



NewmontTM
CADIA

Submissions Report

Modification 15 Tailings Storage Facility Embankment Buttressing

Attachment 5

Updated Biodiversity Development Assessment Report





Premise

CADIA HOLDINGS PTY LIMITED

Biodiversity Development Assessment Report

CADIA VALLEY OPERATIONS – TAILINGS STORAGE FACILITY
BUTTRESSING MODIFICATION


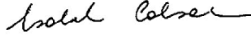


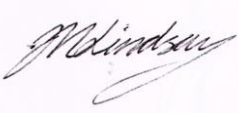

Report No: 221318/R0J

Rev: J

10 May 2024

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DOCUMENT AUTHORISATION					
Revision	Revision Date	Report Details			
Draft 1	05/09/22	Biodiversity Development Assessment Report – Draft 1			
Draft 2	14/7/23	Biodiversity Development Assessment Report – Draft 2			
Draft 3	11/8/23	Biodiversity Development Assessment Report – Draft 3			
Draft 4	11/9/23	Biodiversity Development Assessment Report – Draft 4			
Draft 5	3/11/23	Biodiversity Development Assessment Report – Draft 5			
Draft 6	6/11/23	Biodiversity Development Assessment Report – Draft 6			
Draft 7	14/11/23	Biodiversity Development Assessment Report – Draft 7			
Draft 8	15/11/23	Biodiversity Development Assessment Report – Draft 8			
Draft 9	5/4/24	Biodiversity Development Assessment Report – Draft 9 including Response to Submissions from BCS			
Draft 10	24/4/24	Biodiversity Development Assessment Report – Draft 10			
Final	10/5/24	Biodiversity Development Assessment Report – Final			
Prepared By		Reviewed By		Authorised By	
Sally Kirby		Isobel Colson		Sally Kirby	
Isobel Colson					
Michelle Lindsay					
Renee Dyke					

SUMMARY

The Modification

The Cadia Valley Operations (CVO) are located approximately 25 kilometres (km) south-west of Orange, in the Central Tablelands of New South Wales (NSW). Cadia Holdings Pty Ltd (CHPL) is the owner and operator of the CVO and is a wholly owned subsidiary of Newmont Corporation (Australia) (Newmont).

CHPL plans to seek a modification under the State Significant Development provisions of section 4.55(2) of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act). The Biodiversity Offset Scheme (BOS) applies to State Significant Development proposals and a Biodiversity Development Assessment Report (BDAR) must be prepared by an accredited assessor using the Biodiversity Assessment Method (BAM) (DPIE 2020a).

The main elements proposed for the Modification include the following:

- Placement of additional buttressing material on the outer slopes of the NTSF and STSF embankments, such that the embankments and associated disturbance area include areas outside of existing MLs. No changes to the approved TSF heights, volume of tailings material stored, or stored tailings footprints are proposed. All tailings deposition would remain within the existing MLs.
- A TSF construction infrastructure area, comprising offices, workshops, lubrication and fuel storage to support the upgrades to the NTSF and STSF embankments.
- A minor realignment of Panuara Road in two locations to accommodate the STSF buttressing footprint.
- Restarting the Ridgeway Underground Mine, to recover the remaining 15 Mt of approved resource and a minor change to the approved subsidence zone footprint. This includes using the existing Ridgeway ventilation shafts (upcast and downcast) and the associated operational underground fan system.
- Relocation of a small section of the existing site access road.
- Relocation of the existing on-site batch plant, warehouse and associated laydown facility.
- Construction of a larger tailings pilot plant and associated sand embankment (known as hydrocyclone sands).
- Installation and operation of two additional Cadia East Underground Mine upcast surface ventilation fan installations^{*1}.
- Expansion of the existing 132 kV electrical substation.
- Train arrival and departure activities at the Cadia Dewatering Facility to occur during evening and night-time hours (in addition to approved train arrival and departure activities that occur during daytime hours). This would not result in any change to the total annual number of train movements generated by Cadia. Train loading operations will continue to only be undertaken during daytime hours.
- Approval to conduct construction works for the TSFs in the evening period (i.e. 6.00 pm – 10.00 pm).
- Upgrade of existing infrastructure at the PAX facility.
- Installation of two additional hydrofloat cells within the existing Cadia Ore Processing Facilities' disturbance footprint.
- Realignment of a section of the Belubula River pipeline.
- Other minor infrastructure additions/changes.

As part of the Modification, CHPL is also seeking the following amendments to the conditions of PA 06_0295:

¹ * A third upcast surface ventilation fan installation is in operation at VR81. CHPL has assessed that the installation and operation of the VR81 surface ventilation fan arrangement is generally in accordance with the project as approved.

- A minor administrative change to remove the conditions associated with the now decommissioned Blayney Dewatering Facility; and
- Removal of the *Delma impar* (Striped Legless Lizard) species and the *Aprasia parapulchella* (Pink-tailed Legless Lizard) credits from PA 06_0295 following completion of additional surveys for these species.

The Modification would not change the following components of the approved Cadia:

- Mining method.
- Cadia East Underground Mine and Ridgeway Underground Mine footprint/dimensions.
- Processing rate (i.e. the modification approved in December 2021 to increase the permitted processing capacity from 32 Mtpa to 35 Mtpa is subject to condition 6A, Schedule 2 of PA 06_0295).
- Mine life.
- Maximum approved heights of the TSF embankments.
- Continued use of existing surface facilities, infrastructure and ancillary activities and, construction and use of new and previously approved facilities to support the operation.

Premise Australia Pty Ltd (Premise) was engaged by CHPL in July 2021 to assess the potential environmental impact associated with Modification 15 of Project Approval PA06_0295 for the Cadia East Project. Premise has prepared this BDAR to assess the impact of the Modification on biodiversity values, threatened species, threatened ecological communities and their habitats under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The BDAR also documents measures taken or proposed to avoid, minimise or mitigate potential impacts to threatened entities and calculates the number and class of any biodiversity credits that need to be offset to achieve a “no net loss” of biodiversity using the BAM Credit Calculator (BAM-C) (DPIE 2020b).

The BAM-C case file for this BDAR is 00027936/BAAS18110/21/00027938 (Revision 11: Offset Phase 1 and Revision 12: Offset Phase 2) – Major Projects Assessment.

The Subject Land

The Subject Land encompasses 254.38 hectares (ha) and includes changes to the approved disturbance footprint of elements including Ridgeway Underground Mine, NTSF, STSF and Panuara Road.

The original vegetation on the Subject Land would have been grassy woodlands, most of which has been cleared for agricultural and mining purposes. Category 1 – exempt land was identified on the Subject Land using the Native Vegetation Regulatory Map method statement to justify and map areas that have been lawfully cleared of native vegetation as at 1 January 1990 and are considered low conservation value groundcover. Areas that have existing approval for lawful clearing as per the Cadia Rehabilitation Management Plan (RMP) administered by the NSW Resource Regulator and areas that contain no vegetation are also considered Category 1 – exempt land. Category 1 – exempt land is unregulated and the Biodiversity Assessment Method does not apply. A total of 194.19 ha was identified as Category 1 – exempt land, details provided in the Land Category Report (Premise 2024). The remaining 60.19 ha is Category 2 – regulated land and included in this assessment.

The Subject Land traverses two Bioregions, however the majority falls in the NSW South Eastern Highlands Bioregion and the Orange sub-region.

Methods

The BAM outlines the methodology that underpins the NSW Biodiversity Offset Scheme established under Part 6 of the BC Act. The BAM requires the use of an online program (the BAM Credit Calculator) to assess the biodiversity impacts and determine the biodiversity offset requirements for those impacts. Stage 1 summarises the biodiversity values of the Subject Land, and Stage 2 assesses potential impacts on biodiversity, describes impact avoidance and mitigation measures and determines offset requirements.

Thirty-six (36) BAM quadrats, numerous Rapid Assessment Spot Samples and sixteen (16) Interim Grasslands and other Groundcover Assessment Method transects were undertaken to provide floristic and structural data, assess the conservation value of grasslands and calculate the Vegetation Integrity scores of each vegetation zone.

Native Vegetation

The Subject Land to be assessed in this BDAR contains 32.61 ha of native vegetation including remnant woodland (16.22 ha), Derived Native Grassland (DNG) (8.66 ha) and planted native vegetation (7.73 ha). A further 21.91 ha of exotic dominated grassland was attributed to a Plant Community Type (PCT) for the purpose of being able to include it in the BAM Credit Calculator. Disturbed ground (5.44 ha) and exotic plantings (0.23 ha) were not included.

The native vegetation was divided into nine (9) vegetation zones based on Plant Community Type (PCT) and condition including:

- PCT 266 - White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion
 - VZ1: DNG (1.01 ha)
 - VZ2: Woodland (Poor) (3.17 ha)
- PCT 277 - Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
 - VZ3: DNG (7.65 ha)
 - VZ4: Exotic (21.91 ha)
 - VZ5: Plantings (7.73 ha)
 - VZ6: Paddock Trees (1.08 ha)
 - VZ7: Woodland (Poor) (11.64 ha)
- PCT 287 - Long-leaved Box - Red Box - Red Stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes Bioregion
 - VZ8: Woodland (Moderate) (0.17 ha)
- PCT 85 - River Oak forest and woodland wetland of the NSW South Western Slopes and South Eastern Highlands Bioregion
 - VZ9: Woodland (poor) (0.15 ha)

PCT 266 and PCT 277 are associated with the Threatened Ecological Community (TEC) White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community (CEEC) (Box Gum Woodland) listed under both the NSW BC Act and the Commonwealth EPBC Act. Notwithstanding, PCT 266 and PCT 277 on the Subject Land do not comply with Commonwealth Department of Climate Change, Energy, the Environment and Water (Cth DCCEEW) (2023a) criteria, so are not CEEC under the EPBC Act.

Threatened Species

Database searches and literature review were used to refine the threatened species to be considered in the BDAR:

- Ecosystem species:
 - forty (40) assessed against the available habitat on the Subject Land;
 - twenty-eight (28) retained to be assessed; and
 - twelve (12) were eliminated on the basis of habitat constraints, vagrancy, geographic limitations or microhabitat requirements.
- Candidate species:
 - forty-eight (48) assessed against available habitat on the Subject Land including: two (2) flora species and twenty (20) fauna species were retained for targeted survey.

Following the site survey, only two fauna species credit species were retained in the BAM-C: *Petaurus norfolcensis* (Squirrel Glider) and *Polytelis swainsonii* (Superb Parrot).

Serious and Irreversible Impacts (SAII)

The determination of a Serious And Irreversible Impact (SAII) on biodiversity values is to be made by the decision-maker in accordance with the four principles set out in the *Biodiversity Conservation Regulation (2017)* (BC Reg). Five (5) threatened entities were identified as at risk of SAII including one bird (*Lathamus discolor* [Swift Parrot]), two bats (*Miniopterus orianae oceanensis* [Large Bent-winged Bat] and *Chalinolobus dwyeri* [Large-eared Pied Bat]), one tree (*Eucalyptus canobolensis* [Silver-leaved Candlebark]) and one TEC (Box Gum Woodland).

The Modification would require the permanent removal of 32.29 ha of Box Gum Woodland CEEC and 23.80 ha of foraging habitat for the Swift Parrot. Whereas suitable foraging habitat for the Large Bent-winged Bat and Large-eared Pied Bat does not occur on the Subject Land and maternity roosts were not identified on the site (BMS 2024). It is considered that the proposed activity would not contribute significantly to the risk of Box Gum Woodland, Swift Parrot or Large Bent-winged Bat becoming locally or regionally extinct and it is concluded that serious and irreversible impacts on the threatened entities would not occur.

Matters of National Environmental Significance (MNES)

Forty-nine (49) flora and fauna species recognised as MNES under the EPBC Act were identified during database searches. Of these, ten (10) are considered likely to utilise the Subject Land and have been assessed under Commonwealth guidelines: *Callocephalon fimbriatum* (Gang-gang Cockatoo), *Hirundapus caudacutus* (White-throated Needle-tail), Swift Parrot, *Dasyurus maculatus* (Spotted-tailed Quoll), Superb Parrot, *Anthochaera phrygia* (Regent Honeyeater), *Climacteris picumnus victoriae* (Brown Treecreeper), *Melanodryas cucullata cucullata* (South-eastern Hooded Robin), *Stagonopleura guttata* (Diamond Firetail) and *Pteropus poliocephalus* (Grey-headed Flying-fox). One species, the Superb Parrot was identified on site and all suitable habitat trees have been deliberately excluded from the Subject Land to avoid potential for significant impact. Consequently, referral of the Modification to the Commonwealth under the EPBC Act is not considered necessary for this species. The other nine (9) species were not identified on site and are unlikely to be significantly impacted by the Modification.

Measures to Avoid and Minimise

The Modification Subject Land cannot be relocated, as proposed construction works are associated with the existing mine (including the Tailings Storage Facilities which are in fixed locations). Notwithstanding, opportunities to avoid and minimise impacts were considered during the planning stage of the Modification. The Subject Land has been designed to disturb the minimum area possible, while providing some flexibility for future engineering specifications/changes in design. The Subject Land has deliberately avoided suitable habitat trees for the Superb Parrot. In addition, the Subject Land has been amended to reduce the risk of vehicle strikes, maintain adjacent habitat by not significantly contributing to vehicle strikes, dust, water and noise pollution, and maintain habitat rehabilitation.

Direct Impacts

The direct impacts of the Modification would be the removal of 32.61 ha of native vegetation, of which 32.29 is considered TEC, 2.59 ha is Superb Parrot habitat and 23.61 ha is Squirrel Glider habitat.

Indirect Impacts

Indirect impacts of the Modification would include the temporary disruption to adjacent habitat during construction associated with noise, dust and light, however in the context of an active mining operation this is negligible. There is also a risk of increased pressure on food and shelter resources in adjacent habitat areas as wildlife may be displaced when vegetation is removed from the Subject Land.

Prescribed Impacts

Two prescribed biodiversity impacts relevant to the Subject Land are the loss of habitat connectivity for the Superb Parrot, Squirrel Glider and *Ninox connivens* (Barking Owl), and the increased risk of vehicle strikes which could potentially impact the Superb Parrot, Squirrel Glider and Large Bent-wing Bat. Assessments of significance of the Modification impacts on habitat connectivity and vehicle strike concluded that the habitat is already highly fragmented and there is unlikely to be a significant change in vehicle movement from existing/approved, therefore neither are likely to be significant impacts of the Modification.

There are no identified migratory flight paths traversing the Subject Land. The Modification will not impact the movement of threatened species that maintains their lifecycle, nor will it impact water quality, water bodies or hydrological processes that sustain threatened species or threatened ecological communities. There would be no impact on wind turbines or rocky habitat.

Mitigation Measures

Mitigation measures have been considered for the Modification. These include the timing of works (construction hours and time period undertaken), implementation of pre-clearing surveys and clearing protocols, the inspection of felled trees and investigating options for the relocation of habitat features to reduce impacts associated with the displacement of fauna. Other mitigation measures considered include the installation of temporary fencing and signage, as well as the modification of clearing equipment to reduce inadvertent impacts on adjacent habitat. The impact of the Modification on adjacent habitat and threatened species is also considered to be reduced by the implementation of noise, dust, light, high threat weed and erosion guidelines, hygiene protocols and road amendments (reduced speed, signage and education).

Offset Requirements

CHPL is committed to satisfying the biodiversity credit requirements using offset mechanisms allowed by the NSW Biodiversity Offsets Scheme (i.e. contribution to the Biodiversity Trust Fund administered by the NSW Biodiversity Conservation Trust, purchase of existing credits on the market, funding of a biodiversity conservation action, retirement of biodiversity credits and/or mine site ecological rehabilitation).

Two offset phases are proposed for Modification 15. Impacts that require an offset as per BAM Subsection 9.2.2.(2) (DPIE 2020a) are outlined in **Table E1** and **Table E2**.

Table E1 – Impacts that require an offset – ecosystem credits

Vegetation zone	PCT	TEC	Offset Phase 1		Offset Phase 2	
			Impact area (ha)	Number of ecosystem credits	Impact area (ha)	Number of ecosystem credits
VZ1	266 DNG	Yes	1.01	24	0	N/A
VZ2	266 Woodland (poor)	Yes	3	41	0.17	2
VZ3	277 DNG	Yes	6.46	81	1.2	35
VZ5	277 Plantings	Yes	7.69	143	0.04	1
VZ7	277 Woodland (poor)	Yes	6.15	85	5.49	86
VZ8	287 Woodland (moderate)	No	N/A	N/A	0.17	3
VZ9	85 Woodland (poor)	No	N/A	N/A	0.15	2
Total credits for both offset phases						503

Table E2 – Impacts that require an offset – species credits

Common name	Species name	Offset Phase 1		Offset Phase 2	
		Loss of habitat (ha)	Number of species credits required	Loss of habitat (ha)	Number of species credits required
Squirrel Glider	<i>Petaurus norfolcensis</i>	17.84	221	5.77	74
Superb Parrot	<i>Polytelis swainsonii</i>	1.33	5	1.26	6
Total credits for both offset phases					306

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APPENDICES

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APPENDIX F CREDIT REPORTS

APPENDIX G MIGRATORY SPECIES ASSESSMENT

APPENDIX H THREATENED SPECIES DATABASE ASSESSMENT

APPENDIX I SERIOUS AND IRRIVERSIBLE IMPACTS

SHORTENED FORMS

ASL	Above Sea Level
APZ	Asset Protection Zone
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BCS	Biodiversity, Conservation and Science Directorate
BC Reg	Biodiversity Conservation Regulation 2017 (NSW)
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets And Agreement Management System
BOS	Biodiversity Offsets Scheme
CEEC	Critically Endangered Ecological Community
CHPL	Cadia Holdings Pty Limited
CVO	Cadia Valley Operations
DBH	Diameter At Breast Height Over Bark
DNG	Derived Native Grassland
EC	Ecological Community Listed Under The EPBC Act
EEC	Endangered Ecological Community
EPBC Act	<i>Environment Protection And Biodiversity Conservation Act 1999 (Cwlth)</i>
EP&A Act	<i>Environmental Planning And Assessment Act 1979 (Nsw)</i>
GIS	Geographic Information Systems
ha	Hectares
HTW	High Threat Weed
IBRA	Interim Biogeographic Regionalisation For Australia
IGGAM	Interim Grasslands and other Groundcover Assessment Method
km	Kilometres
km ²	Square kilometres
kV	kilovolt
LLS Act	<i>Local Land Services Act 2013 (NSW)</i>
m	Metres

MLs	Mining Leases
MNES	Matters Of National Environmental Significance
Mt	Million tonnes
Mtpa	Million tonnes per annum
Newmont	Newmont Corporation (Australia)
NPW Act	<i>National Parks And Wildlife Act 1974 (NSW)</i>
NSW	New South Wales
NTSF	Northern Tailings Storage Facility
PAX	Potassium Amyl Xanthate
PCT	Plant Community Type
PIF	Passive InfraRed
PMST	Protected Matters Search Tool
PTSF	Pit Tailings Storage Facility
Premise	Premise Australia
RASS	Rapid Assessment Spot Samples
Ridgeway	Ridgeway Underground Mine
SAII	Serious And Irreversible Impact
SAT	Spot Assessment Technique
SEARS	Secretary's Environmental Assessment Requirements
STSF	South Tailings Storage Facility
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
TSF	Tailings Storage Facility
VEC	Vulnerable Ecological Community
Vegetation SEPP	<i>State Environmental Planning Policy (Vegetation In Non-Rural Areas) 2017 (NSW)</i>
VI	Vegetation Integrity
VI Plots	Vegetation Integrity BAM Plot
VZ	Vegetation Zone

DECLARATIONS

i. Certification under clause 6.15 Biodiversity Conservation Act 2016

I certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the *Biodiversity Conservation Act 2016* (BC Act).

Signature:

A handwritten signature in black ink, appearing to read 'Nally Kirby'.

Date: 10 May 2024

BAM Assessor Accreditation no: BAAS21027

This BDAR has been prepared to meet the requirements of BAM 2020 (DPIE 2020a). Appendix A provides an assessment of compliance with the minimum information requirements outlined in BAM Appendix K.

ii. Details and experience of author/s and contributors

Authors and contributors responsible for preparing this BDAR have been detailed below.

Table 1. Authors and contributors

Name	BAM Assessor Accreditation no. (if relevant)	Position/Role	Tasks performed	Relevant qualifications
Sally Kirby	BAAS21027	Senior Ecologist	BAM Vegetation Integrity Plots, IGGAM transects, Category 1 land assessment, BAM-C data analysis, BDAR preparation and review	BSc, M.Env. Studies, Accredited BAM assessor
Isobel Colson	BAAS22028	Senior Ecologist	BAM Vegetation Integrity Plots, BAM-C data analysis, targeted flora searches, BDAR preparation and review	BSc, MSc, Accredited BAM assessor
Michelle Lindsay	N/A	Ecologist	BAM Vegetation Integrity Plots, IGGAM transects, BAM-C data collation, database searches, targeted flora species searches, BDAR preparation.	BBioCon Undergoing AUSRIVAS accreditation
Renee Dyke	N/A	Ecologist	BDAR preparation	MSc
Adam Davis	N/A	Spatial analyst	GIS data collation, analysis and preparation of figures for BDAR.	Diploma in Civil Construction Certificate II in Information Technology

iii. Conflict of interest

I declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest.

This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Signature:

A handwritten signature in black ink, appearing to read "M. Kelly".

Date: 10 May 2024

BAM Assessor Accreditation no: BAAS21027

STAGE 1: BIODIVERSITY ASSESSMENT

1. INTRODUCTION

1.1 Proposed Development

1.1.1 DEVELOPMENT OVERVIEW

Premise Australia Pty Ltd (Premise) was engaged by Cadia Holdings Pty Limited (CHPL) in July 2021 to assess the potential environmental impact associated with Modification 15 of Project Approval PA06_0295 for the Cadia East Project.

CHPL is the owner and operator of the Cadia Valley Operations (CVO) and is a wholly owned subsidiary of Newmont Corporation (Australia) (Newmont). CHPL has been implementing a number of measures to optimise the ore processing facilities to achieve the currently approved ore processing rate of 32 million tonnes per annum (Mtpa).

Project Approval (PA 06_0295) includes all components of the CVO including the Cadia East underground mine (Cadia East), the Cadia Hill Open Pit Tailings Storage Facility (PTSF), the Ridgeway underground mine (Ridgeway), CVO Dewatering Facilities in Blayney, and a wide range of ancillary and supporting infrastructure. These integrated operations are herein referred to as the CVO.

CHPL plans to seek a modification under the State Significant Development provisions of section 4.55(2) of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act). The Biodiversity Offset Scheme (BOS) applies to State Significant Development proposals and a Biodiversity Development Assessment Report (BDAR) must be prepared by an accredited assessor using the Biodiversity Assessment Method (BAM) (DPIE 2020a) to assess the impact of the proposals on biodiversity values.

Premise has prepared this BDAR to assess the potential impact of the Modification on biodiversity values, threatened species, threatened ecological communities and their habitats under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in accordance with the Biodiversity Assessment Method (BAM) (DPIE 2020a). The BDAR must also document measures taken to avoid, minimise or mitigate potential impacts to threatened entities and calculate the number and class of any biodiversity credits that need to be offset to achieve a "no net loss" of biodiversity using the BAM Credit Calculator (BAM-C) (DPIE 2020b).

1.1.2 LOCATION

CVO is located in the Cabonne and Blayney Shires, 25 km south-west of the City of Orange (**Figure 1 to Figure 4**). The Subject Land associated with the Modification and the modification elements are shown in **Figure 5**. The Subject Land includes Lots in the Cabonne and Blayney Local Government Areas as listed below.

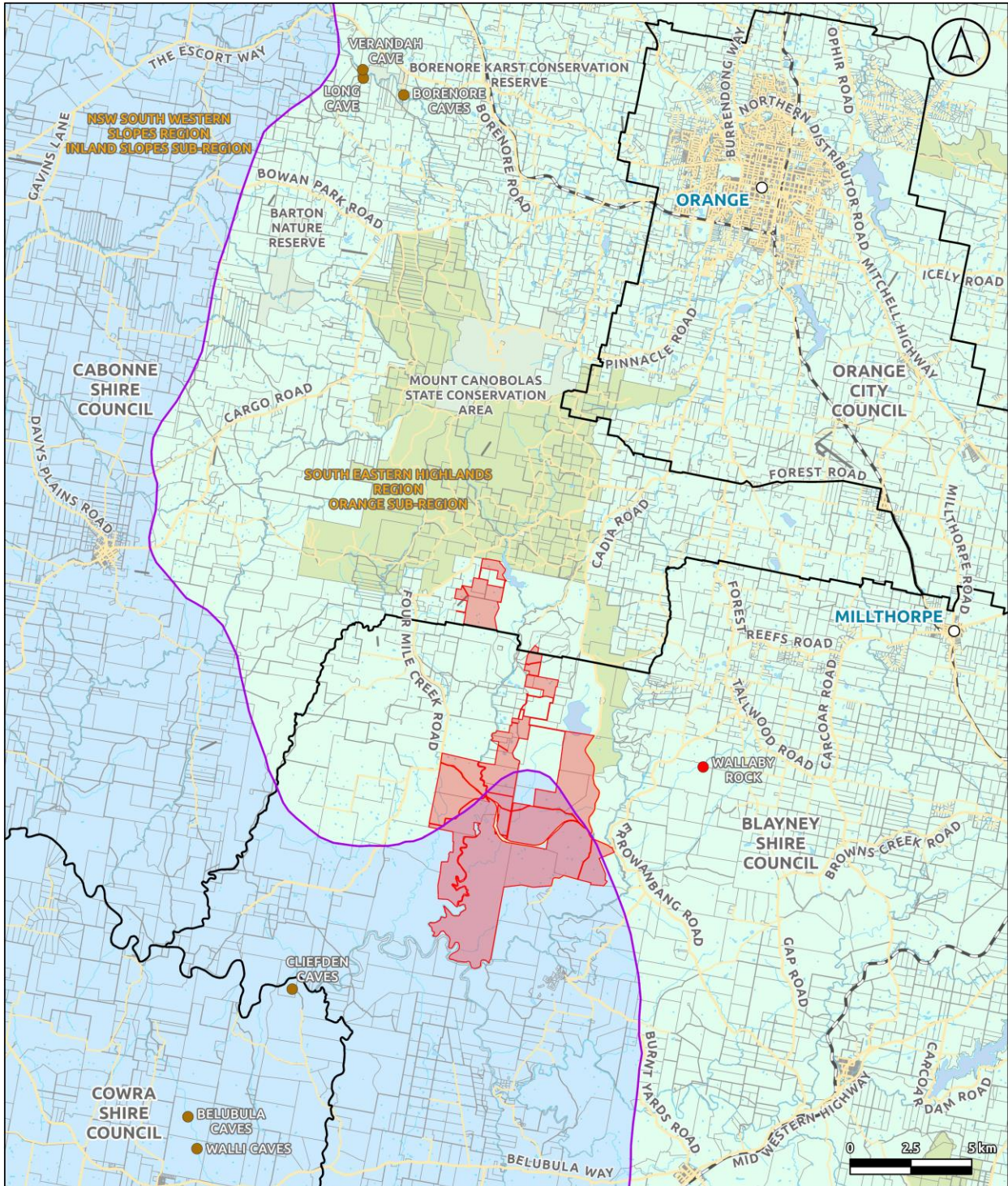
Lots in the Cabonne Shire:

- Lot 16 DP234195.
- Lot A DP437767.
- Lots 93, 97, and 124 DP750371.
- Lot 211 DP865598.

Lots in the Blayney Shire:

- Lot 157 DP40039.
- Lot 1 DP47552.
- Lot 16 DP234195.
- Lot 1 DP731180.
- Lots 1, 5, 24, 25, 43, and 64 DP750362.
- Lot 255 DP750415.
- Lots 1 and 2 DP816924.
- Lot 21 DP825426.
- Lot 3 DP871086.
- Lot 201 DP1037198.
- Lot 21 DP1038104.
- Lot 102 DP1040753.
- Lot 50 DP1132784.
- Lot 1422 DP1168271.
- Lot 32 DP1217542.

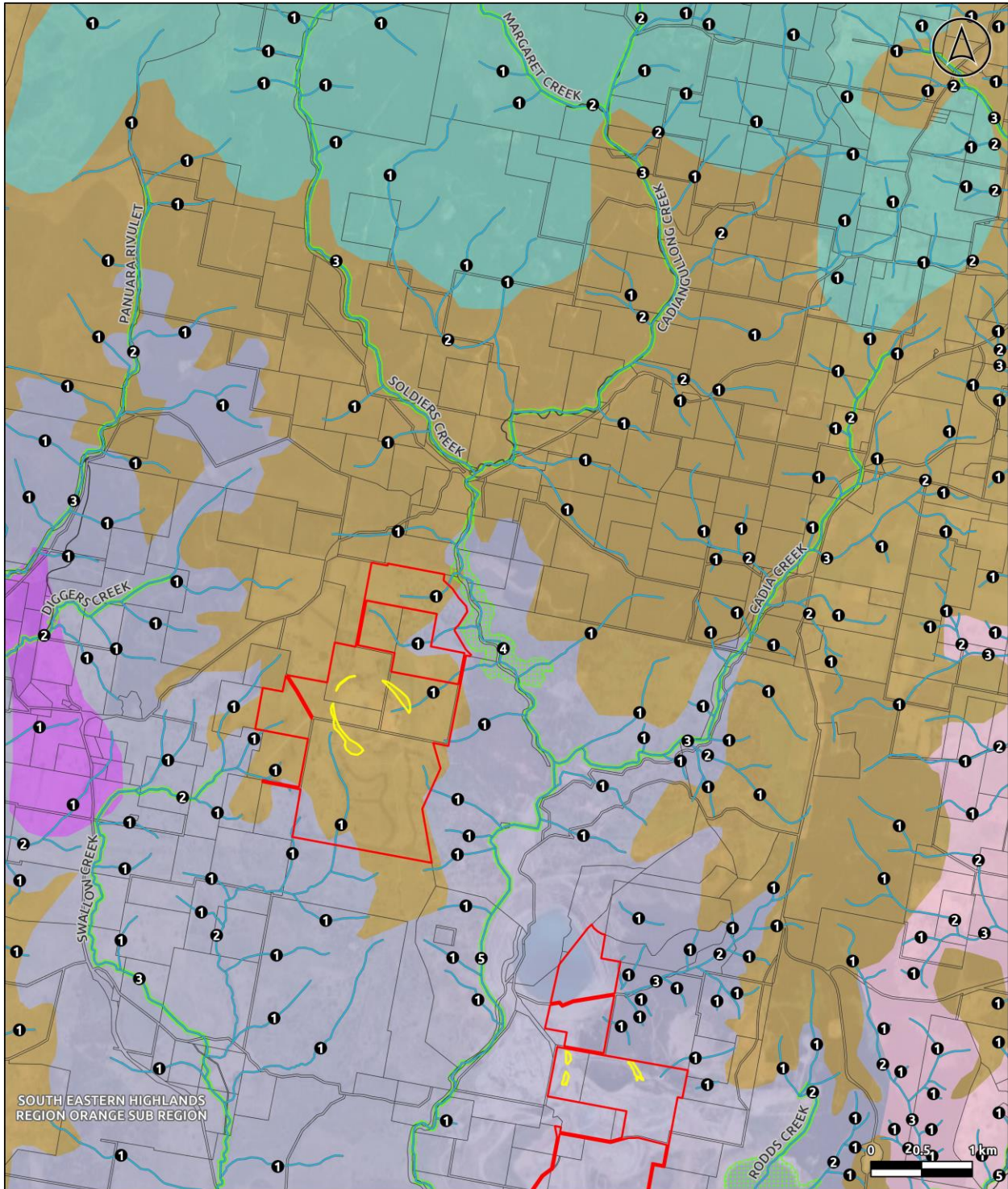
Figure 1. Site Map (1 of 3)



Sources: © State of NSW, Department of Customer Service, Spatial Services 2023
 State of NSW, Department of Planning and Environment 2023
 GDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: zindia.narver Date: 09/11/2023

- Legend**
- Local Government Area
 - Mining Lease Boundary
 - Cadastre
 - Road
 - Railway
 - Runway
 - Water Body
 - Watercourse
 - State Forest
 - NPWS Reserve
 - Cave
 - Rock-Inland
 - IBRA Regions
 - IBRA Sub-Regions**
 - Inland Slopes
 - Orange

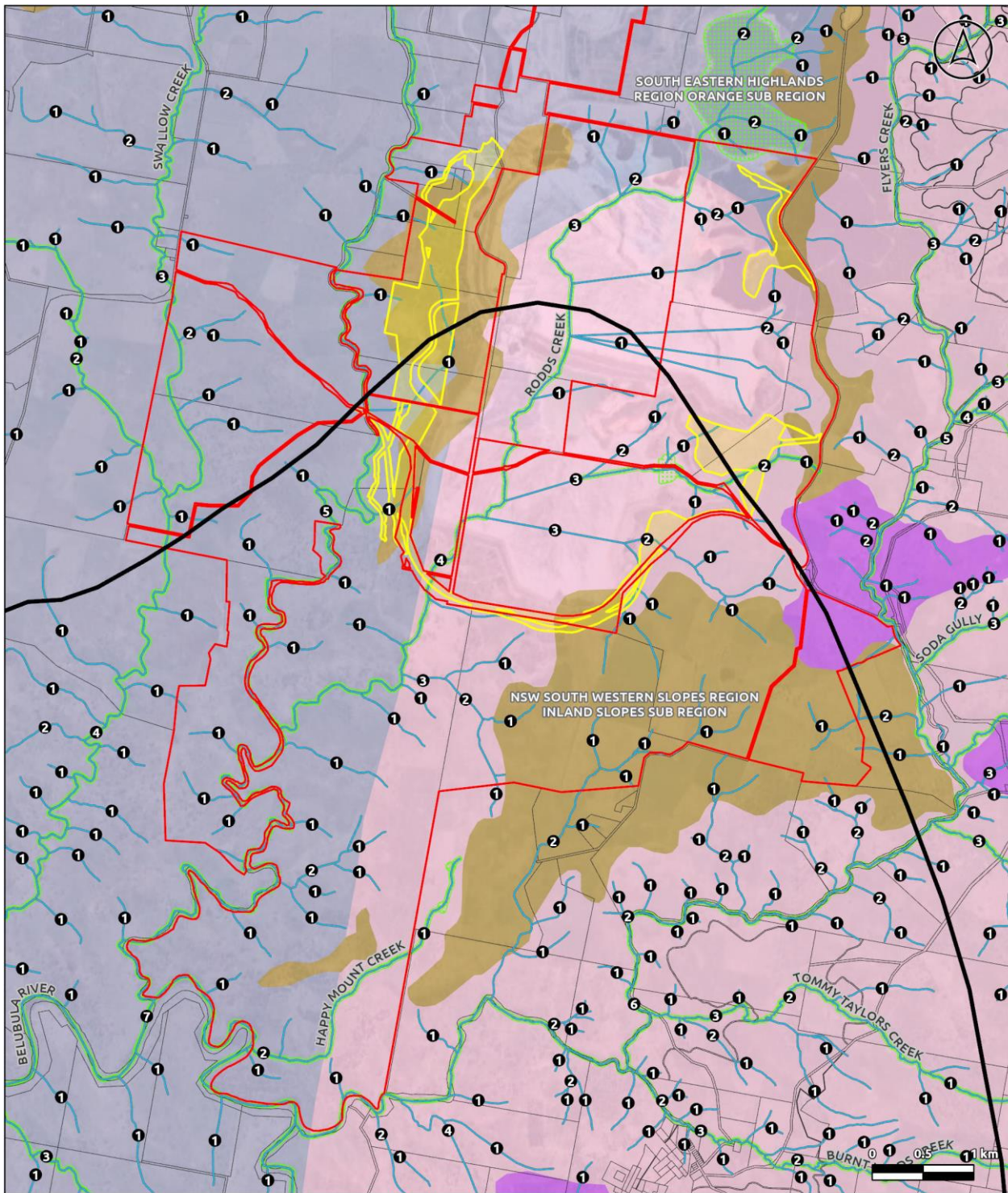
Figure 2. Site Map (2 of 3)



Sources: © State of NSW, Department of Customer Service, Spatial Services 2023
 State of NSW, Department of Planning Industry and Environment 2023; Google 2023
 GDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: zindia.nanver Date: 09/11/2023

- | | |
|---|-------------------------|
| Legend | |
| Affected Land Parcel | Mitchell Landscapes |
| Modification 15 Surface Disturbance Footprint | Canobolas Peaks |
| Cadastre | Canobolas Sheet Basalts |
| Watercourse (Strahler Order) | Canobolas Slopes |
| Biodiversity Values | Carcoar Intrusives |
| Protected Riparian Land | Mandurama Slopes |

Figure 3. Site Map (3 of 3)



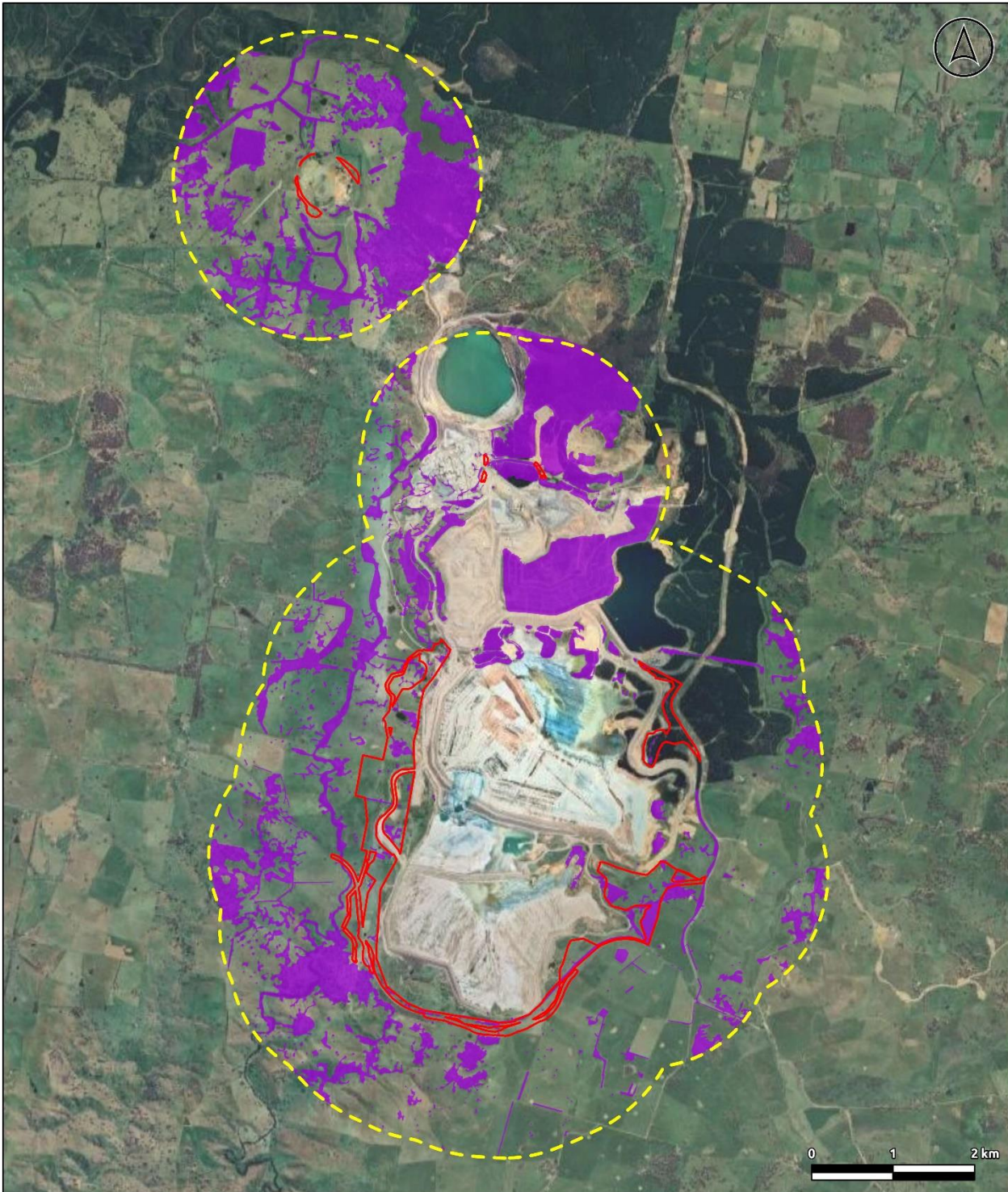
Sources: © State of NSW, Department of Customer Service, Spatial Services 2023
 State of NSW, Department of Planning Industry and Environment 2023; Google 2023
 GDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 28/10/2023

