PCT 3110 rainforest vegetation and second-order stream. The current haul road location avoids these impacts.
- Dust suppression using water carts will minimise indirect impacts caused by excessive dust.
- The proposal avoids impacts to 20 hollow-bearing trees providing potential habitat for the hollow-dependent threatened species including recorded Powerful Owl, Squirrel Glider and Brush-tailed Phascogale.
- The proposal avoids impacts to nine waterbodies (dams and creek lines) that provide suitable foraging habitat for Southern Myotis
- Design of the watercourse / drainage line crossings will be consistent with the NSW Department of Planning Environment Fact Sheet, *Controlled activities – Guidelines for watercourse crossings on waterfront land*, to minimise changes to hydrology and maintain natural functioning of the watercourses
- The proposed pit has been located to avoid significant adverse impacts on water quality, bed and bank stability, aquatic and riparian habitats, and ecological processes (Martens 2025b)
- Sediment and erosion control measures consistent with *Managing Urban Stormwater: Soils and Construction* (the Blue Book) will be adopted to minimise erosion, sedimentation and nutrient loads in runoff
- 30 km/h speed limit imposed throughout the project site will minimise vehicle strike on threatened and common species

The timing and responsibility for each of the avoidance measures are detailed below in Table 15.

Table 15: Summary of Avoidance and Minimisation measures

Action	Outcome	Timing	Responsibility
Location of pit, processing and weighbridge/office	The proposed development has been located to minimise impacts to higher condition vegetation zones (VZ 1, VZ 2 and VZ 7), prioritising impacts to lower condition vegetation zones (VZ 3, VZ 4, VZ 5 and VZ 6) and Category 1-exempt land mapped by the NVR map.	Vegetation clearing prior to construction at all stages	Proponent
Location of quarry pit	The proposed development has been positioned on more elevated landforms with suitable geology to maximise the resource availability within the applications spatial extent. This reduces the long term footprint of the quarry whilst enabling a free draining final landform at the conclusion of resource extraction. The application is for 30 years of quarrying from an estimated resource extent of at least 50 years.	Stage 2, 4	Proponent

Action	Outcome	Timing	Responsibility
Location of stockpile area	Avoids impacts to mapped Biodiversity Values associated with Blind Creek	Stage 3 vegetation clearing and construction	Proponent
Haul roads utilise existing tracks and site access	Minimise vegetation clearing for haul roads	Stage 1 and 2 clearing and construction	Proponent
Alternative option chosen over eastern option	Avoid impacts to PCT 3110 rainforest and 2 nd order stream	Stage 1 and 2 clearing and construction	Proponent
Dust suppression water trucks	Minimise indirect impacts caused by dust	Operation of all stages	Site manager, Plant operators
Quarry location	Avoids impacts to nine waterbodies (dams and creeklines) that provide suitable foraging habitat for Southern Myotis	All stages	Proponent
Watercourse crossing design	Minimise changes to hydrology and maintain natural functioning of the watercourses	Construction of haul road Stage 1	Proponent, engineers, construction team
Sediment and erosion control	Minimise sediment and pollution impacts to watercourses	All stages	Proponent, engineers, construction team
Quarry speed limit	Minimise vehicle strike on threatened and common species	Operation from Stage 1 onward	Site manager, truck operators



Plate 2: Historical Imagery 1961

5. ASSESSMENT OF IMPACTS TO MNES

In accordance with the Supplementary SEARs the following has been provided:

11. The EIS must include an assessment of the relevant impacts of the action on the matters protected by the controlling provisions, including:

a) a description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long term relevant impacts;

- b) a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;
- c) analysis of the significance of the relevant impacts; and
- d) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

5.1 DIRECT IMPACTS

Direct impacts associated with the proposed action are the result of direct clearing of native vegetation and habitat. The extent of direct impacts is detailed in **Table 16**. The timing of impacts (in-line with project staging) is provided in **Table 17**.

Table 16: Summary of direct impacts - total

Direct impact	BC Act status	EPBC Act status	Habitat Type	Extent (ha, number of individuals)
Central Hunter Valley Eucalypt Forest and Woodland	EEC	CEEC	Condition A TEC	32.67 ha
Large -eared Pied Bat (<i>Chalinolobus dwyeri</i>)	E	E	Foraging Habitat	61.63 ha
Grey -headed Flying -fox (<i>Pteropus poliocephalus</i>)	V	V	Supplementary Foraging Habitat	41.3 ha
Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT)	E	E	Potential Foraging	41.29 ha
Regent Honeyeater (<i>Anthochaera phrygia</i>)	CE	CE	Potential Foraging	41.29 ha
Swift Parrot (<i>Lathamus discolor</i>)	CE	CE	Potential Foraging	41.29 ha
Brown Treecreeper (south -eastern) (<i>Climacteris picumnus victoriae</i>)	V	V	Potential Foraging	41.3 ha
Spotted -tailed Quoll (<i>Dasyurus maculatus</i>)	E	V	Potential Foraging	41.3 ha

Table 17: Summary of direct impacts - Staging

Direct impact	BC Act status	EPBC Act status	Project Stage (ha/count)					Total Extent (ha/count)
			1	2	3	4	5	
Central Hunter Valley Eucalypt Forest and Woodland	EEC	CEEC	6.07	16.89	3.61	3.77	2.33	32.67 ha
Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)	E	E	15.27	30.21	4.05	9.12	2.99	61.63 ha
Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)	V	V	6.10	20.61	3.61	8.66	2.33	41.3 ha
Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT)	E	E	6.09	20.61	3.61	8.66	2.33	41.29 ha
Regent Honeyeater (<i>Anthochaera phrygia</i>)	CE	CE	6.09	20.61	3.61	8.66	2.33	41.29 ha
Swift Parrot (<i>Lathamus discolor</i>)	CE	CE	6.09	20.61	3.61	8.66	2.33	41.29 ha
Brown Treecreeper (south-eastern) (<i>Climacteris picumnus victoriae</i>)	V	V	6.10	20.61	3.61	8.66	2.33	41.3 ha
Spotted-tailed Quoll (<i>Dasyurus maculatus</i>)	E	V	6.10	20.61	3.61	8.66	2.33	41.3 ha

5.2 INDIRECT IMPACTS

Indirect impacts associated with the proposed action are detailed in **Table 16**.

Indirect impact	Impacted entities	Extent (ha or zone reference)	Frequency	Duration (long-term/short-term/medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
Accidental clearing outside of Disturbance Footprint, inadvertent impacting adjacent habitat or vegetation	Native vegetation and associated general fauna habitats	5–10 m from disturbance edge	Unlikely during construction or operation. Greater potential for accidental incursions during construction.	Long-term	Construction and operation	Likelihood: Low provided exclusion fencing and other mitigation measures in place. Consequence: Disturbance and damage to adjacent vegetation and disturbance to resident fauna; reduction in quality of adjacent vegetation and habitats
General edge effects	Native vegetation and	5–10 m from	Daily for the duration of construction and	Long-term	Construction and operation	Likelihood: High Consequence: could impact condition of

Indirect impact	Impacted entities	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
(clearing, light, noise, weeds)	associated general fauna habitats	disturbance edge	operation, reducing in intensity and location as the quarry project becomes established.			avoided vegetation and habitats
Noise, dust or light spill	Native vegetation and associated general fauna habitats	5–10 m from disturbance edge	Daily for the duration of construction and operation.	Long-term	Construction and operation	Likelihood: high. Consequence: could reduce quality of habitats for foraging and breeding activities of local or resident fauna. Powerful Owl may be disturbed by construction and operational noise but large area of surrounding habitat will allow for dispersal. Note: no night works are proposed, so light spill is not a relevant impact on adjacent habitats within the quarry.
Movement of weeds and pathogens from the site to adjacent vegetation	Native vegetation and associated general fauna habitats	Vegetation adjoining haul roads and operation areas	Daily for the duration of construction and operation.	Long-term	Construction and operation	Likelihood: moderate Consequence: potential reduction in native flora diversity and increase in cover and diversity of weeds (including high threat weeds, HTWs), and function of the avoided vegetation. High prevalence of <i>Olea europaea</i> (African Oliva) and <i>Lantana camara</i> (Lantana) within the Subject Land and surrounding property provides a large seed bank for further dispersal outside of the site. These

Indirect impact	Impacted entities	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Project phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
						weeds, however, are ubiquitous within the region and any movement outside the Disturbance Footprint is likely to be negligible. Controls include management of residual avoided lands to minimise weeds.

6. SIGNIFICANT IMPACT ASSESSMENT

The following species and Ecological Communities have been assessed under the EPBC Act Matters of National Environmental Significance Significant impact guidelines 1.1 (Department of the Environment [DotE], 2013) (Significant Impact Guidelines):

Critically Endangered Ecological Communities:

- Central Hunter valley eucalypt forest and woodland
- Regent Honeyeater (*Anthochaera phrygia*)
- Swift Parrot (*Lathamus discolor*)

Endangered Species:

- Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT)
- Spotted -tailed Quoll (*Dasyurus maculatus*)

Vulnerable Species:

- Large-eared Pied Bat (*Chalinolobus dwyeri*)
- Grey-headed Flying Fox (*Pteropus poliocephalus*)
- Brown Treecreeper (south -eastern) (*Climacteris picumnus victoriae*)

The assessments are provided in **Appendix 2**, the results summarised in **Table 18**.

Table 18: MNES Assessment of Significance

Direct impact	BC Act status	EPBC Act status	Habitat Type	Extent (ha, number of individuals)	Significant Impact
Central Hunter Valley Eucalypt Forest and Woodland	EEC	CEEC	Condition A TEC	32.67 ha	Yes
Large -eared Pied Bat (<i>Chalinolobus dwyeri</i>)	E	E	Foraging Habitat	61.63 ha	No
Grey -headed Flying -fox (<i>Pteropus poliocephalus</i>)	V	V	Supplementary Foraging Habitat	41.3 ha	No
Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT)	E	E	Potential Foraging	41.29 ha	No
Regent Honeyeater (<i>Anthochaera phrygia</i>)	CE	CE	Potential Foraging	41.29 ha	No
Swift Parrot (<i>Lathamus discolor</i>)	CE	CE	Potential Foraging	41.29 ha	No
Brown Treecreeper (south -eastern) (<i>Climacteris picumnus victoriae</i>)	V	V	Potential Foraging	41.3 ha	No
Spotted -tailed Quoll (<i>Dasyurus maculatus</i>)	E	V	Potential Foraging	41.3 ha	No

7. OFFSETTING

Requirements of the SEARs include:

Item 12(e) - Where a significant residual adverse impact to a relevant protected matter is considered likely, the EIS must provide information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy.

Listed Threatened Species [item a(vii)] - Detail of measures to compensate for any residual significant impacts on listed threatened species and ecological communities in accordance with the EPBC Act Environmental Offsets Policy (2012) or endorsed offset framework.

Offsetting for the proposed action will be completed in accordance with the NSW Biodiversity Offset Scheme (BOS). See BDAR for further details on offsets. A summary of offsetting under the BOS is provided in **Table 19**.

Table 19: Summary of offsetting - total

Direct impact	BC Act status	EPBC Act status	Habitat Type	Offset Type	Credits
Central Hunter Valley Eucalypt Forest and Woodland	EEC	CEEC	Occurrence, Habitat Critical to the Survival of the Species	Ecosystem	956
Large -eared Pied Bat (<i>Chalinolobus dwyeri</i>)	E	E	Foraging Habitat	Species	1782

Direct impact	BC Act status	EPBC Act status	Habitat Type	Offset Type	Credits
Grey -headed Flying -fox (<i>Pteropus poliocephalus</i>)	V	V	Supplementary Foraging Habitat	Ecosystem	1126*
Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT)	E	E	Potential Foraging Habitat	Ecosystem	1125*
Regent Honeyeater (<i>Anthochaera phrygia</i>)	CE	CE	Potential Foraging Habitat	Ecosystem	1125*
Swift Parrot (<i>Lathamus discolor</i>)	CE	CE	Potential Foraging Habitat	Ecosystem	1125*
Brown Treecreeper (south -eastern) (<i>Climacteris picumnus victoriae</i>)	V	V	Potential Foraging Habitat	Ecosystem	1126*
Spotted -tailed Quoll (<i>Dasyurus maculatus</i>)	E	V	Potential Foraging Habitat	Ecosystem	1156*

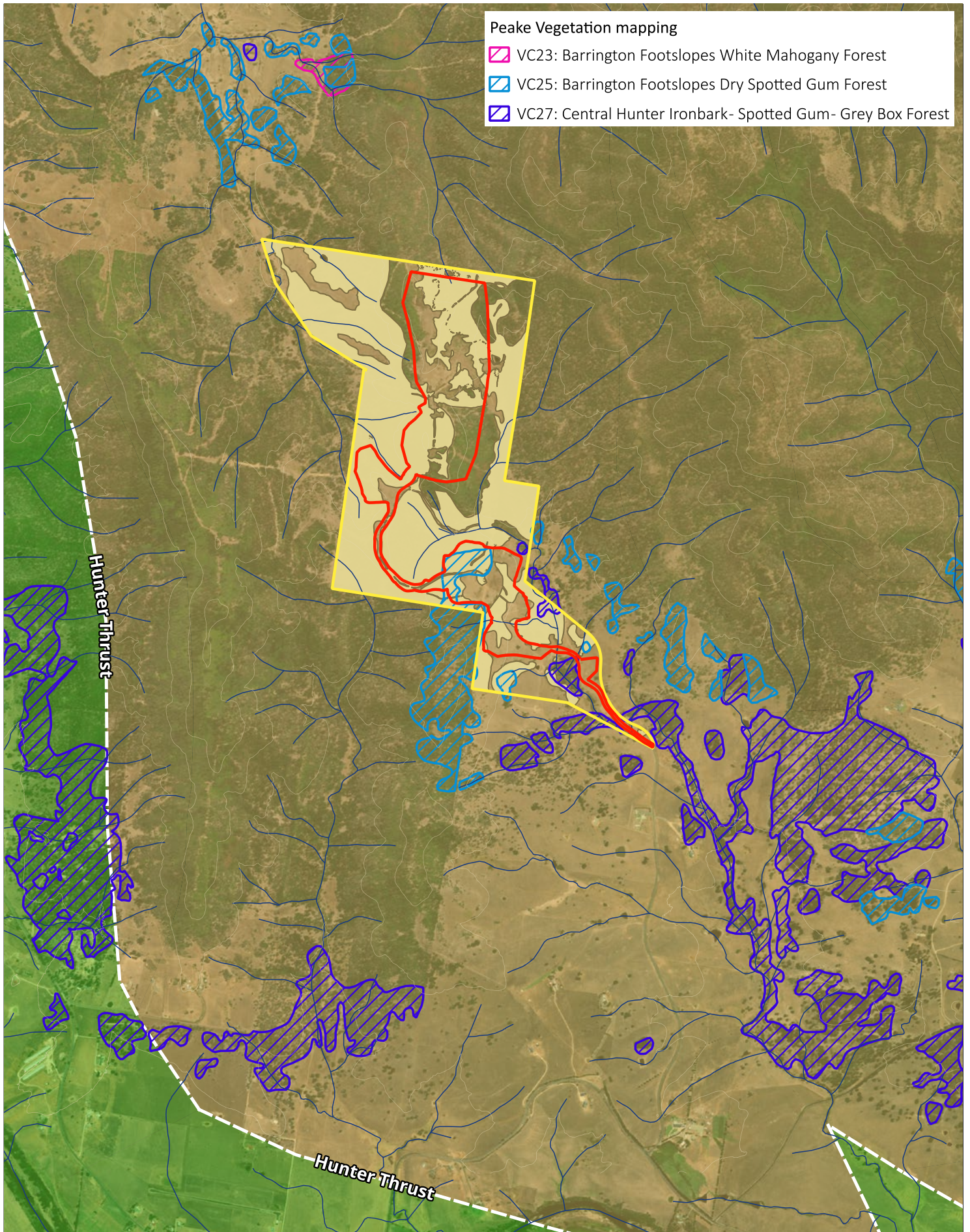
*MNES offset using Ecosystem Credits

Table 20: Summary of direct impacts - Staging

Direct impact	BC Act status	EPBC Act status	Project Stage (Credits)					Total Credits
			1	2	3	4	5	
Central Hunter Valley Eucalypt Forest and Woodland	EEC	CEEC	149	448	90	214	55	956
Large -eared Pied Bat (<i>Chalinolobus dwyeri</i>)	E	E	451	850	122	274	85	1782
Grey -headed Flying -fox (<i>Pteropus poliocephalus</i>)	V	V	229	524	94	218	61	1126*
Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT)	E	E	228	524	94	218	61	1125*
Regent Honeyeater (<i>Anthochaera phrygia</i>)	CE	CE	80	76	4	4	6	1125*
Swift Parrot (<i>Lathamus discolor</i>)	CE	CE	452	850	122	274	85	1125*
Brown Treecreeper (south -eastern) (<i>Climacteris picumnus victoriae</i>)	V	V	229	524	94	218	61	1126*
Spotted -tailed Quoll (<i>Dasyurus maculatus</i>)	E	V	229	553	94	219	61	1156*