Legend

- IBRA Boundary
- Affected Land Parcel
- Modification 15 Surface Disturbance Footprint
- Cadastre
- Watercourse (Strahler Order)
- Biodiversity Values**
- Protected Riparian Land

- Mitchell Landscapes**
- Canobolas Sheet Basalts
 - Canobolas Slopes
 - Carcoar Intrusives
 - Mandurama Slopes




Figure 4. Location Map



Sources: © State of NSW, Department of Customer Services, Spatial Services 2023
 State of NSW, Department of Planning and Environment 2023; Google 2023

GDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 5/04/2024

Legend

-  Modification 15 Surface Disturbance Footprint
-  1500m Buffer
-  Native Vegetation Within 1500m

1.1.3 GENERAL DESCRIPTION OF THE SUBJECT LAND

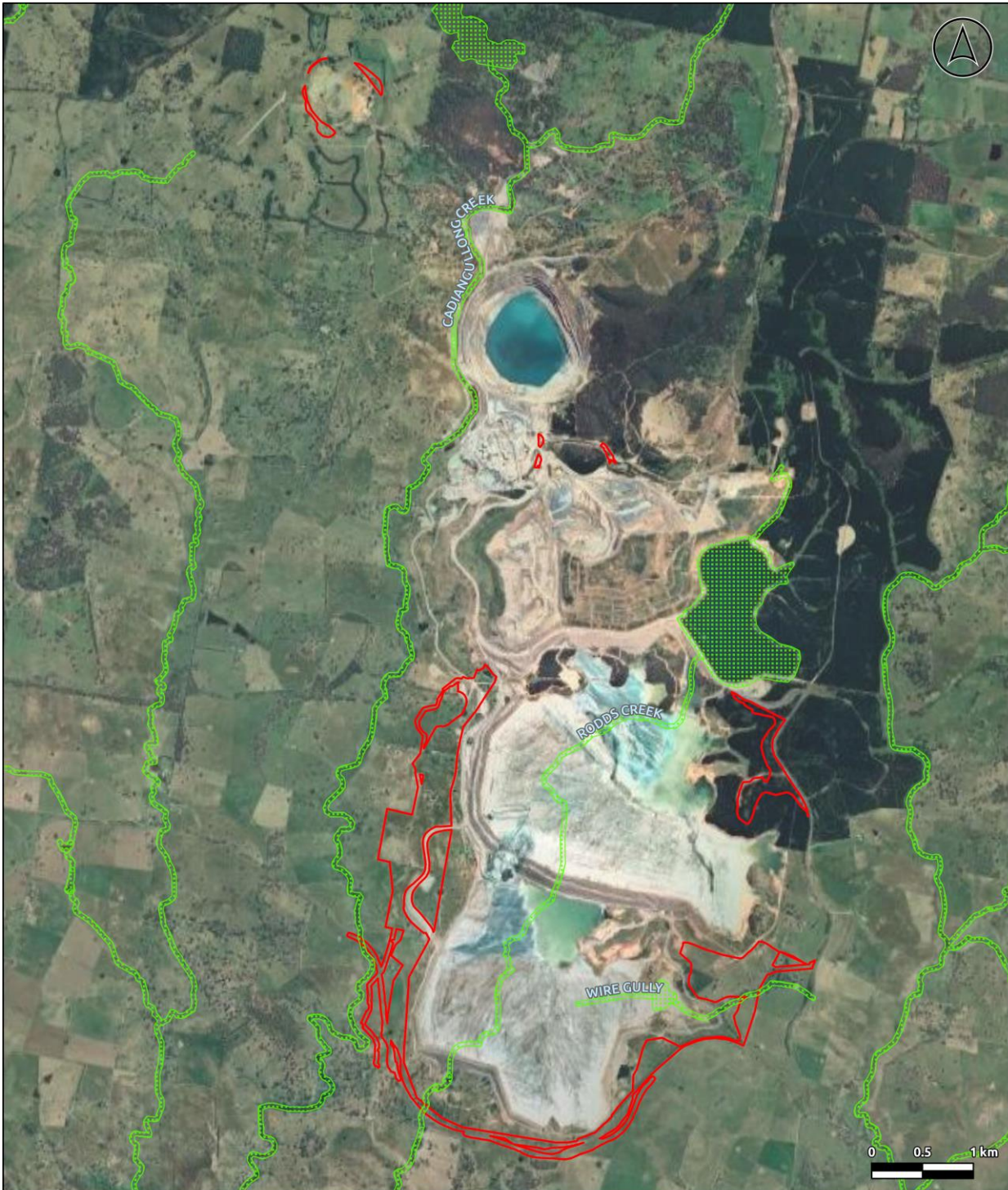
The Subject Land comprises approximately 255 hectares (ha) of undulating land. Elevation on the Subject Land ranges from 600 metres (m) Above Sea Level (ASL) in the grazing paddocks along Panuara Road along the southern extent of the Subject Land to 906 m ASL north-east of the subsidence zone at the northern extent of the Subject Land.

The site is covered by the Bathurst 250K Soil Landscapes map and soils are predominantly characterised as belonging to the Panuara Soil Landscape, with segments belonging to the Towac Soil Landscape in the centre of the site and around the subsidence zone, and the Vittoria-Blayney Soil Landscape along the eastern boundary (NSW Department of Climate Change, Energy, the Environment and Water [NSW DCCEEW] 2024e). Soils in the Panuara landscape are derived from the Angullong Tuff and Malachis Hill formation which consist of Andesite, tuff, limestone, siltstone and shale parent rock. They have generally been formed in situ from alluvial-colluvial materials and form undulating low hills to rolling hills. Red podzolics are found in the mid slope and yellow podzolics and solodics on lower slopes. Towac soil landscapes are tertiary volcanics derived from Mount Canobolas. The parent rock consists of basalt flows separated by layers of volcanic ash and include alkaline olivines, trachytes and some shales and slates. Soil types include krasnozems (dark reddish-brown loam with weak fine crumb structure) and yellow podzolic and solodic soils which are grey-yellow to dull fine sandy loams with weak structure and low pH. Vittoria Blayney landscape soils are derived from Devonian, Silurian and Ordovician formations and parent rock is a broad range which includes andesitic volcanics, limestone and shales, schists and breccias. Soils in this landscape include rocky outcrops and krasnozems higher on slopes, with red and yellow earths in mid slopes. Soils range from low to moderate chemical fertility in the krasnozems, with friable and well drained soils and low erosion risk, to hard setting and imperfectly drained yellow soloth soils in drainage lines.

The Subject Land intersects a total area of 1.39 ha within the Biodiversity Values Map (**Figure 6**) (NSW Government 2022j). This includes riparian areas along Cadiangullong Creek, Rodds Creek and Wire Gully Creek near Panuara Road.

The hydrological context of the Subject Land is described in Section 3.2.2.

Figure 6. Biodiversity Values Map



- Legend**
- Modification 15 Surface Disturbance Footprint
 - Biodiversity Values**
 - Protected Riparian Land

Sources: © State of NSW, Department of Customer Service, Spatial Services 2023
 State of NSW, Department of Planning and Environment 2023; Google 2023

GDA2020 MCA Zone 55 File: 221318_02.aprx Prepared By: zindia.nanver Date: 09/11/2023

1.1.4 PROPOSED DEVELOPMENT AND THE SUBJECT LAND

The Modification proposes placing additional buttressing material on the outer slopes of the TSF embankment footprints which are required following further detailed design, consistent with the evolution of an optimised design and construction program of this scope and magnitude. In addition, a restart of Ridgeway Underground Mine is sought to provide optionality of ore supplies.

The main elements proposed for the Modification are shown in **Figure 5** and include the following:

- Placement of additional buttressing material on the outer slopes of the NTSF and STSF embankments, such that the embankments and associated disturbance area include areas outside of existing MLs. No changes to the approved TSF heights, volume of tailings material stored, or stored tailings footprints are proposed. All tailings deposition would remain within the existing MLs.
- A TSF construction infrastructure area, comprising offices, workshops, lubrication and fuel storage to support the upgrades to the NTSF and STSF embankments.
- A minor realignment of Panuara Road in two locations to accommodate the STSF buttressing footprint.
- Restarting the Ridgeway Underground Mine, to recover the remaining 15 Mt of approved resource and a minor change to the approved subsidence zone footprint. This includes using the existing Ridgeway ventilation shafts (upcast and downcast) and the associated operational underground fan system.
- Relocation of a small section of the existing site access road.
- Relocation of the existing on-site batch plant, warehouse and associated laydown facility.
- Construction of a larger tailings pilot plant and associated sand embankment (known as hydrocyclone sands).
- Installation and operation of two additional Cadia East Underground Mine upcast surface ventilation fan installations*².
- Expansion of the existing 132 kV electrical substation.
- Train arrival and departure activities at the Cadia Dewatering Facility to occur during evening and night-time hours (in addition to approved train arrival and departure activities that occur during daytime hours). This would not result in any change to the total annual number of train movements generated by Cadia. Train loading operations will continue to only be undertaken during daytime hours.
- Approval to conduct construction works for the TSFs in the evening period (i.e. 6.00 pm – 10.00 pm).
- Upgrade of existing infrastructure at the PAX facility.
- Installation of two additional hydrofloat cells within the existing Cadia Ore Processing Facilities' disturbance footprint.
- Realignment of a section of the Belubula River pipeline.
- Other minor infrastructure additions/changes.

As part of the Modification, CHPL is also seeking the following amendments to the conditions of PA 06_0295:

- A minor administrative change to remove the conditions associated with the now decommissioned Blayney Dewatering Facility; and
- Removal of the Striped Legless Lizard species and the Pink-tailed Legless Lizard credits from PA 06_0295 following completion of additional surveys for these species.

The Modification would not change the following components of the approved Cadia:

² * A third upcast surface ventilation fan installation is in operation at VR81. CHPL has assessed that the installation and operation of the VR81 surface ventilation fan arrangement is generally in accordance with the project as approved.

- Mining method.
- Cadia East Underground Mine and Ridgeway Underground Mine footprint/dimensions.
- Processing rate (i.e. the modification approved in December 2021 to increase the permitted processing capacity from 32 Mtpa to 35 Mtpa is subject to condition 6A, Schedule 2 of PA 06_0295).
- Mine life.
- Maximum approved heights of the TSF embankments.
- Continued use of existing surface facilities, infrastructure and ancillary activities and, construction and use of new and previously approved facilities to support the operation

Table 2 provides a comparison of the approved CVO and the Modification and summarises the key changes, while **Table 2** provides a summary justification for these.

Table 2. Comparison of the Approved CVO and the Modification

Project Component	Approved CVO (Incorporating the Changes Proposed as Part of Modification 14)	CVO Incorporating the Modification
Mining Methods	Cadia Hill - conventional open pit mining methods (mining now completed). Ridgeway - underground sub-level and block caving with development of associated surface subsidence zone. Cadia East - underground panel caving with development of associated surface subsidence zone.	No change.
Life of Mine Cadia East and Ridgeway Ore Production	Approximately 525 Mt of Cadia East Ore. Approximately 96 Mt of Ridgeway Ore.	No change (potential restart of Ridgeway to facilitate mining of the 15 Mt of approved resource).
Waste Rock Management	Deposition in the North and South Waste Rock Dumps and mined-out void of the Cadia Extended open pit. Cadia East waste rock to be deposited in the South Waste Rock Dump. Material for the construction of the NTSF encapsulation and STSF embankment construction to be sourced from non-acid forming material from the site waste rock dumps.	No change.
Life of Mine	Mining up until approximately 2031. Project Approval until 2031	No change.

Project Component	Approved CVO (Incorporating the Changes Proposed as Part of Modification 14)	CVO Incorporating the Modification
Tailings Management	<p>Use of the NTSF and STSF and raising of these storages via centreline/ or/downstream embankment lifts. Installation of additional buttressing of the STSF embankment.</p> <p>Deposition of tailings in the Cadia Hill open pit to its full capacity, to a (pre-consolidation) level of approximately 713 m AHD.</p> <p>Cumulative tailings disposal volume of 674 Mt from 2013.</p> <p>NTSF repairs to restore embankment by encapsulation of majority of the slumped section.</p>	<p>Additional material (i.e. buttressing) to be placed on the exterior embankments of the NTSF and STSF, such that the embankment and associated disturbance area extents include areas outside of the southern extent of ML 1481.</p> <p>Construction of a trial tailings embankment from hydrocyclone sands sourced on site.</p> <p>Change to working hours for TSF construction into the evening.</p>
Ventilation Adit	<p>The mining complex includes several ventilation adits/shafts for ventilation of underground mining areas.</p> <p>Decommissioning and closure of existing adit VR101 located within the Cadia Hill open pit.</p> <p>Ventilation shaft within the current approved mine disturbance footprint to replace adit VR101.</p>	<p>Two new upcast ventilation fans on the surface to support the Cadia East Underground Mine (i.e. VR5 and VR11).</p>
Ore Processing	<p>On-site processing of up to 32 Mtpa of gold/copper ore.</p> <p>Increasing the On-site processing of up to 35 Mtpa of gold and copper ore.to up to 35 Mtpa is subject to Condition 6A of Schedule 2.</p>	<p>No change to ore processing throughput.</p> <p>Two hydrofloat cells located within the existing Cadia Ore Processing Facilities' disturbance footprint.</p>
Concentrate Transport and Dewatering	<p>Gold/copper concentrate is transported from the ore processing facilities via a concentrate pipeline to the Blayney Dewatering Facility (now decommissioned and the Modification proposes to remove all conditions associated with the decommissioned Blayney Dewatering Facility).</p>	<p>No change.</p>

Project Component	Approved CVO (Incorporating the Changes Proposed as Part of Modification 14)	CVO Incorporating the Modification
	The Cadia Dewatering Facility to the east of Blayney and the subsequent decommissioning of the existing Blayney Dewatering Facility (now complete).	No change.
	Concentrate pipeline from Cadia to the Cadia Dewatering Facility.	No change.
	Transport of dewatered mineral concentrate by rail to the eastern seaboard.	<p>Changes to the operation of the Cadia Dewatering Facility to allow train arrivals and departure during evening and night time hours. This would not result in any change to the total number of train movements generated by Cadia.</p> <p>Minor administrative changes to remove conditions relating to the former Blayney Dewatering Facility from the Project Approval.</p>
Process Consumables	<p>Use of various chemicals and reagents typically used in gold/copper mining and processing.</p> <p>Sodium Hydrosulphide (NaHS) Solutioning Plant (located adjacent to the Molybdenum Recovery Plant) to produce NaHS on-site to meet Cadia's operational requirements.</p>	<p>Upgrades to the PAX facility.</p> <p>20% increase in PAX consumption.</p>
Water Supply and Management	<p>Water supply sourced from the Cadiangullong Dam, Flyers Creek Weir, Cadia Creek Weir, Orange Sewage Treatment Plant treated effluent, Blayney Sewage Treatment Plant treated effluent, on-site groundwater bores, Belubula River, Cadia Extended open pit and site runoff.</p> <p>Development of additional pipeline/pumping systems and raising of the Rodds Creek Water Holding Dam.</p> <p>Contingent transfer of supernatant tailings water from STSF and NTSF to Cadia Hill open pit for water management.</p>	<p>Further realignment of a portion of the Belubula River pipeline.</p> <p>No other changes to the overall water supply and management strategy for Cadia.</p>

Project Component	Approved CVO (Incorporating the Changes Proposed as Part of Modification 14)	CVO Incorporating the Modification
	Internal tailings return water pipeline and pumping systems from Cadia Hill open pit.	
Power Demand and Supply	Peak demand to 179 megawatts (MW) (using existing power supply infrastructure). 132 kV electrical substation.	<p>Expansion of the existing 132 kV electrical substation.</p> <p>The peak power demand is estimated to be 194 MW.</p> <p>This increase is due to:</p> <ul style="list-style-type: none"> • Power to supply the three additional upcast ventilation fans described previously • Commencement of mobile fleet electrification • Reinstallation of the STSF decant pump system <p>Since approval of Modification 14, CHPL has established a modified Connection Agreement with Essential Energy for the estimated peak power demand. This will support the above as well as increasing production to 35Mpta as described in PA 06_0295 Schedule 2, Condition 6A.</p>
Employment	An average of approximately 945 employees with an additional construction/development workforce of up to approximately 860 personnel. Intermittent shutdown periods require a nominal workforce of approximately 300 to 700 additional personnel during these periods.	<p>An average of approximately 1090 to 1140 employees (i.e. an additional 150 - 200 personnel associated with the recommencement of Ridgeway) with an additional construction/development workforce of up to approximately 970 personnel (i.e. an additional 110 personnel associated with the TSF construction works).</p> <p>No change to the intermittent shutdown workforce personnel.</p>
Final Landforms	Includes South Waste Rock Dump, North Waste Rock Dump, NTSF, STSF, Cadia East Subsidence Zone, Ridgeway Subsidence Zone, Cadia Hill open pit, Cadia Extended open pit, Cadiangullong Dam, Rodds Creek Holding Dam and other	<p>Buttressing the exterior embankment of the NTSF and STSF changes the location of the embankments toes (i.e. footprint).</p> <p>A change to location of the subsidence impacts from Ridgeway mining. The total area of predicted subsidence impact is smaller than that approved.</p>

Project Component	Approved CVO (Incorporating the Changes Proposed as Part of Modification 14)	CVO Incorporating the Modification
	<p>water management infrastructure.</p> <p>The final landform of Cadia Hill pit would be a pit lake (i.e. a wet cover).</p> <p>No intersection between the Cadia East underground mine subsidence zone and Cadia Hill open pit in the long term and, therefore, two separate final void waterbodies (smaller in extent compared with the approved subsidence zone) (as described in MOD 13).</p>	

Table 3. Modification Changes and Justification

Key Changes Sought	Justification
Changes to the embankment footprint of the STSF, such that the embankment and associated disturbance area extents include areas outside of existing Mining Leases (however, all tailings deposition remains within existing Mining Leases).	The potential changes to the TSF footprints are driven by new information which has come to light since the Mod 14 TSF concept designs were formulated: Recent drilling results indicate that the NTSF requires a larger foundation width. Higher engineering significance rating would require a larger foundation footprint.
Restart of the Ridgeway Underground Mine (after an initial trial period).	Ridgeway Underground Mine has been on care and maintenance since 2017. The remaining approved ore is planned to be mined to supplement Cadia East ore (e.g. during years of Cadia East development works).

The Subject Land is dominated by exotic pasture associated with historic agricultural land use. There are several farm dams on the Subject Land, as well as farm tracks and formed roads including Panuara Road in the South. Native vegetation consists of isolated paddock trees and some areas dominated by native grasses derived from the original grassy woodland that would have occurred on the site pre-European settlement. There is a pine forest plantation in the north-east corner of the site, and some areas where trees and shrubs have been planted for wind breaks, including both native and exotic species.

The Subject Land is 254.38 ha, of which 174.94 ha is exotic pasture, 25.77 ha is disturbed ground, 8.66 ha is native grassland considered to be derived from the original vegetation community (DNG), 18.56 ha is remnant woodland, 0.17 ha is regenerating, 0.05 ha is rehabilitated, 7.73 ha is native plantings and 18.49 ha is planted exotic vegetation, predominantly pine forest plantation.

The Subject Land is zoned for Primary Production Purpose RU1 under the *Cabonne Local Environmental Plan 2012* in the north, and *Blayney Local Environmental Plan 2012* in the south.

1.1.5 OTHER DOCUMENTATION

The findings of the Baseline Fauna Survey Report prepared by BMS (2024) have been incorporated into this BDAR. The Baseline Fauna Survey Report is provided in Appendix E.

1.2 Biodiversity Offsets Scheme Entry

The proposed Modification is considered a State Significant Development under Section 4.55(2) of the EP&A Act. The BOS applies to State Significant Development proposals.

1.3 Excluded Impacts

Areas that did not contain vegetation, for example roads, buildings, dams and other infrastructure were excluded from the assessment. Drone imagery provided by Newcrest in 2023 was used to identify non vegetated areas to be excluded on this basis.

Given the historical land use and the condition of the vegetation on the Subject Land, exotic vegetation and regrowth was assessed in accordance with the *Local Land Services Act* (LLS Act) to determine whether it met the definition of Category 1 – Exempt Land. The land is zoned as RU1 and therefore the LLS Act applies. Three categories of land are recognised under the Land Management Framework:

- Category 1 (exempt land) – vegetation can be cleared without approval.
- Category 2 (regulated/vulnerable/sensitive) – vegetation is protected and needs a permit to clear.
- Excluded land – urban areas, National Parks, State Forestry, Crown Reserves etc where the LLS Act does not apply.

Clause 6.8(3) of the BC Act specifies that the BAM is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on category 1-exempt land (as defined in Part 5A of the LLS Act), other than prescribed impacts (as defined in clause 6.1 of the Biodiversity Conservation Regulation 2017 (BC Reg)). A Land Category Report was prepared for endorsement by the Biodiversity, Conservation and Science Directorate (BCS) of the then Department of Planning and Environment (DPE) (now the NSW DCCEE) in 2023 (**Appendix B**).

Premise Ecologists identified 194.19 ha of the Subject Land to be consistent with Category 1 – exempt land based on the following:

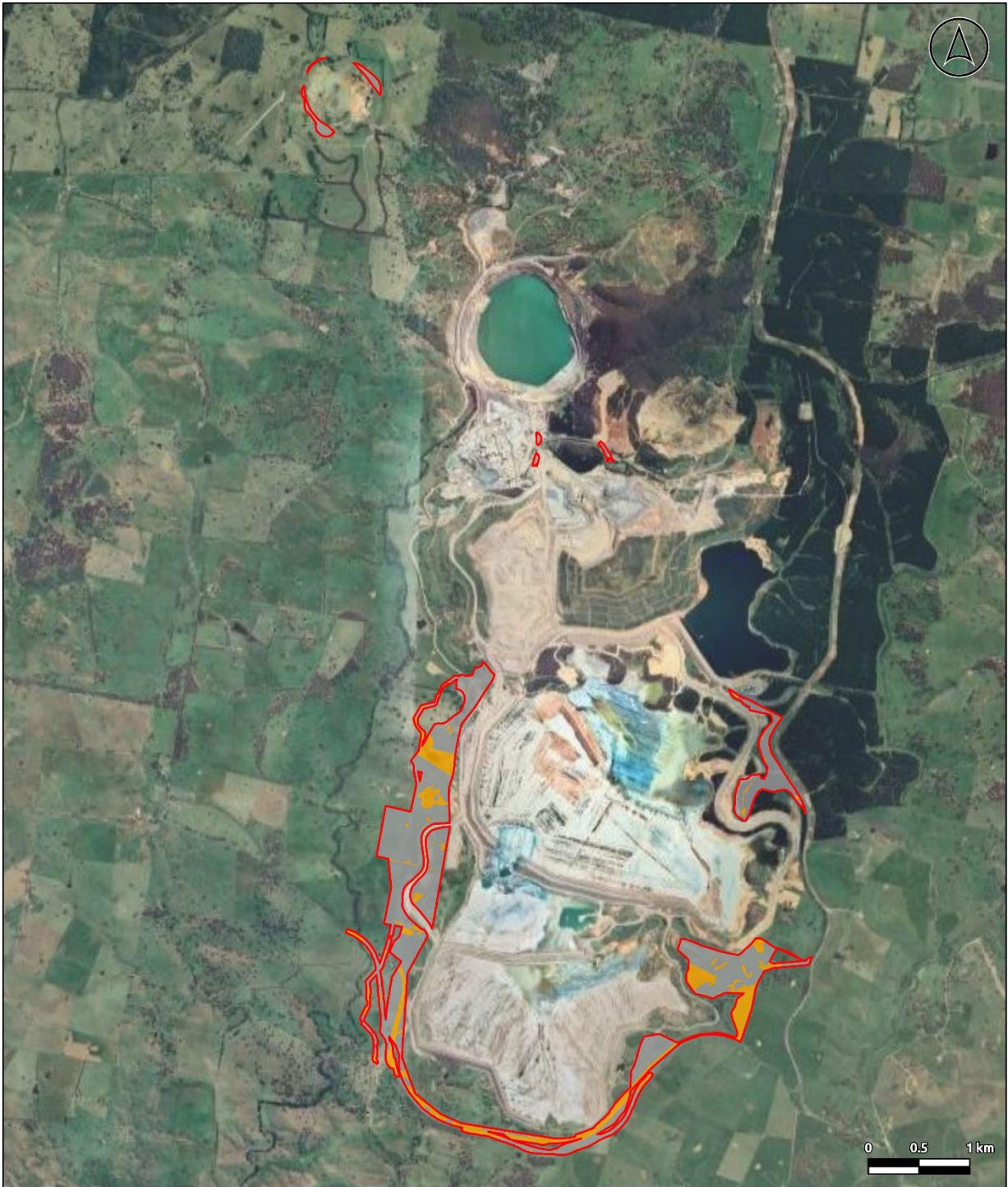
- Vegetation not identified on the Transitional Native Vegetation Regulatory Map (NSW Government, 2021a)
- Vegetation not identified as part of a conservation agreement, set aside or offset (CHPL, 2022)
- Vegetation not identified as core koala habitat or threatened species habitat.
- Vegetation not identified on historical aerial imagery (i.e., it was lawfully cleared prior to 1990 and can be considered as regrowth)
- Vegetation is not identified on the Native Vegetation Extent Layer
- Vegetation is not identified on the Australian Land Use Mapping (ALUM) Land Use layer as a land use consistent with Category 2 (e.g., 1.2.0 Managed resource protection, 1.2.1. Biodiversity, 1.3.0. Other minimal use, 2.1.0 grazing native vegetation, 5.7.0 transport and communication).

The Cadia RMP contains the overarching rehabilitation strategy, including the final landforms, final land-uses and mine closure criteria for the Mine, consistent with the Project Approval (PA06_295), and identifies the extent of disturbance at Cadia (CHPL 2022). The Cadia RMP has been prepared in accordance with the requirements of Schedule 8A of the NSW *Mining Regulation 2016*, and includes rehabilitation objectives, rehabilitation completion criteria and the Final Landform and Rehabilitation Plan (FLRP). The rehabilitation objectives, rehabilitation completion criteria and FLRP are submitted to the NSW Resource Regulator for approval as part of the requirements of Schedule 8A of the NSW *Mining Regulation 2016*.

The Cadia FLRP identifies the Mining Domains and Final Land Use Domains relevant to the Subject Land. Mining Domains for Cadia include Underground Mining Area (SMP), Infrastructure Area, Overburden Emplacement Area, and Water Management Area. These areas are considered in the Land Category Report to have existing lawful clearing approval (CHPL 2022) and were assigned to Category 1. The full Land Category

Report is included as **Appendix B** and excluded impacts are shown on **Figure 7**. Category 1 is excluded from the Subject Land for the remainder of this BDAR, except for the Prescribed Impact Assessment in Section 6.

Figure 7. Excluded Impacts



Sources: © State of NSW, Department of Customer Services, Spatial Services; 2023
 State of NSW, Department of Planning and Environment; 2023; Google; 2023

GDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 24/04/2024

Legend

- Modification 15 Surface Disturbance Footprint
- Land Category**
- Category 1 Land - Excluded from Assessment
- Category 2 Land

1.4 Matters Of National Environmental Significance

This BDAR assesses impacts to Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).

Forty-nine (49) flora and fauna species recognised as MNES under the EPBC Act were identified during database searches as potentially occurring on the Subject Land and are outlined further in Section 5.7 (**Appendix H**). An assessment of whether the proposed development will have a significant impact on these MNES is assessed in **Appendix C**. One species, the Superb Parrot was identified on site and all suitable habitat trees have been deliberately excluded from the Subject Land to avoid significant impact. Consequently, referral of the Modification to the Commonwealth is not considered necessary for any MNES species.

1.5 Information Sources

Key information sources used in the BDAR, including but not limited to:

Title	Web address
Biodiversity Assessment Method (BAM 2020) (DPIE 2020a)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-2020-200438.pdf
Biodiversity Assessment Method Operational Guide – Stage 1 (DPIE 2020c)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-2020-operational-manual-stage-1-200582.pdf
Biodiversity Assessment Method Operational Guide – Stage 2 (DPIE 2019)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-operational-manual-stage-2-230164.pdf
BAM Credit Calculator (BAM-C) (DPIE 2020b)	https://www.lmbc.nsw.gov.au/bamcalc
BAM-C User Guide (OEH 2017)	https://www.lmbc.nsw.gov.au/bamcalc/app/assets/BAMTools_UserGuide.pdf
Vegetation Classification System (DPE 2024a)	https://www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx
Threatened Biodiversity Data Collection (TBDC) (DPE 2024b)	https://www.environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_/Default.aspx?a=1
NSW BioNet Atlas (DPE 2024c)	https://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx
Sharing and Enabling Environmental Data in NSW (SEED) (NSW Government 2022a)	https://geo.seed.nsw.gov.au/Public_Viewer/index.html?viewer=Public_Viewer&locale=en-AU

Title	Web address
Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities – Working Draft (DEC 2004)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/draft-threatened-biodiversity-survey-guide.pdf
Surveying threatened plants and their habitats NSW Survey Guide for the BAM (DPIE 2020d)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/surveying-threatened-plants-and-habitats-nsw-survey-guide-biodiversity-assessment-method-200146.pdf
PlantNET (RBG 2023)	https://plantnet.rbg Syd.nsw.gov.au/floraonline.htm
Directory of Important Wetlands in Australia (Department of Climate Change, Energy, the Environment and Water [DECCW] 2021)	https://www.dcceew.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands
BioNet NSW (Mitchell) Landscapes (NSW Government 2022b)	https://datasets.seed.nsw.gov.au/dataset/nsw-mitchell-landscapes-version-3-1
NSW Interim Biogeographic Regions of Australia (IBRA region and subregion) (NSW Government 2022c)	https://datasets.seed.nsw.gov.au/dataset/interim-biogeographic-regionalisation-for-australia-ibra-version-7-regions

2. METHODS

2.1 Site Context Methods

2.1.1 LANDSCAPE FEATURES

Landscape features were identified according to Section 3.1 of the BAM (DIPE 2020a) using a combination of desktop and field survey methods.

The following resources were reviewed:

- International Biographic Regionalisation for Australia (IBRA) bioregions and subregions: SEED Map (Layer: Interim biogeographic regionalisation for Australia regions) (NSW Government 2022c).
- Habitat connectivity: National Parks and Wildlife Services Reserve, State Forest and Water Feature Corridor layers (NSW Government 2022d-f).
- Rivers, streams, estuaries and wetlands: SEED Map (Layers: Estuaries, NSW Wetlands, Ramsar Wetlands, Hydrography) (NSW Government 2022f-i).
- Karst, caves, crevices, cliffs, rocks and other geological features of significance: (NSW Government 2022a).
- Areas of outstanding biodiversity value (DPE 2024d).
- Areas of high biodiversity value: Biodiversity Values Map (NSW Government 2022j).
- NSW (Mitchell) landscape: SEED Map (Layer: NSW Mitchell Landscapes v3.1 Ecosystem Meso Grouping) (NSW Government 2022b).
- BioNet Vegetation Classification (DPE 2024a).
- NSW State Vegetation Type Map: Central Tablelands Region Version 1.0 (DPE 2019, NSW Government 2022k).
- NSW Landuse 2017 Spatial data (DPE 2020).
- Historical Imagery Viewer (NSW Government 2022l).
- CVO Modification 14 BDAR.

An initial vegetation map of the Subject Land was prepared based on spatial resources and field surveys were conducted between 2020 and 2023 which confirmed the extent and condition of these landscape features.

2.1.2 NATIVE VEGETATION COVER

The percent native vegetation cover estimated to remain in the landscape was assessed according to Section 3.2 of the BAM (DPIE 2020a). A 1500 m buffer was applied to the edge of the Subject Land and all native vegetation within this larger 'Assessment Area' was digitised using Geographic Information Systems (GIS) editing tools.

Native vegetation extent on the Subject Land was mapped using the latest available aerial imagery and digitized using GIS. The initial vegetation maps were ground-truthed in the field between 2020 and 2024. Native vegetation within the 1500 m Assessment Area that was not within the vegetation survey area was identified using the *State Vegetation Type Map: Central Tablelands Region* (DPE 2019). GIS was used to calculate the total area of native vegetation cover on the Subject Land and Assessment Area.

2.2 Native Vegetation Threatened Ecological Communities and Vegetation Integrity Methods

2.2.1 EXISTING INFORMATION

Plant Community Types (PCTs) on the Subject Land were determined according to Section 4.2 of the BAM (DPIE 2020a). Desktop review of the *State Vegetation Type Map: Central Tablelands Region* (DPE 2019) and *BioNet Vegetation Classification System* (DPE 2024a) were used to identify PCTs potentially occurring on the Subject Land. Draft vegetation mapping developed for the Subject Land was then refined following field surveys based on thirty-six (36) Vegetation Integrity BAM plots (VI Plots), Rapid Assessment Spot Samples (RASS) and sixteen (16) Interim Grasslands and other Groundcover Assessment Method (IGGAMs) collected across the site between 2020 and 2023.

Filters were applied to the BioNet Vegetation Classification System using a combination of Interim Biogeographic Regionalisation for Australia (IBRA) region, IBRA sub-region, vegetation formation and species composition. Analysis of floristic data from VI plots and abiotic factors such as landscape position, soil type, geology influence and other relevant information was used to determine the most appropriate PCT for each Vegetation Zone (VZ).

Threatened Ecological Communities (TECs) on the Subject Land were identified in accordance with the relevant listing under the BC Act and EPBC Act. TECs associated with PCTs on the Subject Land were compared with the descriptions in the BioNet Vegetation Classification System (DPE 2024a) and assessed against the following literature and publications to determine TEC extent:

- *Notice of and Reason for the Final Determination for White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the Sydney Basin* (TSSC 2020), hereafter referred to as the Box-Gum Woodland Final Determination.
- *EPBC Act Policy Statement White Box – Yellow Box – Blakely's Red Gum Grassy Woodlands and Derived Native Grasslands* (Department of the Environment and Heritage [DEH] 2006).
- *Conservation Advice for the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (DCCEEW 2023a), hereafter referred to as the Box-Gum Woodland Listing Advice.

The presence of TECs was assessed during late spring and summer as this was identified as the best time of year to assess TEC condition due to the flowering of native forbs and grasses in the Central Tablelands.

Further assessments of PCTs and TECs on the Subject Land are provided in Section 4.2 and Section 4.3.

2.2.2 MAPPING NATIVE VEGETATION EXTENT

Rapid Assessment Spot Samples (RASS) and IGGAM transects were used to confirm the extent of native vegetation on the Subject Land. Aerial photography was used to develop the initial map, and an iPad was used during field surveys to collect spatially referenced data to confirm VZ and their boundaries.

RASS were undertaken by recording all flora species within a 20 × 20 m area. Photographs were taken at each site and location recorded using a GPS. Each species was given an abundance rating according to the following approximate scale;

- A Abundant (>50);
- C Common (11 to 50);
- O Occasional (6 to 10);
- U Uncommon (3 to 5); or
- R Rare (1 or 2).

IGGAM Transects use the transect-intercept method for estimating percent cover of exotic perennial and native vegetation by walking a 100 m transect and recording the species 'hit' at each metre. The total number of exotic perennial species was compared to the total number of native species present to determine whether the groundcover had greater native or exotic perennial cover.

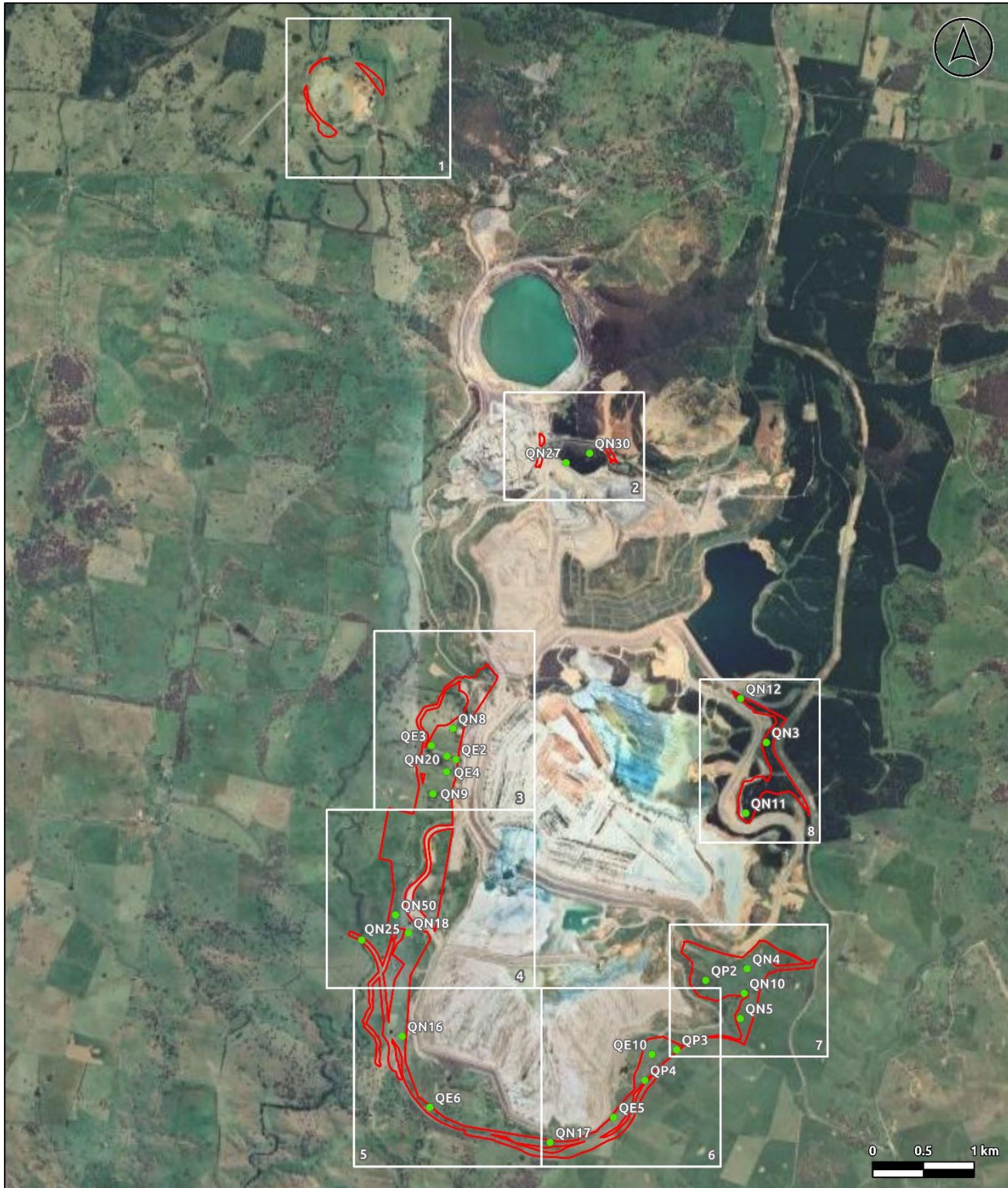
RASS and IGGAM data were used to map the Subject Land into VZ to be included in the BAM Credit Calculator (BAM-C) (DPIE 2020b).

2.2.3 PLOT-BASED VEGETATION SURVEY

VI Plots comprise a 20 x 20 m full floristic sub-plot at one end of a 50 x 20 m quadrat to gain data on vegetation structure and composition in any native vegetation (**Figure 8** to **Figure 16**). A list of vascular plant species was made within each plot with estimates of abundance and groundcover for input into BAM-C. The flora species were categorised as trees, shrubs, grasses and grass-like, forbs, ferns and others. Leaf litter cover in five 1m² sub-plots and tree classes were assessed in the 50 x 20 m quadrat, along with presence or absence of hollows in trees.

Thirty-six (36) VI Plots were undertaken in accordance with BAM Subsection 4.2.1. VI Plots were located in vegetation considered to be representative of each VZ condition, targeted to assess any environmental variation within vegetation communities. VI Plots were located to avoid ecotones, edges or disturbed areas within 50 m of any infrastructure (building, road or track), where possible. Due to changes to the Subject Land, only twenty-three (23) of the thirty-six (36) VI Plots were used in the BAM-C.

Figure 8. Field Survey Locations Overview



Sources: © Google 2023
 GDA2020 NCA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 5/04/2024

Legend

- Modification 15 Surface Disturbance Footprint
- Vegetation Integrity (VI) Plots

- 1 - Subsidence Zone
- 2 - Central Access Roads
- 3 - North West Operational Area
- 4 - Expansion to West
- 5 - Rodds Creek
- 6 - Panuara Road
- 7 - Wire Gully
- 8 - Pine Forest

Figure 9. Field Survey Locations (1 of 8) – Subsidence Zone

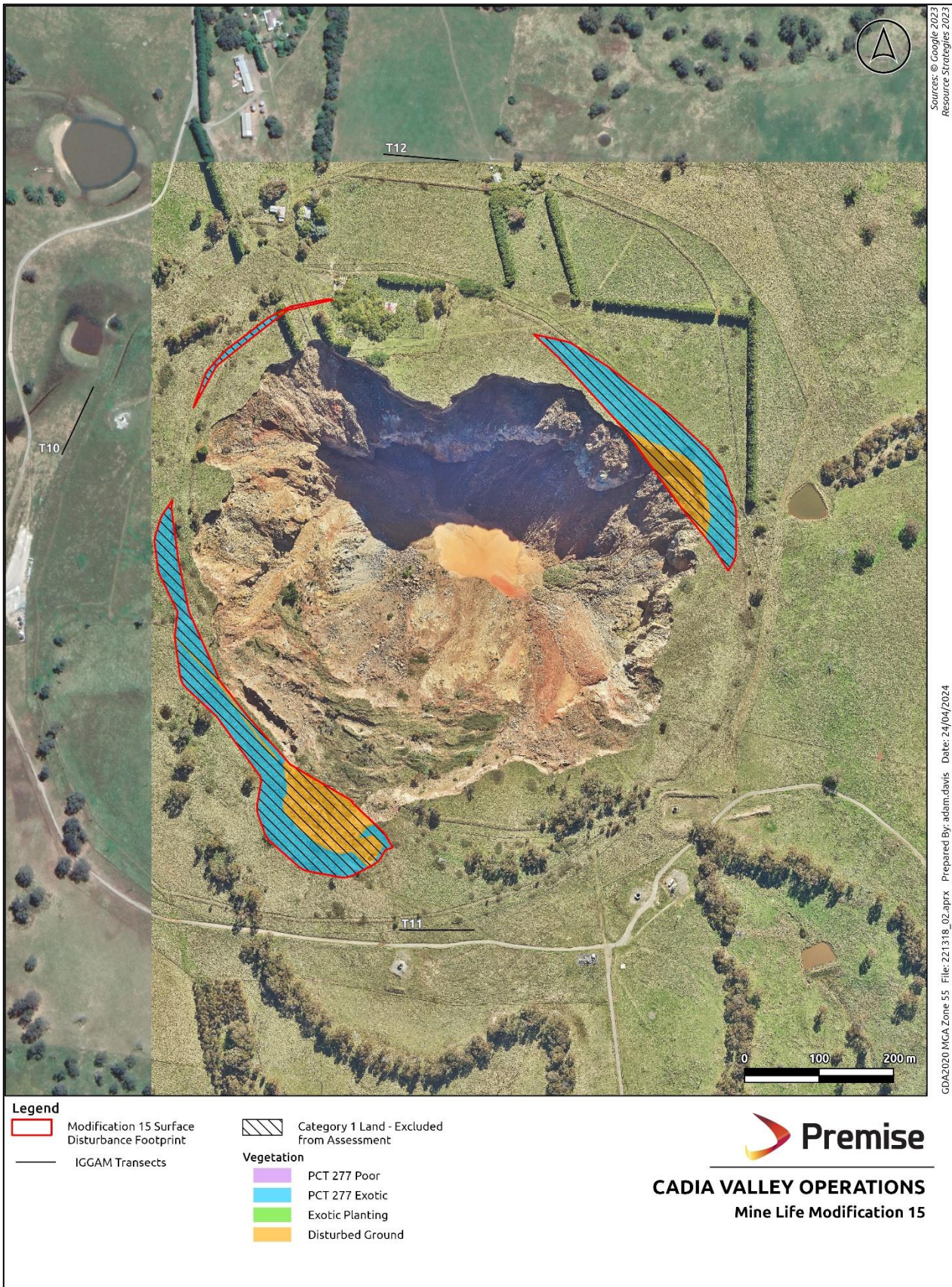


Figure 10. Field Survey Locations (2 of 8) – Central Access Road



Sources: © Google 2023
 Resource Strategies 2023

GDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 24/04/2024

Legend

- Modification 15 Surface Disturbance Footprint
- Threatened Flora Survey Tracks**
- June 2021
- October 2022
- June 2023

- Category 1 Land - Excluded from Assessment
- Vegetation**
- PCT 287 Rehabilitated
- PCT 287 Regenerating
- PCT 277 Exotic
- Exotic Planting
- Disturbed Ground

Figure 11. Field Survey Locations (3 of 8) – North West Operational Area

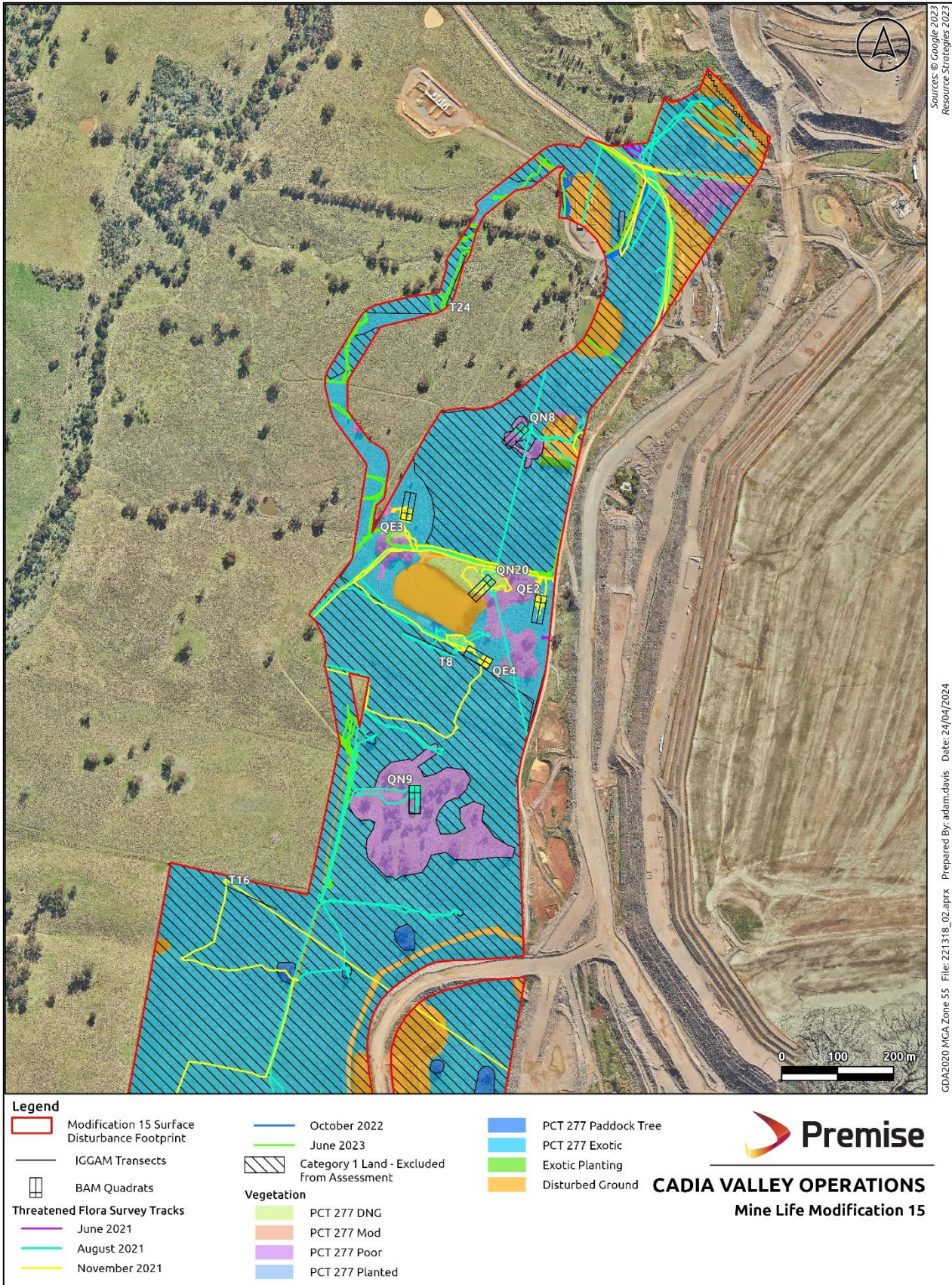


Figure 12. Field Survey Locations (4 of 8) – Expansion to West

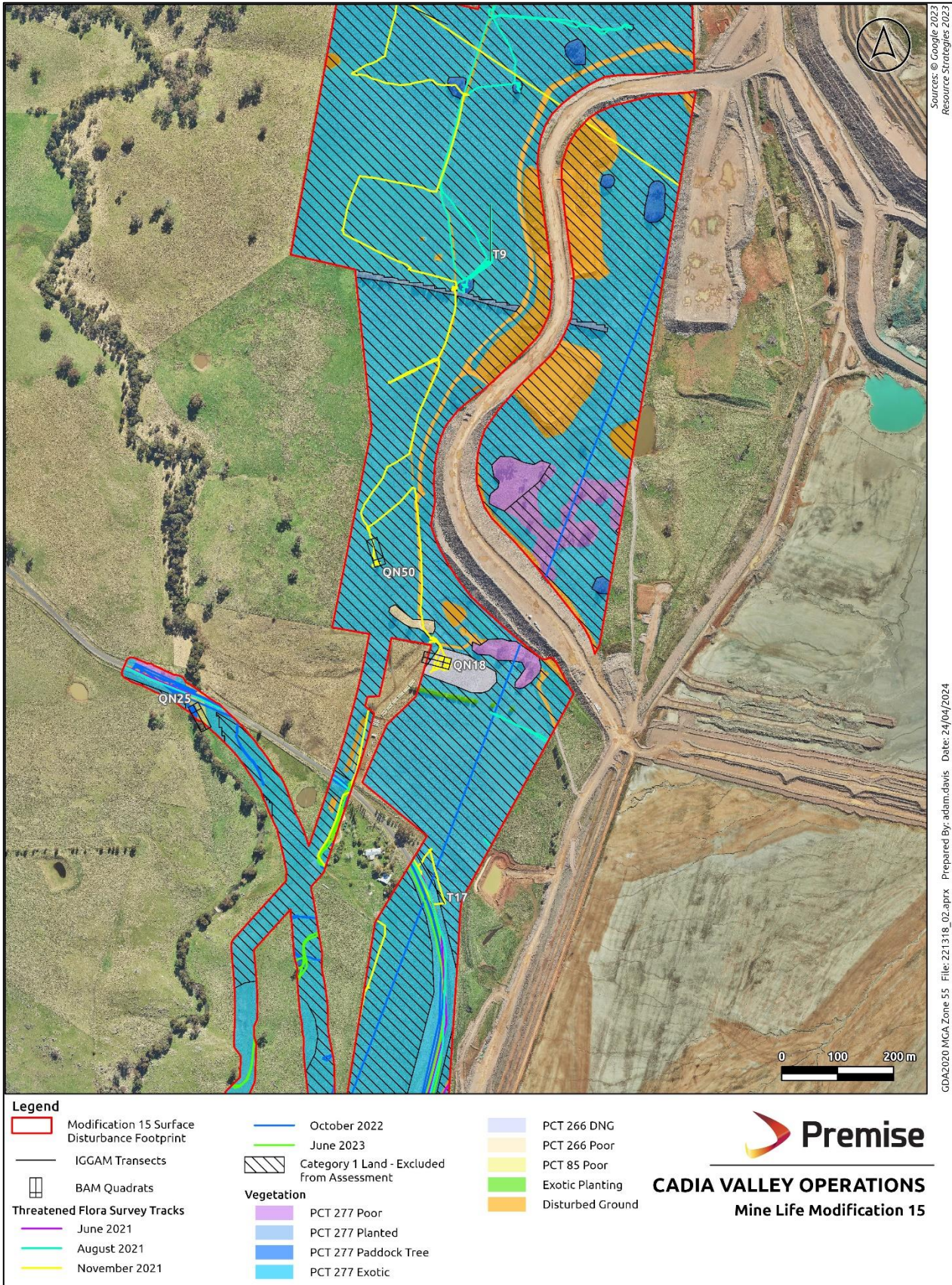


Figure 13. Field Survey Locations (5 of 8) – Rodds Creek

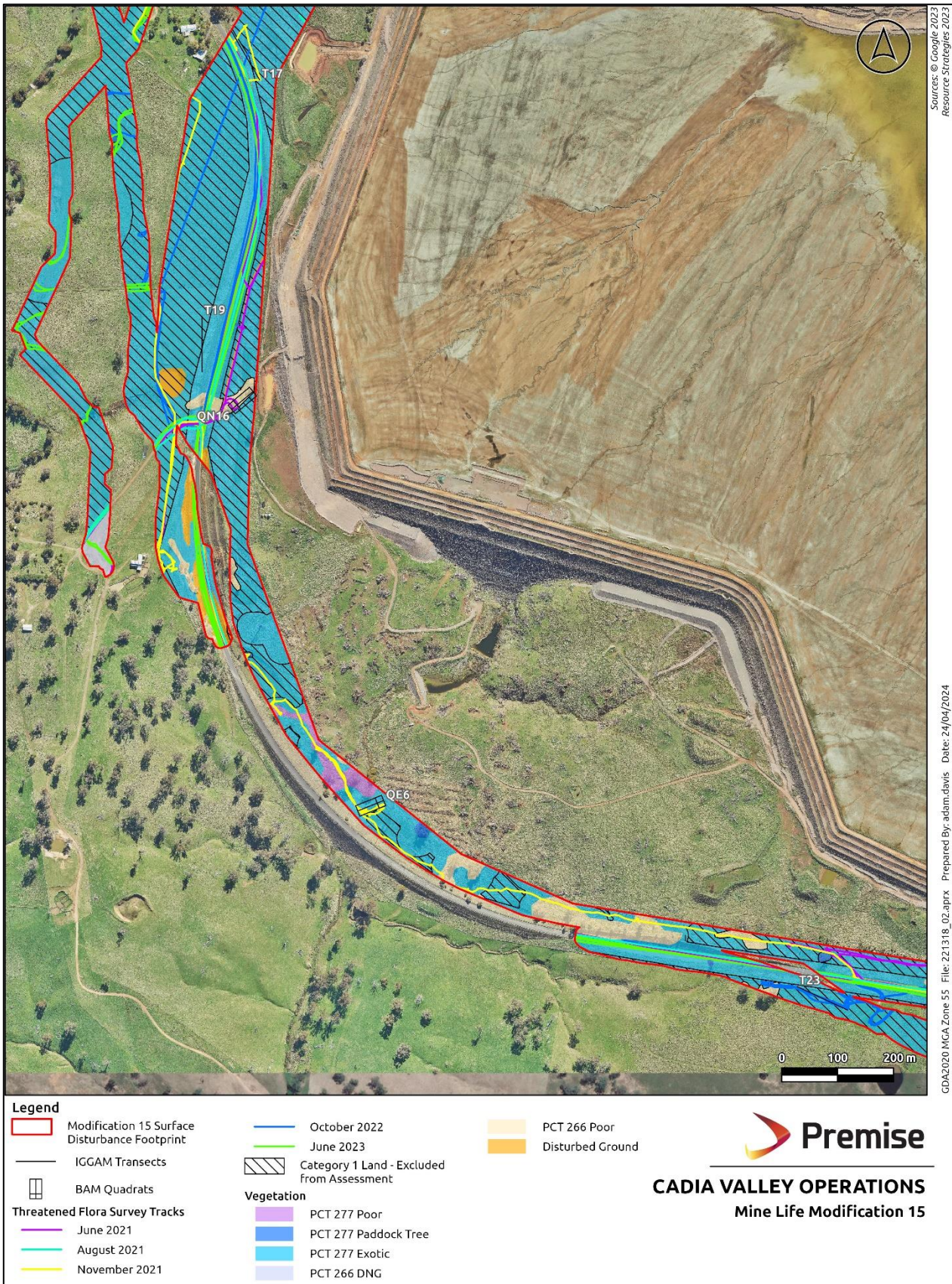


Figure 14. Field Survey Locations (6 of 8) – Panuara Road

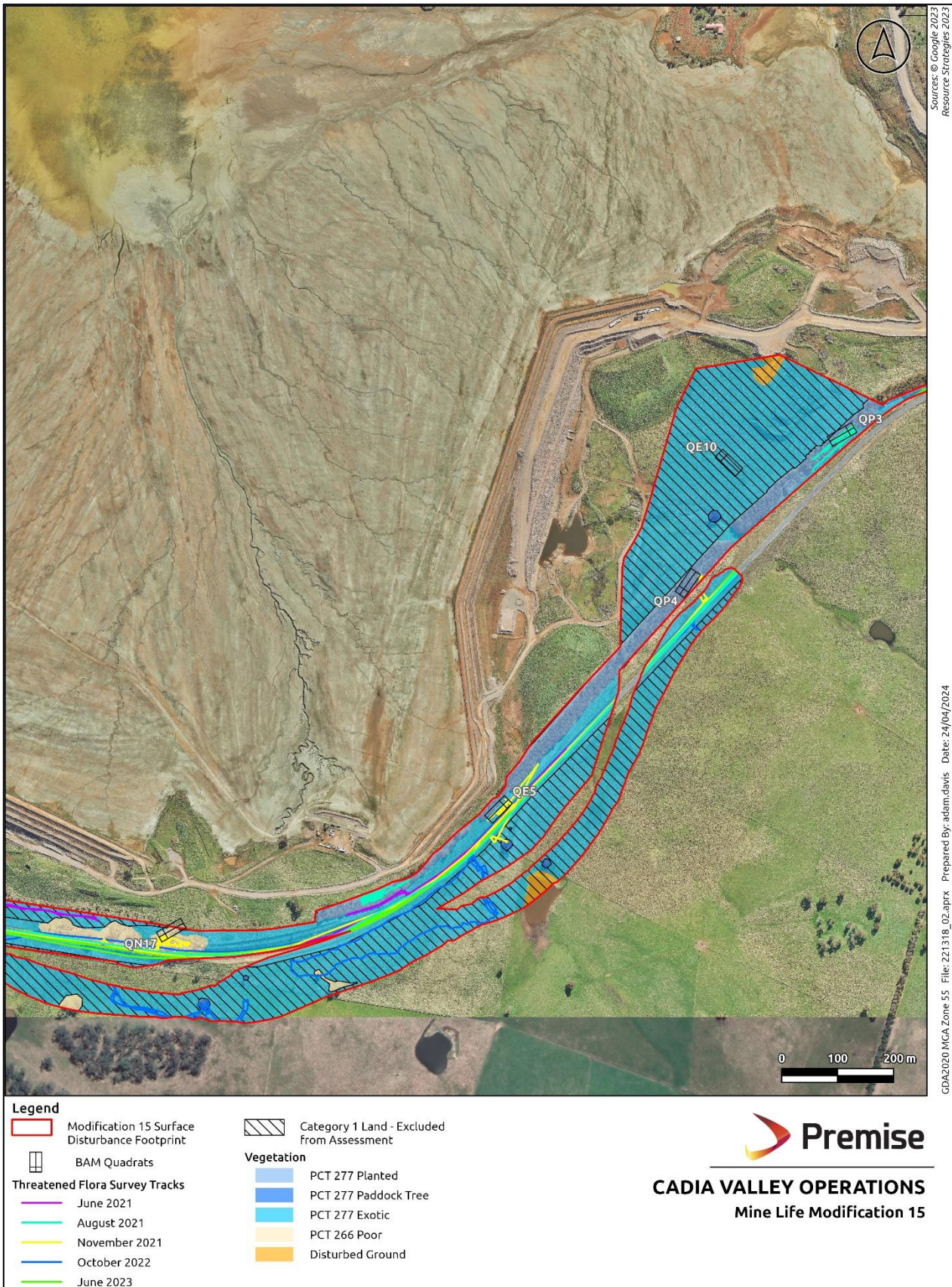


Figure 15. Field Survey Locations (7 of 8) – Wire Gully

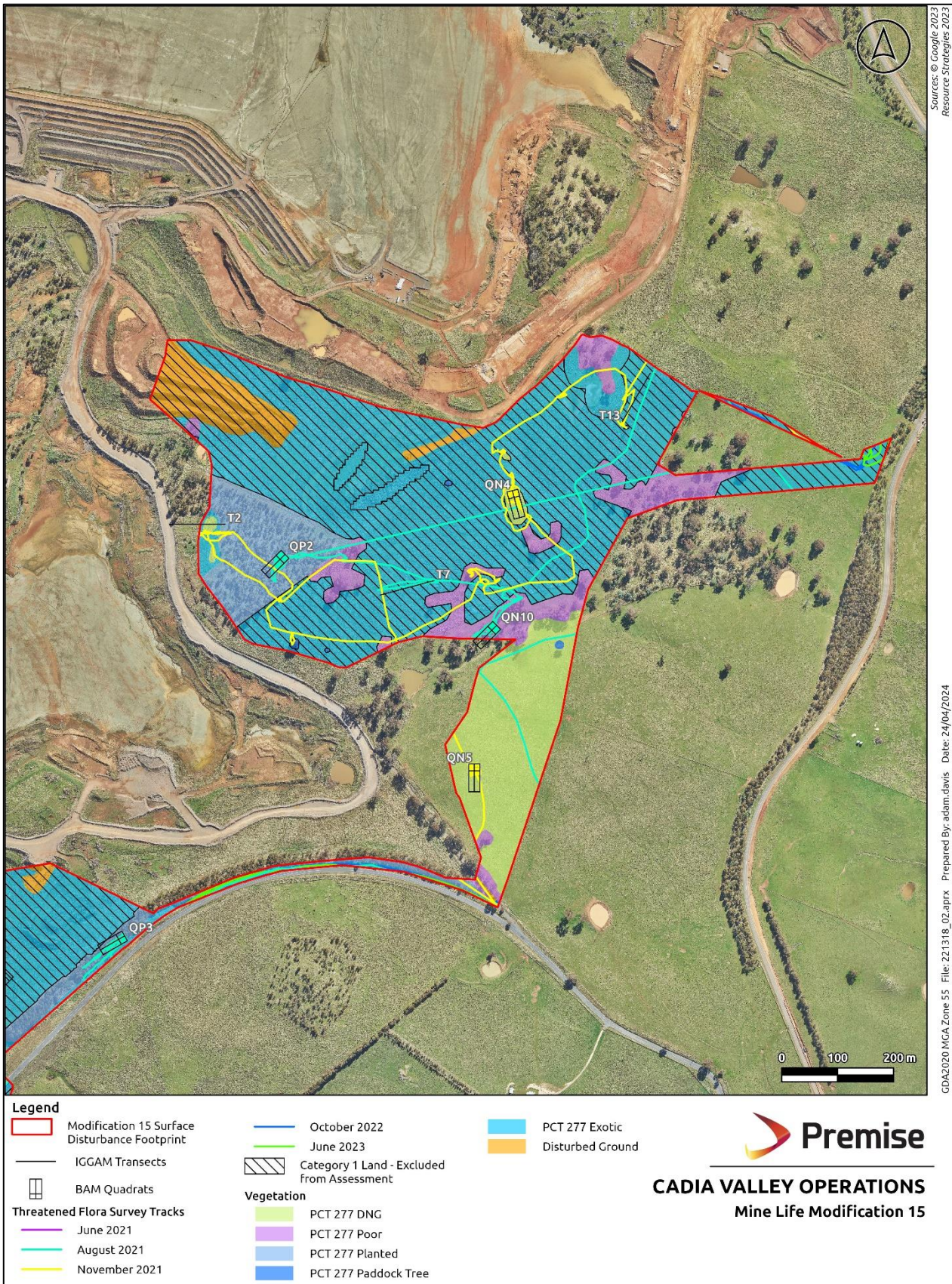
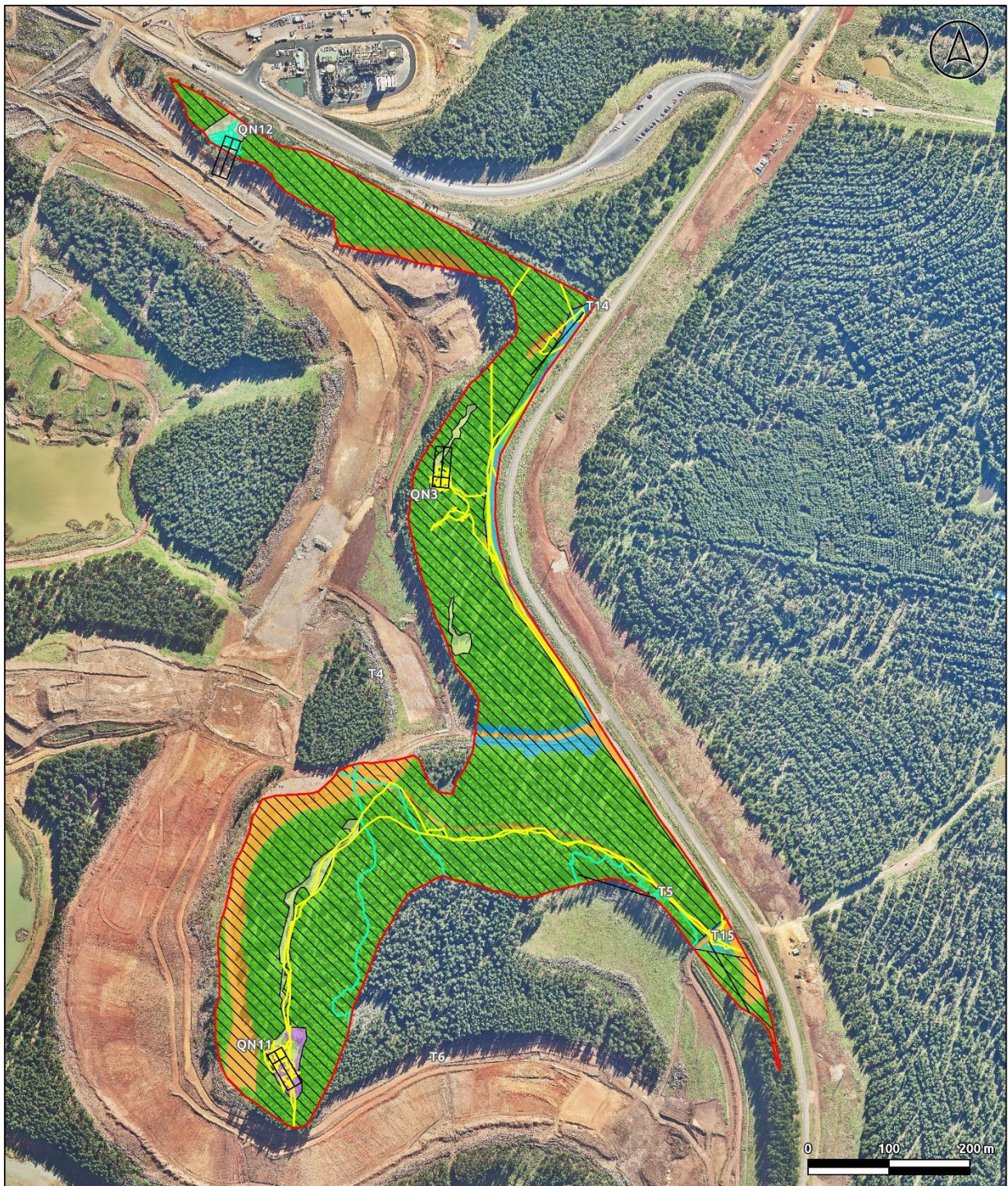


Figure 16. Field Survey Locations (8 of 8) – Pine Forest



Sources: © Google 2023
 Resource Strategies 2023

GDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 24/04/2024

Legend

- | | |
|---|--|
| Modification 15 Surface Disturbance Footprint | Category 1 Land - Excluded from Assessment |
| IGGAM Transects | Vegetation |
| BAM Quadrats | PCT 287 Mod |
| Threatened Flora Survey Tracks | PCT 277 DNG |
| August 2021 | PCT 277 Poor |
| November 2021 | PCT 277 Exotic |
| June 2023 | Exotic Planting |
| | Disturbed Ground |

2.2.4 VEGETATION INTEGRITY SURVEY

The total area of each VZ was calculated using GIS and the minimum number of plots required per VZ area was determined based on Table 3 of BAM Subsection 4.3.4 (DPIE 2020a). VI Plot locations were assigned randomly via GIS to avoid field bias and ensure they captured the attributes relevant to that vegetation zone. Twenty-three (23) 20 x 50 m VI Plots were undertaken on the Subject Land.

2.3 Threatened Flora Survey Methods

2.3.1 REVIEW OF EXISTING INFORMATION

A comprehensive review of literature was undertaken to compile a list of species to be targeted during the threatened flora species surveys:

- NSW BioNet Atlas (NSW DCCEEW 2024c) search within a 10 km buffer. BioNet Atlas searches were undertaken throughout the duration of survey planning and implementation to ensure the candidate species list was as temporally accurate as possible, with the most recent search undertaken on 25 March 2024.
- Protected Matters Search Tool (PMST) (DCCEEW 2024) within the same 10 km buffer. PMST searches were undertaken throughout the duration of survey planning and implementation to ensure the candidate species list was as temporally accurate as possible, with the most recent search undertaken on 25 March 2024.
- NSW BioNet Threatened Biodiversity Data Collection (TBDC) (DCCEEW 2024b).
- The BAM-C (DPIE 2022b).
- Reports to CHPL of previous biodiversity surveys on CVO land. Summaries of studies published between 1995 and 2007 are given in Western Institute and Resource Strategies (2009) for fauna, and FloraSearch (2014), FloraSearch and Resource Strategies (2009), Premise (2019, 2021, 2021b, 2022, 2022b, 2023) for flora.

Each flora species identified in the literature or database search was assessed in the context of the Subject Land to determine whether it would potentially occur. Species information on the Threatened Biodiversity Data Collection (TBDC) (DPE 2024b) and BAM-C (DPIE 2022b) were used to identify habitat requirements, or habitat constraints for each species.

2.3.2 HABITAT CONSTRAINTS ASSESSMENT

Suitable threatened flora habitat was identified by database and literature searches as the extent of the species' associated PCT within the Subject Land, except where habitat constraints were listed in the TBDC.

2.3.3 FLORA FIELD SURVEYS

The Subject Land has been farmed since the 1820s and is among the most highly pasture-improved districts in Central Western NSW. Native groundcover has been replaced with exotic pastures based on *Phalaris aquatica* (Phalaris) and *Dactylis glomerata* (Cocksfoot) by mechanical means on arable lands and by aerial agriculture on steep and less accessible country. These changes are reflected in the very low native groundcover diversity in the flora species lists for the BAM quadrats and IGGAM transects in **Appendix D**. The only native flora surviving are grazing tolerant species with weedy colonising characteristics. It is highly improbable that any listed threatened shrub or ground cover species have persisted since they are generally intolerant of grazing and pasture improvement, and survive only where soil disturbance, herbicides and heavy grazing are absent. In short, the Subject Land is considered too degraded to support any of the threatened flora species.

Two (2) threatened flora species were identified in BAM-C for targeted survey, *Swainsona recta* (Small Purple-pea) and *Swainsona sericea* (Silky Swainson-pea). Searches commenced in accordance with the BAM (DPIE 2020a) and the methods described in the *NSW Surveying Threatened Plants and Their Habitats: NSW Survey Guide for the Biodiversity Assessment Method* (Threatened Flora Survey Guideline) (DPIE 2020d). However there was very little suitable habitat identified on the Subject Land. Parallel field traverses were undertaken in moderate quality woodland areas, the majority of which was subsequently removed from the Subject Land. Tracks demonstrating survey locations were recorded using a GPS and are displayed on **Figure 9** to **Figure 16**. Two ecologists traversed the areas shown, but only one ecologist carried the GPS unit to record the tracks, therefore only half of the survey effort is recorded.

Incidental observations of non-target threatened flora as well as threatened fauna species were recorded simultaneously while undertaking vegetation surveys.

2.4 Threatened Fauna Survey Methods

2.4.1 REVIEW OF EXISTING INFORMATION

Threatened fauna survey and assessment was undertaken by Biodiversity Monitoring Services (BMS) (2024). The findings are summarised in this BDAR, and the full report is found as **Appendix E**. Desktop review included:

- PCTs on the Subject Land identified in this BDAR
- NSW BioNet Atlas (DPE 2024c)
- PMST (DCCEEW 2022)
- BAM-C (DPIE 2020b)
- TBDC (DPE 2024b).

2.4.2 HABITAT CONSTRAINTS ASSESSMENT

Habitat assessments conducted by BMS (2024) between July 2021 and September 2023 involved detailed recording and analysis of fauna habitat features throughout the Subject Land. Habitat features recorded include:

- Live paddock trees with up to approximately 200 cm DBH;
- Dead paddock trees (stags);
- Fallen timber;
- Mistletoe (>5/ha in some areas);
- Flowering eucalypts including *Eucalyptus albens* (White Box), *Eucalyptus melliodora* (Yellow Box), and *Eucalyptus blakelyi* (Blakely's Red Gum), as well as few flowering shrubs;
- Koala feed species including White Box, Yellow Box, Blakely's Red Gum, *Eucalyptus goniocalyx* (Bundy Box), *Eucalyptus bridgesiana* (Apple Box), *Eucalyptus macrorhyncha* (Red Stringybark) and *Eucalyptus dives* (Broad-leaved Peppermint) – all considered feed species in the Central and Southern Tablelands Koala Management Area under Appendix A of the Koala Habitat Protection Guideline (DPIE, 2019);
- Trees with hollows ranging from 5 cm – 30 cm in diameter, greater than 4 m above the ground;
- Small raptor nests (and larger nest nearby survey areas C and D) (BMS 2024);
- Nine dams within development footprint portion of the BMS (2024) study area (six small farm dams, three mine water management dams), 13 dams proximal but outside development footprint portion of the BMS (2024) study area (small to large farm dams), and four small creeklines (one ephemeral across Survey Area B, one ephemeral across Survey Area D Wire Gully, one collecting water from paddock across road running

into mine water management dam in Survey Area D, and one larger ephemeral creek running under Panuara Road). Two large water bodies exist adjacent Survey Areas D and E (Southern Tailings Dam and Rodds Creek Dam). Two additional areas of mine water management/clearwater drainage containing Cumbungi exist within the footprint in Survey Area C and the now removed Survey Area B. Scattered embedded rocks, surrounded by a mix of native and exotic grasses; and

- Areas of native *Rytidosperma* spp. (Wallaby Grass) and *Bothriochloa* spp. (Red Grass).

2.4.3 FAUNA FIELD SURVEYS

BMS (2024) divided the Subject Land into geographic regions corresponding to the different components of the Modification footprint and two major areas of native vegetation in the southern portion. These regions are labelled Survey Areas A-H (BMS 2024) as shown in **Figure 1-3** within the Baseline Fauna Survey Report (BMS 2024). Survey methods included the following:

- diurnal bird surveys;
- call playbacks;
- spotlighting;
- Passive InfraRed (PIF) cameras;
- Koala Spot Assessment Technique (SAT) surveys;
- ultrasonic bat detection;
- frog searches;
- artificial reptile habitat deployment;
- evidence searches (e.g. for scats, tree scratches, nests and potential hollows); and
- habitat assessments (i.e., paddock trees, existing nests, size of hollows, prey species, rocky streams, fallen timber, dams/watercourses and proximity to cliffhines, caves, rocky overhangs, culverts and mine shafts).

Survey methods are described in more detail below (BMS 2024):

- **Diurnal Birds:** Bird surveys included standard diurnal 30-60 min observations at selected sites, spotlighting for nocturnal species, searches for nest sites, and observations around water bodies. Targeted species included the *Calyptorhynchus lathami* (Glossy Black-Cockatoo), *Lophoictinia isura* (Square-tailed Kite), *Haliaeetus leucogaster* (White-bellied Sea-Eagle), *Hieraaetus morphnoides* (Little Eagle), Gang-gang Cockatoo and Superb Parrot. Searches for raptor nests/perches, owl pellets and potential hollows were carried out as part of habitat assessments. The BCS confirmed that the Subject Area is not within a mapped important area for either the Regent Honeyeater or Swift Parrot.
- **Arboreal Mammals:** 16 baited PIR cameras were deployed across native forest patches and hollow-bearing paddock trees in May-June 2021 and another 8 cameras were deployed in August-October 2021. PIR cameras remained in place for a minimum of four weeks and baits were replaced after two weeks. These cameras surveyed for *Phascogale tapoatafa* (Brush-tailed Phascogale). The presence of *Phascolarctos cinereus* (Koala) on the Subject Land was assessed via a combination of 13 SAT surveys and spotlighting. Spot-lighting sessions were carried out on foot in the more heavily wooded areas of the site. Vehicle-based spot-lighting sessions were carried out in the sparsely wooded areas. Searches for tree hollows, trunk scratches, scats and feed tree species were carried out as part of habitat assessments.
- **Nocturnal Birds and Mammals:** Call playbacks were undertaken targeting the following species: Koala, Squirrel Glider, *Ninox strenua* (Powerful Owl), Barking Owl, *Tyto novaehollandiae* (Masked Owl) and *Burhinus grallarius* (Bush Stone-curlew).
- **Terrestrial Mammals:** Evidence of terrestrial animals was searched for across the Subject Land. This included spotlighting and searches for scats.