*MNES offset using Ecosystem Credits

APPENDIX 1. FIGURES



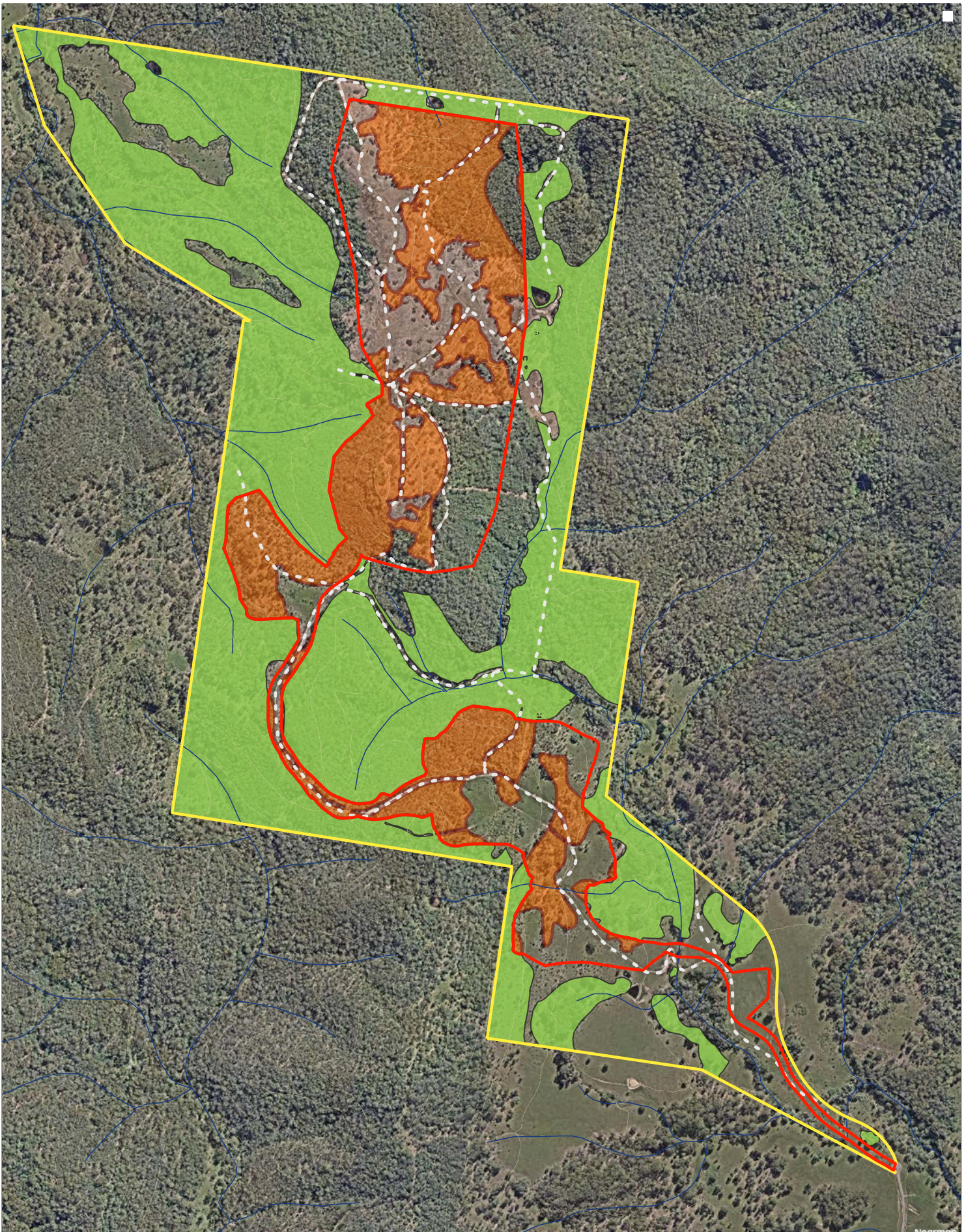
Peake Vegetation mapping

- VC23: Barrington Foothills White Mahogany Forest
- VC25: Barrington Foothills Dry Spotted Gum Forest
- VC27: Central Hunter Ironbark- Spotted Gum- Grey Box Forest

- Project area
- Disturbance footprint
- Central Hunter Valley Eucalypt Forest and Woodland (EPBC Act)
- Carboniferous geology
- Permian geology
- Hunter Thrust
- Watercourse
- Contour (50m)

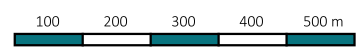
Figure 4: Central Hunter Valley Eucalypt Forest and Woodland – Regional context



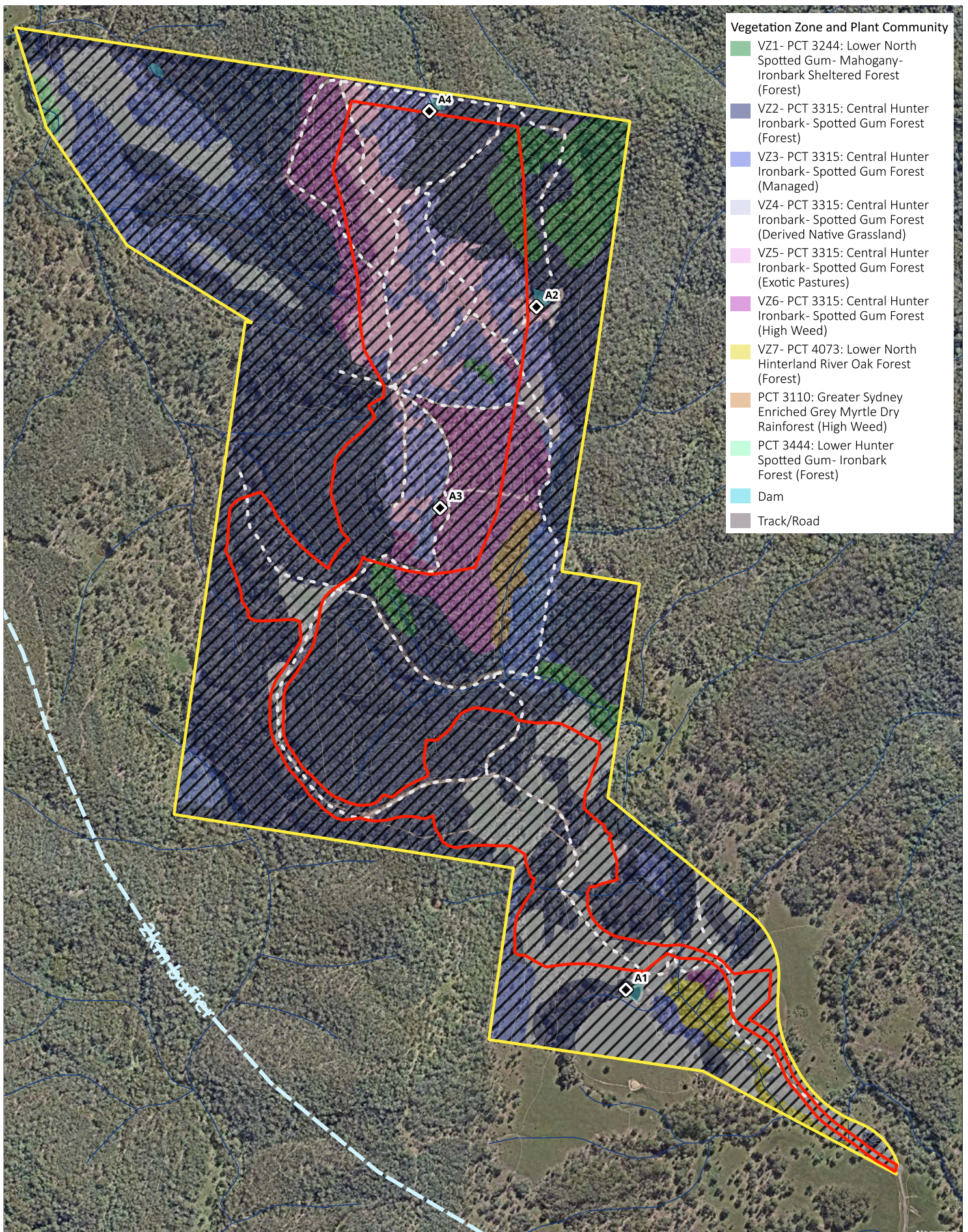


- Project area
- Disturbance footprint
- Impacted
- Not impacted
- Watercourse
- Track
- Contour (20m)

Figure 5: Central Hunter Valley Eucalypt Forest and Woodland - Impact



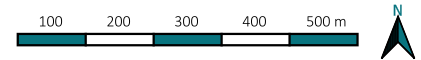
Date: 30/04/2026
 By: Natalia Laws
 GDA94 / MGA zone 56
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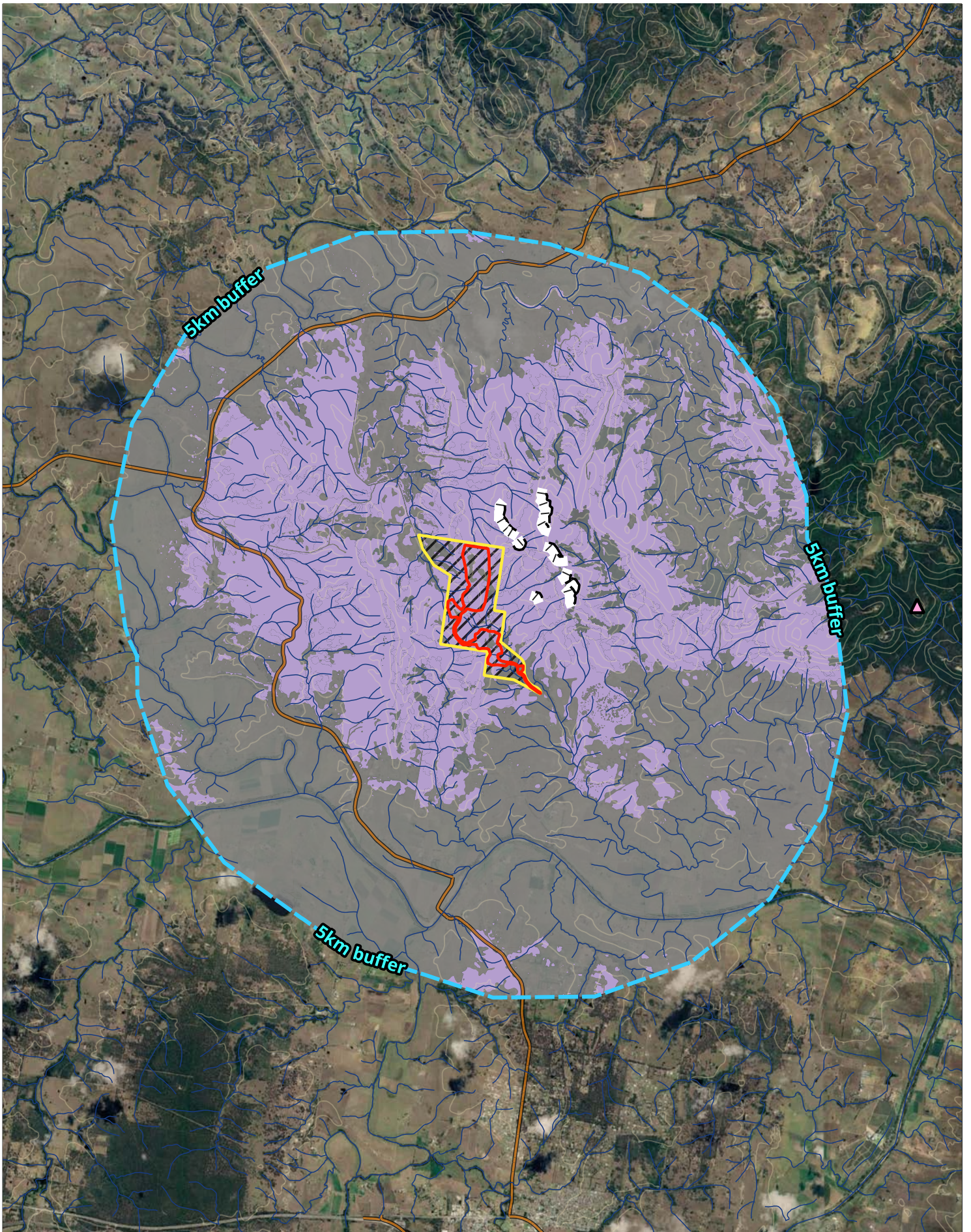


- Vegetation Zone and Plant Community**
- VZ1- PCT 3244: Lower North Spotted Gum- Mahogany- Ironbark Sheltered Forest (Forest)
 - VZ2- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Forest)
 - VZ3- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Managed)
 - VZ4- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Derived Native Grassland)
 - VZ5- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Exotic Pastures)
 - VZ6- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (High Weed)
 - VZ7- PCT 4073: Lower North Hinterland River Oak Forest (Forest)
 - PCT 3110: Greater Sydney Enriched Grey Myrtle Dry Rainforest (High Weed)
 - PCT 3444: Lower Hunter Spotted Gum- Ironbark Forest (Forest)
 - Dam
 - Track/Road

- Project area
- Disturbance footprint
- Escarpment buffer (2km)
- Large-eared Piped Bat (*Chalinolobus dwyeri*) potential foraging habitat
- Large-eared Pied Bat detection
- Track
- Watercourse
- Contour (20m)

Figure 6: Large-eared Pied Bat (*Chalinolobus dwyeri*) - Habitat



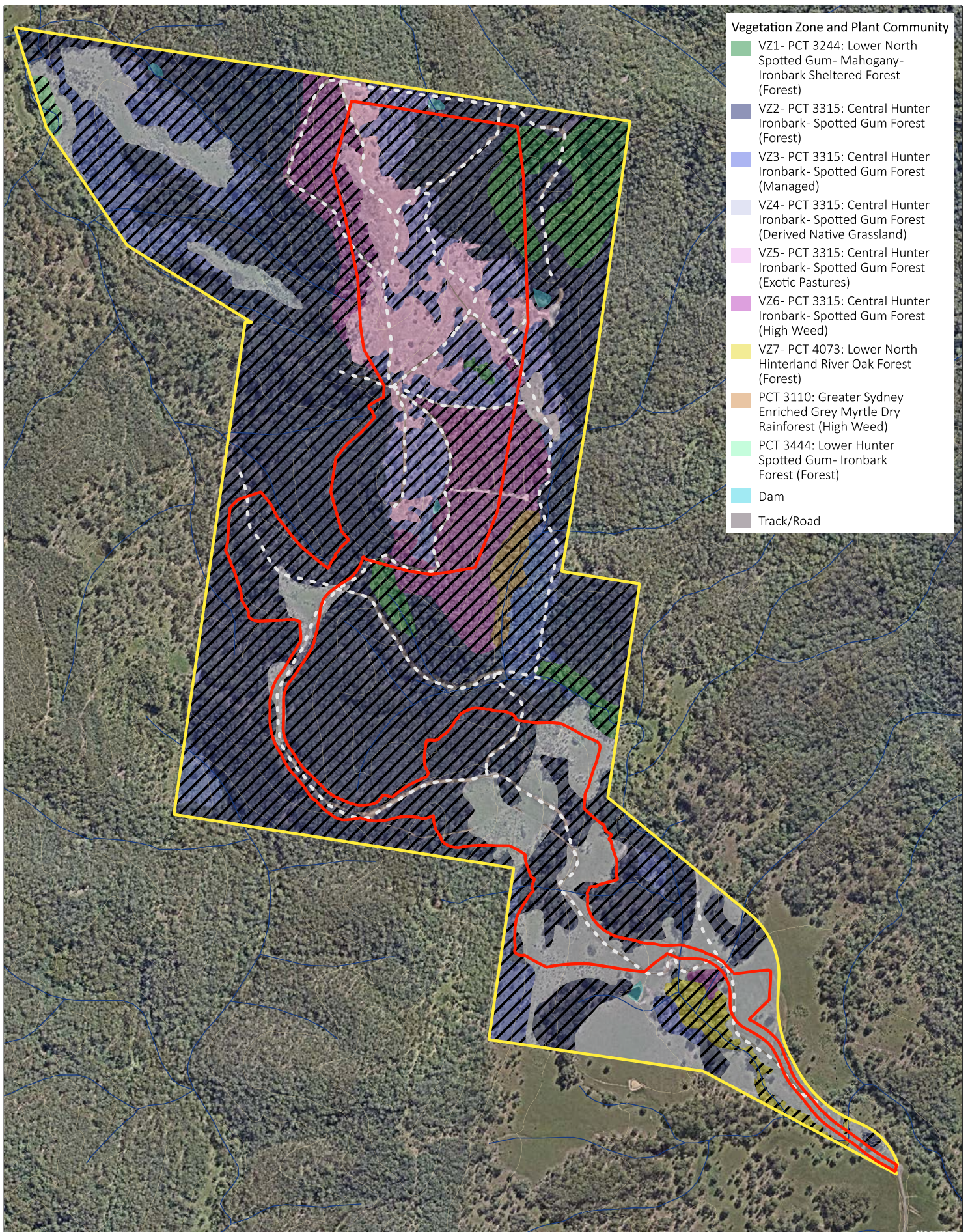


- | | | |
|--|-----------------------------------|---------------|
| Project area | Large-eared Pied Bat (Habitat) | Escarpment |
| Disturbance footprint | Associated PCTs (Habitat) | Arterial Road |
| Buffer (5km) | Non associated PCTs (Not Habitat) | Watercourse |
| Large-eared Piped Bat (Chalinolobus dwyeri) potential foraging habitat | Large-eared Pied Bat (ATLAS) | Contour (50m) |

Figure 7: Large-eared Pied Bat (*Chalinolobus dwyeri*) - Regional Context



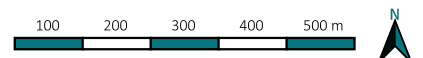
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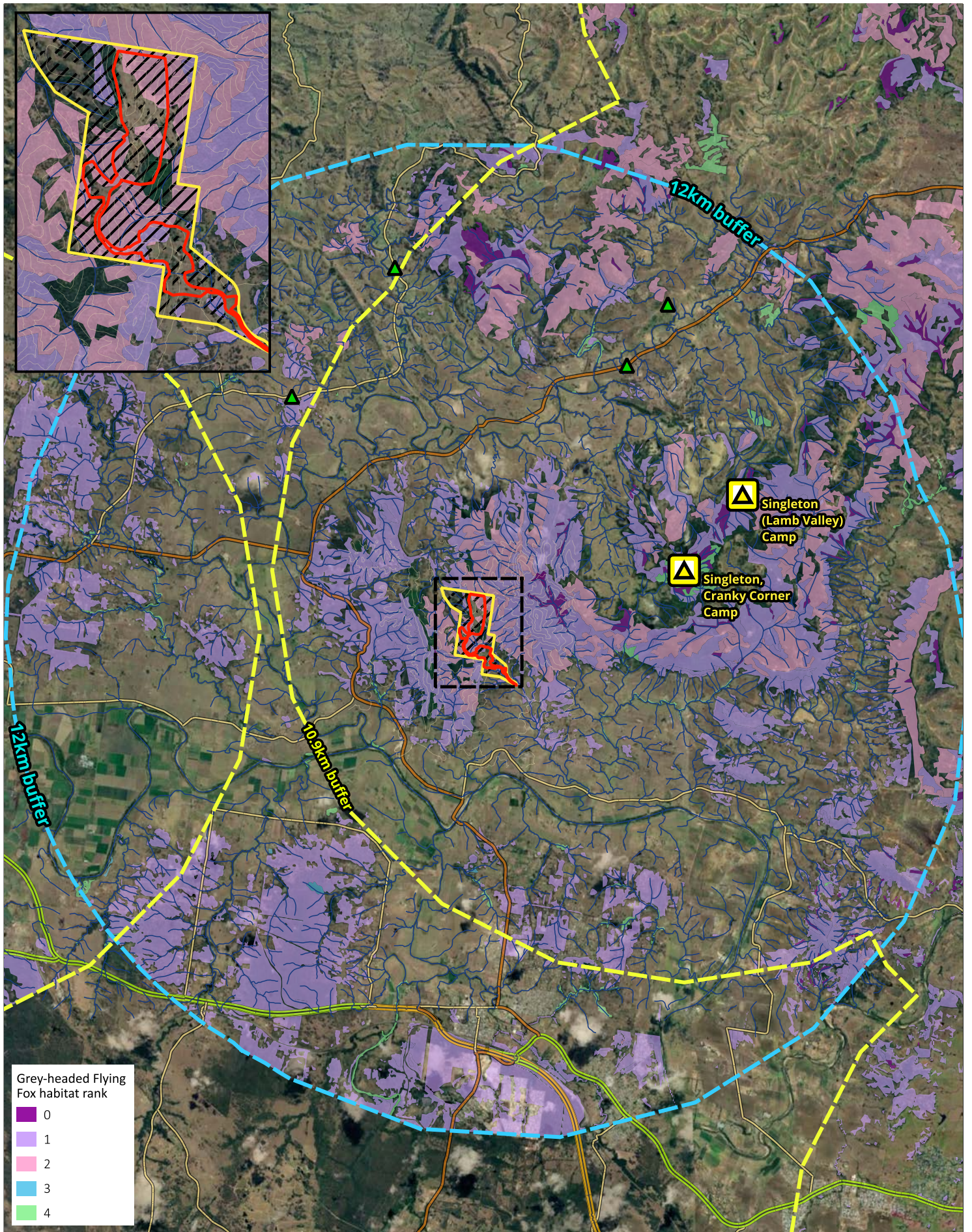