- **Bats:** Habitat constraints for the Large Bent-winged Bat, Large-eared Pied Bat, *Myotis macropus* (Southern Myotis) and Grey-headed Flying-fox were assessed, and species were surveyed using Anabat Express ultrasonic detection units and habitat assessment.
- **Reptiles and Frogs:** Nine grids of 50 tiles were distributed across the Subject Land to survey for the Striped Legless Lizard and Pink-tailed Legless Lizard. An aural-visual survey and habitat assessment was undertaken for *Litoria booroolongensis* (Booroolong Frog) and *Litoria raniformis* (Southern Bell Frog).
- **Invertebrates:** Surveys for *Keyacris scurra* (Key's Matchstick Grasshopper) were completed in PCT 266 (VZ2) and PCT 277 (VZ6 and VZ7) (Bugs Ed, 2024)

Survey effort is summarised in **Table 4** and locations shown in **Figure 1-3** within the Baseline Fauna Survey Report (BMS 2024).

Table 4. Total Fauna Survey Effort

Survey technique	No. surveys (May 2020); BMS, 2020a	No. surveys (Jun 2020); BMS, 2020a	No. surveys (Oct 2020); BMS, 2020a	No. surveys (May 2021)	No. surveys (June 2021)	No. surveys (Aug 2021)	No. surveys (Sep 2021)	No. surveys (Oct 2021)	No. surveys (Nov 2021)	No. surveys (Nov 2022)	No. surveys (Jan 2023)	No. surveys (Feb 2023)	No. surveys (Jun 2023)	No. surveys (Sep 2023)	No. surveys (March 2024)
Diurnal Bird Survey	14 (30-60min each)	18 (30-60min each)	15 (30-60min each)	28 (30-60min each)	8 (30min each)	20 (30-60min each)	28 (30-60min each)	15 (30-60min each)	4 (30-60min each)	14 (30-60min each)	2 (30-60min each)	-	-	9 (120min each)	-
Call Playback	2	3	-	5	1	5	2	-	-	-	2	2	4	-	-
Hand Spotlighting	2 (2 km total)	3 (6 km total)	-	6 (9km total)	2 (3km total)	5	2	-	-	2	2 (4km total)	2 (2km total)	4	-	-
Vehicle Spotlighting Transects	2 (6 km total)	3 (33 km total)	-	5 (50.3 km total)	1 (17.5 km total)	3	1	-	-	-	-	-	-	-	-
Passive Infrared (PIR) Cameras	26	26	-	16	16	4	8	4	-	-	-	-	-	-	-
SAT survey	2	6	-	7	1	4	1	-	-	-	6	3	-	-	-
Anabat	-	-	-	-	-	-	5 (3-4 nights each)	1 (6 nights)	5 (1-2 nights each)	1 (4 nights)	-	-	-	-	-
Harp/Exit counts	-	-	-	1 exit count	-	-	-	-	1 + 3 exit counts	-	-	-	-	-	-
Reptile Grids	-	-	-	-	-	9	9	9	9	-	-	-	-	-	-

Survey technique	No. surveys (May 2020); BMS, 2020a	No. surveys (Jun 2020); BMS, 2020a	No. surveys (Oct 2020); BMS, 2020a	No. surveys (May 2021)	No. surveys (June 2021)	No. surveys (Aug 2021)	No. surveys (Sep 2021)	No. surveys (Oct 2021)	No. surveys (Nov 2021)	No. surveys (Nov 2022)	No. surveys (Jan 2023)	No. surveys (Feb 2023)	No. surveys (Jun 2023)	No. surveys (Sep 2023)	No. surveys (March 2024)
Frog Searches	-	-	-	-	-	-	-	-	2 nights at 4 potentially suitable locations	2 nights at 1 potentially suitable location	-	2 nights at 1 potentially suitable location	-	-	-
Moth searches	-	-	Previously subject to geographic exclusion	-	-	-	-	11	7				-	-	-
Grasshopper Searches	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 days

2.5 Limitations

No limitations were recognised for threatened flora or fauna species. All threatened species surveys occurred close to or within the recommended survey period according to the BioNet Atlas (DPE 2024c).

3. SITE CONTEXT

3.1 Assessment Area

The Assessment Area for the Modification (encompassing a 1,500 m buffer surrounding the Subject Land) is 6577 ha which includes:

- 5660 ha of non-native vegetation.
- 9 ha of derived native grassland.
- 908 ha of woody vegetation.

The assessment area showing extent of woody and non-woody native vegetation is shown in **Figure 4**. The vegetation on the Subject Land was mapped using GIS and has been provided as spatial file with reference `Vegetation_20240424_GDA2020_MGA55_Submission`.

3.2 Landscape Features

Landscape features on the Subject Land and in the Assessment Area are described below in accordance with Section 3.1 of the BAM (DPIE 2020a) and shown on **Figure 1 to Figure 4**.

3.2.1 IBRA BIOREGIONS AND IBRA SUBREGIONS

The northern extent of the Subject Land and Assessment Area are located in the South Eastern Highlands Bioregion (Orange Sub-region) of the IBRA (Thackway and Cresswell 1995). The southern portion (near Panuara Road) is located in the NSW South Western Slopes Bioregion (Inland Slopes Sub-region).

The IBRA Region and Subregion applied in BAM-C for the Modification are the South Eastern Highlands Bioregion (Orange Sub-region) as stipulated in Section 2.2.1 of the BAM 2020 Operational Manual – Stage 1 (DPIE 2020c).

3.2.2 RIVERS, STREAMS, ESTUARIES AND WETLANDS

Cadiangullong Creek, Rodds Creek and Wire Gully Creek are the main streams flowing over the assessment area (**Figure 2** and **Figure 3**). There are several unnamed creeks and numerous farm dams, as well as the NTSF, STSF and PTSF.

No wetlands or estuaries occur on the Subject Land or Assessment Area (NSW Government 2022f-i)

3.2.3 HABITAT CONNECTIVITY

The Subject Land and Assessment Area are located in a highly cleared agricultural region. Native vegetation remnants exist in the surrounding landscape as isolated paddock trees and remnant patches on hill tops, and narrow corridors along creeks. Native remnant woodland patches on the Subject Land vary considerably in size and are predominantly isolated from each other and from other large remnants in the broader landscape (**Figure 1** and **Figure 4**). However, remnant woodland areas across the central extent of the site (south of the northern dam) are connected to a ~300 ha woodland patch north of the Subject Land (PCT 287 Pines, Regenerating, Rehabilitated, Remnant). The remaining native vegetation remnants and derived native grassland areas on the Subject Land lack connectivity with the surrounding landscape. The Subject Land is bordered by State Forests dominated by *Pinus Radiata* (Radiata Pine) to the north and north-east, and highly cleared grazing agricultural land to the south-east, west and south. Panuara Road bounds the outside of the Subject Land and the NTSF and STSF bound the inside.

3.2.4 KARST, CAVES, CREVICES, CLIFFS, ROCKS OR OTHER GEOLOGICAL FEATURES OF SIGNIFICANCE

Karst, caves and crevices are absent from the Subject Land, while rocks occur in low quantities (NSW Government 2022a). There are some un-used adits related to past mining activities north of the Subject Land.

3.2.5 AREAS OF OUTSTANDING BIODIVERSITY VALUE

There are no areas of outstanding biodiversity value, as declared by the NSW Minister for Energy and Environment, within the Subject Land or Assessment Area (DPE 2024d).

3.2.6 NSW BIONET LANDSCAPE

The Subject Land is located within the following NSW BioNet (Mitchell) Landscapes (NSW Government 2022b):

- Canobolas Sheet Basalts (94% cleared).
- Canobolas Slopes (96% cleared).
- Mandurama Slopes (79% cleared).

The alignment of the Subject Land with NSW BioNet Landscapes is shown in **Figure 2** and **Figure 3**. The largest proportion of the Subject Land lies within the Mandurama Slopes Landscape; therefore this has been adopted in the BAM-C as per Section 2.2.6 of the BAM 2020 Operational Manual – Stage 1 (DPIE 2020c).

3.2.7 ADDITIONAL LANDSCAPE FEATURES IDENTIFIED IN SEARS

No additional landscape features have been identified in any Secretary's Environmental Assessment Requirements (SEARs) for the Modification.

3.2.8 SOIL HAZARD FEATURES

Soil hazard features must be identified for vegetation clearing proposals that require approval under Part5A of the LLS Act, or a permit under the Vegetation SEPP). Therefore, Section 3.2.8 does not apply to this BDAR.

3.3 Native Vegetation Cover

Native vegetation in the Assessment Area (within the 1,500 m buffer) was estimated to be 917 ha. Woody vegetation was calculated using State Vegetation Type Mapping (DPE 2019), non-woody vegetation layers and historical aerial photography as per methods described in Section 2.1.2. Native vegetation cover in the Assessment Area is outlined in **Figure 4** and **Table 5**. The percentage of native vegetation cover was assigned to >10-30% as per Section 2.3 of the BAM 2020 Operational Manual – Stage 1 (DPIE 2020c).

Table 5. Native vegetation cover in the Assessment Area

Assessment area (ha)	Total area of native vegetation cover (ha)	Percentage of native vegetation cover (%)	Class (0-10, >10-30, >30-70 or >70%)
6577	917	14	>10-30

4. NATIVE VEGETATION, THREATENED ECOLOGICAL COMMUNITIES AND VEGETATION INTEGRITY

4.1 Native Vegetation Extent

The Subject Land is 254.38 ha with 32.61 ha of native vegetation identified for assessment (excludes Category 1 land):

- Remnant woodland (16.22 ha);
- Derived Native Grassland (8.66 ha); and
- Planted native vegetation (7.73 ha).

The vegetation on the Subject Land was mapped using GIS and has been provided as spatial file with reference Vegetation_20240424_GDA2020_MGA55_Submission (**Figure 17**).






Figure 17. Vegetation assessed on the Subject Land



Sources: © State of NSW, Department of Customer Service, Spatial Services 2023
 Google 2023

GDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 24/04/2024

Legend

-  Modification 15 Surface Disturbance Footprint
-  Category 1 Land - Excluded from Assessment
-  Native Vegetation
-  Non-Native Vegetation
-  Cleared Land

4.1.1 CHANGES TO THE MAPPED NATIVE VEGETATION EXTENT

The extent of native vegetation on the Subject Land is similar to that shown on the aerial imagery used in the figures, except some grassland areas that were confirmed during site surveys, and some other areas that have regenerated since the date of the aerial photography (NSW Government 2022I). All mapped paddock trees are those identified via the most recent aerial imagery available and ground-truthing vegetation surveys. Grassland areas were assessed to determine the species composition and attributed to either Category 1 – exempt land using IGGAM transects, or derived native grassland using VI Plots. Areas where native vegetation has regenerated since the aerial photograph were mapped and attributed to the most appropriate PCT and condition.

4.1.2 AREAS THAT ARE NOT NATIVE VEGETATION

Areas on the Subject Land that are not native vegetation include disturbed ground (5.44 ha), exotic plantings including wind breaks and pine plantations (0.23 ha) and exotic dominated grassland areas (21.91 ha). All areas identified as consistent with Category 1 land are excluded from consideration as described in Section 1.3 and **Appendix B**.

The 21.91 ha of exotic dominated grassland was attributed to a PCT for the purpose of being able to include it in the BAM Credit Calculator. Disturbed ground (5.44 ha) and exotic plantings (0.23 ha) were not included.

4.2 Plant Community Types

4.2.1 OVERVIEW

PCTs identified on the Subject Land using the BioNet Vegetation Classification system (DPE 2024a) are listed in **Table 6** and shown on **Figure 18**. Detailed descriptions of each PCT are provided in the following subsections. An update to the PCT classification was released in December 2023. Transitional arrangements allow assessors with in-progress BAM-C cases established prior to 14 April 2023 to use the legacy PCTs. The BAM-C for this BDAAR was commenced in May 2021 and the assessment is based on the legacy PCTs.

Table 6. PCTs identified within the Subject Land

PCT ID	PCT name	Subject Land area (ha)
85	River Oak forest and woodland wetland of the NSW South Western Slopes and South Eastern Highlands Bioregion	0.15
266	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	4.18
277	Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	50.02
287	Long-leaved Box – Red Box – Red Stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes Bioregion	0.17
Total area		54.52














Figure 18. Plant Community Types



Sources: © Google 2023

GDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 24/04/2024

Legend

- | | |
|---|--|
|  Modification 15 Surface Disturbance Footprint |  PCT 277 Paddock Tree |
|  Category 1 Land - Excluded from Assessment |  PCT 277 Exotic |
| Vegetation | |
|  PCT 287 Mod |  PCT 266 DNG |
|  PCT 277 DNG |  PCT 266 Poor |
|  PCT 277 Poor |  PCT 85 Poor |
|  PCT 277 Planted |  Exotic Planting |
| |  Disturbed Ground |

4.2.2 PCT 85 RIVER OAK FOREST AND WOODLAND WETLAND

4.2.2.1 PCT Overview

Remnant riparian patch of *Casuarina cunninghamiana* (River Oak) trees along Cadiangullong Creek with an exotic-dominated groundcover (**Table 7; Plate 1**). Multiple River Oak trees contained scattered *Amyema cambagei* (Needle-leaf Mistletoe). The groundcover was dominated by the exotic Cocksfoot, *Silybum marianum* (Variegated Thistle), *Bromus diandrus* (Great Brome), *Bromus catharticus* (Praire Grass) and *Lolium perenne* (Perennial Ryegrass). Native species were rare and included the shrub *Solanum ferocissimum* (Spiny Potato-bush), the sedge *Carex appressa* (Tall Sedge) and the forbs *Urtica incisa* (Stinging Nettle) and *Geranium solanderi* (Native Geranium).

Table 7. PCT 85 River Oak Woodland

PCT ID	PCT name	Vegetation formation	Vegetation class	Per cent cleared value (%)	Extent within Subject Land (ha)
85	River Oak forest and woodland wetland of the NSW South Western Slopes and South Eastern Highlands Bioregion	KF_CH9 Forested Wetlands	Eastern Riverine Forests	73	0.15

Plate 1. PCT 85 River Oak Remnant on Subject Land



4.2.2.2 Condition states

River Oak Woodland was recorded as one condition on the Subject Land as described by QN25 (**Appendix D**):

- PCT 85 Woodland (poor) – refers to River Oak woodland with a predominantly exotic understorey (QN25).

4.2.2.3 Justification of PCT selection

BioNet Vegetation Classification System (DPE 2024a) was used to identify the most likely PCT for this vegetation community using the filters: River Oak, NSW South Eastern Highlands IBRA Region, Orange Subregion and Cabonne LGA. PCT 85 was the only PCT identified.

State Vegetation Type Mapping identifies PCT 85 in isolated riparian remnants opposite Panuara Road to the south of the Subject Land. Riparian vegetation along Cadiangullong Creek is identified as PCT 79 River Red Gum shrub/grass riparian tall woodland, however the absence of *Eucalyptus camaldulensis* (River Red Gum) on the Subject Land renders this PCT unlikely.

PCT 85: River Oak forest and woodland wetland of the NSW South Western Slopes and South Eastern Highlands Bioregion is considered the most likely to occur in portions of the Subject Land dominated by River Oak. The Subject Land lies within the known distribution of this PCT, which includes the Orange Subregion of the NSW South West Slopes and Inland Slopes Subregion of the South Eastern Highlands Bioregion. The species composition on the Subject Land is consistent with the scientific description of PCT 85 on the BioNet Vegetation Classification system (DPE 2024a).

4.2.2.4 Alignment with TECs

PCT 85 is not aligned with any TECs listed on the BC Act (DPE 2024a).

4.2.2.5 Alignment with EPBC Act listed Ecological Communities (ECs)

PCT 85 is not aligned with any TECs listed on the EPBC Act (DPE 2024a).

4.2.3 PCT 266 WHITE BOX GRASSY WOODLAND

4.2.3.1 PCT Overview

White Box Woodland was characterised by open woodland with trees to 25 m dominated by White Box as the only tree species (**Table 8; Plate 2-4**). The shrub layer was mostly absent due to historical land use with a modified groundlayer consisting of native and exotic species. Groundcover was dominated by exotic grass species *Phalaris* and *Lolium rigidum* (Wimmera Ryegrass). Native grasses were present in small numbers including Yanganbil (*Austrostipa bigeniculata*) and Speargrass (*Austrostipa scabra*), *Rytidosperma racemosum* (Wallaby Grass), *Microlaena stipoides* (Weeping Grass), *Bothriochloa macra* (Red Grass) and *Carex inversa* (Knob Sedge). Native forbs were also present in low numbers, including *Oxalis perennans* (Grassland Wood-sorrel), *Einadia nutans* (Climbing Saltbush), *Cheilanthes lasiophylla* (Woolly Cloak Fern), *Convolvulus graminetinus* (Bindweed), *Euphorbia drummondii* (Caustic Weed), Native Geranium and *Rumex brownii* (Swamp Dock).

Table 8. PCT 266 White Box Grassy Woodland

PCT ID	PCT name	Vegetation formation	Vegetation class	Per cent cleared value (%)	Extent within Subject Land (ha)
266	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	KF_CH3 Grassy Woodlands	Western Slopes Grassy Woodlands	94	4.18

Plate 2. PCT 266 Woodland (poor)



Plate 3. PCT 266 Woodland (poor)



Plate 4. PCT 266 DNG



4.2.3.2 Condition states

White Box Woodland was recorded as two different condition states as described by QN16, QN17 and QN18 (**Appendix D**):

- PCT 266 Woodland (poor) – refers to more than three White Box trees in a patch with predominantly exotic understorey (QN16 and QN17).
- PCT 266 DNG – refers to all grassland areas in close proximity to White Box where the groundlayer was dominated by native species (QN18).

4.2.3.3 Justification of PCT selection

BioNet Vegetation Classification System (DPE 2024a) was used to identify the most likely PCT for this vegetation community. The BioNet Vegetation Classification database was searched for PCTs with White Box in the title, the Grassy Woodland Vegetation Formation, the NSW South Western Slopes IBRA Region and the Inland Slopes Subregion. Thirteen possible PCTs were identified: 266, 267, 268, 272, 274, 275, 282, 347, 426, 434, 483, 1383 and 1609.

PCT 266 White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion is considered the most likely to occur in portions of the Subject Land dominated by White Box. The Subject Land lies within the known distribution of this PCT, the species present in the vegetation community are consistent with those listed in the scientific description of PCT 266 on BioNet (DPE 2024a). Further, PCT 266 is mapped on the State Vegetation Type Map as occurring on the Subject Land in these locations. Other PCTs were discounted on the basis of having co-dominant species that do not occur on the Subject Land.

4.2.3.4 Alignment with TECs

PCT 266 is aligned with *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community* (CEEC) listed on the BC Act (DPE 2024a).

4.2.3.5 Alignment with EPBC Act listed ECs

PCT 266 is aligned with *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community* listed on the EPBC Act (DPE 2024a).

4.2.4 PCT 277 BLAKELY'S RED GUM – YELLOW BOX GRASSY TALL WOODLAND

4.2.4.1 PCT Overview

Blakely's Red Gum – Yellow Box grassy tall woodland describes areas on the Subject Land dominated by Yellow Box and Blakely's Red Gum trees, with Apple Box and Bundy Box as less common associates (**Table 9; Plate 5-9**). Shrubs were mostly absent, and the ground layer a mixture of native and exotic grasses and forbs. The native groundcover species in this community included Weeping Grass and Wallaby Grass, with less abundant but common Speargrass, Knob Sedge, Swamp Dock, *Anthosachne scabra* (Common Wheatgrass), *Sporobolus creber* (Slender Rat's Tail Grass), Red Grass, *Cynodon dactylon* (Common Couch), *Panicum effusum* (Hairy Panic) and *Chloris truncata* (Windmill Grass). Native forbs *Acaena ovina*, *Geranium retrorsum* (Cranesbill Geranium), *Asperula conferta* (Common Woodruff), Grassland Wood-sorrel, Swamp Dock, Climbing Saltbush and *Gonocarpus tetragynus* (Poverty Raspwort) were also relatively common. Phalaris, Wimmera Ryegrass, Prairie Grass, *Avena barbata* (Bearded Oats), *Agrostis capillaris* (Browntop Bent), Cocksfoot, *Holcus lanatus* (Yorkshire Fog) and *Hordeum leporinum* (Barley Grass) were the most prevalent exotic grasses, and *Trifolium subteranneum* (Subterranean Clover), *Trifolium repens* (White Clover), *Echium plantagineum* (Patterson's Curse) and *Arctotheca calendula* (Capeweed) were common exotic forbs in the groundlayer.

Native trees and shrubs planted in fenced areas on the Subject Land were generally characteristic of the local area and included Yellow Box, White Box, Apple Box, Bundy Box, as well as the occasional *Eucalyptus polyanthemos* (Red Box), *Eucalyptus sideroxylon* (Mugga Ironbark), *Eucalyptus viminalis* (Ribbon Gum), *Eucalyptus nortonii* (Large-flowered Bundy), *Eucalyptus caesia* (Caesia) and *Acacia dealbata* (Silver Wattle). Native shrubs included *Acacia buxifolia* (Box-leaved Wattle), *Dodonaea viscosa* (Sticky Hop-bush) and *Hakea salicifolia* (Willow-leaved Hakea) and the groundlayer was dominated by exotic species including Phalaris, Wimmera Ryegrass and Cocksfoot with some natives present in small numbers. Native grasses included Speargrass, Red Grass, Knob Sedge and Hairy Panic, and forbs included Swamp Dock, Native Geranium, *Crassula sieberiana* (Australian Stonecrop) and *Epilobium* spp. (Willow-herb).

Table 9. PCT 277 Blakely’s Red Gum – Yellow Box Grassy Tall Woodland

PCT ID	PCT name	Vegetation formation	Vegetation class	Per cent cleared value (%)	Extent within Subject Land (ha)
277	Blakely’s Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	KF_CH3 Grassy Woodlands	Western Slopes Grassy Woodlands	94	50.02

Plate 5. PCT 277 Woodland (Poor)



Plate 6. PCT 277 Plantings



Plate 7. PCT 277 Paddock Trees



Plate 8. PCT 277 DNG



Plate 9. PCT 277 Exotic



4.2.4.2 Condition states

Blakely's Red Gum – Yellow Box grassy tall woodland was recorded in five condition states on the Subject Land as described by QN3, QN4, QN5, QN7, QN8, QN9, QN10, QN11, QN20, QP1, QP2, QP3, QP4, QE1, QE2, QE3, QE4, QE5, QE6, QE10 and QN50 (**Appendix D**):

- PCT 277 Woodland (Poor) – refers to more than three Yellow Box or Blakely's Red Gum trees in a patch with understorey dominated by exotic grasses and agricultural weeds (QN8, QN9, QN10 and QN11).
- PCT 277 Plantings – refers to native trees and shrubs planted in fenced areas on the Subject Land (QP1, QP2, QP3 and QP4).
- PCT 277 DNG – refers to grassland areas with Yellow Box or Blakely's Red Gum vegetation nearby, dominated by native species (QN3, QN4, QN5 and QN20).
- PCT 277 Exotic – refers to exotic vegetation on the Subject Land with Yellow Box or Blakely's Red Gum trees nearby (QE1, QE2, QE3, QE4, QE5, QE6 and QE10).
- PCT 277 Paddock Trees. This includes all isolated paddock trees that are greater than 50 m from other living or dead trees and are generally surrounded by exotic vegetation. There were twenty-four (24) trees, three (3) Blakely's Red Gum, fifteen (15) White Box, one (1) Apple Box and five (5) Yellow Box trees. (QN50)

4.2.4.3 Justification of PCT selection

BioNet Vegetation Classification System (DPE 2024a) was used to identify the most likely PCT for this vegetation community. The database was searched for a combination of Blakely's Red Gum, the Grassy Woodland Vegetation Formation, the NSW South Western Slopes IBRA Region and the Inland Slopes Subregion. Nine potential PCTs were identified: 268, 277, 278, 279, 280, 282, 283, 284, 286 and 347. PCT 1330 was also considered as it was identified on the State Vegetation Type Map.

PCT 277 Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion is considered the most likely PCT to occur on woodland sites dominated by Yellow Box or Blakely's Red Gum on the Subject Land. PCT 277 is a broadly defined community which includes the characteristic species in the upper and ground stratum (DPE 2024a). PCT 277 is mapped on the State Vegetation Type Map, and occurs on fertile deep, loam or clay soils derived from sedimentary and metamorphic rocks, as well as volcanics and fine grained-granite which occur on the Subject Land (DPE 2024a). PCT 277 is also known to grade into PCT 266 which has been identified on the Subject Land. Other PCTs were discounted on the basis that they are not identified as present on the State Vegetation Type Map and many of the co-dominant tree species for these species are absent. PCT 1330 was the only other PCT closely considered for this vegetation community, however it was discounted on the basis that this vegetation community is dominated by two species, Yellow Box and Blakely's Red Gum, whereas PCT 1330 contains a more diverse upper stratum selection including species that are not present, such as Broad-leaved Peppermint, Red Stringybark, *Eucalyptus rubida* (Candlebark), *Eucalyptus pauciflora* (Snow Gum), *Eucalyptus mannifera* (Brittle Gum) and Ribbon Gum. Similarly, the ground stratum species in the vegetation community on the Subject Land are not consistent with those listed on BioNet for PCT 1330, with the exception of two species, Red Grass and Weeping Grass (DPE 2024a). PCT 1330 was also discounted as it occurs on loamy soils, which are not common on the Subject Land.

PCT 277 Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion is considered the most likely PCT for the native plantings on the Subject Land which all contain the dominant species, Yellow Box. PCT 266 and 268 were discounted on the basis that Yellow Box is not a dominant or characteristic species according to BioNet, and the plantings are generally in the flatter and more heavily cleared parts of the landscape, where PCT 277 is likely to have been the dominant PCT pre-European settlement.

4.2.4.4 Alignment with TECs

PCT 277 is aligned with *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community* (CEEC) listed on the BC Act (DPE 2024a).

4.2.4.5 Alignment with EPBC Act listed ECs

PCT 277 is aligned with *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community* (CEEC) listed on the EPBC Act (DPE 2024a).

4.2.5 PCT 287 LONG LEAVED BOX – RED BOX – RED STRINGYBARK MIXED OPEN FOREST

4.2.5.1 PCT Overview

Mid high to tall open forest dominated by Bundy Box and Red Stringybark with the occasional Apple Box and Red Box tree were considered to be PCT 287 (**Table 10; Plates 10**). Shrubs recorded in this vegetation community included *Acacia genistifolia* (Early Wattle), Box-leaved Wattle, *Pultenaea procumbens* (Coxs River Bush-pea), *Pultenaea microphylla* (Spreading Bush-pea), *Cassinia sifton* (Sifton Bush), *Hibbertia obtusifolia* (Hoary Guinea Flower). Vines and creepers were rare and included *Hardenbergia violacea* (False Sarsaparilla), *Cassytha pubescens* (Downy Dodder-laurel) and *Amyema pendula* (Drooping Mistletoe). Native grass species present included Weeping Grass, Speargrass, Wallaby Grass and *Lomandra filiformis* (Wattle Matt-rush). Native forbs were more abundant with Native Geranium, Climbing Saltbush, Swamp Dock, *Hydrocotyle laxiflora* (Stinking Pennywort) and Grassland Wood-sorrel being the most prevalent. Other forbs present included Common Woodruff, *Dichondra repens* (Kidney Weed) and *Hypericum gramineum* (Small St John's Wort). Exotic species were dominant at all sites with Prairie Grass, *Marrubium vulgare* (Horehound), *Rumex acetosella* (Sheep Sorrel), Wimmera Ryegrass, Phalaris and Cocksfoot the most common.

Table 10. PCT 287 Long-leaved Box – Red Box – Red Stringybark mixed open forest

PCT ID	PCT name	Vegetation formation	Vegetation class	Per cent cleared value (%)	Extent within Subject Land (ha)
287	Long-leaved Box – Red Box – Red Stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes Bioregion	KF_CH5B Dry Sclerophyll Forests (Shrubby sub-formation)	Western Slopes Dry Sclerophyll Forests	67	0.17

Plate 10. PCT 287 Woodland (Moderate)



4.2.5.2 Condition states

Mid to high open forest dominated by Red Stringybark trees were found to be in one (1) condition state on the Subject Land as described by QN12 (**Appendix D**):

- PCT 287 Woodland (Moderate) – refers to mid to tall open forest dominated by Red Stringybark and Bundy Box where the shrub layer is mostly absent and exotic grasses dominate as described in QN12.

4.2.5.3 Justification of PCT selection

BioNet Vegetation Classification System (DCCEEW 2024b) was used to identify the most likely PCT for this vegetation community. The BioNet Vegetation Classification database was searched for PCTs with Long-leaved Box in the title, the NSW South Western Slopes IBRA Region and the Inland Slopes Subregion. Thirteen (13) possible PCTs were identified: 268, 280, 287, 288, 290, 321, 326, 338, 345, 348, 350, 354 and 957 (DPIE 2023b). The vegetation community is mapped as PCT 287 on the State Vegetation Type Map.

PCT 287 Long-leaved Box – Red Box – Red Stringybark mixed open forest is considered the most likely to occur in portions of the Subject Land dominated by Red Stringybark and Bundy Box trees. PCTs with dominant species in the upper stratum that were not part of this vegetation community or described as shrubby or low woodland were excluded from consideration (288, 354, 957). Similarly, PCTs with a limited range or described as occurring in a part of the landscape that was not consistent with this vegetation community were also discounted (PCT 280, 321, 326, 338, 345, 348, 350). PCT 268 and 287 were both considered as potential candidates for this vegetation community. PCT 268 occurs on lower slopes and flats adjacent to major rivers, in contrast to this PCT 287 which occurs on sheltered slopes in hills, as does this vegetation community. State Vegetation Mapping identifies this vegetation community as PCT 287, and it is considered the best fit.

4.2.5.4 Alignment with TECs

PCT 287 is not aligned with any TECs listed on the BC Act (DCCEEW 2024a).

4.2.5.5 Alignment with EPBC Act listed ECs

PCT 287 is not aligned with any ECs listed on the EPBC Act (DCCEEW 2024a).

4.3 Threatened Ecological Communities

TECs associated with each PCT are identified in the BioNet Vegetation Classification System (DCCEEW 2024a). Conformance of the vegetation on the Subject Land with a TEC identified through BioNet was verified by reference to the relevant Final Determination of the NSW Scientific Committee.

Four potential TECs were identified by database searches of the BioNet Vegetation Classification System (DCCEEW 2024a) and PMST (DCCEEW 2022):

- *Eucalyptus microcarpa* (Grey Box) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia Endangered Ecological Community (EEC).
- Natural Temperate Grassland of the South Eastern Highlands CEEC.
- Poplar Box Grassy Woodland on Alluvial Plains EEC.
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC.

4.3.1 GREY BOX GRASSY WOODLANDS

No Grey Box trees were identified on the Subject Land. Grey Box Grassy Woodland TEC has a tree canopy that is dominated or co-dominated Grey Box (DEWHA 2010). Therefore, it is not considered to occur on the Subject Land.

4.3.2 NATURAL TEMPERATE GRASSLANDS

Natural Temperate Grassland of the South Eastern Highlands TEC contains a groundcover dominated or co-dominated by *Themeda triandra* (Kangaroo Grass), *Poa sieberiana* (Snowgrass), *Poa labillardierei* (River Tussock Grass), Yanganbil, Speargrass, Red Grass, *Rytidosperma* spp. or *Lachnagrostis* spp (TSSC 2016a). None of these grasses dominate or co-dominate areas of the Subject Land. Therefore, it is not considered to occur on the Subject Land.

4.3.3 POPLAR BOX WOODLAND

No *Eucalyptus populnea* (Poplar Box) trees were identified on the Subject Land. Poplar Box Grassy Woodland on Alluvial Plains TEC has a tree canopy dominated by Poplar Box (DEE 2019). Therefore, it is not considered to occur on the Subject Land.

4.3.4 BOX GUM WOODLAND

PCT 266 and PCT 277 are part of the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community listed under both the BC Act and the EPBC Act. This community is commonly known as Box-Gum Woodland.

The Final Determination for listing under the BC Act states that areas with predominately native canopy, dominated by the relevant species, but with a predominately non-native ground layer, are included within the Box-Gum Woodland CEEC. Additionally, areas where the tree overstorey is absent and only the understorey is present are also considered Box-Gum Woodland CEEC. According to the Final Determination, disturbed remnants are still considered to form part of the community if the overstorey, understorey, or both would respond to assisted natural regeneration, such as where the natural soil and associated seed bank are still at least partially intact (DPE, 2020).

All of the vegetation in PCT 266 and PCT 277 were considered to be Box Gum Woodland CEEC under the BC Act with the exception of PCT 277 Exotic.

PCT 277 Exotic was attributed to PCT 277 for input into the BAM-C to account for species credit species polygons which include exotic vegetation. It should be noted that this is not a true representation of PCT 277. Areas defined as exotic grassland are dominated (>95%) by introduced perennial species such as Phalaris and Cocksfoot, with only a small number of grazing tolerant native species remaining, such as Speargrass and the occasional Wallaby Grass, *Juncus* sp., Swamp Dock and *Oxalis perennans*.

An ecological community is defined as 'an assemblage of species occupying a particular area'. The ecological community that once occurred has been lost through historic clearing associated with agriculture and mining, as evidenced by current and historic air photos and a review of the floristic data. The vegetation attributed to PCT 277 Exotic is not Box Gum Woodland CEEC on the basis that:

- it is not characterised by the assemblage of species listed in Part 1.1 of the Final Determination but rather it is characterised by Phalaris, Cocksfoot, Tall Fescue, Yorkshire Fog, Wimmera Ryegrass, Soft Brome and Rat's Tail Fescue;
- the native understory species listed in Part 1.1 of the Final Determination which are present (Swamp Dock, *Oxalis perennans*, Cranesbill Geranium) are not uniformly distributed (based on the VI plots, some areas have one of these species, and others have up to five of these species recorded in a 20 x 20 m plot); and
- the zone has lost integrity and the ability to function as an ecological community (evidenced by a Vegetation Integrity Score of 2.1) and natural restoration is very unlikely in this transformed state and would need active intervention and revegetation (i.e. flora species brought into the site to recreate the community that once occurred) (Good et al., 2021).

In comparison, the EPBC Act criteria within the Final Determination, refers to thresholds such as patch size, number of native species in the ground layer and presence of important, or sensitive species to indicate the condition (DEH 2006). The final determination by the NSW Threatened Species Scientific Committee for Box Gum CEEC (TSSC 2020a) states that the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland is characterised by the assemblage of the species listed on in Part 1. Assemblage of species. It also states that the community may vary with the presence or absence of species as a function of sampling effort, site history and environmental influences (soil, topography, climate, disturbance). On the Subject Land it was determined that all areas of PCT 266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion and PCT 277: Blakely's Red Gum – Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion qualify as Box Gum CEEC under the BC Act.

The DCCEEW (2023a) *Conservation Advice for the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* states that:

- The ecological community occurs in the following bioregions (IBRA, DoE 2012): Brigalow Belt South, Murray Darling Depression, Nandewar, New England Tableland, NSW North Coast, NSW South Western Slopes, Riverina, South Eastern Queensland, South East Corner, South East Coastal Plain, South Eastern Highlands, Southern Volcanic Plain, Sydney Basin and Victorian Midlands.
- It has, or previously had, an overstorey dominated or co-dominated by:
 - White Box and/or Yellow Box and/or Blakely's Red Gum (applicable across the entire range of the ecological community); or
 - in the Nandewar bioregion (IBRA, DoE 2012), any of the above three species and/or Grey Box and/or *Eucalyptus moluccana* (Coastal Grey Box);
- It has a predominantly native ground layer.
- Tussock grasses are conspicuous in the ground layer (except in some situations, such as under dense groves of shrubs or regenerating trees), usually with several native species from some the following genera: *Austrostipa*, *Bothriochloa*, *Chloris*, *Cymbopogon*, *Dichanthium*, *Microlaena*, *Poa*, *Themeda*, *Rytidosperma* or *Sorghum* spp.
- Amongst the grass tussocks and sometimes in swathes, a range of broad-leaved forbs and petaloid monocots (e.g. lilies sens. Lat.) may be a major component of the plant diversity.
- While shrubs may be dominant locally within areas of the ecological community, areas of native vegetation with a more continuous shrub layer, in which the average shrub cover of the whole patch is greater than 30%, is considered to be a shrubby woodland and so is not part of the listed ecological community. In assessing this, the effects of disturbance need to be considered, for example where heavy grazing may result in high densities of shrubs during a recovery phase.
- A 'patch' is a continuous area containing the ecological community. The patch is the larger of:
 - an area that contains five or more trees in which the gap between the outer canopy of any tree and the outer canopy of the nearest tree is no greater than 75 m, or
 - the area over which the ground layer is predominantly native (at least 50% of the perennial vegetation cover in the ground layer is made up of native species).

Condition classes and thresholds are provided in the DCCEEW conservation advice as follows (DCCEEW 2023a):

Table 11. Box-Gum Woodland Condition Classes and Thresholds (DCCEEW 2023a)

Condition class	Patch size	Features present
<i>Class A</i> <i>Good quality understorey and mature overstorey both present.</i>	<i>0.1 ha (1,000 m²) or larger</i>	<ul style="list-style-type: none"> • <i>The ground layer is predominantly native* and</i> • <i>the understorey contains at least 12 native, non-grass species (such as forbs, shrubs, ferns and sedges) and</i> • <i>at least one of the understorey species should be a species recognised as 'important' (e.g. grazing sensitive, regionally significant, listed threatened or uncommon species) (see 'Important' column in plant species list at</i> • <i>Appendix A – Species lists) and</i>

Condition class	Patch size	Features present
		<ul style="list-style-type: none"> the patch contains 10 or more mature trees* per hectare consistent with the key diagnostics for the ecological community
<p><i>Class B</i> Good quality understorey present. Characteristic trees may be absent.</p>	<p>0.1 ha (1,000 m²) or larger</p>	<ul style="list-style-type: none"> The ground layer is predominantly native* and the understorey contains at least 12 native, non-grass species (such as forbs, shrubs, ferns and sedges) and at least one of the understorey species should be a species recognised as 'important' (e.g. grazing sensitive, regionally significant, listed threatened or uncommon species) (see 'Important' column in plant species list at Appendix A – Species <u>lists</u>)
<p><i>Class C</i> Allows for a lower diversity in the understorey in areas where there is regeneration and/or tree density may be relatively dense.</p>	<p>2 ha (20,000 m²) or larger</p>	<ul style="list-style-type: none"> The ground layer is predominantly native* and The patch contains 20 or more mature trees* per hectare and/or The patch contains natural regeneration of dominant overstorey eucalypts*

*Definitions on next page.