- Vegetation Zone and Plant Community**
- VZ1- PCT 3244: Lower North Spotted Gum- Mahogany- Ironbark Sheltered Forest (Forest)
 - VZ2- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Forest)
 - VZ3- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Managed)
 - VZ4- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Derived Native Grassland)
 - VZ5- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Exotic Pastures)
 - VZ6- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (High Weed)
 - VZ7- PCT 4073: Lower North Hinterland River Oak Forest (Forest)
 - PCT 3110: Greater Sydney Enriched Grey Myrtle Dry Rainforest (High Weed)
 - PCT 3444: Lower North Spotted Gum- Ironbark Forest (Forest)
 - Dam
 - Track/Road

- Project area
- Disturbance footprint
- Grey-headed Flying Fox (*Pteropus poliocephalus*) habitat polygon
- Track
- Watercourse
- Contour (20m)

Figure 9: Grey-headed Flying Fox (*Pteropus poliocephalus*) - Habitat



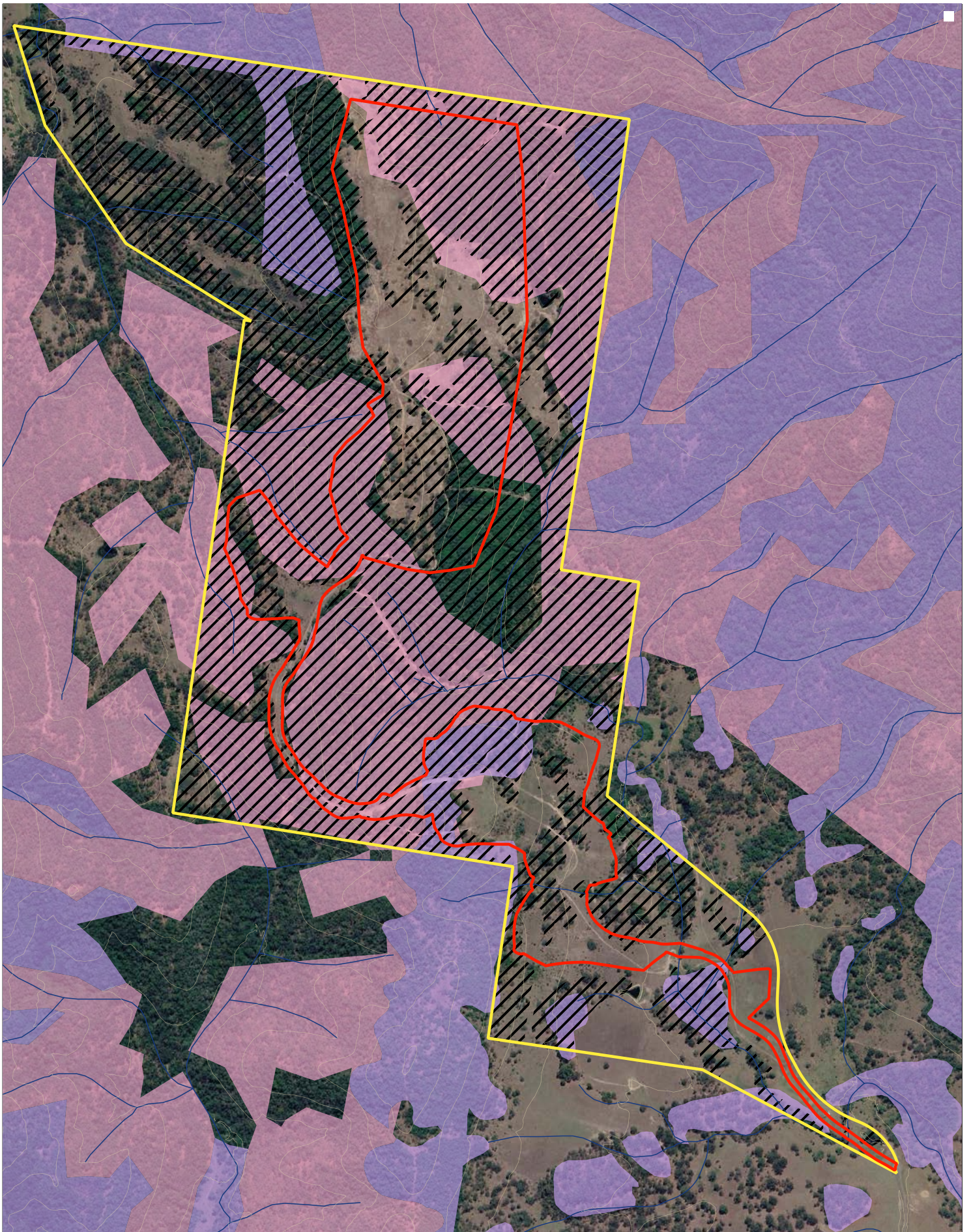


- | | | | |
|--------------------------|---|---------------|-------------------|
| Project area | Grey-headed Flying Fox foraging habitat | Watercourse | Sub-Arterial Road |
| Disturbance footprint | Grey-headed Flying Fox (ATLAS) | Motorway | Contour (50m) |
| Buffer (12km) | Grey-headed Flying Fox camps | Primary Road | |
| Foraging buffer (10.9km) | | Arterial Road | |

Figure 10: Grey-headed Flying Fox (*Pteropus poliocephalus*) - Regional Context

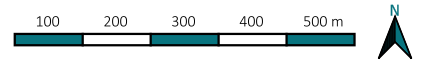


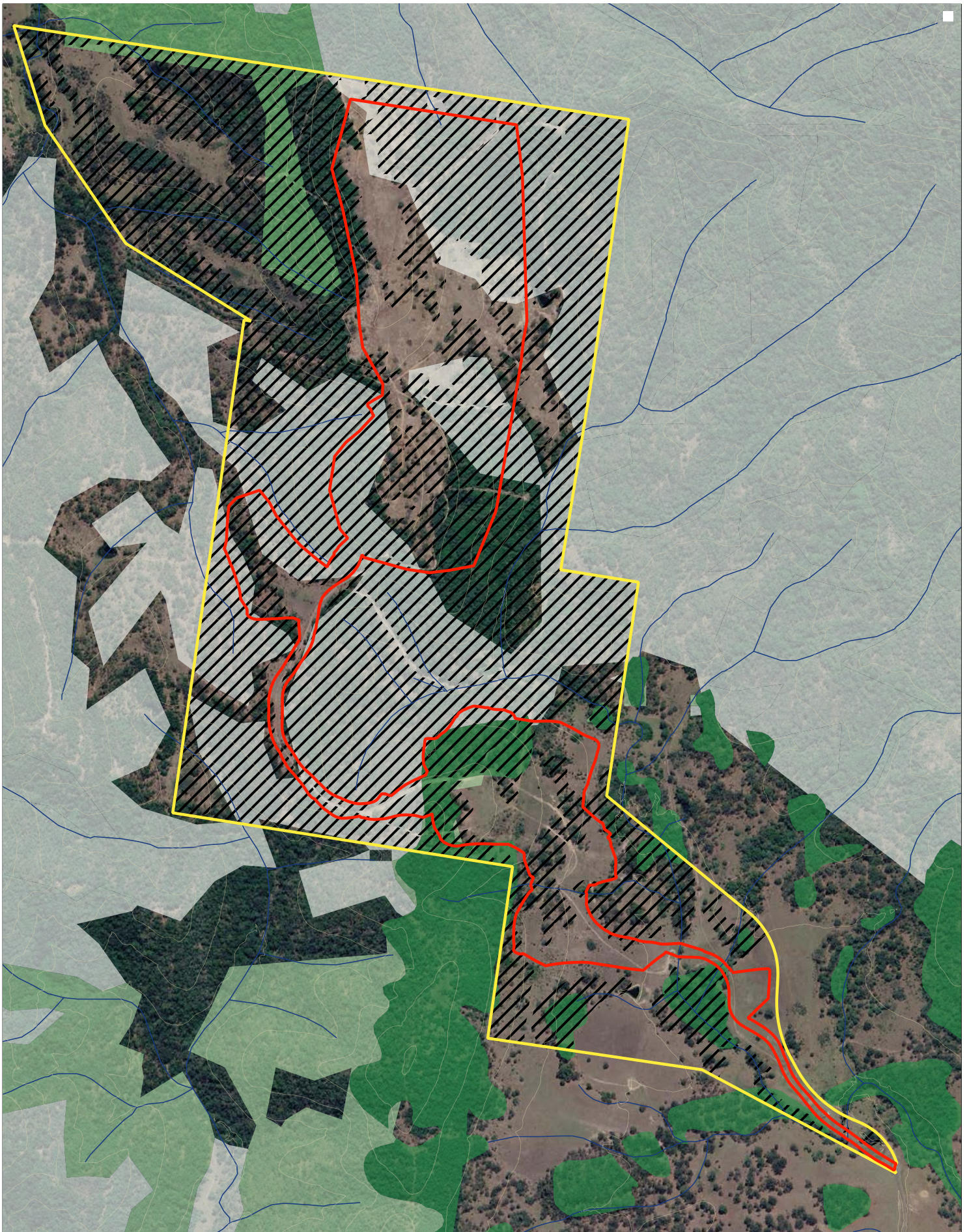
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- ▭ Project area
 - ▭ Disturbance footprint
 - ▨ Grey-headed Flying Fox (*Pteropus poliocephalus*) foraging habitat
 - Watercourse
 - Contour (20m)
- Grey-headed Flying Fox habitat rank
- ▭ 1
 - ▭ 2

Figure 9: Grey-headed Flying Fox (*Pteropus poliocephalus*) - Habitat



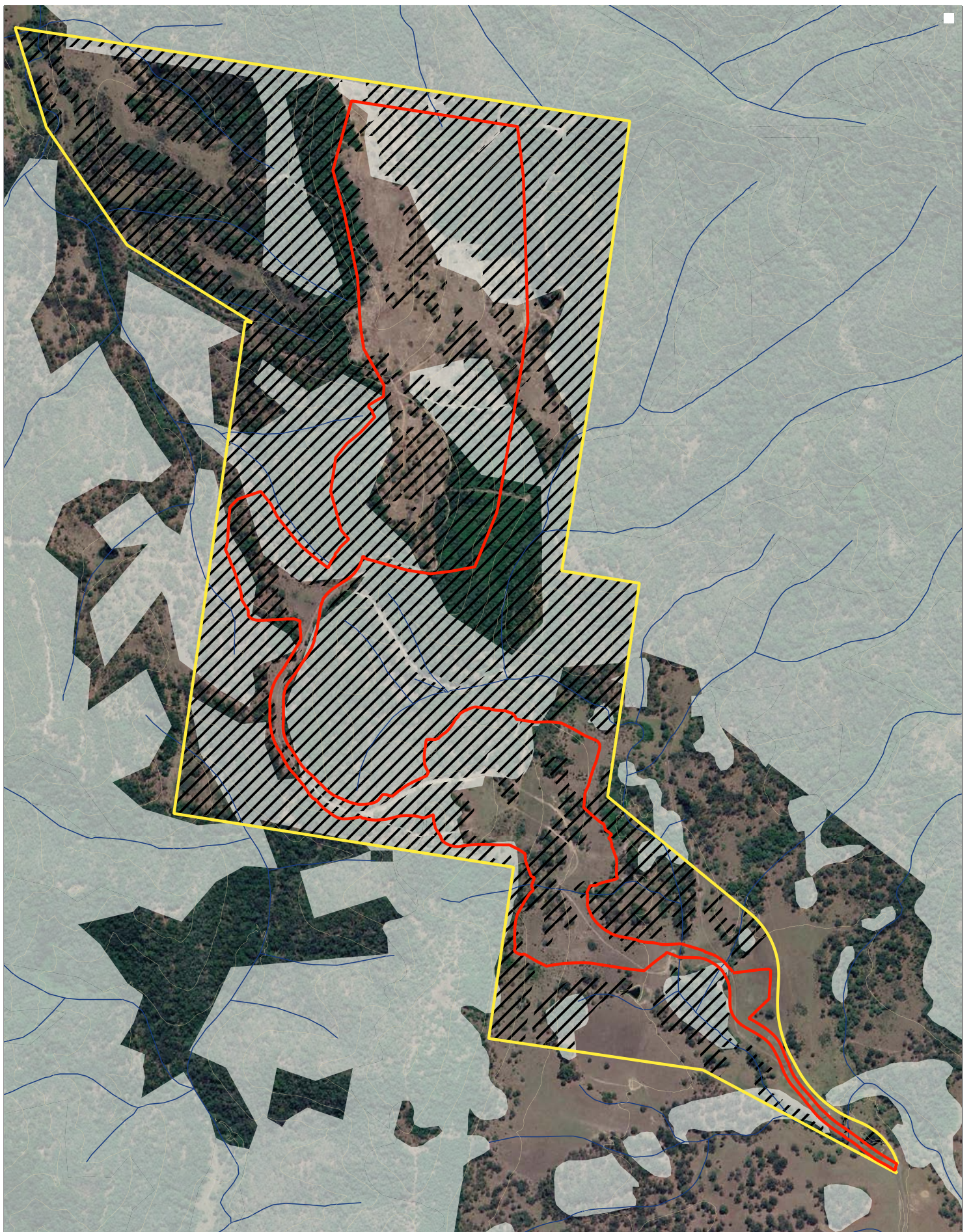


- ▭ Project area
- ▭ Disturbance footprint
- ▨ Grey-headed Flying Fox (*Pteropus poliocephalus*) foraging habitat
- ▭ Grey-headed Flying Fox foraging productivity
 - ▭ 0- 0.26
 - ▭ 0.26- 0.29
 - ▭ 0.29- 0.38
 - ▭ 0.38- 0.44
- Watercourse
- Contour (20m)

Figure 13: Grey-headed Flying Fox (*Pteropus poliocephalus*) - Foraging Productivity (Feb-Mar)

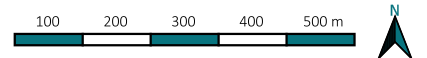


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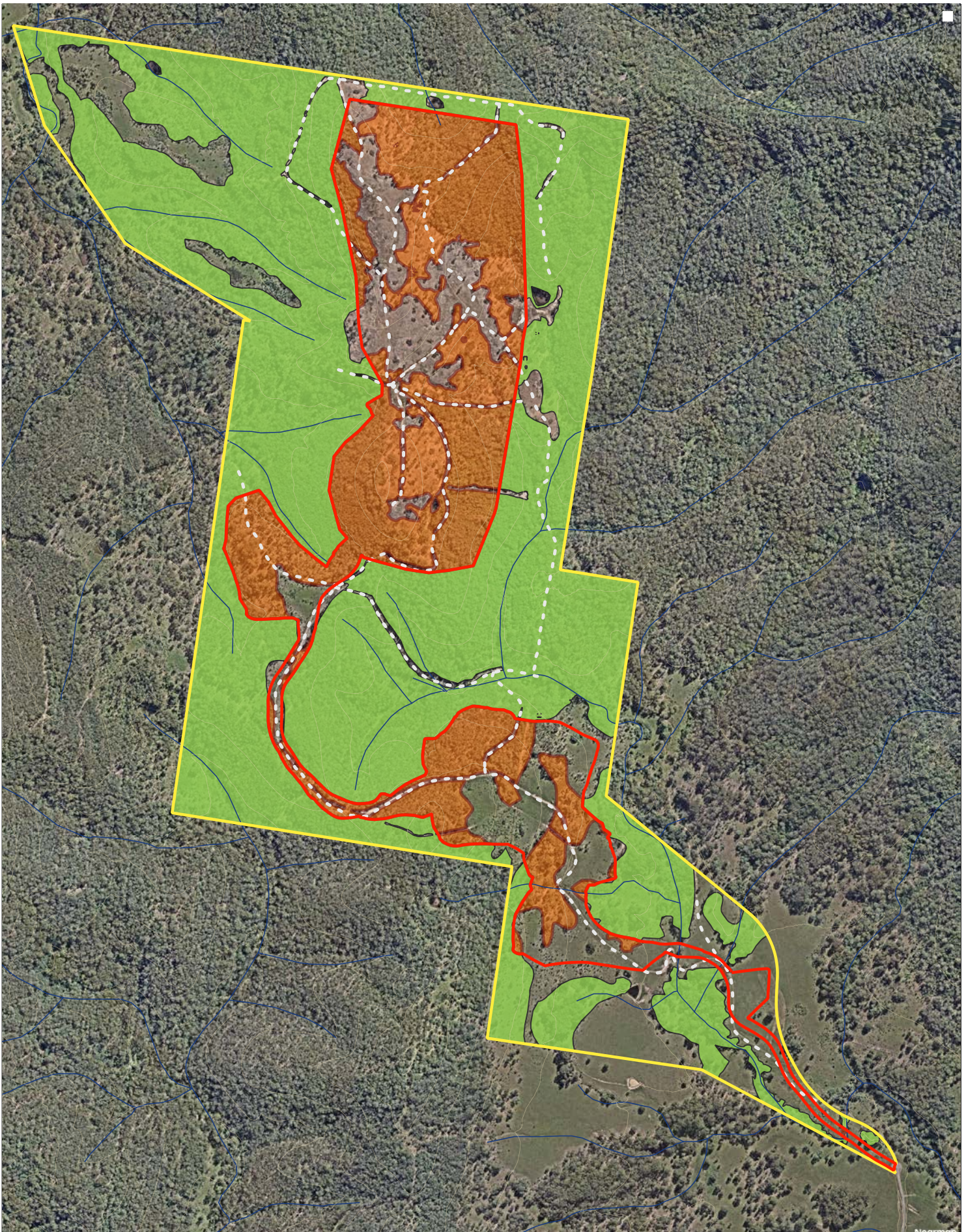


- Project area
- Disturbance footprint
- Grey-headed Flying Fox (*Pteropus poliocephalus*) foraging habitat
- Grey-headed Flying Fox foraging productivity
- 0
- Watercourse
- Contour (20m)

Figure 15: Grey-headed Flying Fox (*Pteropus poliocephalus*) - Foraging Productivity (Jun-Jul)

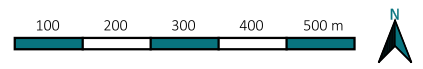


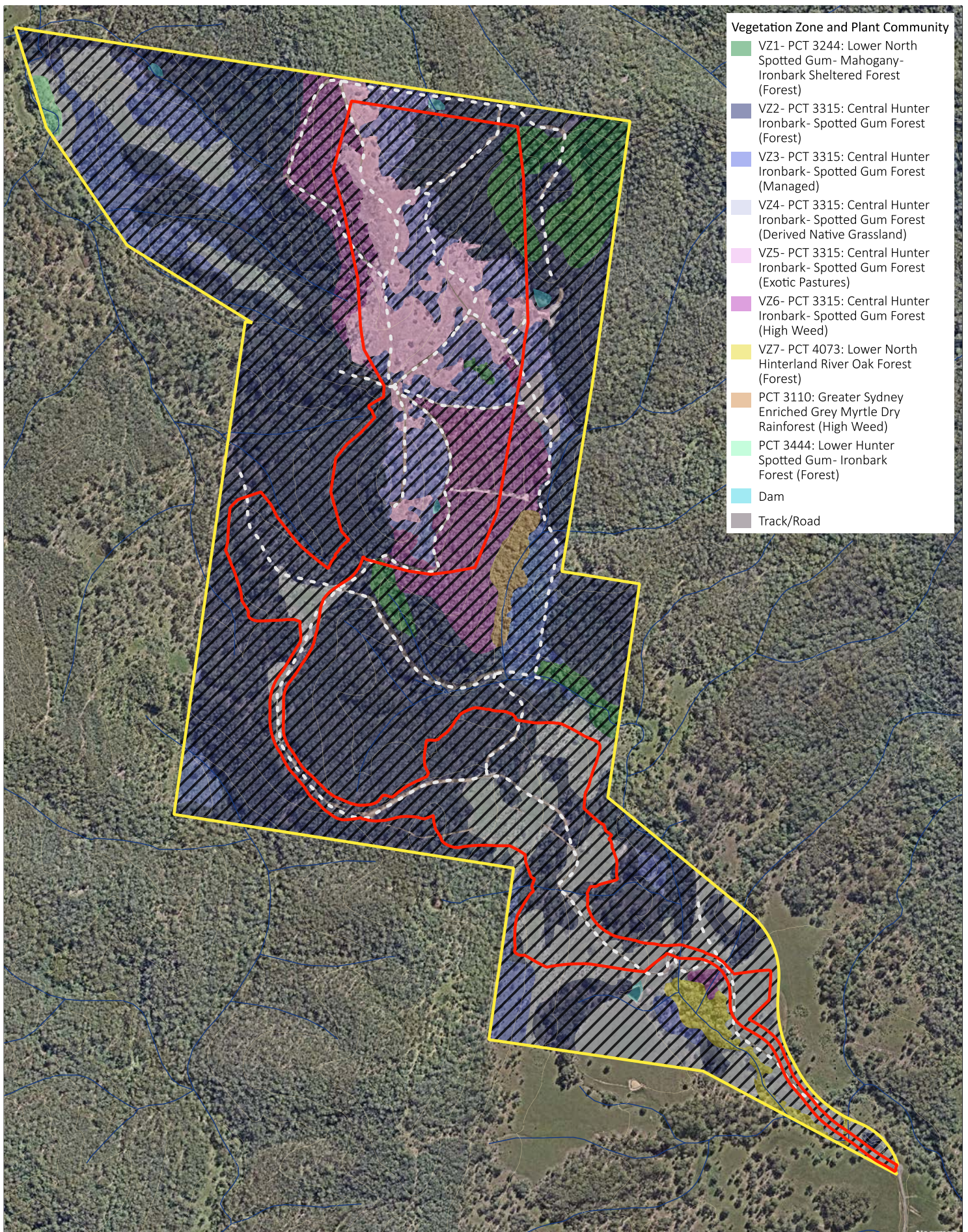
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- Project area
- Disturbance footprint
- Impacted Grey-headed Flying Fox foraging habitat
- Not impacted Grey-headed Flying Fox foraging habitat
- Track
- Watercourse
- Contour (20m)

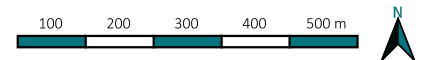
Figure 18: Grey-headed Flying Fox (*Pteropus poliocephalus*) - Impact



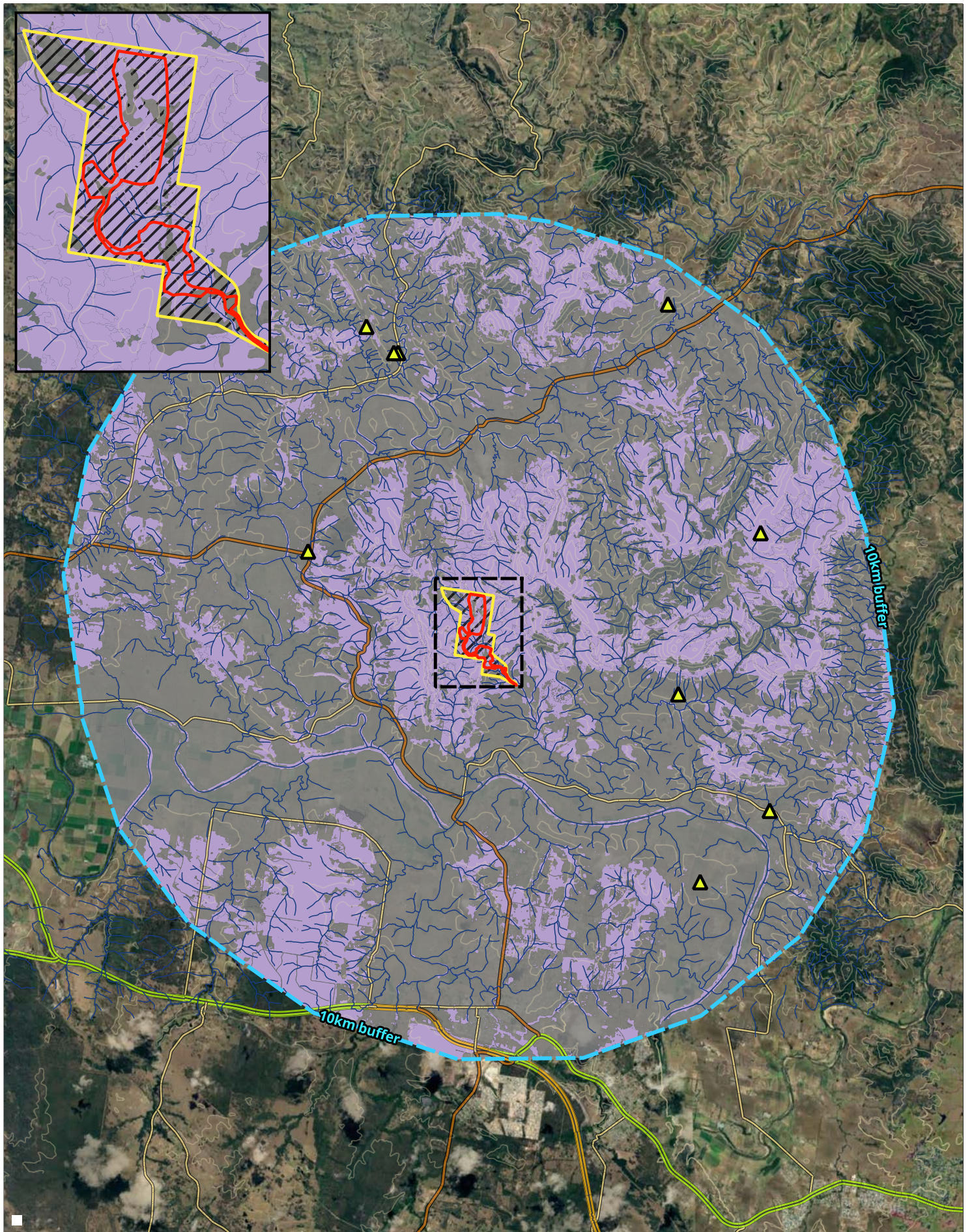


- Project area
- Disturbance footprint
- Koala (*Phascolarctos cinereus*) foraging habitat
- Watercourse
- Contour (20m)
- Track

Figure 19: Koala (*Phascolarctos cinereus*) - Habitat

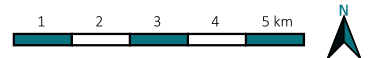


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- | | | | |
|--|-----------------------------------|-------------------|---------------|
| Project area | Koala (Habitat) | Motorway | Watercourse |
| Disturbance footprint | Associated PCTs (Habitat) | Primary Road | Contour (50m) |
| Buffer (10km) | Not associated PCTs (Not Habitat) | Arterial Road | |
| Koala (<i>Phascolarctos cinereus</i>) foraging habitat | Koala (ATLAS) | Sub-Arterial Road | |

Figure 20: Koala (*Phascolarctos cinereus*) - Regional Context



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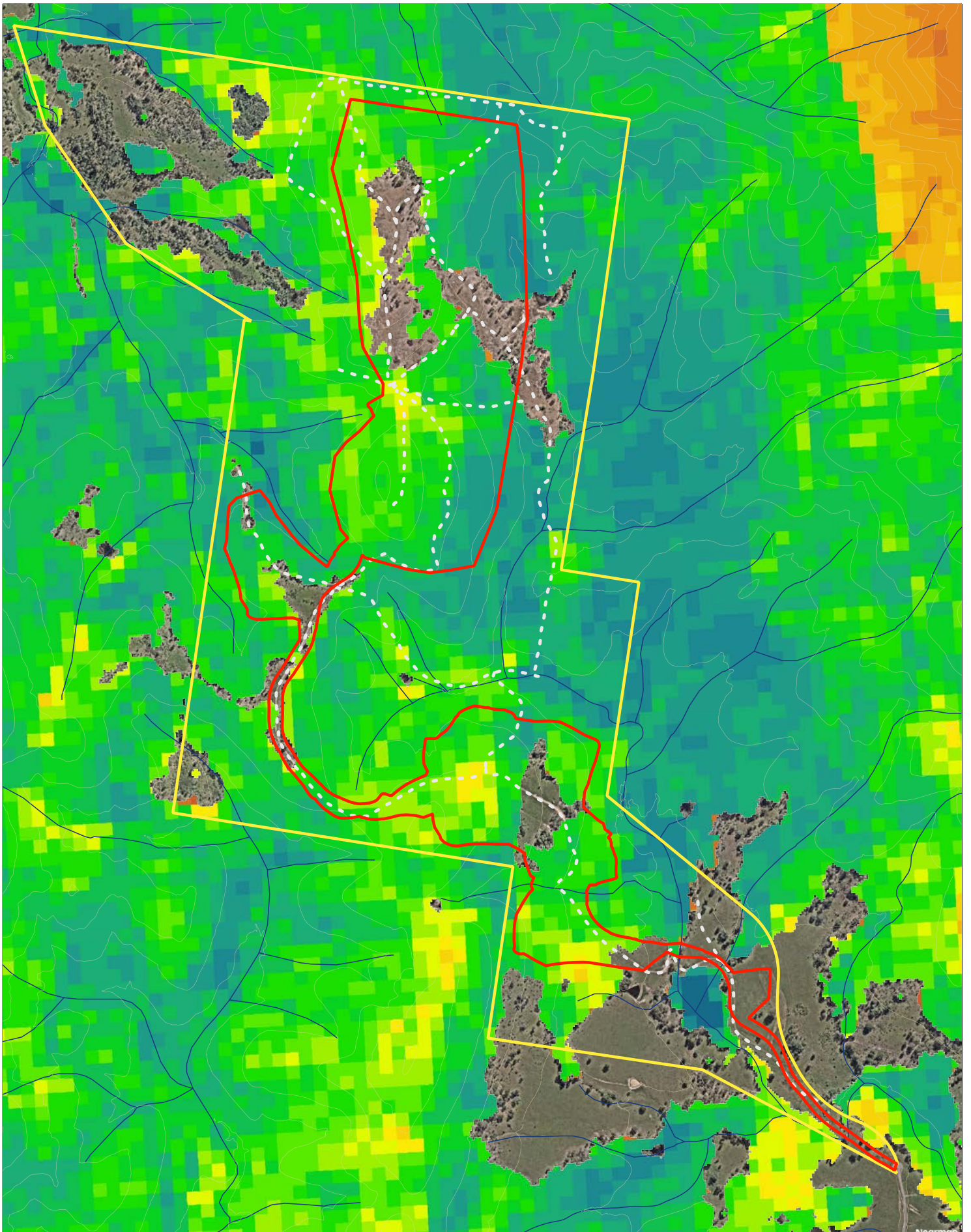
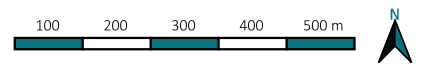
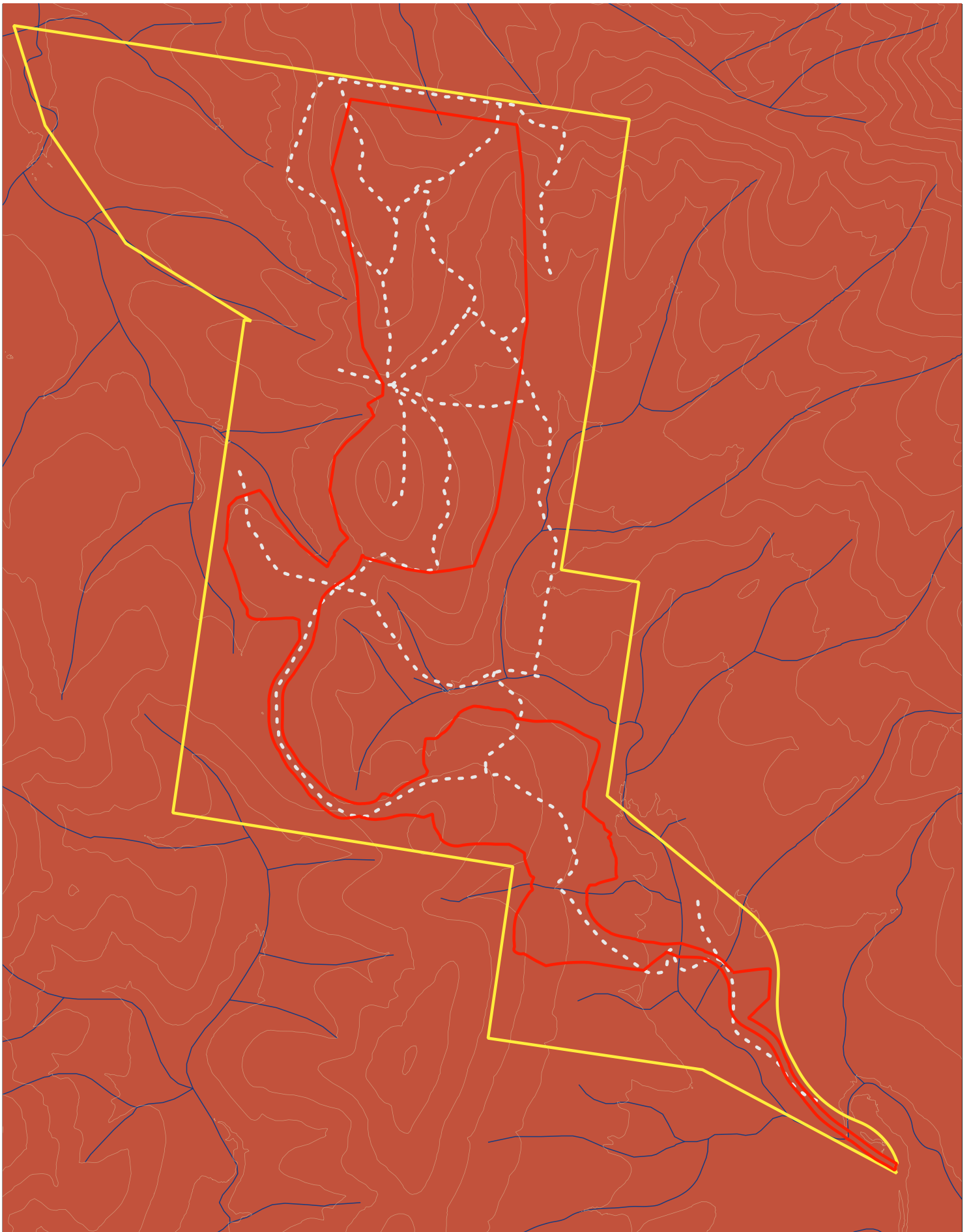


Figure 21: Koala (*Phascolarctos cinereus*) – Habitat Suitability Map (KHSM)