BAM VI Plots were undertaken across the Subject Land as part of the assessment for the BDAR. None of the vegetation on the Subject Land meets the criteria to be considered Box-Gum CEEC under the EPBC Act due to the lack of native non grass species in the understorey, the size of the patch and the lack of regeneration.

The conformance of PCT 266 and PCT 277 on the Subject Land was assessed according to the EPBC Act criteria and the results are summarised in **Table 12**.

An assessment for Serious and Irreversible Impacts (SAII) on Box Gum Woodland under the BC Act is provided in **Appendix I**.

Table 12. Conformance of PCT 266 and PCT 277 to EPBC Act CEEC criteria

Vegetation Zone and condition	Quadrat	Predominantly native ground cover	Is the patch ≥ 0.1 ha?	Greater than 12 native ground cover species (other than grasses) in 0.01 ha (no.)	Presence of one or more important species (no.)	Is the patch ≥ 2 ha?	>20 mature trees per hectare OR natural regeneration?	Conforms to EPBC Act CEEC?	Reason
PCT 266 Woodland (Poor)	QN16	No	Yes	No (2)	No (0)	No	No	No	The patch does not have a predominantly native understorey
PCT 266 Woodland (Poor)	QN17	No	Yes	No (3)	No (0)	Yes	Yes (> 20 mature trees per ha and regeneration)	No	The patch does not have a predominantly native understorey
PCT 266 DNG	QN18	Yes	Yes	No (9)	Yes (1: <i>Desmodium varians</i>)	No	No	No	Patch size is less than 2 ha
PCT 277 Woodland (Poor)	QN8	No	Yes	No (1)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey
PCT 277 Woodland (Poor)	QN9	No	Yes	No (1)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey
PCT 277 Woodland (Poor)	QN10	No	Yes	No (0)	No (0)	Yes	Yes (> 20 mature trees per ha)	No	The patch does not have a predominantly native understorey
PCT 277 Woodland (Poor)	QN11	No	Yes	No (7)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey
PCT 277 Plantings	QP1	No	Yes	No (3)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey
PCT 277 Plantings	QP2	No	Yes	No (4)	No (0)	Yes	Yes (> 20 mature trees per ha and regeneration)	No	The patch does not have a predominantly native understorey

Vegetation Zone and condition	Quadrat	Predominantly native ground cover	Is the patch ≥ 0.1 ha?	Greater than 12 native ground cover species (other than grasses) in 0.01 ha (no.)	Presence of one or more important species (no.)	Is the patch ≥ 2 ha?	>20 mature trees per hectare OR natural regeneration?	Conforms to EPBC Act CEEC?	Reason
PCT 277 Plantings	QP3	No	Yes	No (2)	No (0)	Yes	Yes (> 20 mature trees per ha and regeneration)	No	The patch does not have a predominantly native understorey
PCT 277 DNG	QN3	No	Yes	No (8)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey
PCT 277 DNG	QN4	No	Yes	No (1)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey
PCT 277 DNG	QN5	No	Yes	No (2)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey
PCT 277 DNG	QN20	Yes	Yes	No (5)	Yes (1: <i>Chrysocephalum apiculatum</i>)	Yes	No	No	The patch does not contain >20 mature trees per hectare or regeneration
PCT 277 Exotic	QE1	No	Yes	No (5)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey
PCT 277 Exotic	QE2	No	Yes	No (2)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey
PCT 277 Exotic	QE3	No	Yes	No (2)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey
PCT 277 Exotic	QE4	No	Yes	No (1)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey
PCT 277 Exotic	QE5	No	Yes	No (1)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey

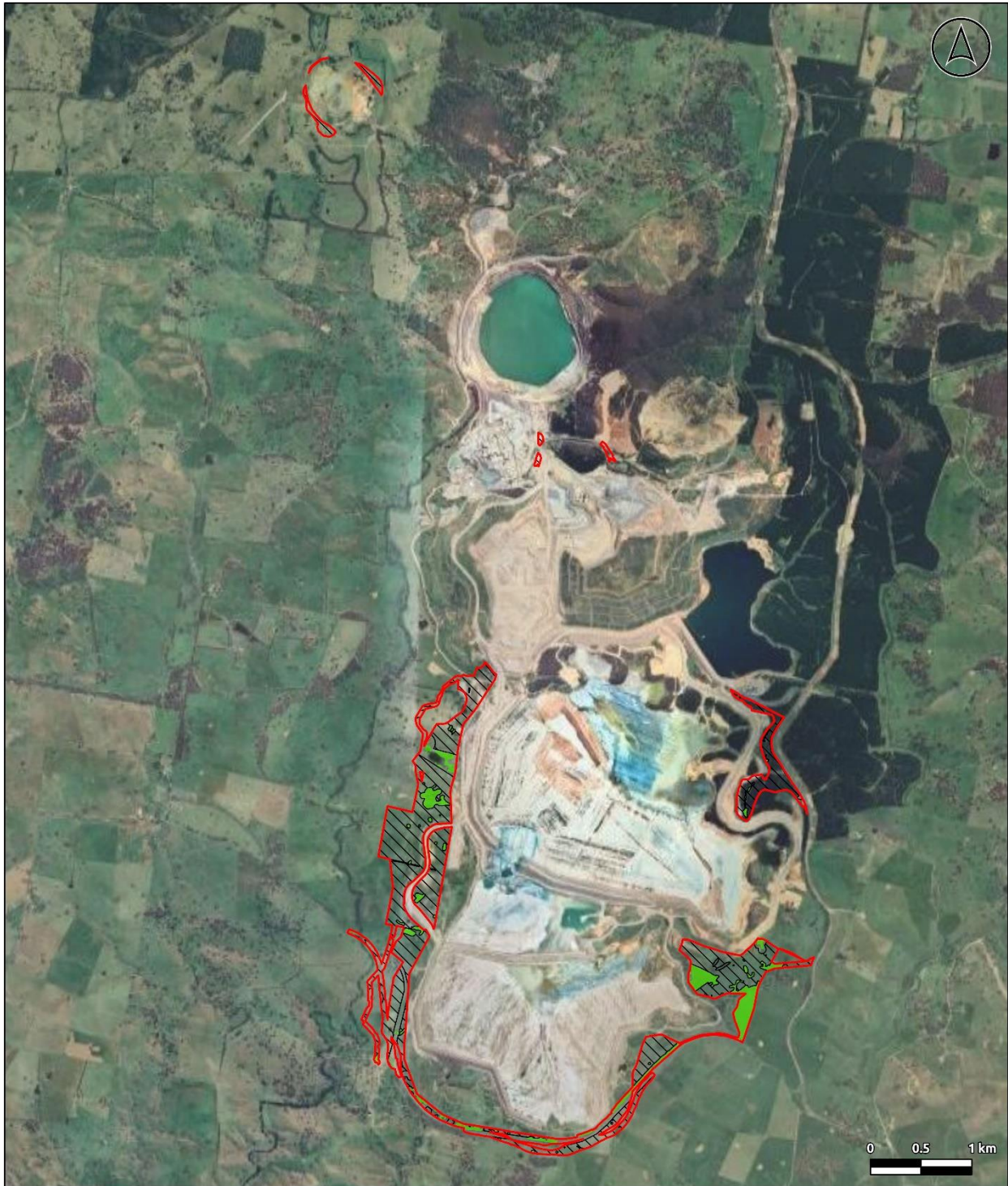
Vegetation Zone and condition	Quadrat	Predominantly native ground cover	Is the patch \geq 0.1 ha?	Greater than 12 native ground cover species (other than grasses) in 0.01 ha (no.)	Presence of one or more important species (no.)	Is the patch \geq 2 ha?	>20 mature trees per hectare OR natural regeneration?	Conforms to EPBC Act CEEC?	Reason
PCT 277 Exotic	QE6	No	Yes	No (2)	No (0)	Yes	No	No	The patch does not have a predominantly native understorey
PCT 277 Paddock Trees	QN50	No	No	No	No	No	No	No	There are 24 trees included in this VZ10. None have predominantly native understorey.

TECs and ECs identified within the Subject Land are listed in **Table 13** and their extent is shown on **Figure 19**.

Table 13. TECs and ECs within the Subject Land

TEC name	Profile ID (from TBDC)	BC Act status	EPBC Act status	Associated vegetation zones within the Subject Land	BC Act TEC within Subject Land (ha)	EPBC Act EC within Subject Land (ha)
White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived native Grassland	10837	CEEC	CEEC	PCT 266 DNG PCT 266 Woodland (poor) PCT 277 DNG PCT 277 Plantings PCT 277 Woodland (poor) PCT 277 Paddock Trees	32.29	0



Figure 19. Threatened Ecological Communities




Sources: © Google 2023

GDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 24/04/2024

Legend

-  Modification 15 Surface Disturbance Footprint
-  Category 1 Land - Excluded from Assessment

Threatened Ecological Communities

-  White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC (BC Act)

4.4 Vegetation Zones

Native vegetation was classified into nine (9) VZ as per Subsection 4.3.1 of the BAM (DPIE 2020a). Vegetation zones are based on PCT and the condition of the vegetation, specifically relative abundance of native species in the ground stratum. Moderate quality woodlands had more than five native species in the ground layer in contrast to the poor-quality woodland sites that were predominantly remnant trees surrounded by exotic grasses and forbs. It is considered that the variation in groundcover has been captured in the quadrats which provide an accurate representation of the variation encountered in the field.

CHPL intends to stage the Offsets for the Modification over two phases as shown in **Table 14**. The area of each Vegetation Zone has been calculated using GIS and there was a need to use representative plots where the minimum number of VI Plots was unable to be achieved following the split. Three VI Plots, QN20, QN8 and QN9, were included in the Offset Phase 1 BAM-C despite occurring in the Offset Phase 2 area. Similarly, three VI Plots (QN50, QP4 and QN16) were included in the Offset Phase 2 BAM-C for the same reason.

QN20 has been replicated in the assessment of VZ3 due to a shortfall in the minimum number of VI Plots following the split of the Offset Phases. There are four VI Plots for VZ3, spread across the Subject Land, capturing any variability. QN20 is very close to the boundary of the division of Offset Phase 1 and Phase 2 and is considered appropriate to be used in either Phase.

QN8 and QN9 have been replicated in the assessment of VZ7 similarly to above. There are four VI Plots for VZ7, spread across the Subject Land capturing any variability. The condition of VZ7 across the Subject Land was in a very similar condition with very little variation. The poor condition is attributed to the presence of remnant woodland vegetation with exotic dominated understorey. The species composition was very similar across QN8, QN9, QN10 and QN11 and it is considered appropriate to replicate the VI Plots for this assessment.

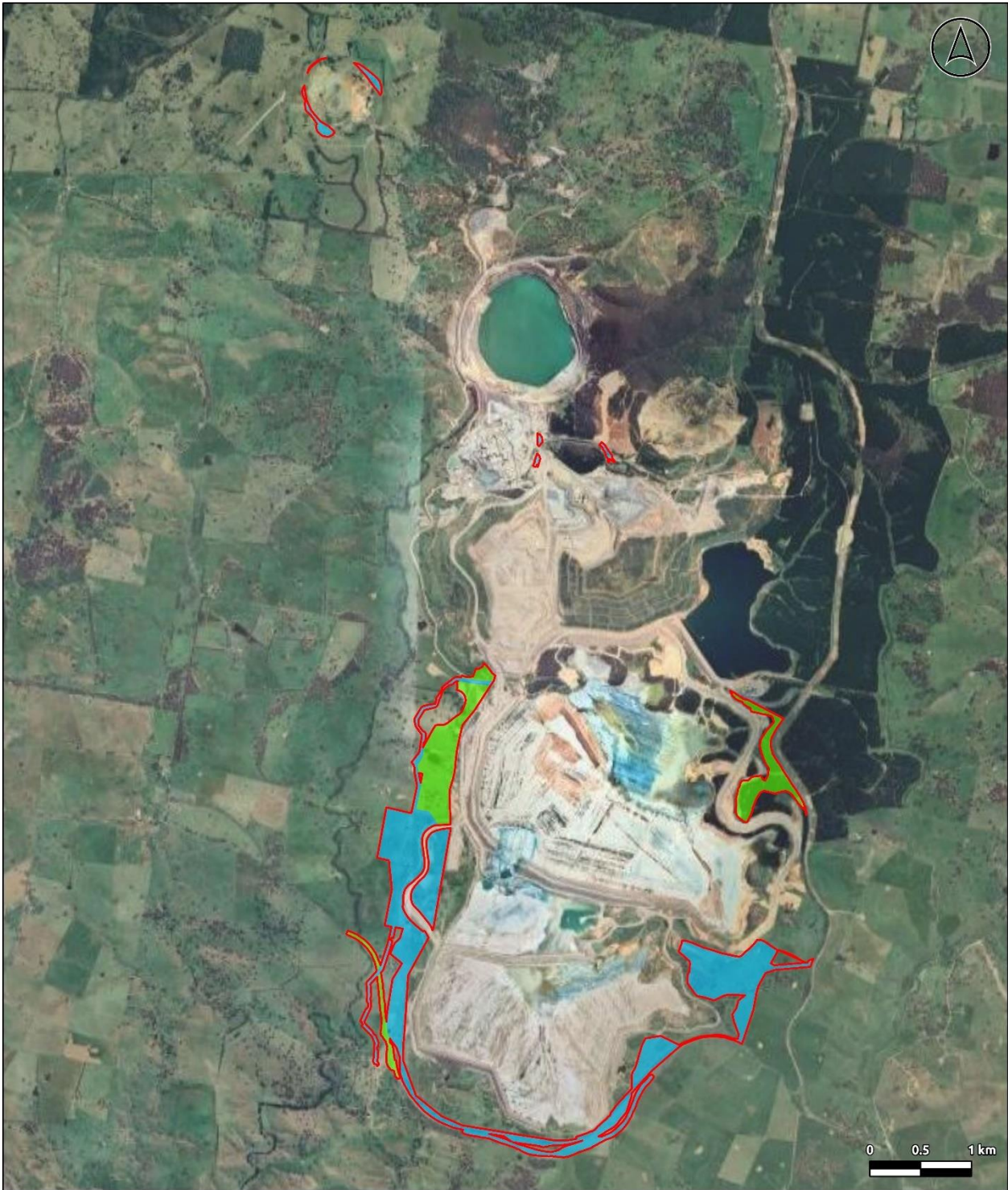
QN50 is the only VI Plot conducted for Paddock Trees on the Subject Land as is a small vegetation zone (1.08 ha) and the condition of isolated paddock trees surrounded by exotic vegetation did not vary from tree to tree. QN50 is used as a representative Plot for Paddock Trees in both Offset Phase 1 and Offset Phase 2, despite being located in Offset Phase 1. There is 0.08 ha of VZ6 in Offset Phase 2.

QP4 has been replicated for the assessment of 0.04 ha of VZ5 which occurs in Offset Phase 2, despite the VI Plot QP4 being situated in Offset Phase 1. The PCT 277 Planted in Offset Phase 2 is a single row of native trees and a VI Plot was not conducted due to inadequate area. The use of PQ4 as a surrogate for the condition of the PCT 277 Planted in Offset Phase 2 is an overestimation of the condition of VZ5, therefore it is considered appropriate to replicate for the assessment.

QN16 has been replicated for the assessment of VZ2, PCT 266 Poor. As specified for VZ7, the poor condition of this vegetation zone is attributed to the lack of native species in the understorey and the resulting low diversity and variability. QN16 is considered appropriate for the assessment of PCT 266 Poor in Offset Phase 1 as it is close to the boundary of the split, and is representative of the condition of the vegetation.

Patch size classes are identified in accordance with BAM Subsection 4.3.2 which states '*A patch is an area of native vegetation that occurs on the Subject Land and includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤ 30 m for non-woody ecosystems)*' (DPIE 2020a). A patch may extend into adjoining land. Patch sizes were assigned to one of the following classes <5 ha, 5-<25 ha, 25-100 ha and ≥ 100 ha (**Table 14** and **Figure 21**).

Figure 20 – Offset Phase 1 and Phase 2



Sources: © Google 2023

CGDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 8/04/2024

Legend

Site




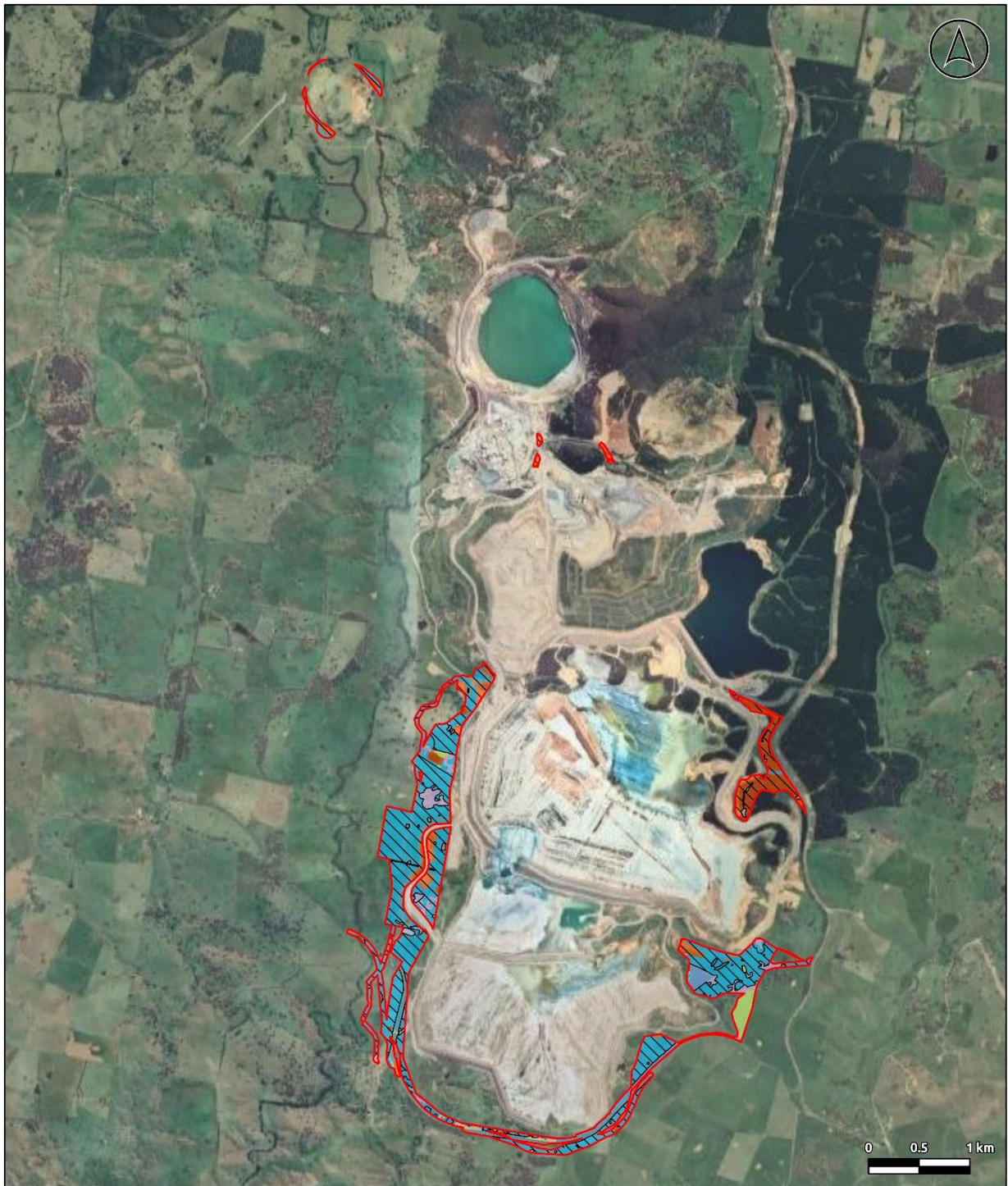
-  Modification 15 Surface Disturbance Footprint
-  Offset Phasing 1
-  Offset Phasing 2

Table 14. Vegetation zones and patch sizes

Vegetation zone ID	PCT ID number and name	Offset Phase 1						Offset Phase 2					
		Area (ha)	Patch size class	No. VI plots required	No. VI plots completed	No. VI plots used in assessment	Plot IDs of vegetation integrity plots used in assessment	Area (ha)	Patch size class	No. VI plots required	No. VI plots completed	No. VI plots used in assessment	Plot IDs of vegetation integrity plots used in assessment
VZ1	PCT 266 DNG	1.01	☒ <5 ha	1	1	1	QN18	0	☒ <5 ha	N/A	N/A	N/A	N/A
VZ2	PCT 266 Woodland (Poor)	3.00	☒ >100 ha	2	2	2	QN16 and QN17	0.17	☒ >100 ha	1	1	1	QN16
VZ3	PCT 277 DNG	6.46	☒ 25-100 ha	3	3	3	QN4, QN5 and QN20	1.20	☒ 25-100 ha	1	2	2	QN3 and QN20
VZ4	PCT 277 Exotic	16.96	☒ >100 ha	3	3	3	QE3, QE6 and QE10	4.95	☒ >100 ha	2	3	3	QE2, QE3 and QE4
VZ5	PCT 277 Plantings	7.69	☒ >100 ha	3	3	3	QP2, QP3 and QP4	0.04	☒ >100 ha	1	1	1	QP4
VZ6	PCT 277 Paddock Trees	1.00	☒ <5 ha	1	1	1	QN50	0.08	☒ <5 ha	1	1	1	QN50
VZ7	PCT 277 Woodland (Poor)	6.15	☒ >100 ha	3	3	3	QN8, QN9 and QN10	5.49	☒ >100 ha	3	3	3	QN8, QN9 and QN11
VZ8	PCT 287 Woodland (Moderate)	0	☒ <5 ha	N/A	N/A	N/A	N/A	0.17	☒ <5 ha	1	1	1	QN12
VZ9	PCT 85 Woodland (Poor)	0	☒ >100 ha	N/A	N/A	N/A	N/A	0.15	☒ >100 ha	1	1	1	QN25












Figure 21. Vegetation Zones



Sources: © Google 2023

GDA2020 MCA Zone 55 File: 221118_02.aprx Prepared By: adam.davis Date: 24/04/2024

Legend

- | | |
|---|---|
|  Modification 15 Surface Disturbance Footprint |  VZ5 (>100 ha) |
|  Category 1 Land - Excluded from Assessment |  VZ6 (<5 ha) |
| Vegetation Zone and Patch Size |  VZ7 (>100 ha) |
|  VZ1 (<5 ha) |  VZ8 (<5 ha) |
|  VZ2 (>100 ha) |  VZ9 (>100 ha) |
|  VZ3 (25-100 ha) | |
|  VZ4 (>100 ha) | |

4.5 Vegetation Integrity (Vegetation Condition)

4.5.1 VEGETATION INTEGRITY SURVEY PLOTS

The minimum number of VI Plots required for each vegetation zone area was sampled in accordance with the BAM (DPIE 2020a) (**Table 14**). Thirty-nine (39) VI plots were undertaken, however changes to the Subject Land over the lifetime of the project rendered only twenty three (23) VI plots relevant to the assessment. An explanation for the use of representative VI Plots required due to the splitting of the Subject Land into two discrete Offset Phases is described in Section 4.4.

4.5.2 SCORES

The composition, structure, function and vegetation integrity score for each vegetation zone is provided in **Table 15**.

4.5.3 USE OF BENCHMARK DATA

Benchmark data was sourced from the NSW BioNet Vegetation Classification system for each PCT in the relevant IBRA Bioregion (DCCEEW 2024a).

Table 15. Vegetation integrity scores

Vegetation zone ID	PCT ID number and name	Offset Phase 1				Offset Phase 2				Hollow bearing trees present?
		Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	
VZ1	PCT 266 DNG	50.9	70.6	15.0	37.8	N/A	N/A	N/A	N/A	No
VZ2	PCT 266 Woodland (Poor)	10.0	16.4	62.2	21.6	11.9	15.7	39.9	19.5	Yes
VZ3	PCT 277 DNG	28.4	67.7	4.1	20.0	47	69.5	31.5	46.9	No
VZ4	PCT 277 Exotic	4.2	0.3	15.0	2.6	2.1	0	14.5	0.5	No
VZ5	PCT 277 Plantings	31.9	19.2	42.9	29.7	44.9	20.8	43.9	34.5	No
VZ6	PCT 277 Paddock Trees	27.7	2.7	24.9	12.3	27.7	2.7	24.9	12.3	Yes
VZ7	PCT 277 Woodland (Poor)	9.4	16.4	70.7	22.2	13	16.5	74.1	25.2	Yes
VZ8	PCT 287 Woodland (Moderate)	N/A	N/A	N/A	N/A	27.2	47.8	70.5	45.1	Yes
VZ9	PCT 85 Woodland (Poor)	N/A	N/A	N/A	N/A	8.5	42.5	55.9	27.2	Yes

5. HABITAT SUITABILITY FOR THREATENED SPECIES

5.1 Identification of Threatened Species for Assessment

5.1.1 ECOSYSTEM CREDIT SPECIES

As detailed in Sections 2.3 and 2.4 a comprehensive desktop review was conducted to identify threatened flora and fauna species and ecological communities which have, or may have, suitable habitat within the Subject Land (**Appendix H**). This was followed by field surveys where suitable habitat was assessed and targeted searches undertaken for those species requiring survey under the BAM (DPIE 2020a) and/or considered likely to occur.

A total of forty (40) predicted ecosystem credit or dual credit species were identified by the BAM-C, PMST and database searches as requiring consideration. This includes twenty-eight (28) species identified by the BAM-C (**Table 16**), and twelve (12) additional species identified in the PMST search (DCCEEW 2022). Premise also undertook database searches as detailed in Sections 2.3.1 and 2.4.1 to ensure all required threatened species were considered and no additional species requiring consideration were identified.

Details regarding the listing status, associated VZ, sensitivity to gain and statement regarding the need for further assessment are provided in **Table 16**. Two (2) predicted ecosystem credit species were excluded from the ecosystem credit cost in the BAM-C due to habitat constraints, vagrant status, geographic limitations or microhabitat requirements.

All of the additional twelve (12) EPBC Act listed species identified in the PMST search (DCCEEW 2022) and two (2) of the BAM-C species (**Appendix H**) were excluded from further assessment as potential candidate species based on the following:

- Six (6) species were excluded from further assessment based on dependence on wetland habitat and the absence of suitable habitat within the Subject Land (*Botaurus poiciloptilus* [Australasian Bittern], *Calidris acuminata* [Sharp-tailed Sandpiper], *Calidris ferruginea* [Curlew Sandpiper], *Gallinago hardwickii* [Latham's Snipe], *Neophema chrysostoma* [Blue-winged Parrot] and *Rostratula australis* [Australian Painted Snipe]).
- The *Pycnoptilus floccosus* [Pilotbird] was excluded due to the geographic limitations as this species is only known to occur in the Brindabella Ranges, Snowy Mountains and wet forests between the Blue Mountains (west of Newcastle) and Dandenong (near Melbourne) and has not been recorded west of Portland.
- The *Leipoa ocellata* (Malleefowl) was excluded due to absence of suitable habitat for the species, which occurs in Mallee eucalypt woodland in Western NSW.
- The *Nyctophilus corbeni* [Corben's Long-eared Bat] was excluded due to geographic limitations as this species is known to occur in the Murray Darling Basin and the Pilliga scrub and has not been recorded near the Subject Land.
- The *Falco hypoleucos* [Grey Falcon] was excluded due to geographic limitations as the Subject Land does not occur in an arid or semi-arid area and average annual rainfall is >900 mm.
- The *Aphelopcephala leucopsis* [Southern Whiteface] was excluded as surveys failed to detect the species which is yet to be attributed a credit category.
- The *Petaurus australis* (Yellow-bellied Glider) was excluded from further assessment as it is not associated with any PCTs identified on the Subject Land.
- Two species were excluded from further assessment due to the absence of habitat constraints. The Glossy Black-Cockatoo was excluded due to the absence of Allocasuarina and Casuarina feed tree species and the Painted Honeyeater was excluded due to the absence of mistletoes at a density of >5 mistletoes/ha.

Each of the EPBC Act listed ecosystem credit or dual credit species are addressed in detail in Section 8 and **Appendix H**.

Candidate fauna species (species credit species) as identified by the BAM-C are detailed in Section 5.1.2.

Table 16. Predicted ecosystem credit species

Common name	Scientific name	Listing status		Dual credit species	SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPB C Act							
Birds										
Regent Honeyeater	<i>Anthochaera phrygia</i>	CE	CE	Yes	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	High
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All	Moderate
Gang-Gang Cockatoo	<i>Callocephalon fimbriatum</i>	V	E	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	Moderate
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	V	-	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	No	Absence of <i>Allocasuarina</i> and <i>Casuarina</i> species in associated PCT 266	N/A	High
Speckled Warbler	<i>Chthonicola sagittata</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	High

Common name	Scientific name	Listing status		Dual credit species	SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPB C Act							
Spotted Harrier	<i>Circus assimilis</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	High
Brown Treecreeper	<i>Climacteris picumnus victoriae</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All	High
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All	Moderate
Black Falcon	<i>Falco subniger</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	Moderate
Little Lorikeet	<i>Glossopsitta pusilla</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All	High
Painted Honeyeater	<i>Grantiella picta</i>	V	V	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey	No	<u>Habitat Constraint:</u> mistletoes are absent from the Subject	N/A	Moderate

Common name	Scientific name	Listing status		Dual credit species	SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPB C Act							
						<input type="checkbox"/> Current survey		Land at a density <5 mistletoes/ha		
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V	-	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All	High
Little Eagle	<i>Hieraaetus morphnoides</i>	V	-	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All	Moderate
White-throated Needle-tail	<i>Hirundapus caudacutus</i>	-	V	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	High
Swift Parrot	<i>Lathamus discolor</i>	E	CE	Yes	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	Moderate
Square-tailed Kite	<i>Lophoictinia isura</i>	V	-	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All	Moderate

Common name	Scientific name	Listing status		Dual credit species	SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPB C Act							
Hooded Robin	<i>Melanodryas cucullata cucullata</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	Moderate
Black-chinned Honeyeater	<i>Melithreptus gularis gularis</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	Moderate
Turquoise Parrot	<i>Neophema pulchella</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	High
Scarlet Robin	<i>Petroica boodang</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All	Moderate
Flame Robin	<i>Petroica phoenicea</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All	Moderate
Superb Parrot	<i>Polytelis swainsonii</i>	V	V	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey	Yes	N/A	All	Moderate

Common name	Scientific name	Listing status		Dual credit species	SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPB C Act							
						<input checked="" type="checkbox"/> Current survey				
Grey-crowned Babbler	<i>Pomatostomus temporalis temporalis</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	Moderate
Diamond Firetail	<i>Stagonopleura guttata</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All	Moderate
Mammals										
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V	E	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	High
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	V	-	Yes	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All	High
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	V	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	All	High

Common name	Scientific name	Listing status		Dual credit species	SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPB C Act							
Yellow-bellied Sheathtail-bat	<i>Saccolaimus flaviventris</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All	High

5.1.2 SPECIES CREDIT SPECIES

As detailed in Sections 2.3 and 2.4 a comprehensive desktop review was conducted to identify threatened flora and fauna species and ecological communities which have, or may have, suitable habitat within the Subject Land (**Appendix H**). This was followed by field surveys to identify suitable habitat and inform targeted searches to be undertaken for those species requiring survey under the BAM (DPIE 2020a) and/or considered likely to occur.

A total of sixteen (16) flora species credit species and thirty-two (32) fauna species credit species were returned by the BAM-C or through PMST search as requiring consideration. This included twenty-six (26) species identified by the BAM-C, and twenty-two (22) additional species identified by the PMST search (DCCEEW 2022). Premise also undertook database searches as detailed in Sections 2.3.1 and 2.4.1 to ensure all required threatened species were considered and no additional species requiring consideration were identified.

Details regarding the listing status, associated VZ, sensitivity to gain and statement regarding the need for further assessment are provided in **Table 17** and **Table 18**. Two (2) flora species and twenty (20) fauna species were retained for targeted survey. Fifteen (15) flora species credit species and seven (7) fauna species credit species identified by the PMST search were excluded from further assessment. Exclusions were made based on habitat degradation, constraints, vagrant status, geographic limitations or microhabitat requirements.

All of the additional twenty-two (22) EPBC Act listed species identified in the PMST search (DCCEEW 2022) and assessed in **Appendix H** were excluded from further assessment as potential candidate species based on the following:

- All fifteen flora species were excluded based on habitat degradation and non-detection during targeted surveys (see Section 5.3 for further details).
- The Curlew Sandpiper was excluded from further assessment based on dependence on wetland habitat and absence of suitable habitat on the Subject Land.
- Two species (*Petauroides volans* [Greater Glider] and *Crinia sloanei* [Sloane's Froglet]) were excluded as they are not associated with any PCTs on the Subject land.
- The *Petrogale penicillata* (Brush-tailed Rock Wallaby) was excluded from further assessment due to absent habitat constraints (steep rocky slopes).
- Two species (*Synemon plana* (Golden Sun Moth) and Southern Bell Frog) were excluded due to geographic limitations as the Golden Sun Moth is only known to occur south of the Mid-Western Highway in the Inland Slopes IBRA sub-region, and the Southern Bell Frog occurs as isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria.
- The *Tympanocryptis mcartneyi* (Bathurst Grassland Earless Dragon) was excluded from further assessment due to absent microhabitat in the form of alluvial plains.

Each of the EPBC Act listed species credit species are addressed in detail in Section 8.

Table 17. Predicted flora species credit species

Common name	Scientific name	Listing status		SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Small Purple-pea	<i>Swainsona recta</i>	E	E	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	PCT 266: VZ2 PCT 277: VZ5, VZ6
Silky Swainson-pea	<i>Swainsona cericea</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Yes	N/A	PCT 266: VZ2 PCT 277: VZ5, VZ6

Table 18. Predicted fauna species credit species

Common name	Scientific name	Listing status		Dual credit species	SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act						
Birds									
Regent Honeyeater	<i>Anthochaera phrygia</i>	CE	CE	Yes	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	No	Habitat constraints: Subject Land is not a mapped Important Area.	N/A
Bush Stone-curlew	<i>Burhinus grallarius</i>	E	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Partial	Retained in VZ with fallen/standing dead timber including logs	PCT 85: VZ9 PCT 266: VZ2 PCT 277: VZ6

Common name	Scientific name	Listing status		Dual credit species	SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act						
									PCT 287: VZ8
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	V	E	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input type="checkbox"/> Current survey	Partial	Retained in VZ with hollow bearing trees (<3 m above ground, >7 cm diameter)	PCT 85: V9 PCT 266: VZ2 PCT 277: VZ6, VZ7
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	V	-	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Partial	Retained in VZ with hollow bearing trees (>8 m above ground, >15 cm diameter)	PCT 85: VZ9 PCT 266: VZ2 PCT 277: VZ6, VZ7 PCT 287: VZ8
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V	-	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Partial	Retained in VZ with living or dead mature trees within 1 km of a river, lake, large dam, or creek.	All
Little Eagle	<i>Hieraaetus morphnoides</i>	V	-	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	No	<u>Habitat constraints:</u> absence of large stick nests (BMS 2024)	N/A
Swift Parrot	<i>Lathamus discolor</i>	E	CE	Yes	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey	No	<u>Habitat constraints:</u> Subject Land is not a mapped Important Area	N/A

Common name	Scientific name	Listing status		Dual credit species	SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act						
						<input type="checkbox"/> Current survey			
Square-tailed Kite	<i>Lophoictinia isura</i>	V	-	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	No	<u>Habitat constraints:</u> absence of large stick nests (BMS 2024)	N/A
Barking Owl	<i>Ninox connivens</i>	V	-	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Partial	Retained in VZ with hollow bearing trees (>4 m above ground and >20 cm diameter)	PCT 85: VZ9 PCT 266: VZ2 PCT 277: VZ6, VZ7 PCT 287: VZ8
Powerful Owl	<i>Ninox strenua</i>	V	-	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Partial	Retained in VZ with hollow bearing trees (>20 cm diameter)	PCT 85: VZ9 PCT 266: VZ2 PCT 277: VZ6, VZ7 PCT 287: VZ8
Superb Parrot	<i>Polytelis swainsonii</i>	V	V	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Partial	Retained in VZ with living or dead eucalyptus species containing hollows (>5 cm diameter, >4 m above ground, DBH >30 cm)	PCT 266: VZ2 PCT 277: VZ6, VZ7
Masked Owl	<i>Tyto novaehollandiae</i>	V	-	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Partial	Retained in VZ with hollow bearing trees (>20 cm diameter)	PCT 85: VZ9 PCT 266: VZ2 PCT 277: VZ6, VZ7 PCT 287: VZ8

Mammals

Common name	Scientific name	Listing status		Dual credit species	SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act						
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	No	<u>Degraded microhabitat:</u> well-spaced eucalypts with little to no shrub layer and little to no coarse woody debris, and presence of foxes.	N/A
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V	V	No	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All
Large Bent-winged Bat	<i>Miniopterus oriana oceanensis</i>	V	-	Yes	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All
Southern Myotis	<i>Myotis macropus</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Partial	Retained in VZ within 200 m of waterbodies with permanent pools/stretches >3m wide	PCT 85: VZ9 PCT 277: VZ4, VZ7
Squirrel Glider	<i>Petaurus norfolcensis</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	PCT 266: VZ2 PCT 277: VZ5, VZ6, VZ7
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	V	-	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey	Yes	N/A	All

Common name	Scientific name	Listing status		Dual credit species	SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act						
						<input checked="" type="checkbox"/> Current survey			
Koala	<i>Phascolarctos cinereus</i>	E	E	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All
Grey-headed Flying Fox	<i>Pteropus poliocephalus</i>	V	V	Yes	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	No	<u>Habitat constraint:</u> Breeding camps are absent from the Subject Land	N/A
Reptiles									
Pink-tailed Legless Lizard	<i>Aprasia parapulchella</i>	V	V	No	No	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All
Striped Legless Lizard	<i>Delma impar</i>	V	V	No	No	<input type="checkbox"/> BAM-C <input type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	All
Insects									
Key's Matchstick Grasshopper	<i>Keyacris scurra</i>	E	E	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey	Yes	N/A	PCT 266 VZ2 PCT 277 VZ6, VZ7

Common name	Scientific name	Listing status		Dual credit species	SAII	Sources	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act						
						<input checked="" type="checkbox"/> Current survey			
Amphibians									
Booroolong Frog	<i>Litoria booroolongensis</i>	E	E	No	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	Yes	N/A	N/A
Yellow-spotted Tree Frog	<i>Litoria castanea</i>	CE	E	No	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> Previous survey <input checked="" type="checkbox"/> Current survey	No	<u>Geographic limitations:</u> species is associated with PCT 85 and the Orange IBRA sub-region. PCT 85 is absent from the Orange sub-region.	N/A

5.2 Presence Of Candidate Species Credit Species

From the remaining list of candidate species credit species, no threatened flora species (**Table 19**) were determined to be present on the Subject Land based on the absence of suitable habitat and targeted threatened species surveys in accordance with BAM Subsection 5.2.4 (DPIE 2020a). Twenty (20) fauna species were assessed in detail and two (2) were positively identified during targeted threatened species surveys and have been retained as species credits in the BAM-C (BMS 2024) (**Table 20**).