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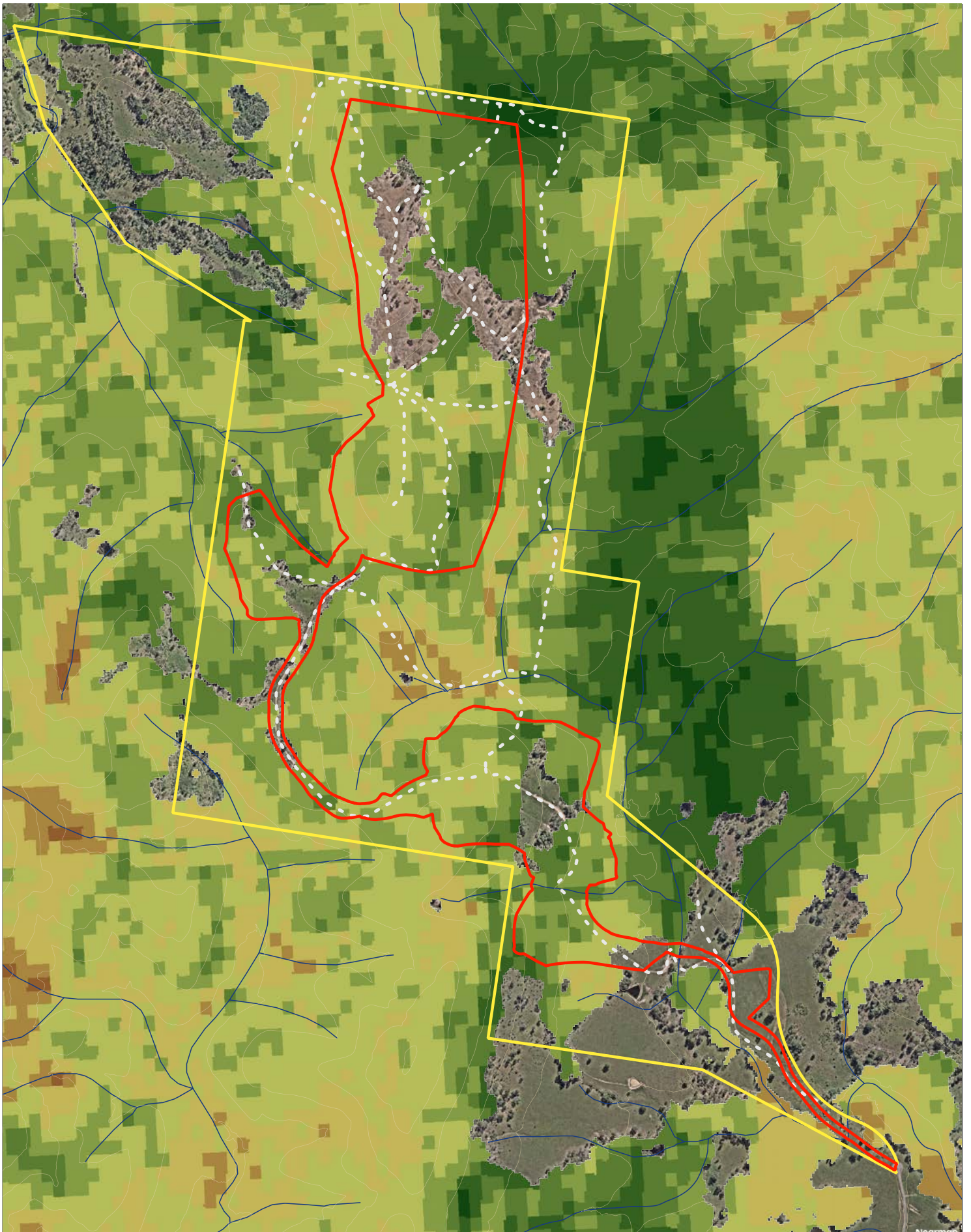
- | | | |
|--|---|---|
|  Project area |  Koala Likelihood (v2.0) Map |  Watercourse |
|  Disturbance footprint |  No Koala Records |  Contour (20m) |
| |  Track | |

Figure 22: Koala (*Phascolarctos cinereus*) – Koala Likelihood Map (KLM)

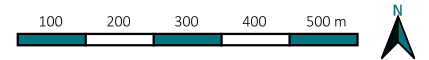


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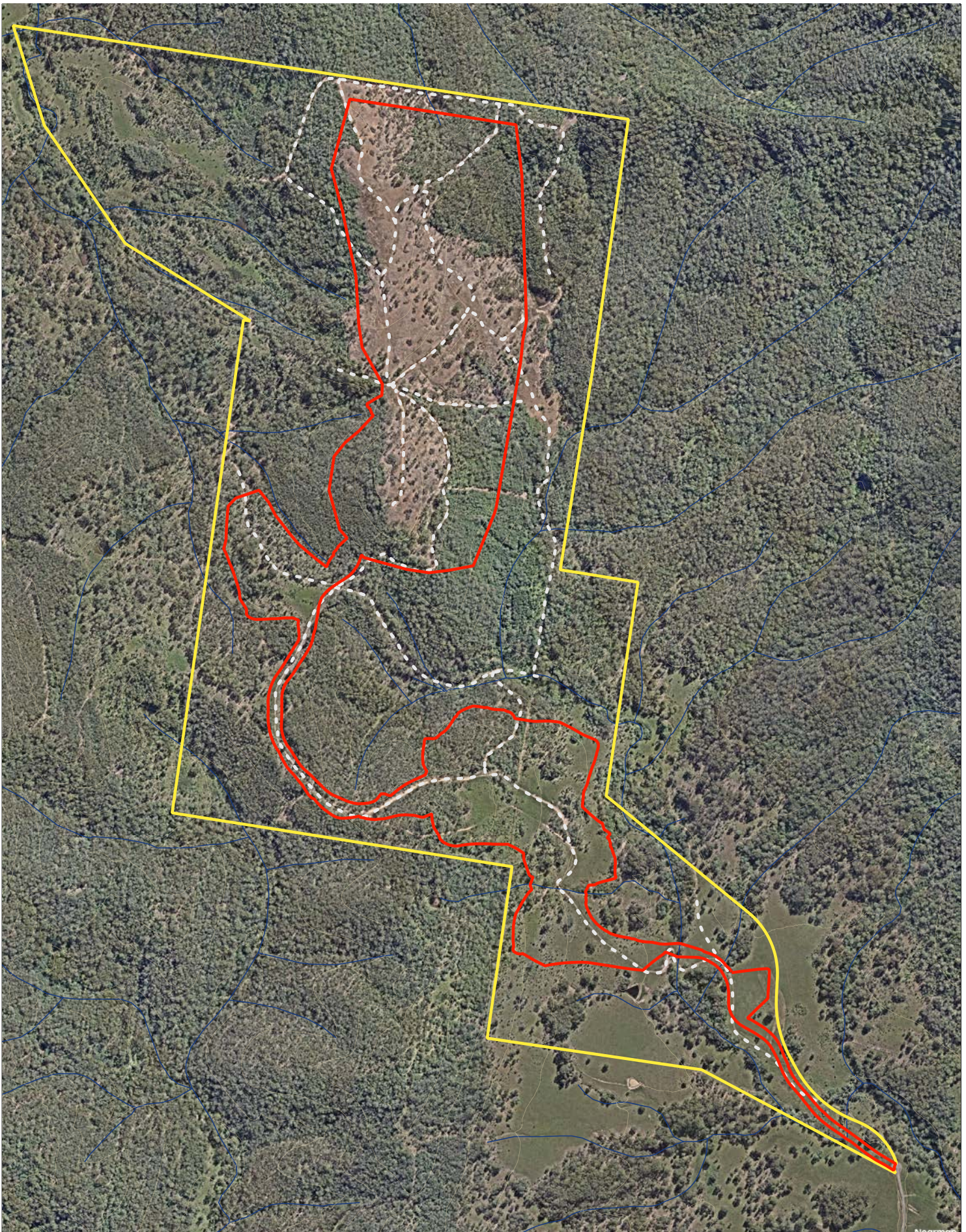


- | | | | |
|-----------------------|--|----------------|----------------|
| Project area | koala tree index - Cental Coast | 0.4000- 0.5000 | 0.8000- 0.9000 |
| Disturbance footprint | Less than 0.1000 | 0.5000- 0.6000 | 0.9000- 1.0000 |
| | 0.1000- 0.2000 | 0.6000- 0.7000 | Track |
| | 0.2000- 0.3000 | 0.7000- 0.8000 | Watercourse |
| | 0.3000- 0.4000 | | Contour (20m) |

Figure 23: Koala (*Phascolarctos cinereus*) – Koala Tree Index Map



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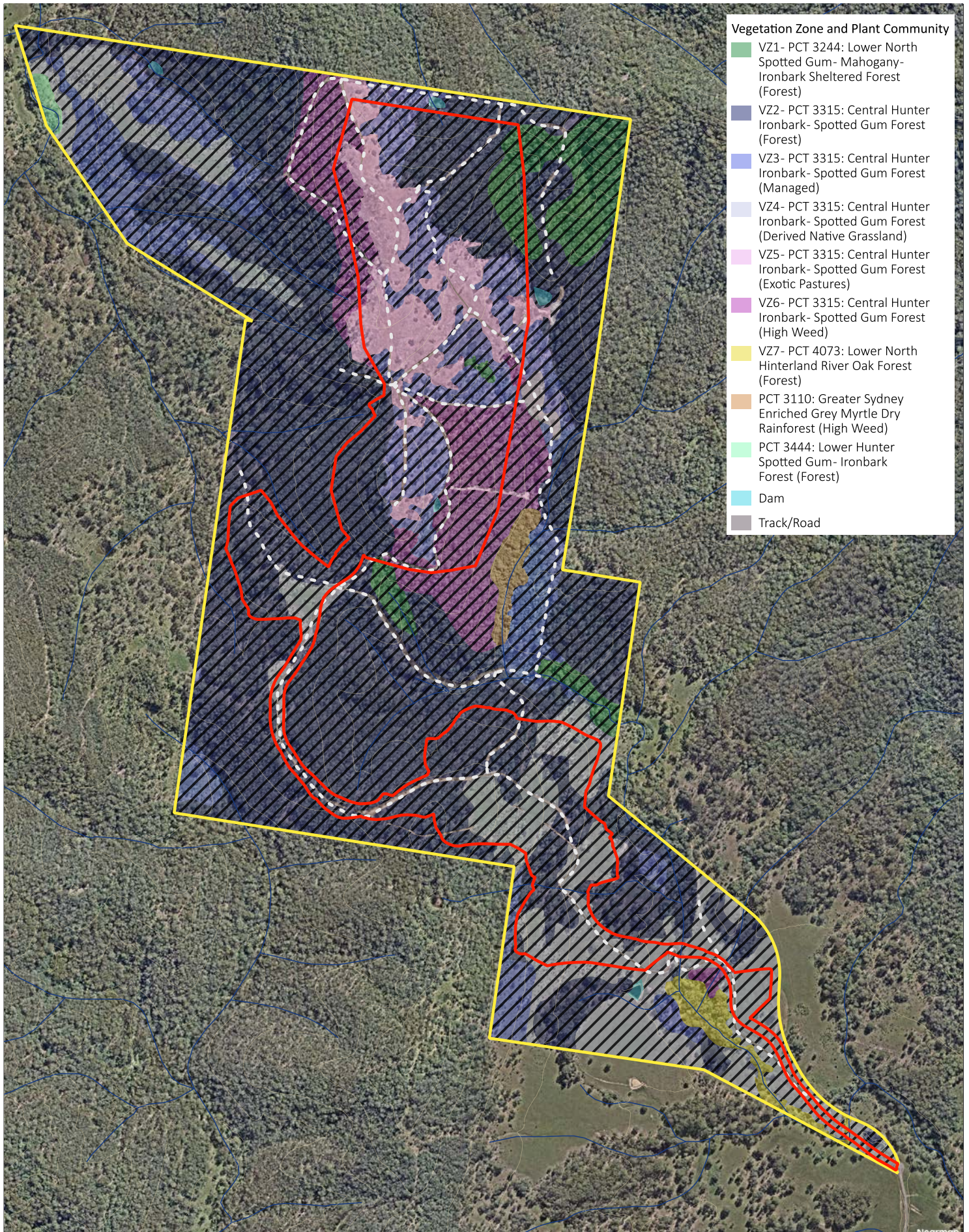


Project area
 Disturbance footprint
 Track
 Watercourse
 Contour (20m)

Figure 24: Koala (*Phascolarctos cinereus*) – Koala ARK Map

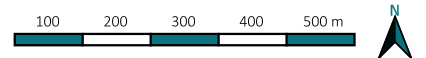


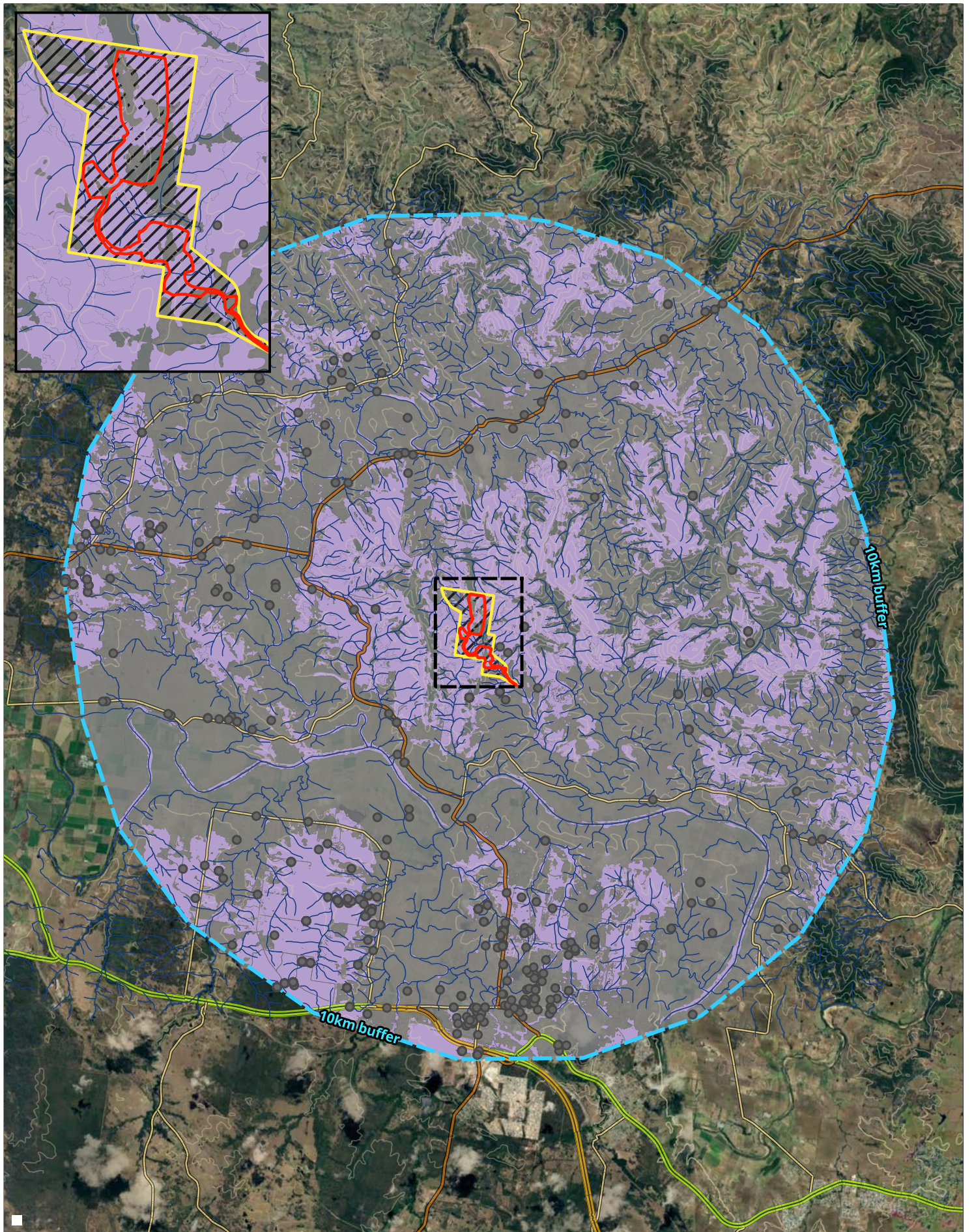
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- Project area
- Disturbance footprint
- Regent Honeyeater (*Anthochaera phrygia*) foraging habitat
- Track
- Watercourse
- Contour (20m)

Figure 26: Regent Honeyeater (*Anthochaera phrygia*) - Habitat

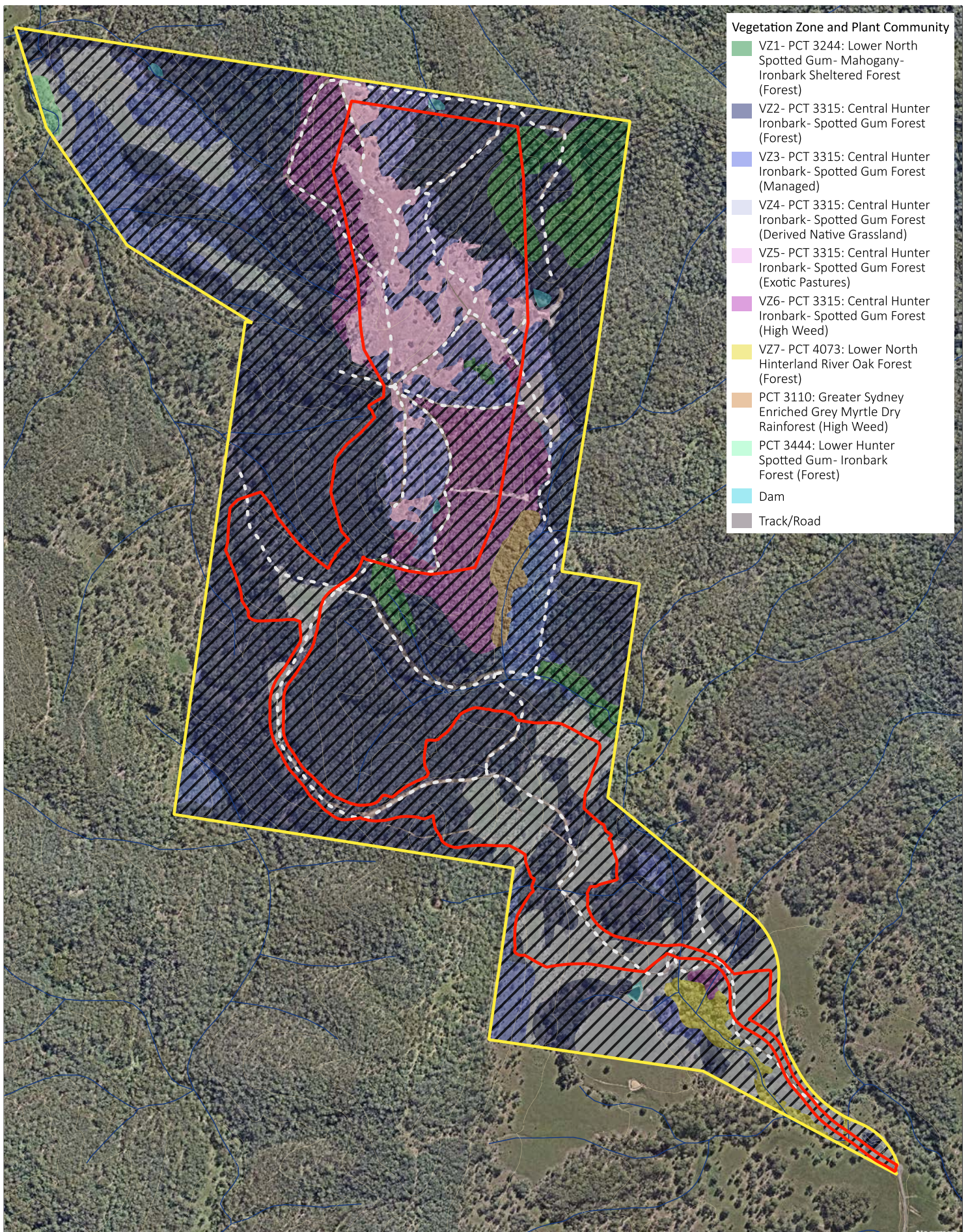




- | | | | |
|---|------------------------------------|-------------------|---------------|
| Project area | Regent Honeyeater (Habitat) | Motorway | Watercourse |
| Disturbance footprint | Associated PCTs (Habitat) | Primary Road | Contour (50m) |
| Buffer (10km) | Not associated PCTs (Not Habitat) | Arterial Road | |
| Regent Honeyeater (<i>Anthochaera phrygia</i>) foraging habitat | Birds (ATLAS) | Sub-Arterial Road | |

Figure 27: Regent Honeyeater (*Anthochaera phrygia*) - Regional Context

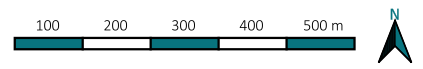


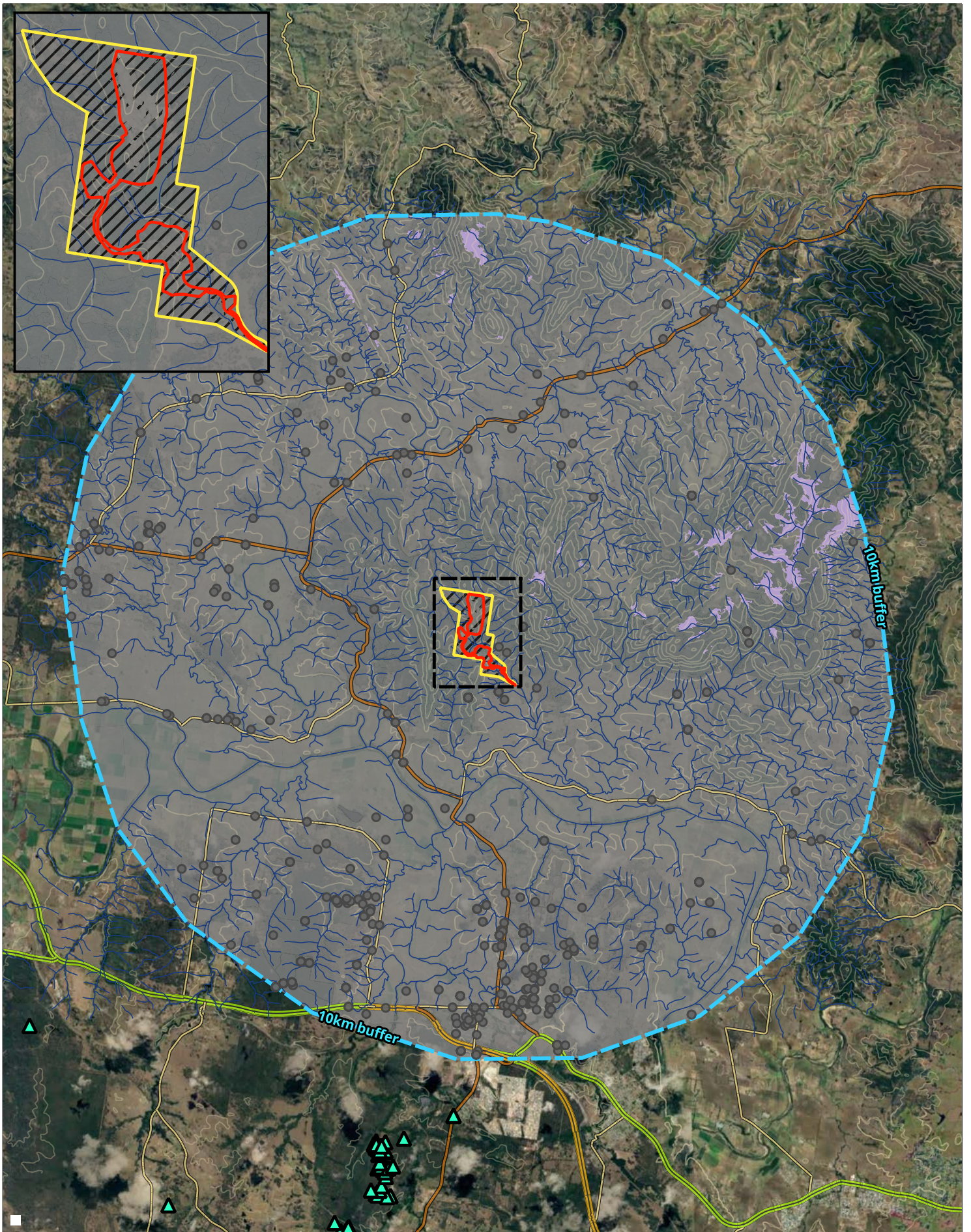


- Vegetation Zone and Plant Community**
- VZ1- PCT 3244: Lower North Spotted Gum- Mahogany- Ironbark Sheltered Forest (Forest)
 - VZ2- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Forest)
 - VZ3- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Managed)
 - VZ4- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Derived Native Grassland)
 - VZ5- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Exotic Pastures)
 - VZ6- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (High Weed)
 - VZ7- PCT 4073: Lower North Hinterland River Oak Forest (Forest)
 - PCT 3110: Greater Sydney Enriched Grey Myrtle Dry Rainforest (High Weed)
 - PCT 3444: Lower Hunter Spotted Gum- Ironbark Forest (Forest)
 - Dam
 - Track/Road

- Project area
- Disturbance footprint
- Swift Parrot (*Lathamus discolor*) foraging habitat
- Watercourse
- Contour (20m)
- Track

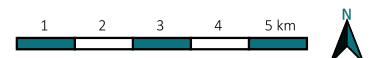
Figure 29: Swift Parrot (*Lathamus discolor*) - Habitat

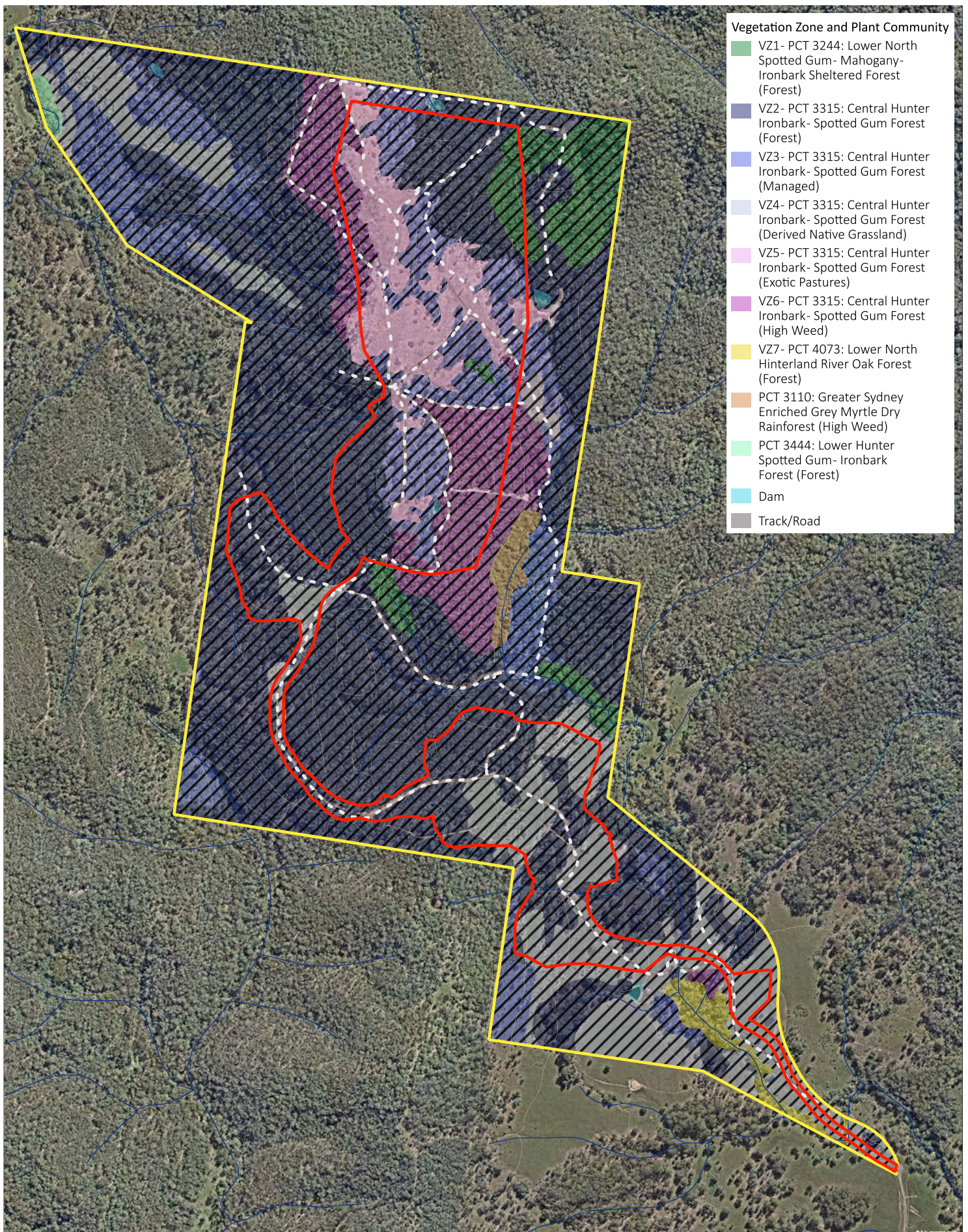




- | | | | |
|--|------------------------------------|-------------------|---------------|
| Project area | Regent Honeyeater (Habitat) | Birds (ATLAS) | Watercourse |
| Disturbance footprint | Associated PCTs (Habitat) | Motorway | Contour (50m) |
| Buffer (10km) | Not associated PCTs (Not Habitat) | Primary Road | |
| Swift Parrot (<i>Lathamus discolor</i>) foraging habitat | Swift Parrot (ATLAS) | Arterial Road | |
| | | Sub-Arterial Road | |

Figure 30: Swift Parrot (*Lathamus discolor*) - Regional Context

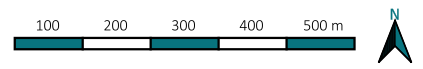


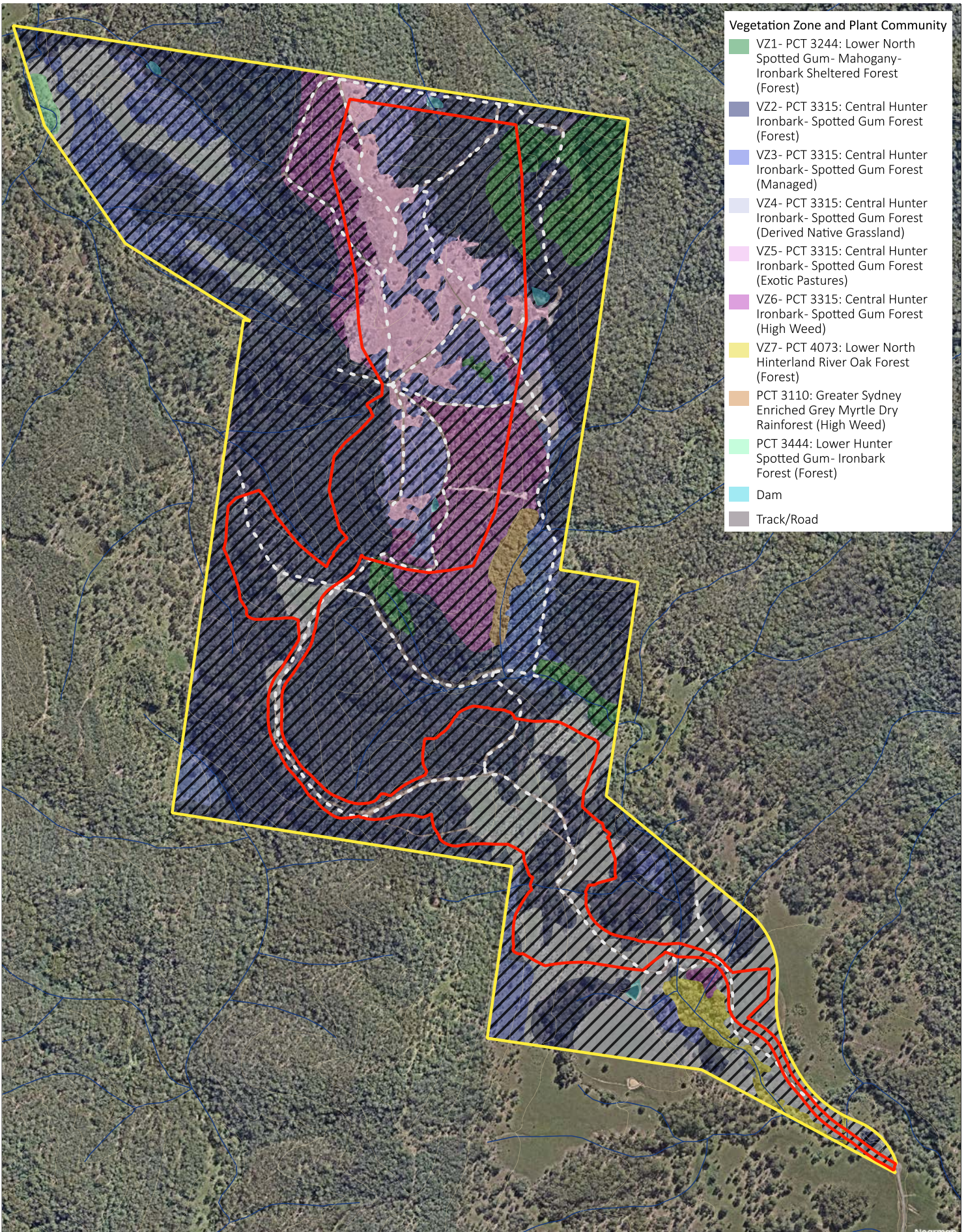


- Vegetation Zone and Plant Community**
- VZ1- PCT 3244: Lower North Spotted Gum- Mahogany- Ironbark Sheltered Forest (Forest)
 - VZ2- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Forest)
 - VZ3- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Managed)
 - VZ4- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Derived Native Grassland)
 - VZ5- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Exotic Pastures)
 - VZ6- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (High Weed)
 - VZ7- PCT 4073: Lower North Hinterland River Oak Forest (Forest)
 - PCT 3110: Greater Sydney Enriched Grey Myrtle Dry Rainforest (High Weed)
 - PCT 3444: Lower North Spotted Gum- Ironbark Forest (Forest)
 - Dam
 - Track/Road

- Project area
- Disturbance footprint
- Brown Treecreeper (*Climacteris picumnus*) foraging habitat
- Watercourse
- Contour (20m)
- Track

Figure 32: Brown Treecreeper (*Climacteris picumnus*) - Habitat

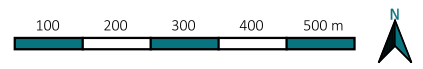


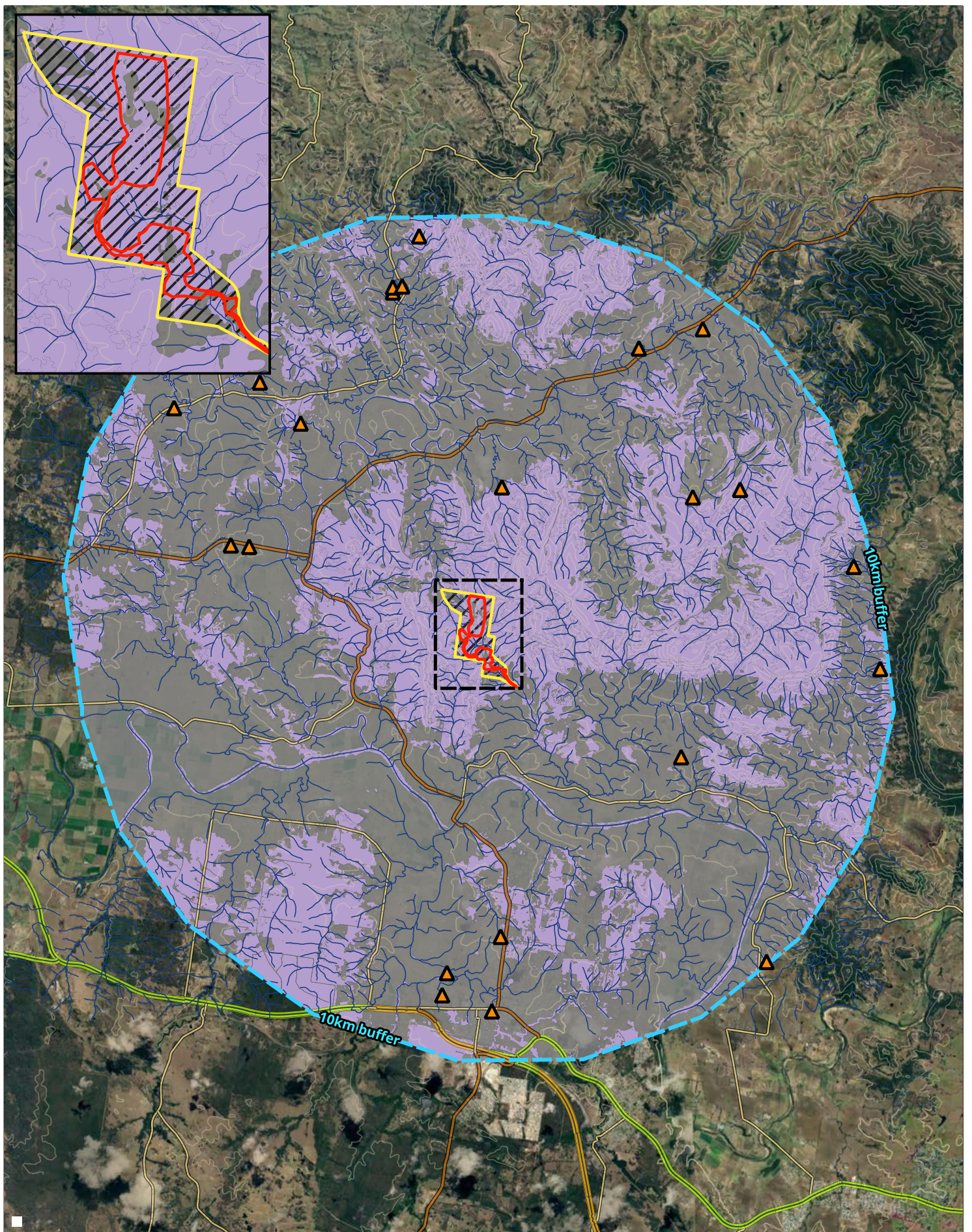


- Vegetation Zone and Plant Community**
- VZ1- PCT 3244: Lower North Spotted Gum- Mahogany- Ironbark Sheltered Forest (Forest)
 - VZ2- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Forest)
 - VZ3- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Managed)
 - VZ4- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Derived Native Grassland)
 - VZ5- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (Exotic Pastures)
 - VZ6- PCT 3315: Central Hunter Ironbark- Spotted Gum Forest (High Weed)
 - VZ7- PCT 4073: Lower North Hinterland River Oak Forest (Forest)
 - PCT 3110: Greater Sydney Enriched Grey Myrtle Dry Rainforest (High Weed)
 - PCT 3444: Lower Hunter Spotted Gum- Ironbark Forest (Forest)
 - Dam
 - Track/Road