Table 19. Determining the presence of candidate flora species credit species on the Subject Land

Common name	Scientific name	Listing status		Method used to determine presence	Present	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
Small Purple-pea	<i>Swainsona recta</i>	E	E	Targeted threatened species survey	No	No
Silky Swainson-pea	<i>Swainsona sericea</i>	V	-	Targeted threatened species survey	No	No

Table 20. Determining the presence of candidate fauna species credit species on the Subject Land

Common name	Scientific name	Listing status		Method used to determine presence	Present	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
Amphibians						
<i>Litoria booroolongensis</i>	Booroolong Frog	E	E	Targeted threatened species survey	No	No
Reptiles						
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	V	V	Targeted threatened species survey	No	No
<i>Delma impar</i>	Striped Legless Lizard	V	V	Targeted threatened species survey	No	No
Insects						
<i>Keyacris scurra</i>	Key's Matchstick Grasshopper	E	E	Targeted threatened species survey	No	No
Birds						
<i>Burhinus grallarius</i>	Bush Stone-curlew	E	-	Targeted threatened species survey	No	No

Common name	Scientific name	Listing status		Method used to determine presence	Present	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	-	Targeted threatened species survey	No	No
<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	V	E	Targeted threatened species survey	No	No
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	-	Targeted threatened species survey	Yes	No
<i>Hieraaetus morphnoides</i>	Little Eagle	V	-	Targeted threatened species survey	No	No
<i>Lophoictinia isura</i>	Square-tailed Kite	V	-	Targeted threatened species survey	No	No
<i>Ninox connivens</i>	Barking Owl	V	-	Targeted threatened species survey	Yes	No
<i>Ninox strenua</i>	Powerful Owl	V	-	Targeted threatened species survey	No	No
<i>Polytelis swainsonii</i>	Superb Parrot	V	V	Targeted threatened species survey	Yes	Yes
<i>Tyto novaehollandiae</i>	Masked Owl	V	-	Targeted threatened species survey	No	No
Mammals						
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	Targeted threatened species survey	Yes	No
<i>Miniopterus orianae oceanensis</i>	Large Bent winged Bat	V	-	Targeted threatened species survey	Yes	No
<i>Myotis macropus</i>	Southern Myotis	V	-	Targeted threatened species survey	No	No
<i>Petaurus norfolcensis</i>	Squirrel Glider	V	-	Targeted threatened species survey	Yes	Yes
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	V	-	Targeted threatened species survey	No	No

Common name	Scientific name	Listing status		Method used to determine presence	Present	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
<i>Phascolarctos cinereus</i>	Koala	V	V	Targeted threatened species survey	No	No

5.3 Threatened Species Surveys

5.3.1 THREATENED FLORA SURVEYS

The Small Purple-pea and Silky Swanson-pea occur in grassy woodland and open forests dominated by Blakely’s Red Gum, Yellow Box and/or Bundy Box. These species flower throughout spring with a peak in October. The recommended survey period for both species is September to November (DCCEEW 2024c). Flora surveys have been conducted on the Subject Land and in adjacent areas and neighbouring properties for many years. FloraSearch and Resource Strategies (2009), FloraSearch (2014), Premise (2019, 2021, 2021b, 2022, 2022b, 2023) have never detected Small Purple-pea or Silky Swainson-pea. There was no suitable habitat on the Subject Land, as all of the woodland areas contained remnant trees surrounded by exotic vegetation (PCT 266 Poor and PCT 277 Woodland Poor). The PCT 277 Planted is technically woodland, however it has been completely cleared in its history of agricultural land use.

Targeted threatened flora species surveys were conducted at the end of August 2021, November 2021 and October 2022, during which no threatened flora species were found to be present within the Subject Land (**Table 21**). Survey tracks are shown on **Figure 9** to **Figure 16**. As noted in Section 2.3.3, only one ecologist carried a GPS unit, therefore the search effort is underrepresented in the Figures. Random meanders through PCT 266 and PCT 277 vegetation zones were undertaken as a precautionary measure only, as none of the areas in the Subject Land were considered suitable habitat for the Silky Swainson-pea or Small Purple-pea due to the poor condition with very few native species remaining in the understorey.

Table 21. Threatened species surveys for candidate flora species credit species on the Subject Land

Common name	Scientific name	Threatened flora species surveys			Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (transects or grids)	Timing of survey – within recommended period? (BAM-C / TBDC)			
Small Purple-pea	<i>Swainsona recta</i>	Transects	<input checked="" type="checkbox"/> Yes September, October, November	<input type="checkbox"/> No	Two ecologists	No
Silky Swainson-pea	<i>Swainsona sericea</i>	Transects	<input checked="" type="checkbox"/> Yes September, October, November	<input type="checkbox"/> No	Two ecologists	No

5.3.1.1 Justification for Survey Methods

Additional details on the survey requirements for the Small Purple-pea and Silky Swainson-pea are provided below:

5.3.1.1.1 Habitat

Small Purple-pea and Silky Swainson-pea are associated with PCT 266 and PCT 277 which occur on the Subject Land in various states ranging from woodland in poor condition to exotic dominated grassland. Suitable habitat for these species was refined in accordance with Section 5.2.3(2a) of the BAM (DPIE, 2020a).

From the literature it has been established that the Small Purple-pea is found predominantly in grassy woodlands, sometimes extending into grassy open-forest with the tree cover dominated by Blakely's Red Gum, Yellow Box, Bundy Box and White Box which is present on the Subject Land. The understorey is reported to be dominated by Kangaroo Grass, Snowgrass and *Austrostipa* spp (Spear Grass), and a wide range of native forbs, most commonly *Bulbine bulbosa* (Bulbine Lily), *Chrysocephalum apiculatum* (Common Everlasting), *Leptorhynchos squamatus* (Billy Buttons), *Stackhousia monogyna* (Creamy Candles), *Podolepis jaceoides* (Showy Copperwire Daisy), *Arthropodium finbriatum* (Nodding Chocolate Lily) and *Arthropodium milleflorum* (Vanilla Lily) (NSW OEH 2012).

Similarly, the Silky Swainson-pea is also found in grassy woodlands dominated by White Box, White Cypress Pine and Yellow Box with *Acacia doratoxylon* (Currawang) and *Acacia tetragonophylla* (Dead Finish) (TSSC 2008). The groundcover is dominated by *Rytidosperma* spp., *Austrostipa nodosa* and *Enteropogon acicularis*, with a variety of native forbs including *Walwhalleya proluta*, *Chrysocephalum apiculatum* (Common Everlasting), *Pycnosorus globosus* (Drumsticks), *Calotis scabiosifolia* (Rough Burr-daisy), *Microseris lanceolata* (Murmong), *Swainsona murrayana* (Slender Darling-pea), *Swainsona plagiotropis* (Red Swainson-pea), *Swainsona procumbens* (Broughton Pea) and *Maireana aphylla* (Lesfless Bluebush) (TSSC 2008).

The understorey of the woodland areas on the Subject Land have been degraded through many years of agricultural land use, to the point where the only native grass species remaining are grazing tolerant Spear Grasses and Wallaby Grass, and the forb layer is similarly depleted with no Lilies or *Swainsona* spp. observed over this vegetation survey or previous surveys undertaken in the surrounding areas (FloraSearch and Resource Strategies 2009, FloraSearch 2014, Premise 2019, 2021, 2021b, 2022, 2022b, 2023).

5.3.1.1.2 Population Trends and Threats

Briggs and Leigh (1990) cite the range reduction and decline in populations of the Small Purple-pea is due to both low adult mortality of plants and low recruitment due to habitat loss through pasture improvement and agricultural development, domestic stock grazing, competition from herbaceous weeds, reduction in fire frequency and resulting competition with native groundcover species and urban development and roadworks. Grazing affects the Small Purple-pea as it is palatable to both domestic stock and native and feral herbivores. The grazing impacts extend beyond individual plant losses, but include habitat degradation, for example physical disturbance, introduction of animal dung, weeds and chemical application in farming systems. The Conservation Advice for the Small Purple-pea states that research indicates that plants are not usually killed by fire, and that new vegetative growth has been observed sprouting from the tops of rootstocks that have been cut off during grading of firebreaks or from roots exposed during erosion of a road cutting. However, it also states that despite this capacity to resprout from damaged rootstock, the species will not persist when the shoot growth is periodically removed by domestic stock grazing (NSW OEH 2012).

The main threats to the Small Purple-pea identified in the Conservation Advice are habitat loss and degradation, including through grazing, competition from native and weed species, and poor recruitment and

loss of genetic diversity (DCCEEW 2023d). Weed spraying, soil dumping and recreational activities causing edge effects such as run-off, erosion and disturbance are all listed as threats to the habitat condition.

According to the TSSC (2008), there is currently no evidence to suggest population reductions of the Silky Swainson-pea across its geographic distribution. However, localised reductions in range are due to clearing or overgrazing. Similarly, to the Small Purple-pea, Silky Swainson-pea is affected by grazing and associated habitat disturbance. This species is a seasonal perennial, existing as persistent rootstock which regenerates in response to winter-spring rainfall and fire (TSSC 2008). Silky Swainson-pea remains dormant in unfavourable conditions (i.e., unfavourable light grazing pressure and weed invasion). This species is not known to persist in the soil seed bank on sites with moderate-high grazing pressure due to the effects of trampling and pugging (TSSC 2008).

As with the Small Purple-pea, known threats to the survival of the Silky Swainson-pea include the loss and degradation of habitat through weed invasion and the intensification of grazing regimes.





The Subject Land is currently grazed and has been part of an agricultural landscape with sheep and cattle grazing present for many decades. Due to this, it is considered highly unlikely Small Purple-pea or Silky Swainson-pea persist in the soil seed-bank.




5.3.1.1.3 Survey Effort and Habitat Assessment



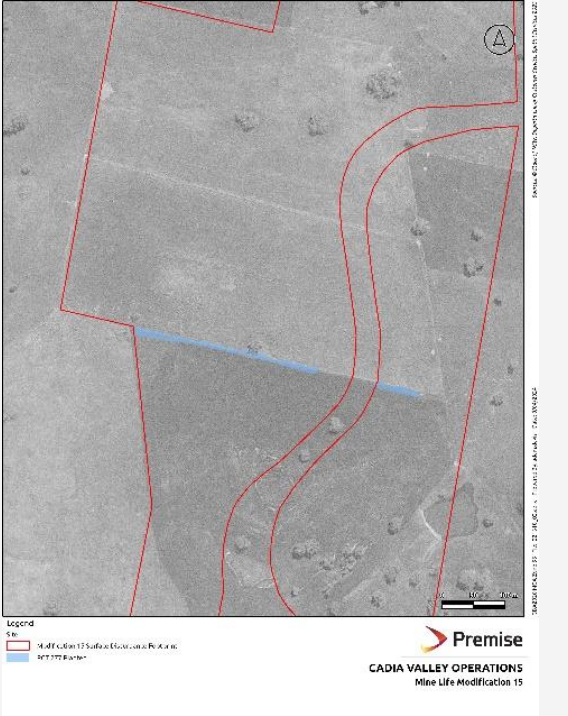
PCT 266 Woodland Poor (VZ2), PCT 277 Paddock Trees (VZ6) and PCT 277 Woodland Poor (VZ7) were initially identified as potential habitat for the Small Purple-pea and Silky Swainson-pea. Two ecologists visited each of these vegetation zones to undertake Vegetation Integrity Plots and habitat assessment for threatened species between August and November 2021. Each vegetation zone was traversed on foot, with two ecologists walking approximately 10 m apart. Only one ecologist was holding the GPS tracker, so only one track appears on **Figure 9** to **Figure 16**. The microhabitat at all locations was considered too degraded to support the Small Purple-pea or Silky Swainson-pea. Random meanders were employed to be conservative, but no *Swainsona spp.* were detected. The habitat condition at each of the vegetation zones (VZ2, VZ6 and VZ7) are shown in **Table 22** using the FIDs from the spatial dataset for reference.

Table 22 – Small Purple-pea and Silky Swainson-pea habitat assessment

PCT, VZ, FID	Photos	Suitability of habitat
PCT 266 Woodland Poor (VZ2) FID 99270 FID 99277 FID 99275 FID 99408 FID 99281 FID 99256 FID 151 FID 133		Microhabitat degraded and unsuitable for the Small Purple-pea and Silky Swainson-pea. Significant disturbance with road cutting and dense Phalaris around base of trees. Species list QN17 80% Phalaris, 20% Perennial Rye Grass, only native species recorded are White Box Trees, 1% Spear Grass, 0.2% Wallaby Grass, 0.1% Climbing Saltbush, 0.1% Grassland Wood-sorrel and 0.1% Swamp Dock. Survey tracks November 2021.

PCT, VZ, FID	Photos	Suitability of habitat
		
<p>PCT 277 Woodland Poor (VZ6) FID 99195 FID 74</p>		<p>Microhabitat degraded and unsuitable for the Small Purple-pea and Silky Swainson-pea. Base of trees denuded by livestock camping under trees. Lots of sheep dung present at time of assessment.</p>
<p>PCT 277 Woodland Poor (VZ6) FID 79 FID 467 FID 99358 FID 9904 FID 9905 FID 99205</p>	 	<p>Microhabitat degraded and unsuitable for the Small Purple-pea and Silky Swainson-pea. Base of trees weed infested and evidence of stock camp in past. High level of Phalaris, Pattersons Curse, Stinging Nettle.</p>

PCT, VZ, FID	Photos	Suitability of habitat
PCT 277 Poor (VZ6) FID 66 FID 67 FID 99178		Microhabitat degraded and unsuitable for the Small Purple-pea and Silky Swainson-pea. Evidence of stock camp at base of trees with exposed roots and weeds. Searches conducted November 2021.
PCT 277 Poor (VZ6) FID 71 FID 72 FID 548 FID 99183		Microhabitat degraded and unsuitable for the Small Purple-pea and Silky Swainson-pea. High level of exotic grasses around the base of trees. QN9 80% Perennial Ryegrass, 2% Barley Grass, only native forb recorded was Swamp Dock.
PCT 277 Poor (VZ6) FID 57 FID 58 FID 108		Microhabitat degraded and unsuitable for the Small Purple-pea and Silky Swainson-pea. Yellow Box trees with dense Phalaris around bases. Some Native Geranium and Swamp Dock present. No interstitial space for forbs to recruit or regenerate.

PCT, VZ, FID	Photos	Suitability of habitat
		
<p>PCT 266 Paddock Tree (VZ7) FID 550</p>		<p>Microhabitat degraded and unsuitable for the Small Purple-pea and Silky Swainson-pea.</p> <p>QN50 25% Phalaris, 20% Pale Pigeon Grass (<i>Setaria pumilio</i>), 10% Variagated Thistle, 10% Oats, only native forbs include Knob Sedge, Swamp Dock and Small Crumbweed.</p>
<p>PCT 277 Planted (VZ5) was not considered due to prior clearing history.</p>		<p>Planted woodland areas shown in these figures demonstrate that the areas were formerly cleared of vegetation and formed part of the agricultural landscape. The Small Purple-pea and Silky Swainson-pea are found in grassy woodland situations, and were not considered to be present in PCT 277 Plantings. Random meanders were conducted through VZ5 in November 2021 and no Swainsona species were observed.</p>

PCT, VZ, FID	Photos	Suitability of habitat
	 	

The survey effort on the Subject Land was considered sufficient to detect Small Purple-pea and Silky Swainson-pea if it was present. VI Plots and threatened species searches were undertaken on the Subject Land on 16, 17, 19, 25 August 2021 which is technically just outside of the recommended survey period, however it is when Small Purple-pea and Silky Swainson-pea would theoretically be re-sprouting from underground rootstocks (DCCEEW 2023) especially following above average rainfall in June and July 2021 (BOM 2023). Targeted

searches were also conducted on 22, 23, 24 November 2021 and 17, 18, 19 October 2022 within the recommended survey period (DCCEEW 2024b). No Small Purple-pea or Silky Swainson-pea were detected on the Subject Land and these species are not considered further.

5.3.2 THREATENED FAUNA SURVEYS

Targeted threatened fauna species surveys were conducted between May 2020 and September 2023 (BMS 2024) and March 2024 (Bugs Ed 2024), during which two threatened fauna species were found to be present within the Subject Land and warranted further assessment (**Table 23**). Further survey method details are provided in the Baseline Fauna Survey Report (BMS 2024).

Table 23. Threatened species surveys for candidate fauna species credit species on the Subject Land

Common name	Scientific name	Threatened fauna species surveys			Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort (hours & no. people)		
Amphibians						
<i>Litoria booroolongensis</i>	Booroolong Frog	Habitat assessment / aural-visual survey	<input checked="" type="checkbox"/> Yes November 2022	<input checked="" type="checkbox"/> No February 2023	<u>Aural-visual survey</u> : 4 nights (0.5 hour each), 1 person	No
Reptiles						
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	Habitat assessment. Artificial habitat (tiles) deployment.	<input checked="" type="checkbox"/> Yes September-November 2021	<input type="checkbox"/> No	<u>Artificial habitat</u> : 10 tile checks, 1 person	No
<i>Delma impar</i>	Striped Legless Lizard	Habitat assessment. Artificial habitat (tiles) deployment.	<input checked="" type="checkbox"/> Yes September-November 2021	<input type="checkbox"/> No	<u>Artificial habitat</u> : 10 tile checks, 1 person	No
Birds						
<i>Burhinus grallarius</i>	Bush Stone-curlew	Bird survey, diurnal flushing, call playback, spotlight.	<input checked="" type="checkbox"/> Yes May-June 2020, May, June, August, September	<input type="checkbox"/> No	<u>Diurnal bird survey</u> : 132 nights	No

Common name	Scientific name	Threatened fauna species surveys			Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	Timing of survey – within recommended period? (BAM-C / TBDC)			
			2021, November 2022 and January 2023		(0.5-1 hr each), 1 person <u>Call playback</u> : 20 nights (0.5 hour/night), 1 person <u>Spotlight</u> : 39 nights, 1 person	
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	Bird survey, hollow-bearing tree survey.	<input checked="" type="checkbox"/> Yes October, November 2021, November 2022 and January 2023	<input type="checkbox"/> No	<u>Diurnal bird survey</u> : 15 days (0.5-1 hr each), 1 person	No
<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	Diurnal bird survey, feed tree survey, nest tree survey.	<input checked="" type="checkbox"/> Yes May-June 2020, May, June, August 2021 and January 2023	<input type="checkbox"/> No	<u>Diurnal bird survey</u> : 90 days (0.5-1 hr each), 1 person	No
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Bird survey, nest tree survey	<input checked="" type="checkbox"/> Yes August-November 2021	<input type="checkbox"/> No	<u>Diurnal bird survey</u> : 67 days (0.5-1 hr each), 1 person	Yes
<i>Hieraaetus morphnoides</i>	Little Eagle	Bird survey, nest tree survey	<input checked="" type="checkbox"/> Yes August-October 2021	<input type="checkbox"/> No	<u>Diurnal bird survey</u> : 63 days	No

Common name	Scientific name	Threatened fauna species surveys			Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort (hours & no. people)		
					(0.5-1 hr each), 1 person	
<i>Lophoictinia isura</i>	Square-tailed Kite	Bird survey, nest tree survey	<input checked="" type="checkbox"/> Yes August-November 2021	<input type="checkbox"/> No	<u>Diurnal bird survey</u> : 78 days (0.5-1 hr each), 1 person	No
<i>Ninox connivens</i>	Barking Owl	Spotlight, call playback.	<input checked="" type="checkbox"/> Yes May-June 2020 and May, June, August and September 2021	<input type="checkbox"/> No	<u>Spotlight</u> : 35 nights, 1 person. <u>Call playback</u> : 18 nights (0.5 hour/night) 1 person	Yes
<i>Ninox strenua</i>	Powerful Owl	Spotlight, call playback.	<input checked="" type="checkbox"/> Yes May-June 2020 and May, June and August 2021	<input type="checkbox"/> No	<u>Spotlight</u> : 32 nights, 1 person <u>Call playback</u> : 16 nights (0.5 hour/night) 1 person	No
<i>Polytelis swainsonii</i>	Superb Parrot	Bird survey, hollow-bearing tree survey.	<input checked="" type="checkbox"/> Yes September 2021 to September 2023	<input type="checkbox"/> No	<u>Diurnal bird survey</u> : 47 days (0.5-1 hr each), 1 person	Yes

Common name	Scientific name	Threatened fauna species surveys			Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	Timing of survey – within recommended period? (BAM-C / TBDC)			
<i>Tyto novaehollandiae</i>	Masked Owl	Spotlight, call playback.	<input checked="" type="checkbox"/> Yes May-June 2020, May, June, August 2021 and June 2023	<input type="checkbox"/> No	<u>Spotlight</u> : 36 nights, 1 person <u>Call Playback</u> : 20 nights (0.5 hour/night) 1 person	No
Mammals						
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Habitat assessment. Acoustic detection at accessible mine adits within 2 km of Subject Land.	<input checked="" type="checkbox"/> Yes November 2021 and November 2022	<input checked="" type="checkbox"/> No September 2021	<u>Anabat</u> : ~34 nights per area (11 areas), 1 person	Yes
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Habitat assessment. Acoustic detection of accessible adits within 2 km of Subject Land.	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No September and November 2021, and November 2022	<u>Anabat</u> : ~34 nights per area (11 areas), 1 person	Yes
<i>Myotis macropus</i>	Southern Myotis	Habitat assessment. Acoustic detection at suitable locations.	<input checked="" type="checkbox"/> Yes November 2021 and November 2022	<input checked="" type="checkbox"/> No May 2021	<u>Anabat</u> : ~14 nights per area (6 areas), 1 person	No
<i>Petaurus norfolcensis</i>	Squirrel Glider	Spotlight, call playback, PIR camera.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<u>Spotlight</u> : 38 nights, 1 person <u>Call playback</u> :	Yes

Common name	Scientific name	Threatened fauna species surveys			Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort (hours & no. people)		
			May-June 2020 and May, June, August and September 2021		11 nights (0.5 hour/night) 1 person <u>PIR Camera</u> : 40 nights, 1 person	
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	PIR camera, spotlight.	<input checked="" type="checkbox"/> Yes May-June 2020, and May-June 2021	<input checked="" type="checkbox"/> No August-October 2021	<u>PIR Camera</u> : 96 nights, 1 person <u>Spotlight</u> : 35 nights, 1 person	No No
<i>Phascolarctos cinereus</i>	Koala	SAT survey, spotlight, call playback, scat/scratching search, PIR camera, habitat assessment/feed tree identification.	<input checked="" type="checkbox"/> Yes June 2019, June 2020, May-June, August-October 2021, November 2022, and February and June 2023	<input checked="" type="checkbox"/> No	<u>SAT Survey</u> : 30, 1 person <u>Spotlight</u> : 45 nights, 1 person <u>Call Playback</u> : 26 nights, 1 person <u>PIR Camera</u> : 100 nights	No No
Invertebrates						
<i>Keyacris scurra</i>	Key's Matchstick Grasshopper	Targeted survey. Parallel transects with separation distance of 5 m within PCT 266 and 277. Entomological sweep nets employed to flush out grasshoppers.	<input checked="" type="checkbox"/> Yes 4-8 March 2024.	<input checked="" type="checkbox"/> No	<u>Parallel Transects</u> : 2 people, 5 days	No No

5.3.2.1 Justification for Survey Methods

Targeted surveys for five (5) species (Booroolong Frog, Large-eared Pied Bat, Large Bent-winged Bat, Southern Myotis and Brush-tailed Phascogale) were undertaken both inside and outside the TBDC recommended survey period.

Surveys for the Booroolong Frog were undertaken where Panuara Road intersects Cadiangullong Creek over four nights in November 2022 and February 2023. The February 2023 surveys were conducted outside the required survey period due to major flooding of the creek crossing in November which resulted in emergency works by Blayney Shire Council to repair the culvert. According to BMS (2024) "*pressures for Booroolong Frog include modification and loss of streamside habitats (including sedimentation and colonisation by Willows), regulation of water flows, stream drying, forest plantations, use of pesticides/herbicides, all of which characterise the associated habitat on site*". BMS considers the surveys to be adequate for this species as the marginal potential habitat present is considered too degraded to support this species based on the aforementioned factors (BMS 2024).

Initial Large-eared Pied Bat surveys were conducted outside the recommended survey period in September 2021 to identify potential cave-roosting habitat. Further surveys of this habitat were undertaken in November 2021 and 2022, within the recommended survey period. As no adits were located within the Subject Land, BMS consider the investigative sampling to be sufficient to classify the adits within 2 km of the Subject Land (BMS 2024).

Targeted surveys for the Large Bent-winged Bat were undertaken in September and November 2021 and November 2022 to identify potential cave-roosting habitat. As no adits were located within the Subject Land, BMS consider the investigative sampling to be sufficient to classify the adits within 2 km of the Subject Land (BMS 2024).

A reconnaissance survey for the Southern Myotis was conducted in May 2021 to identify the potential occupation of the Southern Myotis within suitable habitat. This assessment was used to inform the location of further targeted surveys (November 2021 and 2022) which occurred within the recommended survey period.

The recommended survey period for the Brush-tailed Phascogale is December to June. PIR camera and spotlighting were carried out in May/June 2021 and August-October 2021 (outside the recommended survey period). Additional PIR camera were deployed in August-October 2021 as two new areas were added to the Subject Land. These cameras were proximal to the locations of those deployed in May-June 2020. BMS considers the reduced survey effort combined with spotlighting to be sufficient survey effort for the species in the location of the Subject Land, considering the paucity of recent local records. Communication with the DPIE in 2020 (provided in the BMS Fauna Survey Report [2024]) confirmed that the survey effort conducted in 2020 and 2021 met the survey requirements at this location, as according to the DPIE, "*no further survey besides the spotlighting already conducted needs to be done. Spotlighting at least gave an opportunity to discover the species*".

Spotlighting, call playback and inspection of potential nest trees was undertaken to detect the presence of the Barking Owl, Masked Owl and Powerful Owl on the Subject Land. Survey was undertaken in the appropriate season for the recommended duration as per the Guidelines in place at the time of survey (DEC 2004). One single Barking Owl was observed outside of the Subject Land and inspection of all potential habitat trees within the area identified no suitable Owl hollows. No breeding habitat was found for any of the three Owl species, and they were excluded from further consideration (BMS 2024). It is noted that Forest Owls changed to species credits on 14 March 2024 (DCCEEW 2024) and the survey methods were updated in the TBDC (DPE 2024). The status of the Owls has been updated in the BAM-C and the BDAR, however the survey was completed in 2021 and is considered valid following advice from Department of Planning, Industry and Environment (DPIE 2020) stating:

"If the Department publishes new or amend existing survey guides to support the application of the BAM, assessors are expected to apply these to all assessments for which the survey component has yet to be completed, and to all new assessments that commence on, or after the publication date. ...

Where survey has been completed prior to the publication of a survey guide, the Department expects the assessor (or surveyor) to have applied current best-practise in searching for the target species (in accordance with BAM s6.5.1.4)".

5.4 Expert Reports

No expert reports have been used in place of threatened species surveys.

5.5 More Appropriate Local Data (Where Relevant)

No local data has been used to assess habitat suitability.

5.6 Area or Count, and Location of Suitable Habitat for a Species Credit Species (Species Polygons)

The total area of suitable habitat within the Subject Land for both candidate species (Superb Parrot and Squirrel Glider) has been calculated by Premise, based on species polygons provided by BMS (BMS 2024). Species polygons were generated in accordance with the BAM (DPIE 2020a) and the TBDC (DPE 2024) and are shown on **Figure 22**, **Figure 23** and **Table 24**. No threatened flora were determined to be present based on targeted surveys, therefore no flora species credits would be generated by the Modification.

Superb Parrot

Targeted surveys for the Modification recorded ~50 individuals (i.e., diurnal bird surveys and hollow bearing tree assessments). According to the TBDC, Superb Parrot polygons include a 100 m radius around nest trees (hollows >5 cm diameter, >4 m above ground in trees with >30 cm DBH) (DPE 2024). These guidelines were applied to species polygons along the western extent of the Subject Land as per the presence of nest trees. The remaining two species polygons along Panuara Road represent the species credit habitat that was present prior to tree clearing associated with Modification 14. This habitat was assessed in 2019/2020 by BMS as part of the CVO Modification 14 BDAR and some nest trees were identified within the patch. The survey effort in 2019/2020 did not include the identification of all nest trees within the patch. Therefore, these two species polygons have been retained, as the CVO Modification 14 survey effort is not considered adequate to deny the presence of additional nest trees in this patch and further surveys are not possible due to tree removal. Overall, the Superb Parrot species polygon accounts for 2.59 ha, including PCT 277 Planted (0.03 ha), PCT 277 Woodland (poor) (0.33 ha), PCT 277 Exotic (1.94 ha), PCT 277 DNG (0.06 ha), PCT 266 Poor (0.23 ha) and Disturbed Ground (0.02 ha).

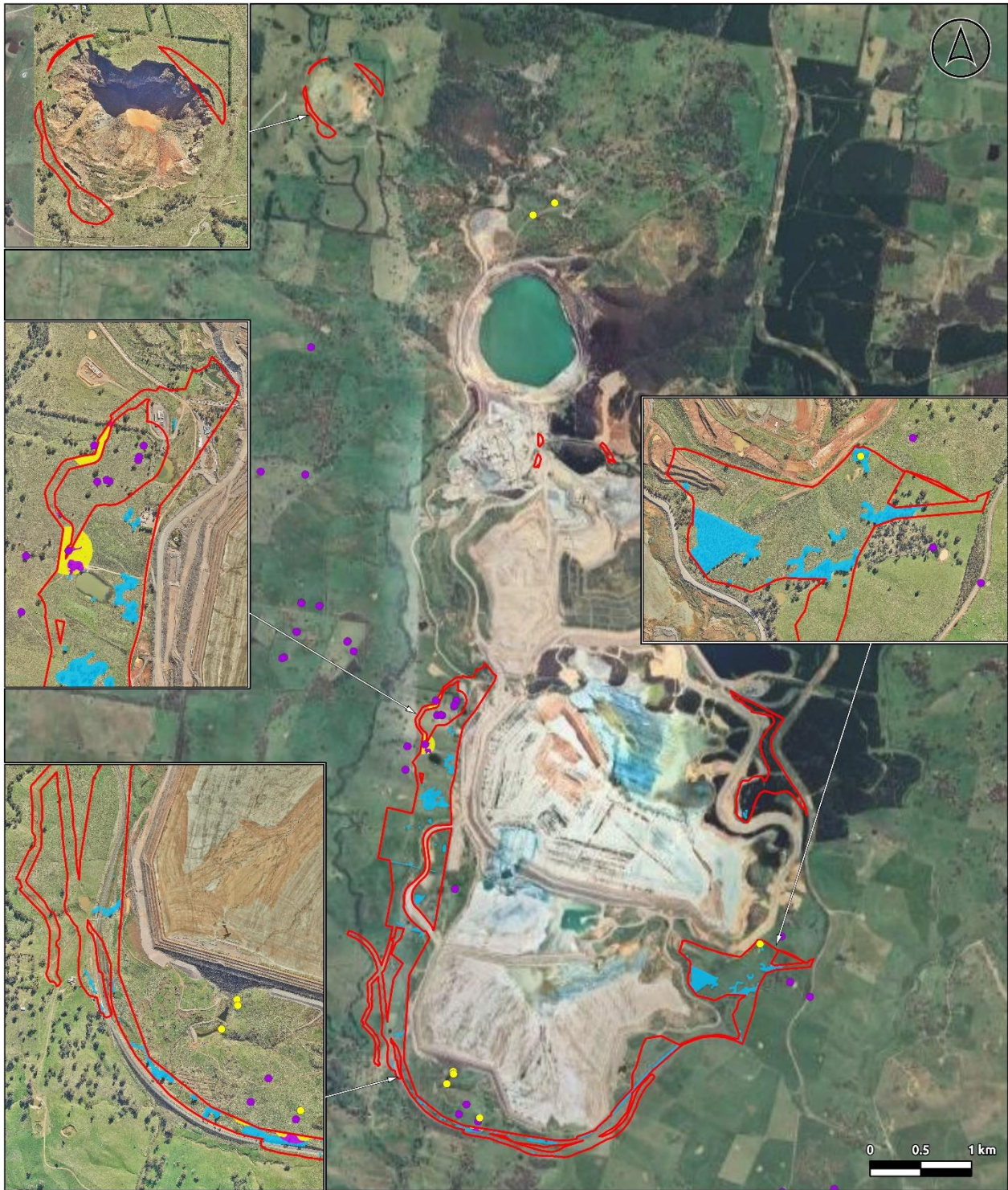
Squirrel Glider

Nine (9) Squirrel Glider were recorded during targeted surveys (i.e., PIR cameras, spotlighting and scat assessment) conducted by BMS (2024). According to the TBDC, species polygons for this species include large old trees with <50 m separation between patches (DPE 2024). Feedback from the BCS (14/12/23 and 15/3/24) states:

"In the absence of habitat constraints or other species - specific guidance in the TBDC, species polygons should be mapped to the full extent of PCTs associated with the species on the Subject Land."

This advice was adopted to include a total of 23.61 ha, comprising all PCT 266 Woodland Poor (3.17 ha), PCT 277 Woodland Poor (11.64 ha), PCT Woodland Planted (7.73 ha), PCT 277 Exotic (0.02 ha) and those PCT 277 Paddock Tree polygons <50 m apart (1.05 ha). The only woody vegetation on the Subject Land not included in the species polygon was PCTs not associated with Squirrel Gliders, vegetation with existing clearing approval (Category 1 Excluded), and isolated paddock trees greater than 50 m from adjacent woody vegetation as the TBDC notes that trees are critical for movement and typically need to be closely connected (i.e., no more than 50 m apart) (DPE 2024).





Figure 22. Candidate Species Credit Species Records and Species Polygons



Sources: © Google 2023
 BMS 2023

GDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 24/04/2024

Legend

-  Modification 15 Surface Disturbance Footprint
-  Squirrel Glider Habitat
-  Superb Parrot Habitat
-  Squirrel Glider and Superb Parrot Habitat

Habitat Features


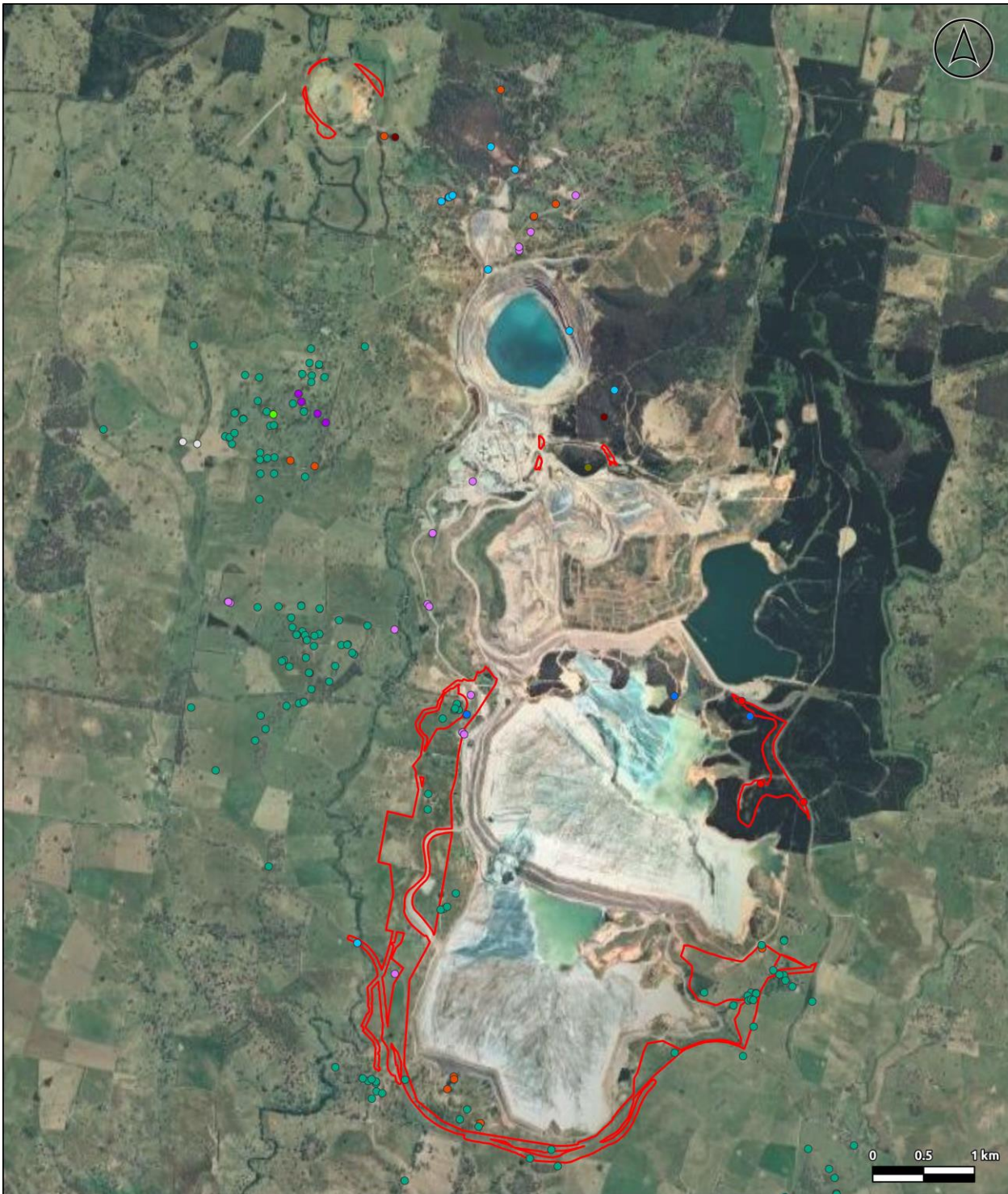
-  Squirrel Glider Hollow Bearing Trees
-  Superb Parrot Hollow Bearing Trees

Figure 23. Candidate Species Credit Species Records



Sources: © BMS 2023, Google 2023
 GDA2020 MCA Zone 55 File: 221318_02.aprx Prepared By: zindia.nanver Date: 09/11/2023

Legend

- | | |
|--|------------------------------|
| Modification 15 Surface Disturbance Footprint | Large Bent-winged Bat |
| Biodiversity Monitoring Services Threatened Species Sightings | Large-eared Pied Bat |
| Barking Owl | Scarlet Robin |
| Diamond Firetail | Squirrel Glider |
| Dusky Woodswallow | Sugar Glider/Squirrel Glider |
| Eastern False Pipistrelle | Superb Parrot |
| Flame Robin | Varied Sittella |
| | White-bellied Sea-eagle |

Table 24. Results for present species (recorded within the Subject Land)

Common name	Scientific name	Threatened Status		Biodiversity risk weighting	SAII entity	Habitat constraints / microhabitats present on the Subject Land / vegetation zone	Abundance – No. individual fauna present on Subject Land	Extent (ha) of suitable habitat present on site	TBDC species specific recommendations e.g. buffers, general comments	Habitat condition (current vegetation integrity score for each vegetation zone in the polygon – area species only)
		BC Act	EPBC Act							
Squirrel Glider	<i>Petaurus norfolcensis</i>	V	-	High (2)	No	<u>Habitat constraints:</u> N/A <u>Vegetation Zones:</u> PCT 266: Woodland (poor) PCT 277: Planted and Woodland (poor)	Nine	23.61	<u>Buffers:</u> All areas of contiguous vegetation within 50 m of associated PCTs.	PCT 266 Woodland (poor): 3.17 ha PCT 277 Exotic: 0.02 ha PCT 277 Planted: 7.73 ha PCT 277 Woodland (poor): 11.64 ha PCT 277 Paddock Tree: 1.05 ha
Superb Parrot	<i>Polytelis swainsonii</i>	V	V	High (2)	No	<u>Habitat constraints:</u> Living or dead Eucalyptus trees with hollows >5 cm diameter, >4 m above ground in trees with >30 cm DBH <u>Vegetation Zones:</u> PCT 266: Woodland (poor) PCT 277: Planted, Woodland (poor) and Exotic	~50	2.59	<u>Species Polygon Buffers:</u> 100 m buffer around nest trees <u>General Notes:</u> Breeding habitat can be identified by the presence of habitat features and observed nest OR two or more birds seen on site.	PCT 266 Woodland Poor: 0.23 ha PCT 277 DNG: 0.06 ha PCT 277 Planted: 0.03 ha PCT 277 Woodland (poor): 0.33 ha PCT 277 Exotic: 1.94 ha

5.7 Matters of National Environmental Significance

A PMST search (DCCEEW 2024) was conducted on 25 March 2024 (10 km buffer of the Subject Land) to identify Matters of National Environmental Significance (MNES) that have the potential to occur within the Subject Land including:

- Wetlands of International Importance.
- Threatened Ecological Communities.
- Threatened Species.
- Migratory Species.