- Project area
- Disturbance footprint
- Track
- Spotted-tailed Quoll (*Dasyurus maculatus*) foraging habitat
- Watercourse
- Contour (20m)

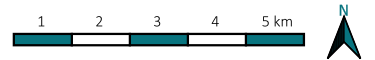
Figure 35: Spotted-tailed Quoll (*Dasyurus maculatus*) - Habitat



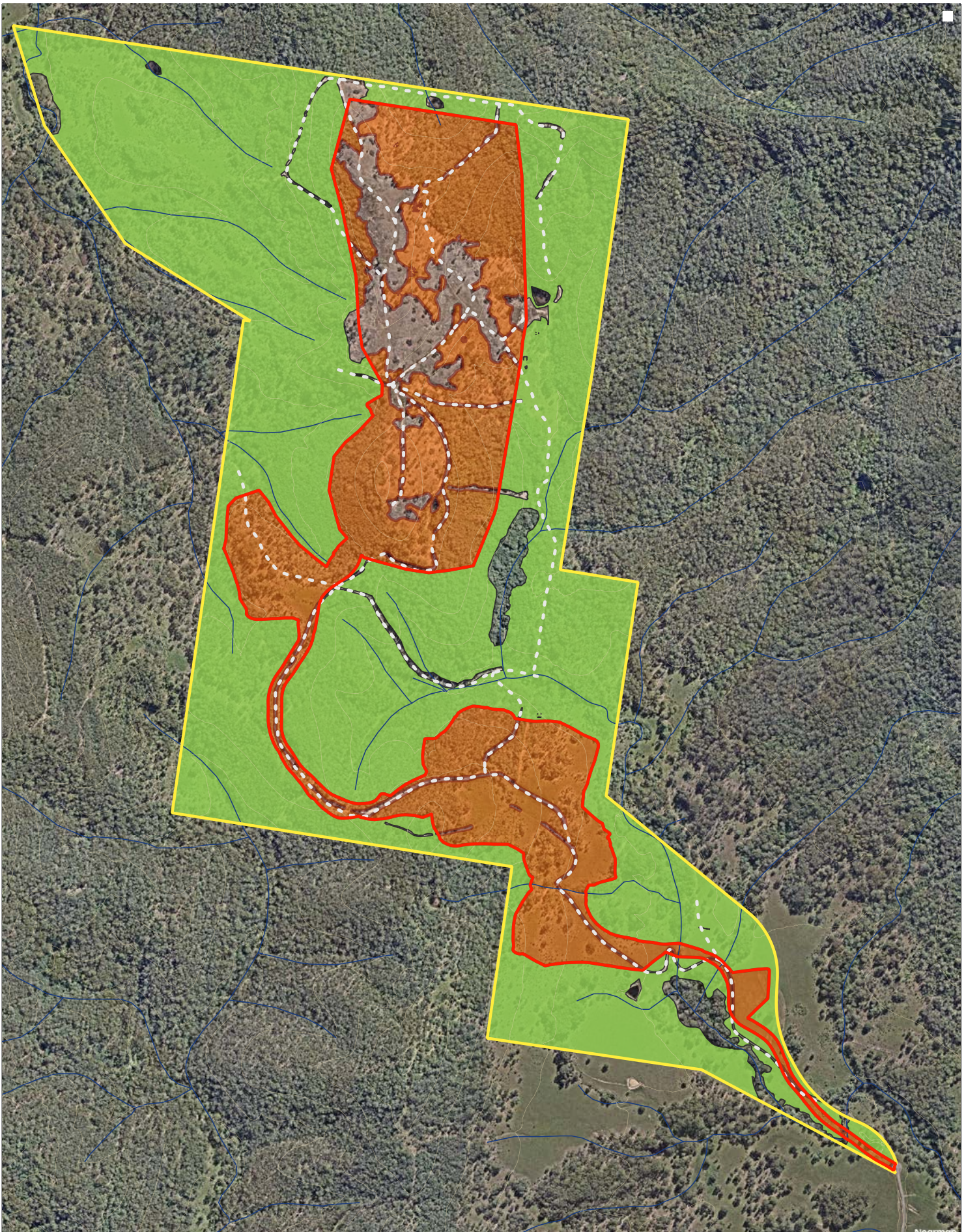


- | | | | |
|---|--|-------------------|---------------|
| Project area | Spotted-tailed Quoll (Habitat) Associated PCTs (Habitat) | Motorway | Watercourse |
| Disturbance footprint | Not associated PCTs (Not Habitat) | Primary Road | Contour (50m) |
| Buffer (10km) | Spotted-tailed Quoll (ATLAS) | Arterial Road | |
| Spotted-tailed Quoll (<i>Dasyurus maculatus</i>) foraging habitat | | Sub-Arterial Road | |

Figure 36: Spotted-tailed Quoll (*Dasyurus maculatus*) - Regional Context

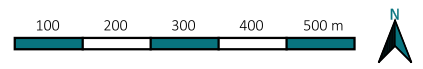


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- Project area
- Disturbance footprint
- Impacted Spotted-tailed Quoll
- Not impacted Spotted-tailed Quoll
- Track
- Watercourse
- Contour (20m)

Figure 37: Spotted-tailed Quoll (*Dasyurus maculatus*) - Impact



APPENDIX 2. SIGNIFICANT IMPACT ASSESSMENTS

Species Assessed under the EPBC Act Significant Impact Guidelines

The following pertains to Assessments of Significance for direct or indirect impacts to EPBC Act listed threatened species, populations and communities.

The following species and Ecological Communities have been assessed under the EPBC Act Matters of National Environmental Significance Significant impact guidelines 1.1 (Department of the Environment [DotE], 2013) (Significant Impact Guidelines):

Critically Endangered Ecological Communities:

- Central Hunter valley eucalypt forest and woodland
- Regent Honeyeater (*Anthochaera phrygia*)
- Swift Parrot (*Lathamus discolor*)

Endangered Species:

- Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT)
- Spotted -tailed Quoll (*Dasyurus maculatus*)

Vulnerable Species:

- Large-eared Pied Bat (*Chalinolobus dwyeri*)
- Grey-headed Flying Fox (*Pteropus poliocephalus*)
- Brown Treecreeper (south -eastern) (*Climacteris picumnus victoriae*)

Migratory Species:

- None

Critically Endangered and Endangered Ecological Communities

Central Hunter Valley eucalypt forest and woodland ecological community (CEEC)

Assessment of Significance

Central Hunter Valley eucalypt forest and woodland is listed as Critically Endangered under the EPBC Act. Under the IUCN listing categories, an entity is critically endangered if it is considered to be facing an extremely high risk of extinction in the wild (IUCN 2012).

Within this assessment of significance it is important to note the areas mapped as potential CEEC within this report were not previously considered CEEC per Peake 2006 that formed part of the Conservation listing, but more likely mapped to align with the Barrington Footslopes Dry Spotted Gum Forest. Such that assuming the vegetation mapped in this report is commensurate with the CEEC, it is not a reduction on the previously mapped extent of the Central Hunter Valley Eucalypt Forest and Woodland.

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

1. Reduce the extent of an ecological community

If consistent with the CEEC, yes, the proposed action will reduce the extent of the CEEC, however, it is of note that the vegetation mapped within the Subject Land / Project Site represents a potential extension of the previously mapped community. A total of 32.67 ha of vegetation commensurate with Central Hunter Valley Eucalypt Forest and Woodland will be impacted by the proposed action (see assessment in **Figure 5**). This represents approximately 25% removal of the community from within the Subject Land / Project Area. Conservation advice for the CEEC (based on Peake 2006), suggests a total area of occupancy of 37,000 ha. Recognising the vegetation community within the Subject Land was not considered CEEC in Peakes estimate of total occupancy and is largely outside the Peake 2006 Study Area. Thus the proposal will impact less than 0.09% of the occurrence of this CEEC. All direct impacts to the vegetation commensurate with this CEEC will be offset through the NSW BOS, that requires offsets for an additional 7 ha owing to variations in minimum condition requirements.

2. Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines

Impacts associated with the proposed actions will reduce the potential extent of the CEEC but is unlikely to cause or increase fragmentation of the CEEC beyond its current extent within the locality. The Disturbance Footprint is surrounded on most sides by connective habitat, much of which is commensurate with the CEEC. No areas of the CEEC will be fragmented by the proposal.

3. Adversely affect habitat critical to the survival of an ecological community

The proposal will result in the removal of 32.67 ha of vegetation potentially commensurate with the CEEC, representing approximately 25% of this vegetation community within the Subject Land/ Project Site, resulting in 96.02 ha of avoidance. The Subject Land is also surrounded by large areas of vegetation commensurate with the CEEC.

4. Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.

Within the Disturbance Footprint, the CEEC will be completely removed. The TEC is not a Groundwater-dependent Ecosystem (GDE) and the Hydrological Impact Assessment (Martens 2025a) states that peak groundwater drawdown at the maximum pit extents (at 30 years) will be largely confined to the quarry extents and will not detrimentally impact on any surrounding ecosystems. No substantial alterations of surface water drainage patterns are expected in areas outside of the proposed quarry area. The occurrence of the CEEC within the property, which has undergone historical disturbance associated with clearing for pastoral use suggests that the ecological community is fairly resilient to minor changes in abiotic factors.

Overall, the project has a low chance of modifying or destroying abiotic factors necessary for the CEEC's survival in the Subject Land.

5. Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting

Within the Disturbance Footprint, the CEEC will be completely removed. Potential indirect impacts on the surrounding CEEC vegetation are likely to be minimal but may include increased colonisation of exotic species, edge effects and increased dust. Adherence to control and mitigation measures presented in Section 8.4 of the BDAR will reduce the potential for changes in species composition following indirect impacts.

These impacts are not expected to significantly change the composition of CEEC such as that it leads to a decline in the extent of the CEEC.

6. Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:

- assisting invasive species, that are harmful to the listed ecological community, to become established, or
- causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or

The project has the potential to assist the establishment of harmful and exotic species within the CEEC and to introduce pollutants harmful to the CEEC. Given the specific weed management and control measures presented in Section 8.4 of the BDAR, i.e., proper cleaning of equipment and machinery prior to entry to the quarry; sediment controls bordering vegetation commensurate with the CEEC to reduce exotic seed dispersal during periods of runoff; and careful stockpiling of topsoil with high weed load, the chance of significant exotic species establishment within the avoided areas of the CEEC is greatly reduced. Furthermore, specific mitigation measures for pollutants and contaminants, such as spill kits, designated re-fuelling areas, and sediment controls, will greatly reduce the chance of harmful contaminants entering areas of the avoided CEEC.

In addition a Management Plan will be developed to control weeds within the avoided areas of the Subject Land.

As such, given the strict mitigation measures surrounding exotic species establishment and pollutants, the project is not expected to cause a significant reduction in community quality or integrity.

7. Interfere with the recovery of an ecological community.

Vegetation within the Disturbance Footprint has experienced historical clearing (see 1961 imagery in **Plate 2**). It is currently in an immature phase with many small trees but no substantial large remnant trees. It is likely, if left undisturbed, the CEEC would continue to recover to an extent. However, the existing land use practices (grazing, pasture improvement) and high weed presence would limit any recovery substantially.

Conclusion

The Bluestone Hardrock Quarry proposal will result in the removal of 32.67 ha of the CEEC. Indirect impacts on avoided areas of the CEEC, such as weed incursion and pollutants, will be significantly reduced through implementation of mitigation measures presented in Section 8.4 of the BDAR. Given the level of direct impact on the CEEC the proposed action may constitute a significant impact and require referral under the EPBC Act.

Regent Honeyeater (*Anthochaera phrygia*) – Critically Endangered

Assessment of Significance

1. Is the action likely to lead to a long-term decrease in the size of a population of a species?

The species was not recorded within the Project Area, however the vegetation is considered broadly suitable foraging habitat for the species. No mapped Important Bird Areas for the Species (i.e. Key breeding areas or other breeding areas) are mapped within the Project Area. The vegetation within the Project Area does contain key foraging species for the Regent Honeyeater including *Corymbia maculata* (Spotted Gum), as such the vegetation meets the definition of “any foraging habitat in areas where the species is likely to occur”. Therefore, the vegetation within the Project Area broadly meets the definition of “Habitat critical to the survival of the species”. However, it is important to note that the majority of vegetation communities within the locality is likely to meet the same definition.

As the species was not recorded within the Project Area, and the vegetation is considered broadly suitable foraging habitat consistent with the vegetation throughout the locality, the proposed action is unlikely to lead to a long-term decrease in the size of the local population of the species.

2. Will the action reduce the area of occupancy of a population of the species?

The proposed action will result in a reduction in the occupancy of the species with the removal of 41.29 ha of broadly suitable foraging habitat for the species. However, as the Area of Occupancy (AOO) is 300 km² (30,000 ha) the proposed action is expected to impact 0.14 % of foraging habitat within the species’ AOO.

3. Will the action fragment an existing population into two or more populations?

The proposed action will directly impact 41.29 ha of suitable habitat for the species. As the proposed action will avoid vegetation surrounding the proposed quarry, and considering the large area of suitable habitat retained within the Tangory Nature Reserve to the east and north of the Project Area, the proposed action is unlikely to result in further fragmentation of an existing population of the species.

4. Will the action adversely affect habitat critical to the survival of a species?

Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

While the species was not recorded within the Project Area, the vegetation within the Project Area does contain key foraging species for the Regent Honeyeater including *Corymbia maculata* (Spotted Gum). As such, despite no records of use, the vegetation meets the definition of “*any foraging habitat in areas where the species is likely to occur*”. Therefore, the vegetation within the Project Area broadly meets the definition of “*Habitat critical to the survival of the species*”. However, it is important to note that the majority of vegetation communities within the locality is likely to meet the same definition. Considering the lack of records and availability of foraging habitat throughout the locality, the proposed action is unlikely to affect habitat critical to the survival of the species to the extent that the species will be significantly impacted.

5. Will the action disrupt the breeding cycle of a population?

The proposed action is unlikely to disrupt the breeding cycle of a population as the species was not recorded within the Project Area, and the vegetation is considered lower value foraging habitat.

6. Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposed action will result in a reduction in the occupancy of the species with the removal of 41.29 ha of broadly suitable foraging habitat for the species. However, as the Area of Occupancy (AOO) is 300 km² (30,000 ha) the proposed action is expected to impact 0.14 % of foraging habitat within the species’ AOO. Higher value foraging habitat for the species will be avoided within the north-western corner of the Project Area.

7. Will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species’ habitat?

Mitigation measures detailed in the BDAR will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or invasive flora species into the Project Area.

8. Will the action introduce disease that may cause the species to decline?

Mitigation measures detailed in the BDAR will prevent construction activities from introducing or spreading plant and animal pathogens that may cause the species to further decline.

9. Will the action interfere substantially with the recovery of the species?

Whilst the proposed action will impact a total of 41.29 ha of suitable habitat for the species, this vegetation is considered lower value foraging habitat. As such, the proposed action is unlikely to lead to interfere substantially with the recovery of the species.

Conclusion

The proposed action will result in impacts to a total of 41.29 ha of suitable habitat for the species, this vegetation is considered lower value foraging habitat. As such, the proposed action is unlikely to be significant.

Swift Parrot (*Lathamus discolor*) – Critically Endangered

Assessment of Significance

1. Is the action likely to lead to a long-term decrease in the size of a population of a species?

The species was not recorded within the Project Area during targeted surveys, and there are no records of the species within 5km of the Project Area. No mapped Important Bird Areas for the Species (i.e. Key breeding areas or other breeding areas) are mapped within the Project Area, however the vegetation is mapped by the Commonwealth broadly as an area where the species is likely to occur. The vegetation within the Project Area does contain key foraging species for the Swift Parrot including *Corymbia maculata* (Spotted Gum), therefore the vegetation is considered to be broadly suitable foraging habitat for the species. As such, the vegetation meets the definition of “any foraging habitat in areas where the species is likely to occur”. Therefore, the vegetation within the Project Area broadly meets the definition of “Habitat critical to the survival of the species”. However, it is important to note that the majority of vegetation communities within the locality is likely to meet the same definition.

While broadly suitable habitat will be impacted by the proposed action, the species was not recorded within the Project Area, there are no records of the species within the locality, and broadly suitable foraging habitat occurs throughout the locality. As such, the proposed action is unlikely to lead to a long-term decrease in the size of the local population of the species.

2. Will the action reduce the area of occupancy of a population of the species?

The proposed action will result in a reduction in the occupancy of the species with the removal of 41.29 ha of broadly suitable foraging habitat for the species. However, as the Area of Occupancy (AOO) is 4,000 km² (400,000 ha) the proposed action is expected to impact 0.01 % of foraging habitat within the species’ AOO.

3. Will the action fragment an existing population into two or more populations?

The proposed action will directly impact 41.29 ha of suitable habitat for the species. As the proposed action will avoid vegetation surrounding the proposed quarry, and considering the large area of suitable habitat retained within the Tangory Nature Reserve to the east and north of the Project Area, the proposed action is unlikely to result in further fragmentation of an existing population of the species.

4. Will the action adversely affect habitat critical to the survival of a species?

Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

While the species was not recorded within the Project Area, the vegetation within the Project Area does contain foraging species for the Swift Parrot including *Corymbia maculata* (Spotted Gum). As such, despite no records of use, the vegetation meets the definition of “any foraging habitat in areas where the species is likely to occur”. Therefore, the vegetation within the Project Area broadly meets the definition of “Habitat critical to the survival of the species”. However, it is important to note that the majority of vegetation communities within the locality is likely to meet the same definition, and the species is known to only breed in Tasmania. Considering the lack of records and the high availability of foraging habitat throughout the locality, the proposed action is unlikely to affect habitat critical to the survival of the species to the extent that the species will be significantly impacted.