The potential for these MNES to occur at the site are outlined below and discussed in **Appendix C**.

5.7.1 WETLANDS OF INTERNATIONAL SIGNIFICANCE

There were five Ramsar Wetlands returned from the PMST report. The closest wetland is the Macquarie Marshes, 200 km from the Subject Land and not connected to the Modification. All other wetlands are between 500 – 900 km away from the Subject Land. The Modification is unlikely to impact any wetland of international significance.

5.7.2 THREATENED ECOLOGICAL COMMUNITIES

Four Threatened Ecological Communities were returned by the PMST report:

- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC.
- Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia EEC.
- Natural Temperate Grassland of the South Eastern Highlands CEEC.
- Poplar Box Grassy Woodland on Alluvial Plains EEC.

The likelihood of each TEC occurring on the Subject Land is discussed in Section 4.3.

PCT 266 and PCT 277 are part of the Box Gum Woodland CEEC. The conformance of PCT 266 and PCT 277 was assessed according to the EPBC Act criteria (DCCEEW 2023a) in Section 4.3 and the results are summarised in **Table 12**. It was determined that no areas of PCT 266 or PCT 277 on the Subject Land meet the EPBC Act criteria, therefore Box Gum Woodland CEEC is not considered to be a MNES and an assessment of significant impact is not required.

No other TECs are considered to occur due to the lack of diagnostic species present.

5.7.3 THREATENED SPECIES

Fifty two (52) flora and fauna species recognised as MNES under the EPBC Act were identified during database searches as potentially occurring on the Subject Land and are outlined further in (**Appendix H**). An assessment of whether the Modification would have a significant impact on these MNES is assessed in **Appendix C**. One species, the Superb Parrot was identified on site and all suitable habitat trees have been deliberately excluded from the possible disturbance footprint to avoid significant impact. Consequently, referral of the Modification to the Commonwealth is not considered necessary for this species.

5.7.4 MIGRATORY SPECIES

Eleven (11) listed migratory species were returned from the PMST. Based on a habitat assessment (**Appendix G, Table 16** and **Table 17**), two of these species could occur on the site on occasion: *Apus pacificus* (Fork-

tailed Swift) and the White-throated Needletail. However, as these species are almost exclusively aerial (DCCEEW 2024) they are considered highly unlikely to rely on the habitats present within the Subject Land.

6. IDENTIFYING PRESCRIBED IMPACTS

Prescribed additional biodiversity impacts (prescribed impacts) are additional impacts on threatened species credit species besides vegetation clearing and habitat loss. Prescribed impacts must be assessed as part of the BOS as per clause 6.1 of the BC Reg. Each prescribed impact and its relevance to the Subject Land is assessed below (**Figure 1** to **Figure 4**, and **Table 25**).

Table 25. Prescribed impacts identified

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature.
Karst, caves, crevices, cliffs, rocks or other geological features of significance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>Caves/adits are absent from the Subject Land but occur within 2 km of the site.</p> <p>Small rocky outcrops occur on the Subject Land in BMS survey areas A, C, F (BMS 2024)</p>	<p>Large Bent-winged Bat and Large-eared Pied Bat utilise caves for breeding habitat (DCCEEW 2024c), however fauna surveys conducted on the Subject Land (BMS 2024) concluded that the site was not being used as a maternity site. These features would not be affected by the Modification and there are no prescribed impacts to consider in relation to karst, caves, crevices or cliffs.</p> <p>Striped Legless Lizard and Pink-tailed Legless Lizard utilise rocky outcrops for breeding (DCCEEW 2024c). The rocky outcrops on the Subject Land were examined by BMS (2024) and no threatened lizards were observed. The removal of rocky outcrops would not impact any threatened entities and is not considered a prescribed impact of the Modification.</p>
Human-made structures	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>Human-made structures includes infrastructures associated with the mine (i.e., buildings and roads). These are concentrated across the central extent of the Subject Land.</p>	<p>Large Bent-winged Bat utilises human-made structures for breeding habitat (DCCEEW 2024c), however fauna surveys concluded that these species do not occur on the Subject Land and there are no prescribed impacts associated with the removal of human-made structures.</p>
Non-native vegetation	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>The Subject Land contains extensive areas of non-native vegetation, including past agricultural areas identified as exotic grassland and the pine forest to the east.</p>	<p>Non-native vegetation represents suitable breeding habitat for the Striped Legless Lizard, however targeted surveys for this species confirmed that the species is not present, and the removal of exotic grassland is unlikely to represent a prescribed impact of the Modification.</p>
Habitat connectivity	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>Remnant woodland and DNG areas within the Subject Land are generally disconnected from the surrounding landscape, with the exception of the pine forest in the east (along Cadia Road), remnant woodland around the access road on the north east of the site, and the Red Stringybark forest near the Boral Concrete Plant. See Figure 17.</p>	<p>Threatened entities that use habitat connectivity for dispersal throughout their home range include woodland birds (Superb Parrot and Barking Owl) and mammals (Squirrel Glider).</p> <p>Squirrel Gliders, Superb Parrots and Barking Owls were present during threatened species surveys (BMS 2024), however no Barking Owl Species Credit habitat (breeding habitat) is within the Subject Land. It is considered appropriate to consider habitat connectivity as a prescribed impact for the Modification.</p>

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature.
Waterbodies, water quality and hydrological processes	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<p>No underground courses of water or aquifers feeding streams or wetlands occur on the Subject Land.</p> <p>Above ground waterbodies on the Subject Land include Cadiangullong Creek, Rodds Creek and Wire Gully Creek. Several unnamed creeks and large tailings dams occur in proximity to the Subject Land.</p> <p>None of the waterbodies would be affected by the Modification.</p>	<p>The Southern Myotis utilises vegetation within 200 m of waterbodies with permanent pools/stretches >3m wide, however targeted surveys concluded that this species is not present (BMS 2024).</p> <p>White-bellied Sea-Eagles forage and breed within 1 km of inland waterbodies. This species has been observed on the Subject Land, however no water bodies would be affected by the Modification and there are no prescribed impacts.</p>
Vehicle strikes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>Roads occur within the mining lease and around the Subject Land. There is potential for vehicle strike of fauna species during construction and operation of the mine.</p>	<p>Species at risk of vehicle strikes include those utilising woodland disconnected by roads (e.g., Superb Parrot, Barking Owl, Squirrel Glider, Large Bent-wing Bat and Large-eared Pied Bat). The Superb Parrot, Barking Owl and Squirrel Glider have been identified as occurring on the Subject Land (BMS 2024), and the Large Bent-wing Bat and Large-eared Pied Bat have been recorded within 2km of the Subject Land and may utilise surrounding areas and be inadvertently impacted whilst traversing the landscape.</p>

STAGE 2: IMPACT ASSESSMENT (BIODIVERSITY VALUES AND PRESCRIBED IMPACTS)

7. AVOID AND MINIMISE IMPACTS

7.1 Avoid and Minimise Direct and Indirect Impacts

The Subject Land occurs on land owned by CHPL and is adjacent to CVO. There were few opportunities to avoid and minimise direct and indirect impacts on native vegetation, TECs, threatened species and habitat due to the location of the existing mine operations and the required location of the Modification elements (e.g., the presence of the existing TSF).

CHPL initially considered a 272 ha new disturbance area for the Modification, made up of areas in the north-east at the Ridgeway and surrounding the southern section of the CVO. However, this was reduced by 17 ha to the current Modification Area (255 ha) in consideration of further review of operational requirements, and outcomes of environmental surveys for the Modification.

CHPL has revised the Modification disturbance area twice. Reductions were made to the original footprint at the realigned site central access road to avoid the Gang-Gang Cockatoo priority management area, and west of the NTSF to avoid direct impact of Superb Parrot habitat nesting trees resulting in a final disturbance area of 255 ha.

Minimisation of indirect impacts would be undertaken including actions to manage water quality, dust and noise pollution as part of the Modification. Measures to avoid and minimise direct and indirect impacts of the Modification are summarised in **Table 26**.

7.2 Avoid and Minimise Prescribed Impacts

Two prescribed biodiversity impacts relevant to the Modification disturbance area have been identified the loss of habitat connectivity for the Superb Parrot, Squirrel Glider and Barking Owl and the increased risk of vehicle strikes which is likely to impact the Superb Parrot, Squirrel Glider and Large Bent-wing Bat.

Measures to avoid and minimise impact on connectivity in the landscape include reducing the overall area of impact on native vegetation, restricting clearing to the edges of woodland remnants and undertaking progressive rehabilitation of mine disturbed areas to restore connectivity in the landscape post-operation (**Table 26**).

Measures to avoid and minimise impact of the Modification on threatened fauna through vehicle strikes include reduction of overall areas of clearing, enforcing speed limits around areas with high risk of fauna interaction and taking other measures such as installing fencing to prevent animal movement onto roads (**Table 26**).

7.3 Other Measures Considered

CHPL also considered no new disturbance associated with the Modification, however the new disturbance area is required:

to facilitate the re-starting of the Ridgeway; and

to allow buttressing of the NTSF and STSF (consistent with the outcomes of further geotechnical and engineering studies since CVO Modification 14).

In addition, some minor clearing is also required to facilitate the infrastructure upgrades required for the Modification.

7.4 Summary Of Measures to Avoid and Minimise Impacts

Table 26 documents the measures to avoid and minimise direct, indirect and prescribed impacts

Table 26. Avoidance and minimisation measures for direct, indirect and prescribed impacts

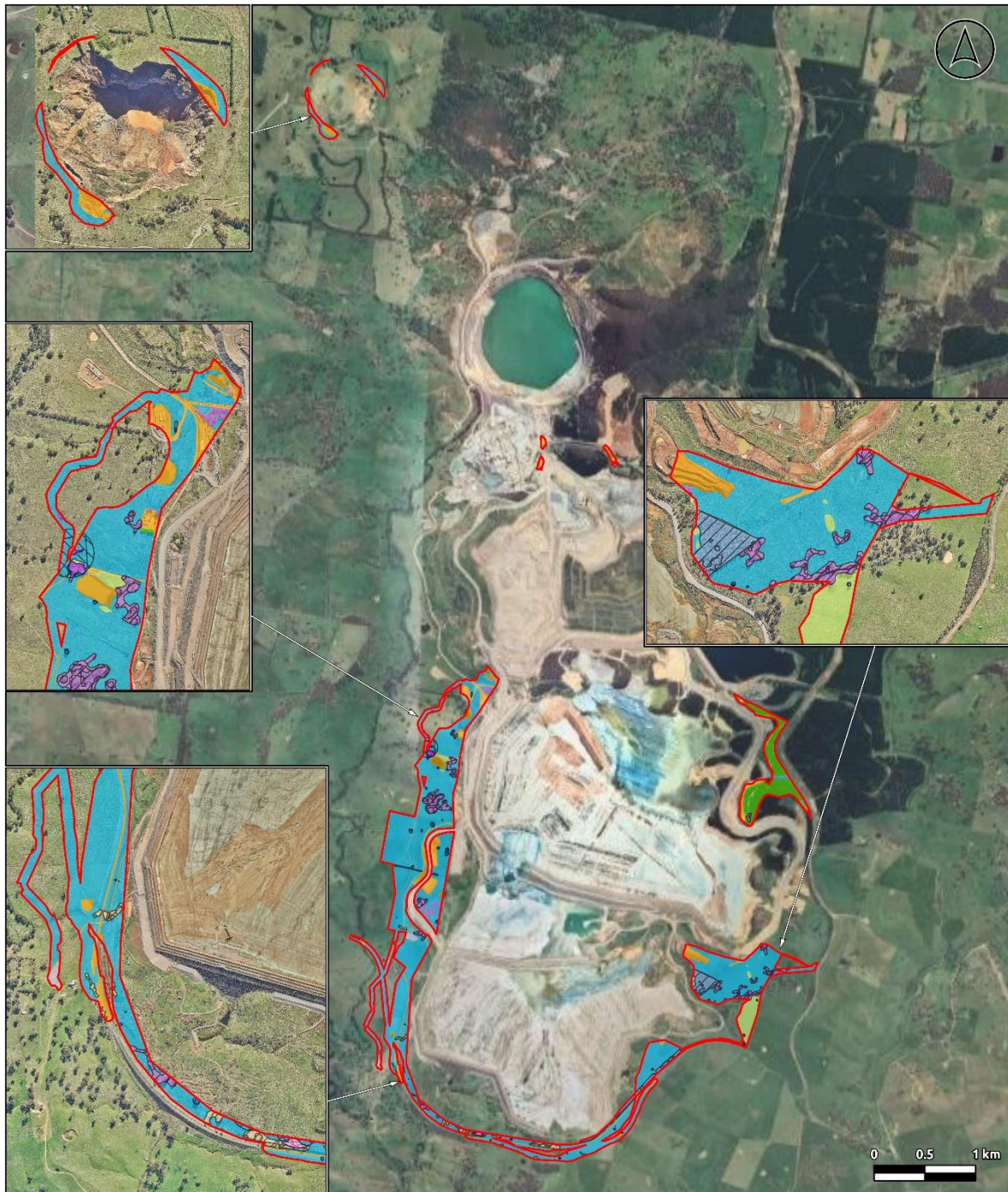
Action	Outcome	Timing	Responsibility
Modification location (e.g., locating the Subject Land on the edge of woodland habitat)	Avoids severing or interfering with corridors connecting habitats and limits the extent to which local movement pathways are impeded	Planning	CHPL
Modification design (e.g., locating infrastructure areas immediately adjacent to mining areas)	Reduce impacts to native vegetation, flora and fauna habitat and the overall area of impact (e.g., preferentially locating disturbance in Category 1 – exempt land or where the vegetation/habitat is in the poorest condition). Reduce the risk of vehicle strike by condensing the disturbance extent and having speed limits.	Planning	CHPL
Minimise impacts on the Box-Gum Woodland CEEC (BC Act)	32.61 ha of PCT 266 and PCT 277 vegetation is considered to be Box-Gum Woodland under the BC Act (all Category 1 and Category 2 PCT 266 and PCT 277 (excluding Exotic Grassland)). As stated above, the Modification design also reduced impacts to this community and the threatened species that utilise this community by preferentially locating disturbance in Category 1 – exempt land or where the vegetation/habitat is in the poorest condition	Planning	CHPL
Reduce risk of vehicle strikes (e.g., install fencing surrounding Panuara Road to prevent animal entry to transport corridors)	Reduce animal vehicle strike fatalities	During construction and operation	CHPL
Control the quality of water released from the site (e.g., ongoing monitoring)	Maintain hydrological processes and water quality controls to minimise downstream impacts on threatened entities	During construction and operation	CHPL
Monitoring of dust levels and enacting dust suppression measures as	Dust suppression measures to keep dust levels to below levels as agreed in Conditions of Consent.	During construction and operation	CHPL

Action	Outcome	Timing	Responsibility
per CVO Environmental Management Strategy			
Monitor noise pollution and enact measures as per the CVO Environmental Management Strategy (CHLP 2021a) and the CVO Noise Monitoring Program (CHPL 2021b)	Noise management measures to keep noise pollution below levels as agreed in Conditions of Consent.	During construction and operation	CHPL
Progressive rehabilitation of mine disturbed areas as per Mine Rehabilitation Plan 2023 and CVO Land and Biodiversity (Landscape) Management Plan 2021	This will involve seed collection and the storage of topsoils from cleared areas prior to commencement of operations, and restoration of landforms and revegetation of areas post-operations using stockpiled materials and the collected native seed. This will restore connectivity and movement corridors in the greater landscape.	Post-operation	CHPL

8. IMPACT ASSESSMENT

Stage 2 of the BAM (DPIE 2020a) provides the requirements for the impact assessment of the BDAR. The impact assessment has incorporated findings from BMS (2024) to assess the potential direct, indirect and prescribed impacts in line with Chapter 8 of the BAM (DPE 2020a). Direct impacts of the Modification on native vegetation, threatened ecological communities, and threatened species and their habitat have been assessed according to Section 8.1 of the BAM and are identified on **Figure 24-Figure 26** and documented in **Table 27**. (DPIE 2020a).

Figure 24. Final Impacts Likely to Occur on the Subject Land (1 of 3)



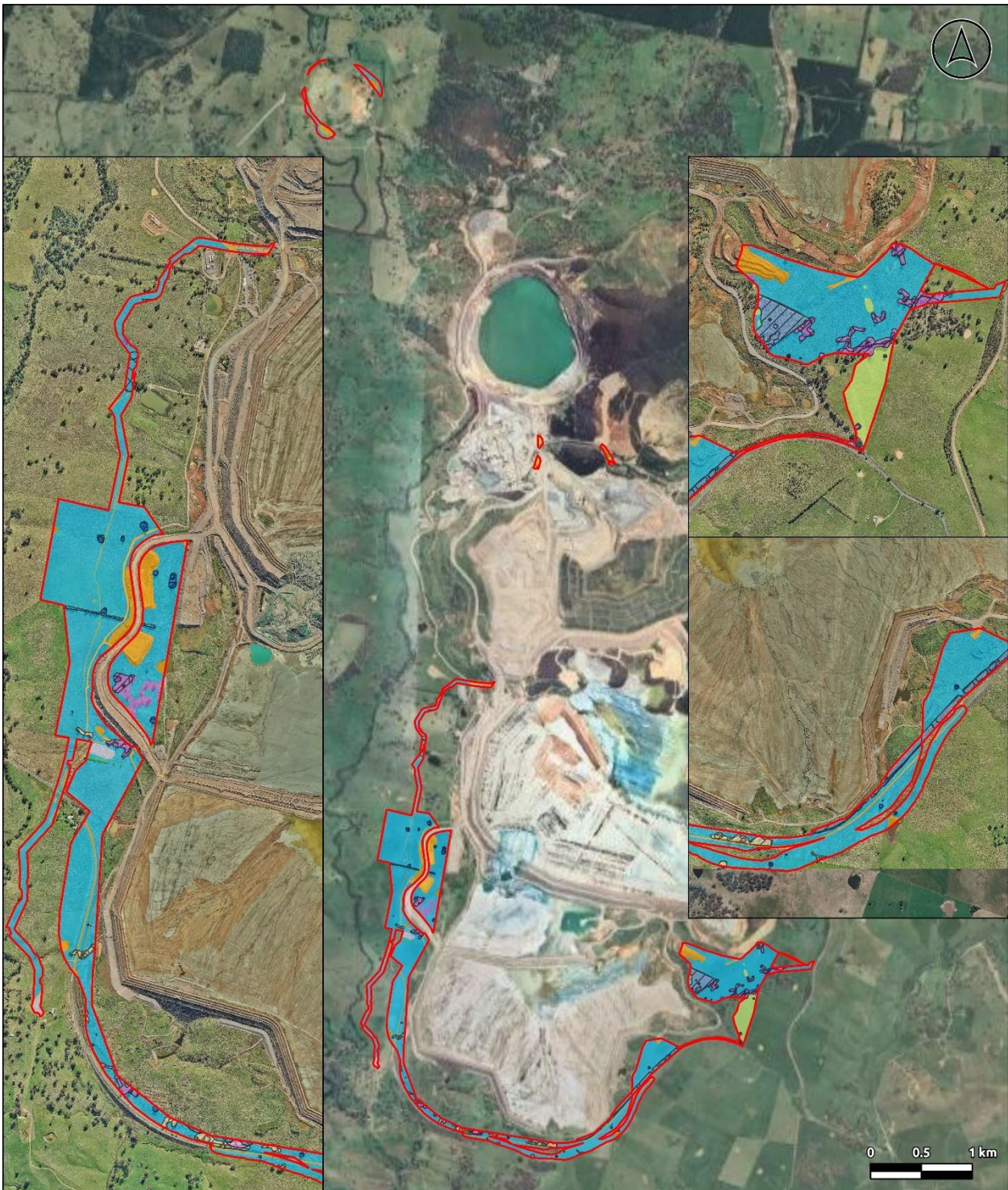
Sources: © Google 2023
 BMS 2023

GDA2020 MGA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 24/04/2024

Legend

- | | | |
|---|----------------------|------------------|
| Modification 15 Surface Disturbance Footprint | PCT 287 Regenerating | PCT 266 Poor |
| Squirrel Glider Habitat | PCT 277 DNG | PCT 85 Poor |
| Superb Parrot Habitat | PCT 277 Mod | Exotic Planting |
| Squirrel Glider and Superb Parrot Habitat | PCT 277 Poor | Disturbed Ground |
| Vegetation | PCT 277 Planted | |
| PCT 287 Mod | PCT 277 Paddock Tree | |
| PCT 287 Rehabilitated | PCT 277 Exotic | |
| | PCT 266 DNG | |

Figure 25. Final Impacts Likely to Occur on the Subject Land (2 of 3)

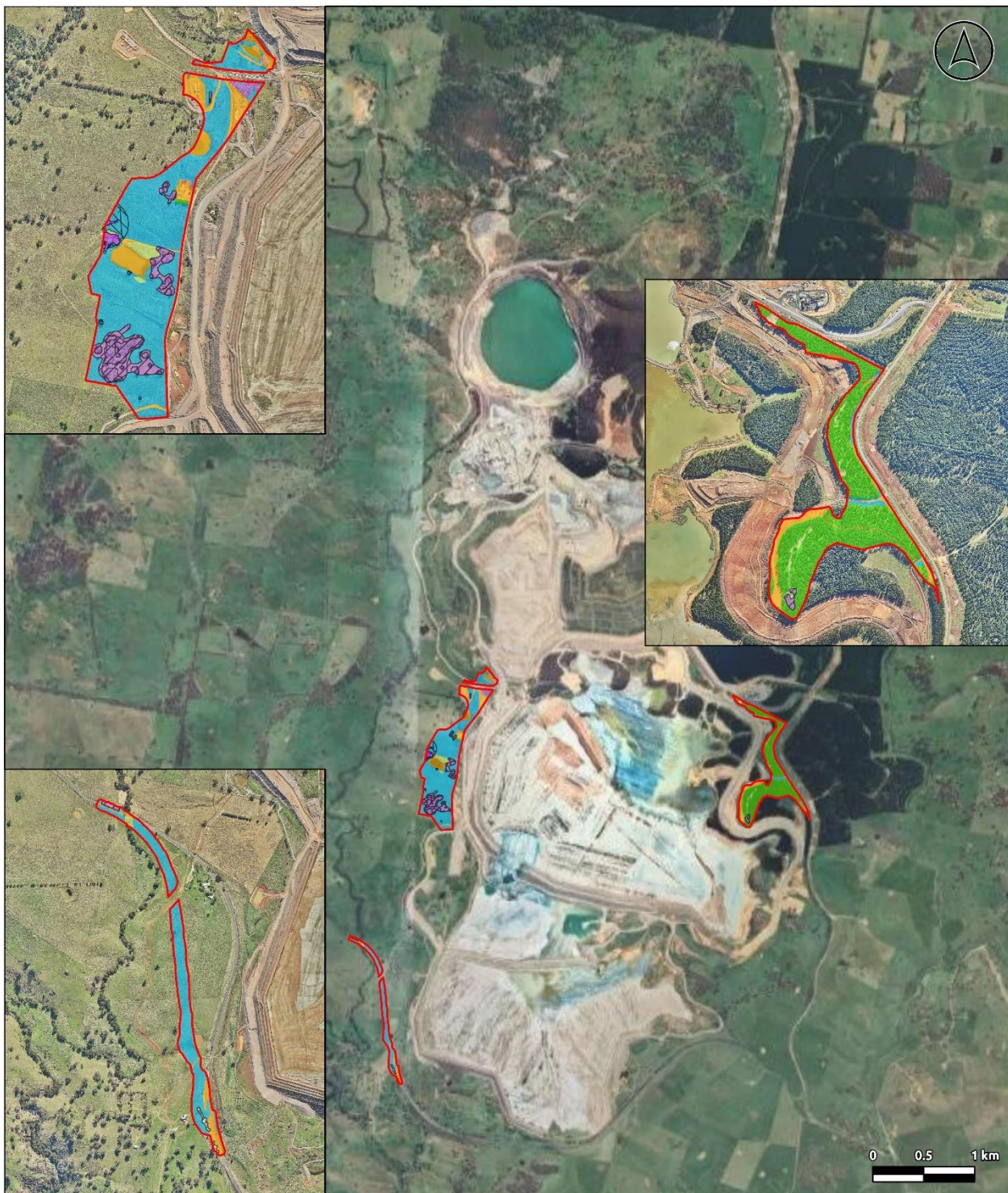


Sources: © Google 2023
 BMS 2023

COA2020 MGA Zone 55 File: 2213118_02.aprx Prepared By: adam.davis Date: 24/04/2024

- | | | |
|---|----------------------|------------------|
| Offset Phasing 1 | PCT 277 DNG | Disturbed Ground |
| Squirrel Glider Habitat | PCT 277 Poor | |
| Superb Parrot Habitat | PCT 277 Planted | |
| Squirrel Glider and Superb Parrot Habitat | PCT 277 Paddock Tree | |
| Vegetation | PCT 277 Exotic | |
| PCT 287 Rehabilitated | PCT 266 DNG | |
| PCT 287 Regenerating | PCT 266 Poor | |
| | Exotic Planting | |

Figure 26. Final Impacts Likely to Occur on the Subject Land (3 of 3)



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- | | | |
|---|----------------------|------------------|
| Offset Phasing 2 | PCT 277 Mod | Disturbed Ground |
| Squirrel Glider Habitat | PCT 277 Poor | |
| Superb Parrot Habitat | PCT 277 Planted | |
| Squirrel Glider and Superb Parrot Habitat | PCT 277 Paddock Tree | |
| Vegetation | PCT 277 Exotic | |
| PCT 287 Mod | PCT 266 Poor | |
| PCT 277 DNG | PCT 85 Poor | |
| | Exotic Planting | |

8.1 Direct Impacts

8.1.1 RESIDUAL DIRECT IMPACTS

Residual direct impacts are those impacts remaining following the implementation of measures to avoid and minimise impacts discussed in **Section 7** and mitigation measures discussed in **Section 8.4**. Final impacts likely to occur on the Subject Land are shown in **Figure 24** and documented in **Table 27**.

The proposed activity will be staged so that the clearing and Offset liability can be undertaken in two distinct phases.

Phase 1 will include:

- Belubula River pipeline
- Western side of NTSF existing approved disturbance limit +100m buffer
- Rest of embankment area generally around the perimeter of the STSF
- Ridgeway

Phase 2 will include:

- NTSF north western area (see area circled in blue)
- Panuara Rd (only very eastern section of alignment)
- Western side of NTSF that is in addition to the existing approved disturbance limit +100m buffer

The direct impacts of the Project have been described for each Phase from herein.

Table 27. Summary of residual direct impacts

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	BC Act status	EPBC Act status	SAII entity	Biodiversity Credit Class	Phase/timing of impact	Extent (ha, # of individuals) Offset Phase 1	Extent (ha, # of individuals) Offset Phase 2	NSW % Cleared for PCT (DCCEW 2024a)
PCT Vegetation Clearance								
PCT 266 DNG			N/A		Construction	1.01	0	94
PCT 266 Woodland (Poor)						3.00	0.17	
PCT 277 Exotic			N/A			16.96	4.95	94
PCT 277 DNG						6.46	1.20	
PCT 277 Woodland (Poor)						6.15	5.49	
PCT 277 Planted						7.69	0.04	
PCT 277 Paddock Trees						1.00	0.08	
PCT 287 Woodland (Moderate)			N/A			N/A	0.17	
PCT 85 Woodland (Poor)			N/A			N/A	0.15	73
TEC Vegetation Clearance								
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CEEC	CEEC	Yes	N/A	Construction	25.31	6.98	N/A
Threatened Fauna Species Habitat Clearance								
Birds								
Superb Parrot	V	V	No	Species	Construction	1.33 ha ~50 individuals on Subject Land	1.26 ha ~50 individuals on Subject Land	N/A

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	BC Act status	EPBC Act status	SAII entity	Biodiversity Credit Class	Phase/timing of impact	Extent (ha, # of individuals) Offset Phase 1	Extent (ha, # of individuals) Offset Phase 2	NSW % Cleared for PCT (DCCEEW 2024a)
Regent Honeyeater	CE	CE	Yes	Ecosystem		44.27 ha	12.48 ha	
White-bellied Sea-Eagle	V	-	No	Ecosystem				
Little Lorikeet	V	-	No	Ecosystem				
Dusky Woodswallow	V	-	No	Ecosystem				
Gang-Gang Cockatoo	V	E	No	Ecosystem				
Speckled Warbler	V	-	No	Ecosystem				
Spotted Harrier	V	-	No	Ecosystem				
Brown Treecreeper	V	-	No	Ecosystem				
Varied Sittella	V	-	No	Ecosystem				
Black Falcon	V	-	No	Ecosystem				
Little Eagle	V	-	No	Ecosystem				
White-throated Needle-tail	-	V	No	Ecosystem				
Swift Parrot	E	CE	Yes	Ecosystem				
Square-tailed Kite	V	-	No	Ecosystem				
Hooded Robin	V	-	No	Ecosystem				
Black-chinned Honeyeater	V	-	No	Ecosystem				
Turquoise Parrot	V	-	No	Ecosystem				
Scarlet Robin	V	-	No	Ecosystem				
Flame Robin	V	-	No	Ecosystem				
Grey-crowned Babbler	V	-	No	Ecosystem				

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	BC Act status	EPBC Act status	SAII entity	Biodiversity Credit Class	Phase/timing of impact	Extent (ha, # of individuals) Offset Phase 1	Extent (ha, # of individuals) Offset Phase 2	NSW % Cleared for PCT (DCCEEW 2024a)
Diamond Firetail	V	-	No	Ecosystem				
Mammals								
Spotted-tailed Quoll	V	E	No	Ecosystem	Construction	44.27 ha	12.48 ha	N/A
Large Bent-winged Bat	V	-	Yes	Ecosystem				
Grey-headed Flying-fox	V	V	No	Ecosystem				
Yellow-bellied Sheathtail-bat	V	-	No	Ecosystem				
Squirrel Glider	V	-	No	Species		17.84 ha ~9 individuals on Subject Land	5.77 ha ~9 individuals on Subject Land	

8.1.2 CHANGE IN VEGETATION INTEGRITY SCORE

Residual impacts on vegetation condition after avoidance and minimisation measure have been carried out are documented in **Table 28**. PCT 277 Exotic has a VI score of <15 which is the benchmark VI score for PCTs representative of an EEC or a CEEC. Therefore, PCT 277 Exotic does not generate any credits.

Table 28. Impacts to vegetation integrity

Vegetation zone	PCT ID	Area (ha)	Offset Phase 1					Offset Phase 2					Post Development
			Composition	Structure	Function	VI score	Change in VI score	Composition	Structure	Function	VI score	Change in VI score	All scores
266 DNG	266	1.01	50.9	70.6	15	37.8	-37.8	N/A	N/A	N/A	N/A	N/A	0

Vegetation zone	PCT ID	Area (ha)	Offset Phase 1					Offset Phase 2					Post Development
			Composition	Structure	Function	VI score	Change in VI score	Composition	Structure	Function	VI score	Change in VI score	All scores
266 Woodland (poor)	266	3.17	10	16.4	62.2	21.6	-21.6	11.9	15.7	39.9	19.5	-19.5	0
277 DNG	277	7.65	28.4	67.7	4.1	20	-20	47	69.5	31.5	46.9	-46.9	0
277 Exotic	277	21.91	4.2	0.3	15	2.6	-2.6	2.1	0	14.5	0.5	-0.5	0
277 Plantings	277	7.73	31.9	19.2	42.9	29.7	-29.7	44.9	20.8	43.9	34.5	-34.5	0
277 Paddock Trees	277	1.08	27.7	2.7	24.9	12.3	-12.3	27.7	2.7	24.9	12.3	-12.3	0
277 Woodland (poor)	277	11.64	9.4	16.4	70.7	22.2	-22.2	13	16.5	74.1	25.2	-25.2	0
287 Woodland (moderate)	287	0.17	N/A	N/A	N/A	N/A	N/A	27.2	47.8	70.5	45.1	-45.1	0
85 Woodland (poor)	85	0.15	N/A	N/A	N/A	N/A	N/A	8.5	42.5	55.9	27.2	-27.2	0

8.2 Indirect Impacts

Indirect impacts of the Modification on native vegetation, threatened entities and their habitat have been assessed according to Section 8.28.2 of the BAM (DPIE 2020a) and include the nature, extent, frequency, duration and timing of the indirect impacts during construction, operation and in the long term (i.e. post-mining) (**Table 29**).

Table 29. Summary of residual indirect impacts

Indirect impact (Describe impact, e.g. transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
Inadvertent impacts on adjacent habitat or vegetation within 100m of Subject Land	<p><u>PCTs identified on Subject Land:</u></p> <ul style="list-style-type: none"> • PCT 85 • PCT 266 • PCT 277 • PCT 287 <p><u>PCTs identified within 100m of Subject Land:</u> 3370, 3387, 3376, 3366, 3534, 3734, 79, 654, 4063 and 3406.</p> <p><u>TEC:</u> Box Gum Woodland CEEC</p>	Subject Land boundary	Infrequent	Short term	Construction	<p><u>Low Likelihood:</u> Indirect clearing would be mitigated through a vegetation clearance protocol and it is recommended that the Subject Land in clearly marked to prevent accidental damage to adjacent vegetation.</p> <p><u>Consequences:</u> Localised changes to soil stability, damage to tree limbs or root structures and increased edge effects.</p>
Reduced viability of adjacent habitat due to edge effects	<p><u>PCTs identified on Subject Land:</u></p> <ul style="list-style-type: none"> • PCT 85 • PCT 266 • PCT 277 • PCT 287 <p><u>PCTs identified within 100m of Subject Land:</u> 3370, 3387, 3376, 3366, 3534, 3734, 79, 654, 4063 and 3406.</p> <p><u>TEC:</u> Box Gum Woodland CEEC</p> <p><u>Threatened Species:</u></p>	Subject Land boundary	Infrequent	Short term and Long term	Construction and Operation	<p><u>Low Likelihood:</u> Clearing would be mitigated through a vegetation clearance protocol and it is recommended that the Subject Land in clearly marked to prevent accidental damage to adjacent vegetation.</p> <p><u>Consequences:</u> Weed invasion, encroachment and predation by pest species and increased species competition.</p>

Indirect impact (Describe impact, e.g. transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
	Squirrel Glider, Superb Parrot, Barking Owl, Little Lorikeet, Brown Treecreeper, Varied Sittella, Dusky Woodswallow, Flame Robin, Scarlet Robin, Diamond Firetail, Squirrel Glider, Large-eared Pied Bat, Yellow-bellied Sheath-tail-bat, Little Eagle and White-bellied Sea-Eagle					
Reduced viability of adjacent habitat due to noise, dust and light spill	<p><u>PCTs identified on Subject Land:</u></p> <ul style="list-style-type: none"> • PCT 85 • PCT 266 • PCT 277 • PCT 287 <p><u>PCTs identified within 100m of Subject Land:</u> 3370, 3387, 3376, 3366, 3534, 3734, 79, 654, 4063 and 3406.</p> <p><u>TEC:</u> Box Gum Woodland CEEC</p> <p><u>Threatened Species:</u> Squirrel Glider, Superb Parrot, Barking Owl, Little Lorikeet, Brown Treecreeper, Varied Sittella, Dusky Woodswallow, Flame Robin, Scarlet Robin, Diamond Firetail, Squirrel Glider, Large-eared Pied Bat, Yellow-bellied Sheath-tail-bat, Little Eagle and White-bellied Sea-Eagle</p>	Subject Land boundary	Frequent	Short term Long term	Construction and Operation	<p><u>Low Likelihood:</u> Noise, dust and light spill would be monitored as per the CVO Environmental Management Strategy (CHPL 2021a) and the CVO Noise Monitoring Program (CHPL 2021b).</p> <p><u>Consequences:</u> The impact of these effects is likely to be increased where the Subject Land intersects remnant native vegetation, as the distance between CVO and remnant vegetation would be decreased through Modification clearing. Increase noise, dust or light spill may impact the foraging and breeding behaviour of threatened species.</p>

Indirect impact (Describe impact, e.g. transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
Transport of weeds and pathogens from the site to adjacent vegetation	<p><u>PCTs identified on Subject Land:</u></p> <ul style="list-style-type: none"> • PCT 85 • PCT 266 • PCT 277 • PCT 287 <p><u>PCTs identified within 100m of Subject Land:</u> 3370, 3387, 3376, 3366, 3534, 3734, 79, 654, 4063 and 3406.</p> <p><u>TEC:</u> Box Gum Woodland CEEC</p>	Subject Land boundary	Frequent	Short term	Construction	<p><u>Low Likelihood:</u> Vegetation adjacent to the Subject Land is already highly disturbed and weeds present on the Subject Land are already likely already present in surrounding vegetation. The risk of this is heightened during the construction phase when vegetation clearing is occurring. However, this risk can be reduced by regularly washing vehicles and machinery and applying weed control measures.</p> <p><u>Consequence:</u> Spread of weeds and pathogens into adjacent habitat at a higher frequency than currently present.</p>
Increased Risk of Starvation, Exposure and Loss of Shelter	<p><u>Threatened Species:</u> Superb Parrot and Squirrel Glider</p>	<p>Superb Parrot species polygon (2.59 ha)</p> <p>Squirrel Glider species polygon (23.61 ha)</p>	Infrequent	Short-term	Construction	<p><u>Low Likelihood:</u> The Subject Land occurs in a predominantly cleared landscape (14% native vegetation within 1500m buffer). The temporary disturbance of species may occur during vegetation removal. However, habitat clearance is to occur</p>

Indirect impact (Describe impact, e.g. transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
						<p>progressively and pre-clearing surveys are to be undertaken to identify and relocate any resident fauna.</p> <p><u>Consequence:</u> Displacement of resident fauna, leading to an increased risk of starvation and exposure.</p>
Loss of Breeding Habitats	<p><u>Threatened Species:</u> Superb Parrot and Squirrel Glider</p>	<p><u>Breeding habitat:</u> Superb Parrot species polygon (2.59 ha) Squirrel Glider species polygon (23.61 ha)</p>	Infrequent	Short-term	Construction	<p><u>Certain Likelihood:</u> Superb Parrot and Squirrel Glider breeding habitat (species polygons) would be removed for the Modification. Vegetation clearing is to occur outside the breeding period of these species, to reduce impacts. The loss of hollow bearing trees would eventually be replaced (post-mine life) through rehabilitation.</p> <p><u>Consequences:</u> Hollow-dwelling fauna displaced from the Subject Land may need to compete for hollows in adjacent habitat.</p>
Trampling of threatened flora species within 30 m	<p><u>Threatened Species:</u> <i>Ammobium craspedioides</i> (Yass Daisy), <i>Eucalyptus aggregata</i> (Black Gum),</p>	Subject Land boundary	Infrequent	Short-term	Construction	<p><u>Low Likelihood:</u> No Small Purple-pea or Silky Swainson-pea individuals were recorded</p>

Indirect impact (Describe impact, e.g. transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
	Silver-leaved Candlebark, <i>Lepidium hyssopifolium</i> (Aromatic Peppergrass), <i>Leucochrysum albicans</i> var. <i>tricolor</i> (Hoary Sunray), Small Purple-pea and Silky Swainson-pea					on or within 30 m of the Subject Land. <u>Consequences:</u> Reduce the size of any local populations
Rubbish dumping	<u>PCTs identified on Subject Land:</u> <ul style="list-style-type: none"> • PCT 85 • PCT 266 • PCT 277 • PCT 287 <u>PCTs identified within 100m of Subject Land:</u> 3370, 3387, 3376, 3366, 3534, 3734, 79, 654, 4063 and 3406. <u>TEC:</u> Box Gum Woodland CEEC	Subject Land boundary	Infrequent	Short-term	Construction and Operation	<u>Low Likelihood:</u> access to CVO is restricted and rubbish would be controlled according to waste management procedures. <u>Consequences:</u> increased presence of rubbish in adjacent vegetation
Wood collection	<u>PCTs identified on Subject Land:</u> <ul style="list-style-type: none"> • PCT 85 • PCT 266 • PCT 277 • PCT 287 <u>PCTs identified within 100m of Subject Land:</u> 3370, 3387, 3376, 3366, 3534, 3734, 79, 654, 4063 and 3406. <u>TEC:</u> Box Gum Woodland CEEC	Subject Land boundary	Infrequent	Short term	Construction and Operation	<u>Low Likelihood:</u> access to CVO is restricted and collection of wood is prohibited outside of the Subject Land. <u>Consequences:</u> Reduced log cover in adjacent woodland

Indirect impact (Describe impact, e.g. transport of weeds and pathogens from the site to adjacent vegetation)	Impacted entities (PCT/threatened entity and their habitats and where relevant, EPBC Act listing)	Extent (ha or zone reference)	Frequency	Duration (long-term/ short-term/ medium-term)	Phase/ timing of impact (e.g. construction, operation, rehabilitation)	Likelihood and consequences
Increased feral animal numbers	<p><u>PCTs identified on Subject Land:</u></p> <ul style="list-style-type: none"> • PCT 85 • PCT 266 • PCT 277 • PCT 287 <p><u>PCTs identified within 100m of Subject Land:</u> 3370, 3387, 3376, 3366, 3534, 3734, 79, 654, 4063 and 3406.</p> <p><u>TEC:</u> Box Gum Woodland CEEC</p> <p><u>Threatened Species:</u> Squirrel Glider, Superb Parrot, Barking Owl, Little Lorikeet, Brown Treecreeper, Varied Sittella, Dusky Woodswallow, Flame Robin, Scarlet Robin, Diamond Firetail, Squirrel Glider, Large-eared Pied Bat, Yellow-bellied Sheathtail-bat, Little Eagle and White-bellied Sea-Eagle</p>	Subject Land boundary	Infrequent	Short-term	Construction and Operation	<p><u>Low Likelihood:</u> The Subject Land occurs within a degraded, agriculturally dominated landscape. Feral animals present on the Subject Land are already likely to utilise adjacent habitat within their wider foraging range.</p> <p><u>Consequences:</u> Increased abundance of foxes, cats, rabbits and pigs which may lead to vegetation trampling and overgrazing, increased competition for resources and the spread of diseases.</p>

8.3 Prescribed Impacts

Measures to avoid and minimise prescribed impacts have been discussed in **Section 7.2**. In accordance with the BAM (DPIE 2020a), this BDAR assesses the prescribed impacts that the Modification would, or is likely to have, on threatened entities and their habitat, taking into account:

- TECs, threatened species and their habitat.
- Ongoing or future impacts that the Modification would have on biodiversity values, considering the measures taken to avoid or minimise impacts.
- The spatial and temporal extent of the impacts likely to result from changes in land use arising from the Modification, in accordance with Section 8.3 of the BAM (DPIE 2020a).

The BDAR includes an assessment of any prescribed impacts of the Modification on threatened entities and their habitat, and describes:

- The nature, extent, frequency, duration and timing of prescribed impacts that:
 - during construction.
 - during operation; and
 - are uncertain (predictions should be made).
- The consequences of prescribed impacts on biodiversity values.
- Any limitations to data, assumptions and predictions about impacts on biodiversity.

Prescribed impact entities are identified in **Section 6**. Relevant prescribed impacts for the Modification have been identified as habitat connectivity and vehicle strikes, which are assessed in the Sections 8.3.1 and 3.4.2, respectively.

8.3.1 HABITAT CONNECTIVITY

The threatened species that have been identified as potentially being affected by habitat connectivity fragmentation are the Superb Parrot, Squirrel Glider, and Barking Owl.

Superb Parrots typically nest near watercourses within 10 km of box-gum woodland, although they also nest in isolated paddock trees and after breeding will forage on a variety of habitat types. The species is highly susceptible to habitat fragmentation as the species avoids open areas on foraging flights, and reducing nearby foraging habitat from breeding locations can make the species abandon those locations altogether (DSE 2003). Additionally, the species is highly vulnerable to human disturbance during breeding season; the bird will avoid the nest if humans are near, and it is unlikely to lay eggs again during a season as incubation appears to be synchronised amongst the population (DSE 2003).

Squirrel Gliders are affected by habitat connectivity predominantly by the distance they can glide to the next tree, typically between 30-50 metres but can be up to 100 metres (Korodaj, Winsemius & Tack 2009). Any time they spend on the ground they are vulnerable to predation by foxes and cats. It is estimated family groups can have a range of up to 9 ha (Korodaj, Winsemius & Tack 2009).

Barking Owls are impacted by habitat connectivity by a reduction in the density of prey that cannot exist across fragmented habitats, such as the Squirrel Glider. This impact is most critical around the Barking Owl's preferred habitat of mature trees in riparian areas (DCCEE 2024c). Breeding trees were not found during fauna surveys, however the species was recorded just outside of the Subject Land, indicating the species may utilise the site for foraging purposes.

Remnant woodland and DNG areas within the Subject Land are generally disconnected from the surrounding landscape, with the exception of the pine forest in the east (along Cadia Road), remnant woodland along the access road to the northeast of the site, and the Red Stringybark forest near the Boral Concrete Plant. These impacts involve the permanent clearing of vegetation.

Consequences

In relation to clearing of nesting trees for the Superb Parrot, recent studies recorded nesting boxes only increasing visit rates of the species to large trees, not small or medium trees, indicating the other habitat attributes of mature trees cannot be easily replaced (DAWE 2021a). Superb Parrot nest trees identified on the site have been avoided for direct clearing and species credits generated relate to the buffer around nesting trees that was established during the CVO Modification 14 assessment.

A reduction in habitat for the Superb Parrot would increase the distance between adjoining habitat patches. This would contribute to fragmentation of woodland in the landscape and increase disturbance edge effects in these patches from interference with humans and other wildlife. As outlined above, although breeding trees would not be removed, there would be a reduction in foraging habitat around some breeding trees which may force the species to abandon these locations altogether (DSE 2003). However, the Superb Parrot is a highly mobile species and the reduction in native vegetation would not restrict their ability to travel across the landscape. The loss of foraging habitat has been assessed under Section 8.1 as a direct impact and an equivalent number of ecosystem species credits would be generated to account for this impact. As described in Section 7.1, known Superb Parrot nesting trees have been avoided.

Squirrel Gliders require patch sizes with trees that are no greater than 50 metres apart to facilitate movement throughout the landscape, with paddock trees serving as vital movement corridors to maintain genetic diversity (Korodaj, Winsemius & Tack 2009). The Squirrel Glider was recorded along the south and south-east border of the Subject Land (BMS 2024). Impacts in this zone are not expected to impact upon habitat connectivity for the Squirrel Glider, because suitable trees are present within 50 metres to the south of this patch.

The Barking Owl does not have breeding habitat on the site and therefore impacts are considered for foraging habitat only. The species may experience some reduction in prey availability due to loss of hollow-bearing trees, however the wide landscape is already largely fragmented, and it is not expected the Modification would greatly increase these effects.

8.3.2 VEHICLE STRIKES

The species that are to be assessed for potential vehicle strike impacts are Superb Parrot, Squirrel Glider and Large Bent-wing Bat (**Table 30**). The Modification would not greatly expand the zone of vehicle traffic compared with existing/approved impacts; as such it is not expected that the risk of interaction between vehicles and fauna would greatly increase. Vehicle strikes are identified as a key threat for the Squirrel Glider (DCCEEW 2024b). Impacts are considered possible due to the fact the species was recorded directly within the Subject Land for the access road (BMS 2024). The Barking Owl was also recorded within the portion of the Subject Land associated with the access road (BME 2023) and may be susceptible to vehicle strikes as it utilises the site for foraging. The site is also within 2 km of adits where Large Bent-wing Bat calls (and possible Large-eared Pied Bat calls) were recorded (BMS 2024). Vehicle strikes are a possible impact of the Modification on Large-eared Pied Bat and Large Bent-wing Bat because both species may utilise this area for foraging.

Table 30. Residual prescribed impacts – vehicle strikes

Threatened fauna or protected fauna that are part of a TEC that are at risk of vehicle strike	SAII entity	Likelihood	Estimated vehicle strike rates	Consequences
Threatened fauna or animals that are part of a TEC	No	Moderate	Similar to current levels	Injury or mortality of fauna which is part of a TEC. Unlikely to lead to a decline in the local population.
Superb Parrot	No	Moderate	Higher than current levels	Injury or mortality of individuals. Unlikely to lead to a decline in the local population.
Squirrel Glider	No	Low	Higher than current levels	Injury or mortality of individuals. Unlikely to lead to a decline in the local population.
Barking Owl	No	Low	Higher than current levels	Injury or mortality of individuals. Unlikely to lead to a decline in the local population.
Large Bent-wing Bat	Yes	Low	Higher than current levels	Injury or mortality of individuals. Unlikely to lead to a decline in the local population.

8.4 Mitigating Residual Impacts – Management Measures and Implementation

Section 8.4 of the BAM (DPIE 2020a) requires a BDAR to describe measures to mitigate and manage residual impacts following impact avoidance and minimisation measures. Proposed mitigation and measurement measures for residual direct, indirect and prescribed impacts are presented in **Table 31**.

Table 31. Summary of proposed mitigation and management measures for residual impacts (direct, indirect and prescribed)

Impact	Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	Risk of Failure	Consequence of Failed Measure
Residual Direct Impacts								
Displacement of resident fauna.	Timing of works	Planning the timing of vegetation removal to avoid the breeding seasons of threatened, migratory and resident species.	Planning and Construction	Regular	Project management and Environmental specialists	High	Low	Fauna dispersal distress, injury or death
	Pre-clearing surveys	Undertake pre-clearing surveys to determine the presence of resident fauna in vegetation, particularly hollow-bearing trees.	Pre-construction	Regular	Environmental specialists and licensed wildlife handler	High	Low	Fauna dispersal distress, injury or death
	Clearing protocols	Implementation of best practice clearing protocols.	Construction	Ongoing	Project management, Site manager and Contractors	High	Low	Inadvertent damage or distress to adjacent habitat and threatened species
	Inspection of felled trees	Licensed wildlife handler is to inspect all felled trees for the presence of fauna. Injured fauna are to be cared for in conjunction with WIRES. Displaced fauna are to be relocated with adjacent vegetation in similar condition by a qualified wildlife handler.	Construction	Infrequent	Licensed wildlife handler	High	Low	Fauna dispersal distress, injury or death
	Investigating ways to relocate habitat features	Relocate habitat features (surface rocks, fallen logs and logs) to	Construction	Infrequent	Project management	High	Low	Loss of habitat features and increased

Impact	Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	Risk of Failure	Consequence of Failed Measure
		adjacent retained vegetation as habitat enhancement (where these opportunities are available).						competition among resident fauna for resources
Residual Indirect Impacts								
Inadvertent impacts on adjacent habitat or vegetation	Pre-clearing protocols	Prior to commencing vegetation clearing, daily site briefings are to occur to identify the Subject Land boundary, the presence of any adjacent remnant vegetation to be retained and methods to relocate habitat features into adjacent habitat.	Construction	Regular	Project management and Contractors	High	Low	Adjacent vegetation or habitat inadvertently damaged
	Temporary fencing and signage	Clearly demark adjacent vegetation and waterbodies to be retained. These areas are to be identified in daily site briefings prior to commencing clearing	Construction	Ongoing	Project management and site manager	High	Low	Adjacent vegetation or habitat inadvertently damaged
	Clearing equipment modification	A chainsaw is preferable to heavy machinery to remove native vegetation for partial clearing.	Construction	Ongoing	Project management and contractors	High	Low	Inadvertent damage to adjacent vegetation or increased soil disturbance
Reduced viability of adjacent habitat due to noise, dust and light spill	Adjust construction hours	Construction activities are to occur generally during daylight hours (with TSF construction also proposed to occur in the evenings i.e., 6:00 pm to 10:00 pm), minimising light spill and noise disturbance.	Construction	Regular	Project management and site manager	High	Low	Increased disturbance to resident fauna in adjacent habitat
	Continued implementation of guidelines	Continue to implement the CVO Environmental Management Strategy (CHPL 2021a) and CVO Noise Monitoring Program (CHPL	Construction and Operation	Regular	Project management and site manager	Moderate	Low	Increased disturbance to resident fauna in adjacent habitat. Disruption of life

Impact	Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	Risk of Failure	Consequence of Failed Measure
		2021b) and Environmental Strategy to keep noise and dust levels below levels agrees in the Conditions of Consent						cycle events (nesting or breeding)
Transport of weeds and pathogens from the site to adjacent vegetation	Hygiene protocols	Implementation of hygiene protocols (regularly washing vehicles and equipment). High threat weed (HTW) recorded on the Subject Land are outlined in Appendix D .	Construction and Operation	Ongoing	Project management and contractors	High	Low	Spread of pathogens or weeds, including HTW, between Subject Land and adjacent habitat
	Reduce chemical drift	Application of herbicides to HTW is to occur as per the NSW Department of Primary Industries guidelines (DPI n.d.). Spraying is to occur during suitable weather conditions.	Construction and Operation	Ongoing	Project management and contractors	High	Low	Spread of herbicides to non-targeted flora species in adjacent habitat
Residual Prescribed Impacts								
Increased erosion	Sediment barriers and erosion control measures	Implementation of best practice erosion management and monitoring	Construction and Operation	Ongoing	Project management and contractors	High	Low	Increased sedimentation in adjacent waterbodies and habitat
Vehicle strikes	Vehicle speeds	Impose speed limits on internal mine roads and access tracks.	Construction and Operation	Ongoing	Project management and site manager	High	Low	Inadvertent wildlife injury or death
	Road signage	Road signage would be placed along roads alerting drivers to wildlife traversing the area.	Planning	Infrequent	Project management and site manager	High	Low	Inadvertent wildlife injury or death

Impact	Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	Risk of Failure	Consequence of Failed Measure
	Education	Identify during toolbox meetings relevant breeding, nesting or migratory periods for threatened fauna.	Construction and Operation	Seasonally	Project management, site manager and ecologist	High	Low	Disrupted life cycle events for adjacent fauna and threatened species

Further details on the implementation of measures outlined in **Table 31** are provided in **Table 32** in accordance with Section 8.4 of the BAM (DPIE 2020a).

Table 32. Management Measures and Implementation

Measure/action	Monitoring and evaluation strategy (Data, frequency, timing and reporting)	Timing	Frequency
Timing of works	<p>The timing of works is considered prior to action undertaking to prioritise favourable undertaking conditions and to minimise the potential impacts. Additionally, under the EPBC Act, proponents are required to detail the provision of project long term security and the project timing (biodiversity offsets).</p> <p>Particular areas to consider timing of works include:</p> <ul style="list-style-type: none"> • Seasonal timing: coinciding operation with favourable climatic conditions (i.e. rehabilitation works might require conditions ideal for soil moisture) • Duration and intensity: coordinating high intensity works with short duration. • Pollution: consideration of timing of works relevant to noise, light and dust pollution (i.e. night and day works). <p>A Threatened Species Management Strategy (2022) has been developed by CHPL for the Squirrel Glider and Superb Parrot and directs the timing of clearing to mitigate impact to these species. The approved CHPL Biodiversity Management Plan (2021) also outlines timing and other mitigation measures.</p>	Prior to Clearing	As required
Pre-clearing surveys	<p>A pre-clearance survey is developed and undertaken where practical to reduce impacts on threatened species and to maximise rehabilitation outcomes. The purpose of pre-clearance inspections are:</p> <ul style="list-style-type: none"> • to identify and clearly mark all habitat structures and recommend management actions to minimise impact on the hollow dependent species during clearing; • identify salvageable topsoil and clay resources; and • identify management strategies to minimise the impact of clearing activities on resident fauna. 	Prior to Clearing	As required
Clearing protocols	<p>A vegetation clearance protocol has been developed to minimise the impact of vegetation clearance on flora and fauna. Vegetation clearance protocols are followed and documented via the EIP process.</p>	Prior to Clearing	As required

Measure/action	Monitoring and evaluation strategy (Data, frequency, timing and reporting)	Timing	Frequency
	<p>Key components of the protocol include:</p> <ul style="list-style-type: none"> • identification of areas requiring clearing; • pre-clearance surveys; • fauna management strategies; • vegetation clearance; and • management of threatened species. <p>Prior to clearing, the veterinary practice will be alerted to the clearing event a week from operation and must be willing to accept wildlife. Any animals injured will be assessed by a suitably licenced and experienced supervising ecologist.</p>		
Inspection of felled trees	Inspection of trees felled for the presence of fauna. Injured fauna to be captured using recommended techniques prescribed by WIRES and WIRES contacted for first aid and temporary care of the animal. Uninjured fauna to be relocated into surrounding native woodland at a suitable time.	Following Clearing	As required
Investigating ways to relocate features	<p>Habitat features concern natural occurring structures of hollows, logs, rocks and general timber. Relocating habitat features can be considered as a fauna management strategy to provide habitat to fauna in areas lacking habitat features. Additionally, it provides an opportunity for important structures and species to be relocated from a mine disturbed area, to a vegetation corridor, rehabilitation or offset area.</p> <p>The process and purpose of relocating habitat features is as follows:</p> <ul style="list-style-type: none"> • Habitat structures suitable for relocation are identified and marked during pre-clearance surveys. • Features and relocation area are decided by the known threatened species in the locality and their nesting, roosting, shelter and feeding regime and requirement. • Monitoring will be taken to determine the success of habitat relocation and occupancy of habitat. <p>From this, remaining habitat features within revegetated areas will remain sedentary and undisturbed. Where features are notably absent in the revegetated/rehabilitated area and where there are nearby sources, Cadia will consider relocating such features into the revegetation area. Internal monitoring of habitat features and their relocation success will also be ongoing.</p>	Following Clearing	As required
Temporary fencing and signage	<p>Temporary fencing and signage may be erected to:</p> <ul style="list-style-type: none"> • identify the presence of threatened species; • alert motorists to potential increases in fauna movement and relocation as a result of clearing; • restrict access to subsidence zones and hazardous voids; • restrict access to rehabilitation and remnant native vegetation areas; and 	Prior to Clearing	As required

Measure/action	Monitoring and evaluation strategy (Data, frequency, timing and reporting)	Timing	Frequency
	<ul style="list-style-type: none"> to control vertebrate pests. 		
Reduce chemical drift	<p>The following methods have been identified to reduce chemical drift:</p> <ul style="list-style-type: none"> implement chemical weed (spray) control methods in remnant areas; undertake chemical control measures in accordance with NSW DPI – Noxious and Environmental Weed control handbook, product labels and SDS; and selective implementation of fertiliser for revegetation purposes directly applied and not via aerial means. 	When deploying weed spraying	Annually
Sediment barriers and erosion control measures	<p>The following broad measures would be implemented to prevent, reduce and manage soil erosion at the CVO:</p> <ul style="list-style-type: none"> minimise disturbance during all phases of the CVO and restrict access to undisturbed areas; sequence construction activities such that sediment control works are completed early in the construction phase; divert clean water around disturbance areas; rehabilitate/revegetate mine infrastructure areas at the earliest possible stage; minimise compaction during soil excavation and movement; use erosion control features (e.g. silt fences and temporary sediment traps, diversion banks, channels and rip-rap structures) to minimise sediment migration, divert surface water around disturbed areas and control runoff velocity; and construct collection drains, diversion drains and culverts to control surface runoff from access roads. 	During operations	As required
Road signage	<p>Road signage will be implemented to minimise vehicular impacts on resident fauna, such as:</p> <ul style="list-style-type: none"> signage erected during clearing periods to warn motorists of potential increases in fauna relocation movement. 	During operations	As required
Education	<p>Education programs will be developed and undertaken to increase knowledge and skills to achieve sustainable/conservation management outcomes including applied ecology farming, landscape repair, optimising conservation and production outcomes.</p>	During operations	Employee induction

8.5 Adaptive Management Strategy for Uncertain Impacts

BAM Section 8.5 refers to the use of adaptive management for uncertain biodiversity impacts, meaning those that are infrequent or difficult to measure. **Table 31** of this report identifies measures to mitigate and manage residual impacts following impact avoidance and minimisation measures. Performance criteria and monitoring methods for the assessment of uncertain impacts associated with the Project are provided in **Table 33**. Triggers for adaptive management and proposed adaptive management responses are provided in **Table 34**.

Table 33 – Performance and completion criteria for mitigation measures

Mitigation measure	Performance criteria	Method	Completion criteria
Hygiene protocols to prevent transport of weeds and pathogens from the site to adjacent vegetation	Number of infestations of identified weed species equal to or less than adjacent land.	Hygiene protocols to prevent transport of weeds and pathogens from the site to adjacent vegetation.	Number of infestations of identified weed species equal to or less than adjacent land.

Table 34 – Triggers for adaptive management

Measure / action	Performance criteria	Adaptive management threshold	Adaptive management response	Reporting
Hygiene protocols	Per cent cover for identified weed species in each management zone equal to or less than adjacent land.	A >5% increase in per cent cover for any identified weed species per vegetation zone in adjacent habitat.	Control weeds according to CVO Landscape Management Plan.	Weed contractor reports to Project Manager. Extent polygons and survey results updated and submitted after each monitoring. Details included in annual report to the department.
	Occurrence of identified weed species in adjacent native vegetation.	Any infestation within native vegetation not identified during baseline survey.	Eradication of new weed infestation according to CVO Landscape Management Plan.	

9. SERIOUS AND IRREVERSIBLE IMPACTS

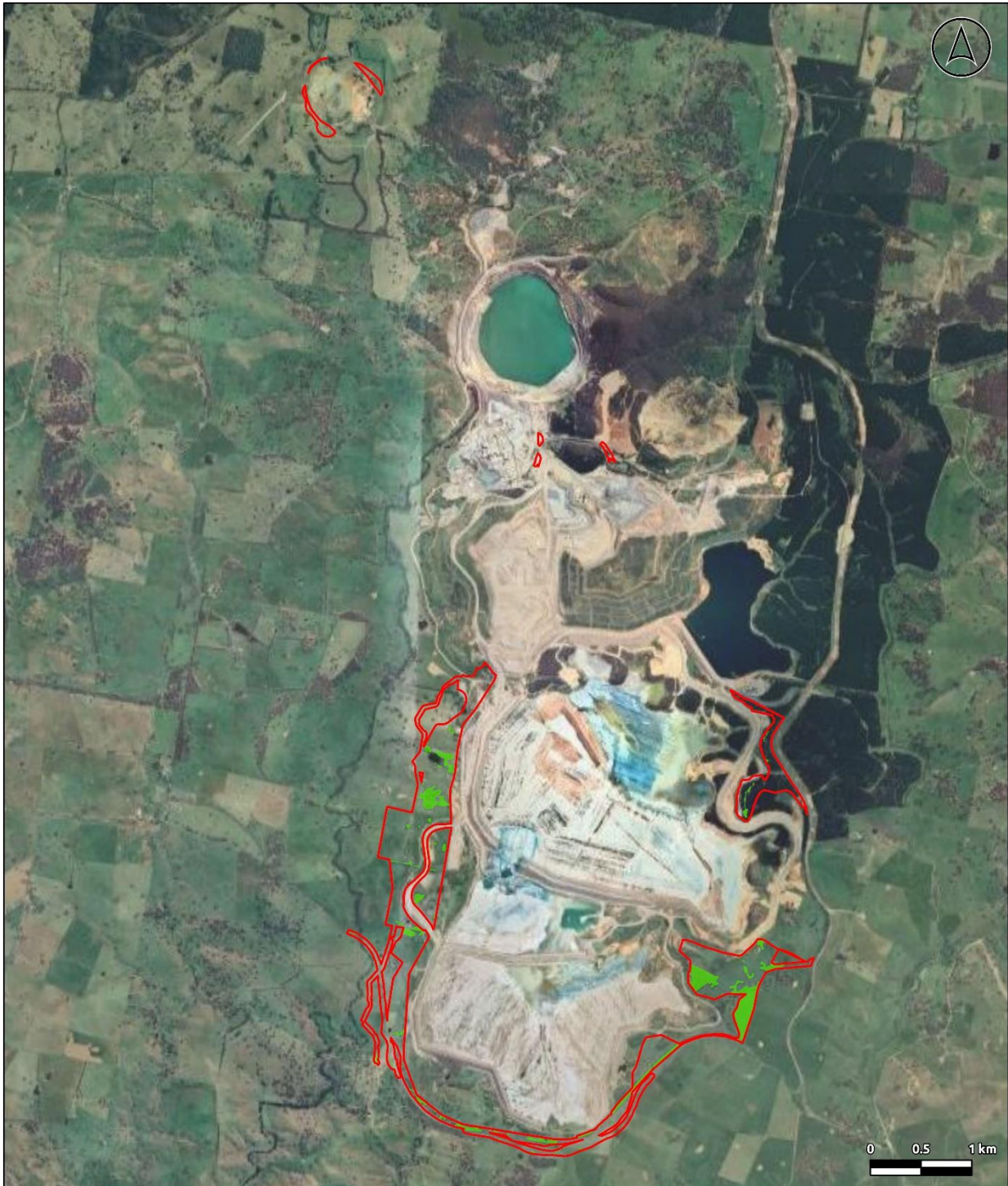
9.1 Assessment For Serious and Irreversible Impacts (SAII) on Biodiversity Values

The determination of a SAII on biodiversity values is to be made by the decision-maker in accordance with the four principles set out in the BC Reg. This section identifies biodiversity values at risk of a SAII by the Modification and evaluates the extent and severity of the impact in accordance with the BAM criteria (Section 9) (DPIE 2020a). Biodiversity values considered at risk of a SAII relevant to the Modification are outlined in **Table 35** and assessed in **Appendix I. Figure 27** and **Figure 28** outline those biodiversity entities considered to be directly impacted by the Modification.

Table 35. Entities at risk of a SAII

Common name	Scientific name	Reason for inclusion in assessment
Fauna		
Swift Parrot	<i>Lathamus discolor</i>	Included in current list of entities at risk of an SAII and is likely to be impacted by the Modification (Ecosystem Credit)
Large Bent-winged Bat	<i>Miniopterus magnater</i>	Included in current list of entities at risk of an SAII and is unlikely to be impacted by the Modification (Ecosystem Credit)
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Included in current list of entities at risk of an SAII and is unlikely to be impacted by the Modification (Ecosystem Credits)
Flora		
Silver-leaved Candlebark	<i>Eucalyptus canobolensis</i>	Included in current list of entities at risk of an SAII and is unlikely to be impacted by the Modification (Species credit)
Threatened Ecological Communities		
Box Gum Woodland	<i>White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC</i>	Included in current list of entities at risk of an SAII and is likely to be impacted by the Modification (Ecosystem Credit)

Figure 27. SAII – Box Gum Woodland



Sources: © Google 2023

CD2020 MGA Zone 55 File: 221318_02.aprx Prepared By: adam.davis Date: 24/04/2024

Legend

- Modification 15 Surface Disturbance Footprint
- Threatened Ecological Communities**
- White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC (BC Act)

Figure 28. SAII – Swift Parrot



Legend

- Modification 15 Surface Disturbance Footprint
- Swift Parrot Foraging Habitat

10. IMPACT SUMMARY

10.1 Determine an Offset Requirement for Impacts

10.1.1 IMPACTS ON NATIVE VEGETATION AND TECS OR ECS (ECOSYSTEM CREDITS)

PCT 277 Exotic (VZ4) has a VI score of 1.7 which is < 15 and does not require offsetting, as per BAM Subsection 9.2.1(3) (DPIE 2020a) (**Table 36, Figure 29**).

Table 36. Impacts that do not require offset – ecosystem credits

Vegetation zone	PCT name	TEC	TEC association	Entity at risk of an SAII?	Offset Phase 1		Offset Phase 2	
					Impact area (ha)	Current VI score	Impact area (ha)	Current VI score
VZ4	277 Exotic	No	N/A	No	16.96	2.6	4.95	0.5
VZ6	277 Paddock Trees	Yes	Box Gum Woodland	No	1.00	12.3	0.08	12.3

Table 37 summarises impacts that require an offset during both Phase 1 and Phase 2, calculated according to AM Subsection 9.2.1(1) (DPIE 2020a) (**Figure 29**).

Table 37. Impacts that require an offset – ecosystem credits

Vegetation zone	PCT name	TEC	Offset Phase 1						Offset Phase 2					
			Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
VZ1	266 DNG	Yes	1.01	37.8	0	-37.8	2.5	24	0	N/A	N/A	N/A	N/A	N/A
VZ2	266 Woodland (poor)	Yes	3.00	21.6	0	-21.6	2.5	41	0.17	19.5	0	-19.5	2.5	2
VZ3	277 DNG	Yes	6.46	20	0	-20	2.5	81	1.20	46.9	0	-46.9	2.5	35
VZ5	277 Plantings	Yes	7.69	2.6	0	-2.6	2.5	143	0.04	34.5	0	-34.5	2.5	1

Vegetation zone	PCT name	TEC	Offset Phase 1						Offset Phase 2					
			Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
VZ7	277 Woodland (poor)	Yes	6.15	22.2	0	-22.2	2.5	85	5.49	25.2	0	-25.2	2.5	86
VZ8	287 Woodland (Moderate)	No	N/A	N/A	N/A	N/A	N/A	N/A	0.17	45.1	0	-45.1	1.75	3
VZ9	85 Woodland (poor)	No	N/A	N/A	N/A	N/A	N/A	N/A	0.15	27.2	0	-27.2	2	2
Total credits for both offset phases													503	

10.1.2 IMPACTS ON THREATENED SPECIES AND THEIR HABITAT (SPECIES CREDITS)

Table 38 identifies impacts on threatened species (species credits) that require an offset, as per BAM Subsection 9.2.2(2.) (DPIE 2020a).

Table 38. Impacts that require an offset – species credits

Common name	Scientific name	BC Act status	EPBC Act status	Biodiversity risk weighting	Offset Phase 1		Offset Phase 2	
					Loss of habitat (ha) or individuals	Number of species credits required	Loss of habitat (ha) or individuals	Number of species credits required
Squirrel Glider	<i>Petaurus norfolcensis</i>	V	-	2	17.84	221	5.77	74
Superb Parrot	<i>Polytelis swainsonii</i>	V	V	2	1.33	5	1.26	6
Total credits for both offset phases								306

10.1.3 INDIRECT AND PRESCRIBED IMPACTS

There are no indirect and prescribed impacts that remain after measures to avoid, minimise and mitigate have been applied. Therefore, additional offsetting of indirect and prescribed impacts is not required.

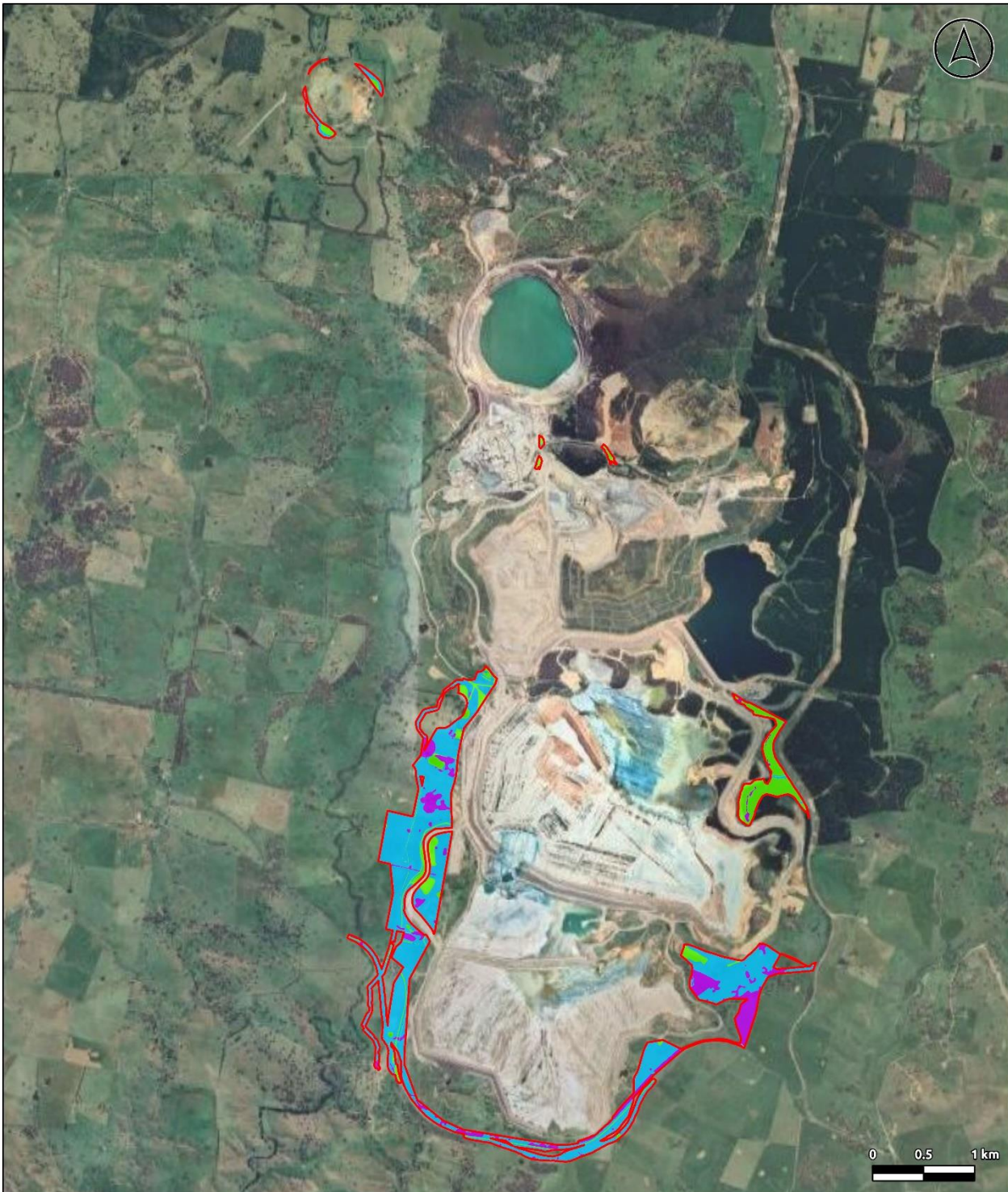
10.2 Impacts That Do Not Need Further Assessment

Table 39 identifies impacts that do not need further assessment for ecosystem credits (as per BAM Section 9.3(1–2.) (DPIE 2020a) (**Figure 29**).

Table 39. Impacts that do not need further assessment for ecosystem credits

Impact	Location within Subject Land	Justification why no further assessment is required
Disturbed Ground (5.44 ha)	Internal and external roads, tracks, infrastructure and bare ground throughout the Subject Land	Areas void of native vegetation. Assessment for threatened species habitat was conducted
Exotic Plantings (0.23 ha)	Pine plantations in Areas 1, 3, 4, 5 and 9 (Figure 8)	Areas void of native vegetation. Assessment for threatened species habitat was conducted

Figure 29. Thresholds for Assessing and Offsetting Impacts



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Legend

- Modification 15 Surface Disturbance Footprint
- Areas not requiring assessment - Disturbed Ground and Exotic Planted Vegetation (Forestry)
- Areas not requiring an offset - VI Score less than 15
- Areas requiring an offset - native vegetation with VI Score over 15 and threatened species habitat

11. BIODIVERSITY CREDIT REPORT

The BAM-C credit report must identify the numbers and classes of biodiversity credits required to be retired in accordance with the like-for-like requirements of the offset rules and those that could be retired in accordance with the variation rules. Credit reports for ecosystem and species credits are provided in **Appendix F** and are summarised in **Table 40** and **Table 41**.

11.1 Ecosystem Credits

Table 40. Ecosystem credit class and matching credit profile

Ecosystem credit	PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC or EC	Offset trading group (BAM Section 10.2, Tables 4 & 5)	Hollow bearing trees present?	IBRA subregion (in which the Subject Land is located)
PCT 277 DNG	277	Grassy Woodlands	Western Slopes Grassy Woodlands	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	No	Orange
PCT 277 Plantings						No	
PCT 277 Woodland (poor)						Yes	
PCT 277 Paddock Trees						Yes	
PCT 287 Woodland (moderate)	287	Dry Sclerophyll Forests (Shrubby sub-formation)	Western Slopes Dry Sclerophyll Forests	N/A	Tier 3	No	Orange
PCT 85 Woodland (poor)	85	Forested Wetlands	Eastern Riverine Forests	N/A	Tier 2	Yes	Orange
PCT 266 DNG	266					No	Orange

Ecosystem credit	PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC or EC	Offset trading group (BAM Section 10.2, Tables 4 & 5)	Hollow bearing trees present?	IBRA subregion (in which the Subject Land is located)
PCT 266 Woodland (poor)		Grassy Woodlands	Western Slopes Grassy Woodlands	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Yes	

11.2 Species Credits

Table 41. Species credit class and matching credit profile

Species credit	Attributes shared with matching credits			
	Kingdom	BC Act status	EPBC Act status	IBRA region
Squirrel Glider	Animalia	V	-	Orange
Superb Parrot	Animalia	V	V	Orange

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