5. Will the action disrupt the breeding cycle of a population?

The species only breeds in Tasmania. As such, the proposed action will not disrupt the breeding cycle of a population.

6. Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposed action will result in a reduction in the occupancy of the species with the removal of 41.29 ha of broadly suitable foraging habitat for the species. However, as the Area of Occupancy (AOO) is 4,000 km² (400,000 ha) the proposed action is expected to impact 0.01 % of foraging habitat within the species' AOO. Similar foraging habitat for the species will be avoided throughout the Project Area.

7. Will the action result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat?

Mitigation measures detailed in the BDAR will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or invasive flora species into the Project Area.

8. Will the action introduce disease that may cause the species to decline?

Mitigation measures detailed in the BDAR will prevent construction activities from introducing or spreading plant and animal pathogens that may cause the species to further decline.

9. Will the action interfere substantially with the recovery of the species?

Whilst the proposed action will impact a total of 41.29 ha of suitable habitat for the species, this vegetation is considered lower value foraging habitat only. As such, the proposed action is unlikely to lead to interfere substantially with the recovery of the species.

Conclusion

The proposed action will result in impacts to a total of 41.29 ha of suitable habitat for the species, this vegetation is considered lower value foraging habitat. As such, the proposed action is unlikely to be significant.

Koala (*Phascolarctos cinereus*) - Endangered

Assessment of Significance

1. Is the action likely to lead to a long-term decrease in the size of a population of a species?

The species was not recorded within the Project Area, however the vegetation within the Project Area is considered broadly suitable habitat for the species. Only one (1) record of the species was recorded within 5 km of the Project Area. The proposed action will result in impacts to 41.29 ha of broadly suitable foraging habitat for the species. The estimated Area of Occupancy (AOO) is 19,428 km² (1,942,800 ha). The proposed impacts will lead to a decrease in the area of occupancy of the species by 0.002 % of the AOO. However, considering that the species was not recorded within the Project Area, the low value of habitat within the Project Area, the lack of records in the locality, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to lead to a long-term decrease in the size of a population of the species.

2. Will the action reduce the area of occupancy of a population of the species?

This species has a large geographical distribution with an area of occupancy estimated to be that of 19,428 km² (1,942,800 ha). The proposed action will result in a reduction in the occupancy of the species by 41.29 ha (0.002 % of the species' geographic distribution). However, considering that the species was not recorded within the Project Area, the lack of records within the locality, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to lead to a long-term decrease in the size of a population of the species.

3. Will the action fragment an existing important population into two or more populations?

The proposed action will directly impact 41.29 ha of broadly suitable foraging habitat for the species. However, considering the staging of the proposed action, the avoidance of impacts to the majority of suitable habitat within the Project Area, the progressive rehabilitation of the site, and considering the large area of suitable habitat retained within the Tangory Nature Reserve to the east and north of the Project Area, the action is unlikely to result in further fragmentation of an existing population of the species.

4. Will the action adversely affect habitat critical to the survival of a species?

Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

As the species was not recorded within the Project Area, the lack of records within the locality, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to adversely affect habitat critical to the survival of the species.

5. Will the action disrupt the breeding cycle of an important population?

The proposed action is unlikely to disrupt the breeding cycle of a population as the species was not recorded within the Project Area, and the avoidance of impacts within to the majority of suitable habitat within the Project Area, and progressive rehabilitation of the site will maintain connectivity for the species within the locality.

6. Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

This species has a large geographical distribution with an area of occupancy estimated to be that of 19,428 km² (1,942,800 ha). The proposed action will result in a reduction in the occupancy of the species by 41.3 ha (0.002 % of the species' geographic distribution). However, considering that the species was not recorded within the Project Area, the lack of records within the locality, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to impact or isolate quality habitat for the species so as to result in a decline of the species.

7. Will the action result in invasive species that are harmful to a vulnerable species becoming established in the Critically Endangered species' habitat?

Mitigation measures detailed within the BDAR will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or invasive flora species into the Project Area.

8. Will the action introduce disease that may cause the species to decline?

Mitigation measures detailed within the BDAR will prevent construction activities from introducing or spreading plant and animal pathogens that may cause the species to further decline.

9. Will the action interfere substantially with the recovery of the species?

As the species was not recorded within the Project Area, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to interfere substantially with the recovery of the species.

Conclusion

The proposed action will result in impacts to a total of 41.29 ha of broadly suitable foraging habitat for the species. Considering that the species was not recorded within the Project Area, the lack of records within the locality, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to result in a significant impact to the species.

Spotted-tailed Quoll (*Dasyurus maculatus*) - Endangered

Assessment of Significance

1. Is the action likely to lead to a long-term decrease in the size of a population of a species?

The species was not recorded within the Project Area, however the vegetation within the Project Area is considered broadly suitable habitat for the species. Only one (1) record of the species was recorded within 5 km of the Project Area. The proposed action will result in impacts to 41.3 ha of suitable habitat for the species. The estimated Area of Occupancy (AOO) is 2,512 km² (251,200ha). The proposed impacts will lead to a decrease in the area of occupancy of the species by 0.016 % of the AOO. However, considering that the species was not recorded within the Project Area, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to lead to a long-term decrease in the size of a population of the species.

2. Will the action reduce the area of occupancy of a population of the species?

This species has a large geographical distribution with an area of occupancy estimated to be that of 2,512 km² (251,200ha). The proposed action will result in a reduction in the occupancy of the species by 41.3 ha (0.016 % of the species' geographic distribution). However, considering that the species was not recorded within the Project Area, the lack of records within the locality, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to lead to a long-term decrease in the size of a population of the species.

3. Will the action fragment an existing important population into two or more populations?

The proposed action will directly impact 41.3 ha of broadly suitable habitat for the species. However, considering the staging of the proposed action, the avoidance of impacts to the majority of suitable habitat within the Project Area, the progressive rehabilitation of the site, and considering the large area of suitable habitat retained within the Tangory Nature Reserve to the east and north of the Project Area, the action is unlikely to result in further fragmentation of an existing population of the species.

4. Will the action adversely affect habitat critical to the survival of a species?

Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

As the species was not recorded within the Project Area, the lack of records within the locality, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to adversely affect habitat critical to the survival of the species.

5. Will the action disrupt the breeding cycle of an important population?

The proposed action is unlikely to disrupt the breeding cycle of a population as the species was not recorded within the Project Area, and the avoidance of impacts within to the majority of suitable habitat within the Project Area, and progressive rehabilitation of the site will maintain connectivity for the species within the locality.

6. Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

This species has a large geographical distribution with an area of occupancy estimated to be that of 2,512 km² (251,200ha). The proposed action will result in a reduction in the occupancy of the species by 41.3 ha (0.016 % of the species' geographic distribution). However, considering that the species was not recorded within the Project Area, the lack of records within the locality, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to impact or isolate quality habitat for the species so as to result in a decline of the species.

7. Will the action result in invasive species that are harmful to a vulnerable species becoming established in the Critically Endangered species' habitat?

Mitigation measures detailed within the BDAR will prevent construction activities from introducing or spreading new or existing environmental and noxious weeds or invasive flora species into the Project Area.

8. Will the action introduce disease that may cause the species to decline?

Mitigation measures detailed within the BDAR will prevent construction activities from introducing or spreading plant and animal pathogens that may cause the species to further decline.

9. Will the action interfere substantially with the recovery of the species?

As the species was not recorded within the Project Area, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to interfere substantially with the recovery of the species.

Conclusion

The proposed action will result in impacts to a total of 41.3 ha of potential habitat for the species. Considering that the species was not recorded within the Project Area, the lack of records within the locality, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to result in a significant impact to the species.

Vulnerable Species

Large-eared Pied Bat (*Chalinolobus dwyeri*)

1. Is the action likely to lead to a long-term decrease in the size of an important population of a species?

An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

The Disturbance Footprint contains suitable foraging habitat for the Large-eared Pied Bat. No suitable roosting / breeding sites occur within the Disturbance Footprint although potential habitat does occur within a 2 km proximity to the NE. Therefore, the Disturbance Footprint is unlikely to contain a key source population for breeding, or one that is necessary for maintaining genetic diversity. As such, it is unlikely the Disturbance Footprint comprises an important population of the Large-eared Pied Bat.

2. Will the action reduce the area of occupancy of an important population of the species?

The proposed action will not impact an important population of this species.

3. Will the action fragment an existing important population into two or more populations?

The proposed action will not impact an important population of this species.

4. Will the action adversely affect habitat critical to the survival of a species?

Under the Significant Impact Guidelines (Commonwealth of Australia 2013), habitat critical to the survival of a species is defined as areas that are necessary: for breeding or dispersal, for the long-term maintenance of the species, to maintain genetic diversity, or for the recovery of the species.

The proposal will remove 61.63 ha of vegetation providing foraging habitat for this species. The Disturbance Footprint is situated within a large patch of vegetation covering several thousand hectares which will continue to provide foraging habitat for the species. The impacted habitat is therefore not likely to be critical to the survival of this species. Roosting and maternity caves are considered critical for this species, and as there are no such features present within or nearby the Disturbance Footprint, the activity will not adversely affect any habitat critical to the survival of the species.

5. Will the action disrupt the breeding cycle of an important population?

The proposed action will not impact an important population of these species.

6. Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposal will remove 61.63 ha of vegetation providing foraging habitat for this species but will not fragment any areas of habitat. The Disturbance Footprint is situated within a large patch of vegetation covering several thousand hectares which will continue to provide foraging habitat for the species. As such, the proposal is unlikely to decrease the availability or quality of habitat such that

the species is likely to decline. All direct impacts to foraging habitat for Large-eared Pied Bat will be offset through the BOS.

7. Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?

Invasive species are not likely to be harmful to this species and are already ubiquitous throughout the Disturbance Footprint and surrounding habitat. Mitigation measures will prevent construction activities from introducing or spreading new or existing invasive species into the Disturbance Footprint.

8. Will the action introduce disease that may cause the species to decline?

There are no known disease issues affecting this species in relation to the action. The action would be unlikely to increase the potential for significant disease vectors to affect local populations.

9. Will the action interfere substantially with the recovery of the species?

As the proposal will impact on foraging habitat only, it is unlikely to impact on the recovery of this species.

Conclusion

Based on the above assessment it is considered unlikely that Large-eared Pied Bat species will be significantly impacted by the proposal.

Grey-headed Flying-fox (*Pteropus poliocephalus*) - Vulnerable

1. Is the action likely to lead to a long-term decrease in the size of an important population of a species?

An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

The Study Area contains a number of myrtaceous tree species which may provide foraging habitat for the species. However, no breeding habitat (camps) were identified within the Study Area. Therefore, the Study Area is unlikely to contain a key source population for breeding, or one that is necessary for maintaining genetic diversity. The Study Area is also highly connected to large areas of suitable foraging habitat within remnant vegetation to the north, east and west of the site.

As such, it is unlikely the Study Area comprises an important population of Grey-headed Flying-fox.

2. Will the action reduce the area of occupancy of an important population of the species?

The area of occupancy of the Grey-headed Flying-fox is not known but the species exists as one interconnected population along the eastern Australian coastal belt from Rockhampton in central Queensland to Melbourne in Victoria. The area occupied by this species would remain the same after the action. No decrease in the area of occupancy for this species is expected as a result of the proposal.

3. Will the action fragment an existing important population into two or more populations?

Highly mobile species such as bats are expected to be less impacted by fragmentation. The Grey-headed Flying-fox is particularly well adapted to accessing widely spaced habitat resources given its mobility and preference for seasonal fruits and blossom in differing parts of the landscape. The proposal would not fragment an important population of the Grey-headed Flying-fox. Individuals would still be able to disperse between roosts along the east Australian coast. Genetic exchange within the population and dispersal would not be disrupted by the proposal. The proposed action is therefore unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of the population.

4. Will the action adversely affect habitat critical to the survival of a species?

This species typically exhibits very large home range and Grey-headed Flying-fox is known to travel distances of at least 50 km from roost sites to access seasonal foraging resources. There are no known roost camps within the Disturbance Footprint and the site does not provide critical roosting habitat. However, there are a number of known roost camps within a 20 km radius of the proposal, the closest active camp being the Singleton Hunter River and Burdekin Park camps are approximately 17 km W. Camps recorded at Cranky Corner (5 km E) and Lamb Valley (7 km E) do not appear to be active showing last recorded activity prior to 2005 (Australian Flying Fox Monitor).

The recovery plan for the Grey-headed Flying-fox identifies critical foraging habitat as:

- Winter and spring flowering native vegetation
- Native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May)
- Native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer, or
- Native and or exotic species used for roosting at the site of a nationally important Grey-headed Flying-Fox camp as identified on the Department's interactive flying-fox web viewer.

Native vegetation within the study area may constitute critical foraging habitat but the affected area of foraging habitat of 41.3 ha would represent a small percentage (0.03%) of the total extent of important foraging vegetation types present within a 20 km radius of the closest camps. Given the high-quality foraging habitats within the locality, outside of the study area, the proposal is not expected to adversely affect foraging habitat critical to the survival of this species in this region.

5. Will the action disrupt the breeding cycle of an important population?

No breeding habitat for this species was identified within the Study Area. Historical camps have occurred within 5 km of the site, with the nearest currently active camp approximately 17km west of the site. The proposed action will impact vegetation that is unlikely to significantly disrupt the breeding cycle of this species or significantly impact the continued survival of the species. The proposal would not directly impact on a known roost camp / breeding or maternity site. Alternative foraging resources are available in the locality that would provide suitable resources during the maternity season. The proposed action will not impact an important population of this species.

6. Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposal will remove 41.3 ha of potential foraging habitat. No camps occur within the Disturbance Footprint. This impact is not expected to lead to a decline in the species in the region given the availability of high-quality foraging habitat available to local animals in the surrounding area. All direct impacts to foraging habitat for Grey-headed Flying Fox will be offset through the BOS.

7. Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?

The proposal is not expected to increase the prevalence of exotic species within the Project Area. The action is unlikely to result in an invasive species harmful to the Grey-headed Flying-fox becoming established in the habitat.

8. Will the action introduce disease that may cause the species to decline?

There are no known disease issues affecting this species in relation to the action. The action would be unlikely to increase the potential for significant disease vectors to affect local populations.

9. Will the action interfere substantially with the recovery of the species?

No, the proposed action will not interfere substantially with the recovery of the species.

Conclusion

Based on the above assessment it is considered unlikely that this Commonwealth-listed species will be significantly impacted by the proposal

Brown Treecreeper (south-eastern) (*Climacteris picumnus victoriae*) - Vulnerable

1. *Is the action likely to lead to a long-term decrease in the size of an important population of a species?*

An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

The vegetation within the Project Area represents broadly suitable habitat for the species. There is a low abundance of nesting hollows within the Project Area and Disturbance Area owing to the extent of historical vegetation clearing, while ongoing management of the property has reduced the availability of shrubs and midstorey resources for the species. The species was not recorded within the Project Area during targeted bird surveys and there are no records of the species within 5km of the Project Area. Therefore, the Project Area is unlikely to contain a key source population for breeding, or one that is necessary for maintaining genetic diversity. The Project Area is also highly connected to large areas of suitable foraging habitat within remnant vegetation to the north, east and west of the site.

As such, it is unlikely the Project Area comprises an important population of the Brown Treecreeper.

2. *Will the action reduce the area of occupancy of an important population of the species?*

This species has a large geographical distribution with an area of occupancy estimated to be that of 30,000 km² (3,000,000 ha). The proposed action will result in a reduction in the occupancy of the species by 41.3 ha (0.0014 % of the species' geographic distribution). However, considering that the species was not recorded within the Project Area, the lack of records within the locality, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to lead to a long-term decrease in the size of a population of the species.

3. *Will the action fragment an existing important population into two or more populations?*

Highly mobile species such as birds are expected to be less impacted by fragmentation. Considering the lack of records of the species within the locality and within the Project Area the proposed action is unlikely to fragment an important population of the Brown Treecreeper. Genetic exchange within the population and dispersal would not be disrupted by the proposal. The proposed action is therefore unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of a local population of the species.

4. *Will the action adversely affect habitat critical to the survival of a species?*

Habitat critical to the survival or important habitats of a species or ecological community refers to areas that are necessary:

- For activities such as foraging, breeding, roosting, or dispersal;

- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
- to maintain genetic diversity and long-term evolutionary development; or
- for the reintroduction of populations or recovery of the species or ecological community.

Habitat critical to the survival of the brown treecreeper (south-eastern) includes areas that have:

- Relatively undisturbed grassy woodland with native understorey.
 - Habitat structure should be quite open at ground level so that birds are able to feed on or near the ground and maintain vigilance against predators.
 - The required degree of openness is mostly likely to be created by moderate levels of disturbance by fire and/or grazing.
- large living and dead trees which are essential for roosting and nesting sites and for foraging;
- fallen timber which provides essential foraging habitat and;
- hollows in standing dead or live trees and tree stumps are also essential for nesting.

The Disturbance Footprint and Project Area contains broadly suitable foraging habitat for the Brown Treecreeper. There is a low abundance of nesting hollows within the Project Area and Disturbance Area owing to the extent of historical vegetation clearing, while ongoing management of the property has reduced the availability of shrubs and midstorey resources for the species. The species was not recorded within the Project Area during targeted bird surveys and there are no records of the species within 5km of the Project Area. As such, it is unlikely the Disturbance Footprint comprises an important population of the Brown Treecreeper or habitat critical to the survival of a species.

5. Will the action disrupt the breeding cycle of an important population?

The proposed action is unlikely to disrupt the breeding cycle of a population as the species was not recorded within the Project Area, and the avoidance of impacts within to the majority of suitable habitat within the Project Area, and progressive rehabilitation of the site will maintain connectivity for the species within the locality.

6. Will the action modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?

The proposal will remove 41.3 ha of broadly suitable habitat for the species. The proposed action will result in a reduction in the occupancy of the species by 41.3 ha (0.0014 % of the species' geographic distribution). However, considering that the species was not recorded within the Project Area, the lack of records within the locality, the small extent of impacts to the species' range, and the staging of impacts within the proposal (along with rehabilitation), the proposed action is unlikely to impact or isolate quality habitat for the species so as to result in a decline of the species.

7. Will the action result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat?

The proposal is not expected to increase the prevalence of exotic species. The action is unlikely to result in an invasive species harmful to the Brown Treecreeper becoming established in the habitat.

8. Will the action introduce disease that may cause the species to decline?

There are no known disease issues affecting this species in relation to the action. The action would be unlikely to increase the potential for significant disease vectors to affect local populations.

9. *Will the action interfere substantially with the recovery of the species?*

No, the proposed action will not interfere substantially with the recovery of the species.

Conclusion

Based on the above assessment it is considered unlikely that this Commonwealth-listed species will be significantly impacted by the proposal